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ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
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ВЕСТНИК

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

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

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

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TEMPERATURE AND PRECIPITATION TREND IN THE ARAL SEA AND ARAL SEA REGION DURING 1960-2016

Abstract. Climate change in the Aral Sea and Pre-Aral region is a complex combination of global, regional, and local processes of varying spatial and temporal scales. Investigating data on temperature and precipitation in the Aral Sea and Pre-Aral region during 1960-2016, we analyzed trends using the Mann-Kendall criterion (MK). Our results showed that the maximum temperature rises by ($P < 0.001$) and at a speed of 1.5 ° C/decade, and the minimum temperature also rises with each decade at a speed of 6.2 °C. The Mann-Kendall static test showed that the trend of average temperatures increases by ($P < 0.001$) and at a speed of 3.2 °C/decade. Annual precipitation showed a significant upward trend ($P < 0.001$) at a rate of 0.8 mm/decade. The correlation between air temperature and precipitation was $R = 0.265$. It is assumed that the results of this study will contribute to a deeper understanding of climate change in the Aral Sea and Pre-Aral region.

Keywords: Climate Change**,** Aral Sea, Pre-Aral region, Mann-Kendal Test.

Introduction. Climate change is a long-term problem that is likely to cause extreme temperatures, floods, droughts, intense tropical cyclones and rising sea levels.

Climate change has become the greatest danger of the 21st century. Climate change manifests itself in the form of irregularities and disturbances in the climate cycle as a result of an increase in the temperature of the Earth due to global warming. Under global warming, climate change has a significant impact on the environment, water resources, industrial production, agricultural activities, and people's lives, but it is especially intense in dry regions. Although scientific observations and studies indicate a worldwide increase in average air temperature[1-2], meteorological observations confirm that between two 30-year control periods of 1942-1972 and 1973-2003, surface temperatures in Central Asia increased by 0, 65 °C.

The serious effects of climate change have already begun to manifest, and the latest example of this is that 2016 has overtaken 2015; It was the warmest year in history. According to the analysis of the World Meteorological Organization (WMO) of the United Nations Climate Agency, the average global temperature in 2016 was 1.1 degrees Celsius above the previous period.

The impact of climate change on water resources is particularly noticeable in Central Asia. In this region, the Aral Sea has historically played an important role in mitigating the cold northerly winds in the fall and winter, reducing the air temperature in the summer. Since the drying up of the Aral Sea, the summer was dry and hot, and in the winter it was cold and long.

In the northern desert part of Central Asia, within Uzbekistan and Kazakhstan, the Aral Sea is located, which until 1960 covered an area of 68 ths.km^2 with a volume of 1000 km^3 of water [3-5]. In these dimensions, the Aral Sea ranked second in the world among the inland mainless lakes after the Caspian Sea [6].

Since the early 1960s, increasing anthropogenic impacts, i.e. The intensive development of irrigation construction has contributed, ultimately, to the emergence of the Aral Sea problem [7].

The subsequent intensive process of reducing the horizon of the sea began, which entailed a change in the hydrological, hydrochemical and hydrobiological regimes of both the Aral Sea itself and the change of the situation in its adjacent territory, in the lower reaches of the Amudarya and Syrdarya rivers. Due to the reduction in river flow inflow by the end of this period (1987), the sea level dropped to 40.19 m abs. BS. Due to the structure of its basin, the Aral began to disintegrate into separate residual reservoirs. The process of separation of the Big Sea from the Small in 1988 began, due to high water flow, the bridge between the Big and Small Aral disappeared, and in subsequent years a dried sea bottom appeared again between them [8, 9].

Despite the presence of observational, meteorological stations on the territory of the Aral Sea region, it is not possible to demonstrate the exact limits of the influence of the sea on the surrounding territory. According to many authors, the general picture of the zone of influence of the sea, both in the multiyear period and during its distribution within the year, was based not on the studied and actual experimental data, but on abstract intuitive reasoning. There is no consensus about the zone of distribution of the moisturizing effect of the sea and its influence on climate change over a period of many years [10].

According to the United Nations Environment Program (UNEP), in recent decades there has been an increase in surface air temperature of about 0.6 °C, in mountainous regions - by 1.6 °C. For natural reasons, the melting of glaciers in Central Asia is pollution. dust (per year on the glaciers accumulates up to 20 g/m^2 of dust), which is carried by dust storms from Iran, Afghanistan, China and other desert areas, and in recent years - from the arid region of the Aral Sea.

Climatology suggests that climate change impacts are measured relative to baseline and expressed as changes in temperature and precipitation. To determine the direction of climate change impact on ecosystems, it is necessary to identify the main long-term trends of meteorological characteristics (temperature and precipitation) that are most important for ecosystems, as well as their joint effect. Long-term fluctuations in air temperature are due to fluctuations in evaporation from the earth's surface and, therefore, can lead to an increase or decrease in humidity in the region.

Many scientists, such as [11, 12], have been studying climate change in the Aral Sea and the Pre-Aral region.

The purpose of this study is to analyze the perennial climate change in the Aral Sea and Pre-Aral region.

Study area. The Aral Sea is located within Uzbekistan and Kazakhstan in the northern part of Central Asia (figure 1) (table 1) [13, 14].

The Aral Sea in the west is bounded by steep slopes of the vast Ustyurt Plateau extending to the Caspian Sea, rising 100–200 m above the Aral level. In the south, there is a flat expanse of the modern and ancient Amudarya delta, southward passing into the dune sandy massifs of the Zanghuz Karakum. In the east it borders with Kyzylkumy - a desert plain with a general bias towards the sea. In the north and northwest, the coastline of the water area is bounded by the sand dunes of the Mugodzhar foothills [15, 16].

Since the 1960s, the sea level (and the volume of water in it) began to decline rapidly [17], including as a result of drawing water from the main feeding rivers of the Amudarya and Syrdarya with the purpose of irrigation, in 1989 the sea broke up into two isolated reservoirs - the Northern (Small) and the Southern (Large) Aral Sea [18].

Continentality and aridity are the main features of the local climate fluctuations. In the northern parts of the region the climate is continental. in the south - subtropical. Average annual amplitudes of air temperature reach 33-36 °C [19].

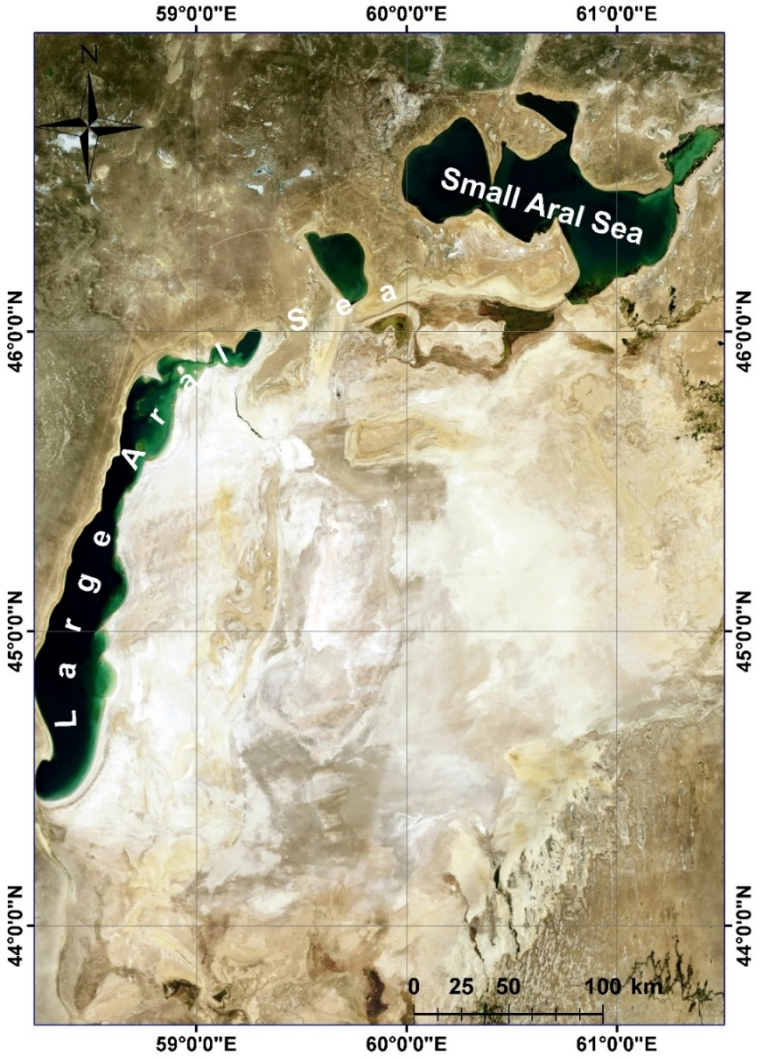

Figure1 – Map of the Aral Sea region

Table 1 – Morphological characteristics of the Aral Sea

	Water surface area, ths.km^2	Water level, m	Water volume, km^3
Large Aral	4,23	26,5	11,6
Small Aral	3,43	43	23,3

Hot long summer, the average July air temperature is 26-33 °C. In winter, cold air masses penetrate here, reducing the overall temperature level. In the northern deserts, the average January temperature is 10–15 °C, in the south in some places it is above 0 °C. Annual precipitation is 20-120 mm [20].

Data collection and Methodology. Data on air temperature and precipitation in the Aral Sea and Pre-Aral region were taken by Climatic Research Unit [21].

Regression to evaluate hydro-meteorological relationships. In this study, regression was used to evaluate climate change in the characteristics of annual mean temperature and total precipitation time series. The linear regression equation for estimating meteorological-hydrological parameters was developed as [22].

$$y = \beta_1 t + \beta_0 \quad (1)$$

where y is temperature (degree Celsius), precipitation (millimeter) or runoff (10^8 m^3), β_1 and β_0 are regressionslope and intercept, respectively, and t is time (year).

Mann-Kendalltest. The Mann-Kendall rank statistics test is an effective method for testing monotonic trends and abrupt time series changes [23-24]. This paper used the Mann-Kendall monotonic trend test [25-26], the nonparametric test, and the abrupt change test method to analyze change trends and possible transition points for temperature and precipitation in the Aral Sea and Pre-Aral region.

In this method, HO represents distribution of random variables and $H1$ represents possibility of bidirectional changes. The test statistic S is given by

$$S = \sum_{i=1}^{n-1} \sum_{k=i+1}^{n} sgn(x_k - x_i) \tag{2}$$

In which x_k and x_j arethesequentialdatavalues,$n$isthelength of the data set, and

$$sgn(\theta) = \begin{cases} +1, \theta > 0 \\ 0, \ \theta = 0 \\ -1, \theta < 0 \end{cases} \tag{3}$$

In particular, if the sample size is larger than 10, the statistic S is nearly normally distributed, i.e., the statistic

$$Z_c = \begin{cases} \dfrac{S-1}{\sqrt{var(S)}}, S > 0, \\ S = 0, \\ \dfrac{S+1}{\sqrt{Var(S)}}, S < 0; \end{cases} \tag{4}$$

is a standard normal random variable, whose expectation value and variance are

$$E(S) = 0 \tag{5}$$

$$\mathrm{var(S)} = \left[n(n-1)(2n+5) - \sum_t t(t-1)(2t+5)\right]/18 \tag{6}$$

in which t denotes the extent of any given tie and Σ denotes the summation over all ties.

Results and Discussion. *Temperature trends.* The Aral Sea and Pre-Aral region occupies the extreme northern position in the zone of continental subtropical climate. This area receives a large amount of solar heat, on average for the year the total radiation here is 5860 MJ/m^2 [27].

The formation of the temperature regime at the stations of the Aral Sea largely depends on the impact of the water basin in a narrow coastal strip, as the air temperature changes from the water body into the depths of the land, being affected by the influence of the continent.

The average annual air temperature in the Aral Sea and Pre-Aral region, as in the multiyear plan, as in some periods, varies in latitude, decreasing from south to north. As the distance from the reservoir into the depths of land increases, the temperature increases. There is a slight fluctuation in air temperature of the Aral Sea for period 1960-2016.

In figure 2 shows the annual maximum, minimum and average temperature fluctuations in different periods using the moving average method for 5 years. The results suggest differences in the inter-decade variations, which may be due to the unique geographical location and climatic conditions of the landscapes being studied.

Since the analysis of moving averages shows that the entire region had relatively changes. As a result of the analyzed data, we can observe that the indicator of maximum temperatures for the first decade of 1960-1969. averaged 14.6 °C per year, and the minimum was 2.9 °C, and the average was 8.7 °C.

For the second decade (1970-1979), the minimum and average air temperature in the Aral Sea region. rises steadily, and the maximum temperature is slightly wary. In the following decade (1980–1989, 1990–1999, and 2000–2009), there is a slight fluctuation in the mean and maximum air temperatures, and the minimum temperature rises steadily over these decades. In the last period (2010-2016), the minimum temperature in the Aral Sea and Pre-Aral region decreases, and the maximum and average temperatures change little.

Over the entire period, we can observe that in the Aral Sea and Pre-Aral region the temperature rises slightly (figure 2).

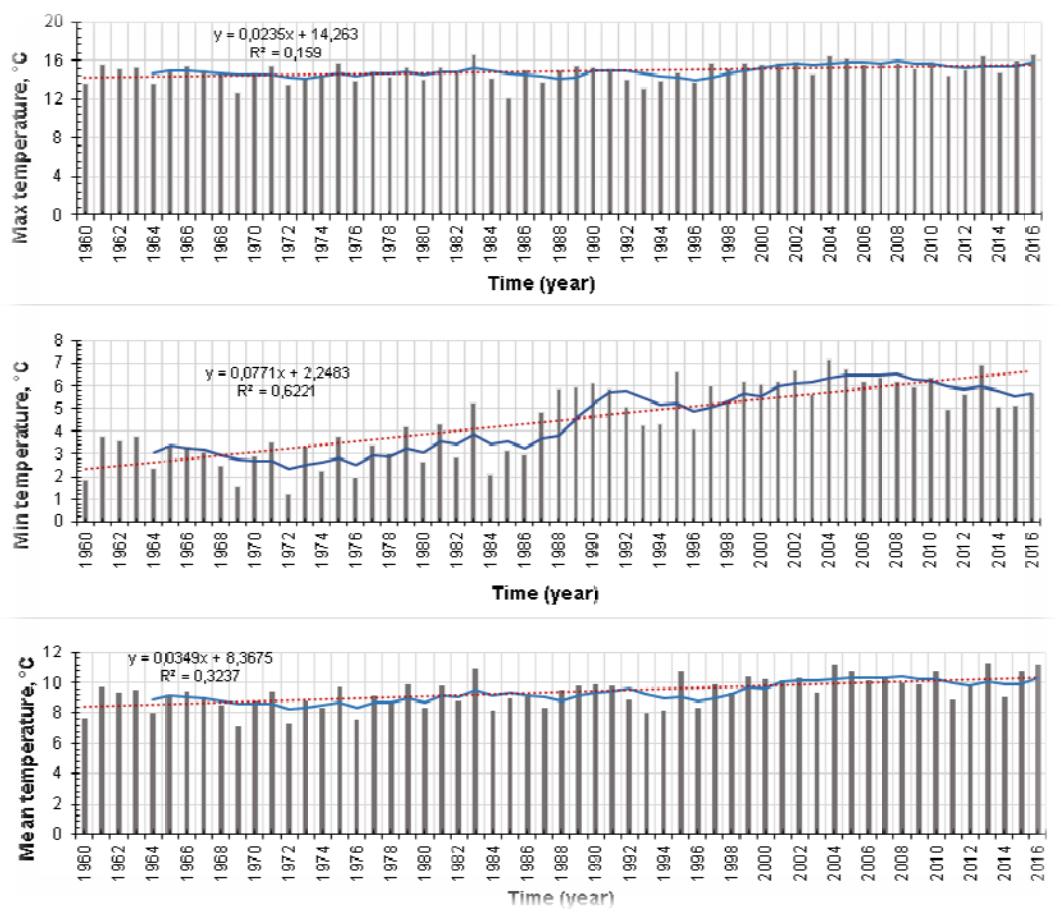

Figure 2 –The trends of the annual max, min and mean temperature in the Aral Sea and Pre-Aral region for the period 1960-2016 (red color implies a linear fit; blue color implies a fit of a 5-year moving average)

Using statistical tests of the Mann-Kendall slope, such fluctuation of indicators showed that during 1960–2016 in the Aral Sea and Pre-Aral region there was a significant tendency to increase the average annual maximum, minimum and average temperatures ($P < 0.001$) at a rate of mean temperature (3.2 °C/decade), min temperature (6.2° C/decade), max temperature (1.5 °C/decade).

Temperature variations in different periods. If we consider the temperature in terms of seasonal indicators, then as can be seen from the data in the winter months, there is a significant increase in temperature (figure 3). The maximum temperature varies little by area. In winter, it averages -3. -4 °C, and in the summer 29-30 ºC (figure 3).

The average minimum temperature gives an approximate temperature profile at night. If you look at the trend of the minimum temperature, you can see that the trend is rising. In winter, it averages -9, -10 ºC, and in the summer 19-21 ºC (figure 3). And the average temperature in the Aral Sea and Pre-Aral region varies little.

The long-term distribution of average air temperature showed only positive reliable trends.

Precipitation trends. The Aral Sea region belongs to a zone slightly moistened with precipitation, where an average of about 90-130 mm of precipitation falls annually, with the maximum amount observed during the cold season.

If we consider the precipitation divided by a decade. In the first decade for the period 1960-1969. The average long-term annual layer of precipitation falling on the water area of the region was equal to 125 mm per year (figure 4).

In the subsequent decade (1970–1979), the average rainfall was slightly lower – 103.4 mm on average per year. In the third (1980–1989) decade, the average long-term annual precipitation layer averaged 150 mm per year. In the fourth (1990–1999) and fifth decade (2000–2009) precipitation

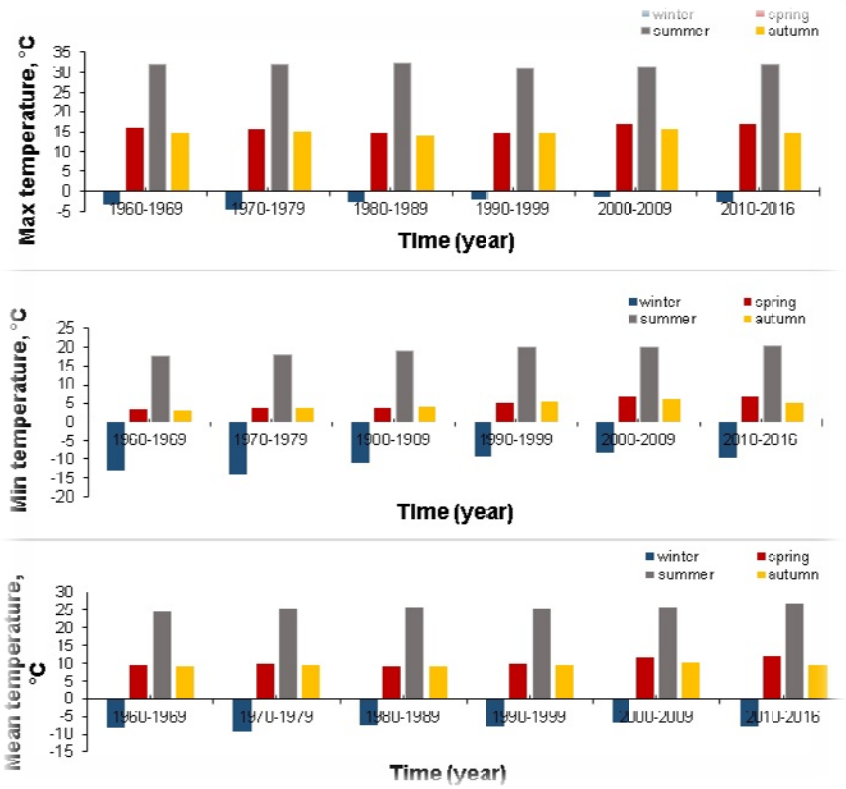

Figure 3 – Seasonal maximum, minimum and average air temperatures in the Aral Sea and Pre-Aral region

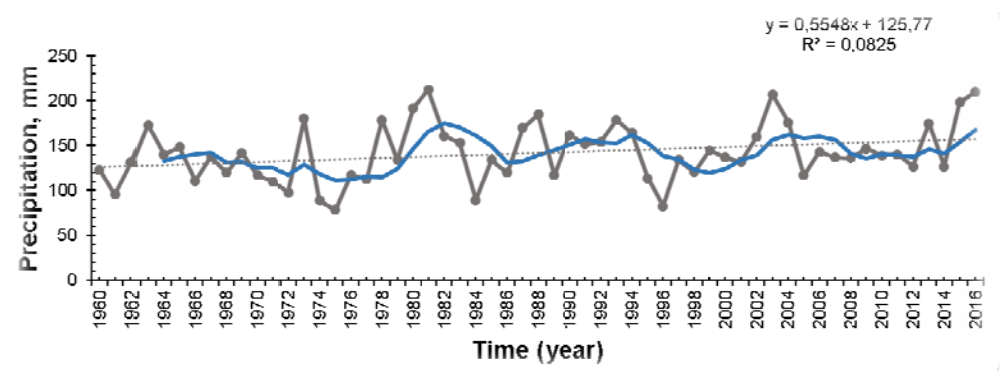

Figure 4 – The trends of the annual precipitation in the Aral Sea and Pre-Aral region for the period 1960-2016 (red color implies a linear fit; blue color implies a fit of a 5-year moving average)

difference in the Aral Sea region was 9 mm. In the last period (2010-2016), precipitation averaged 154 mm per year.

In general, for the years 1960-2016. the average long-term annual precipitation in the sea region averaged 133 mm. Over the entire period, the maximum amount of precipitation was observed in 1981 (235 mm), and the minimum in 1984 (75 mm) (figure 4).

Comparison of precipitation in different 10 years showed that the most significant differences exist between periods.

The correlation between temperature and precipitation in the Aral Sea and Pre-Aral region was R = 0.26 (figure 5).

The Mann-Kendal static test showed that 1960-2016 precipitation in the Aral Sea and Pre-Aral region is increasing ($P < 0.001$) and at a speed of 0.8 mm/decade.

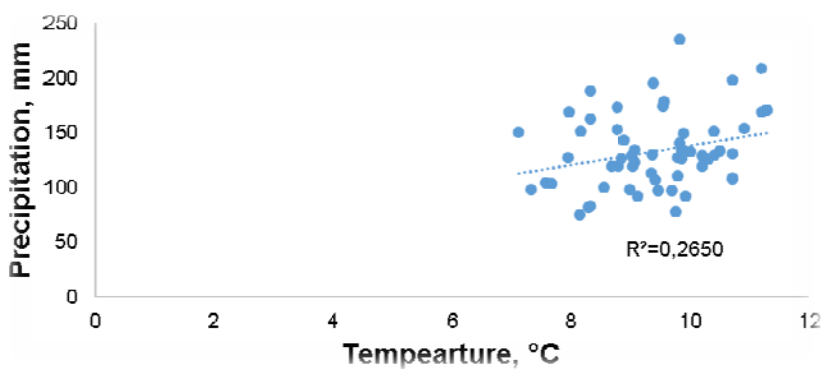

Figure5 –Correlation between temperature and precipitation

Precipitation variations in different periods. In the long-term aspect of the distribution of seasonal rainfall, significant reliable trends have been recorded.

In the second decade (1970-1979), precipitation in the Aral Sea and Pre-Aral region increased sharply during the winter months, in which it averaged 45.6 mm. The reason for this is in these decades, the air temperature was also maximum, and the remaining decades in the winter months the precipitation gradually increases.

Thus, the analyzed data in the Aral Sea and Pre-Aral region revealed significant reliable trends for different periods of the long-term distribution of total precipitation (annual and seasonal), all positive (no negative trends). This significant increase in annual rainfall is due to the cold half of the year and partly due to the warm half of the year, which is due to their main seasonal increase in winter and an increase in half in size in autumn and spring.

Here, the maximum increase in precipitation is undoubtedly observed in the cold half of the year and in the winter season, which increases their share per year (figure 6).

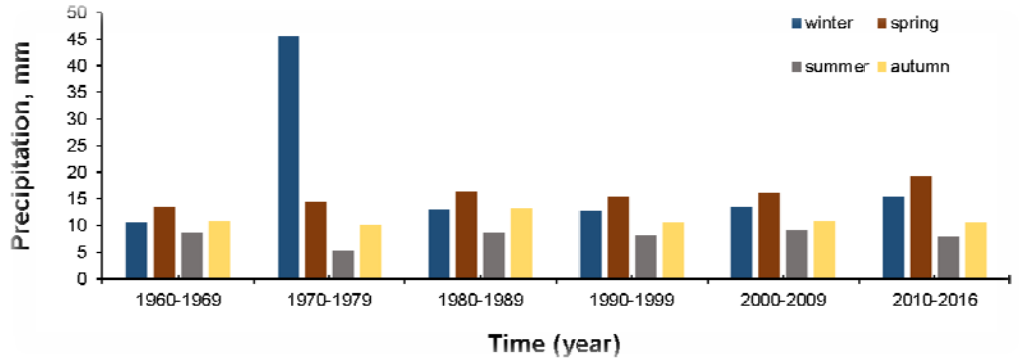

Figure 6 – Seasonal Precipitation in the Aral Sea and Pre-Aral region

Potential causes of climate change in the Aral Sea and Pre-Aral region. It is known that from 1963-1965. The process of lowering the sea level began, it corresponds to the period of creating specialized rice farms in the lower reaches of the Amudarya River. At the same time, an artificial water surface in the lower reaches of the Amudarya River with an area of about 100 thousand hectares was created in the irrigation contour, which led to significant local climate mitigation. In the irrigation zone, in general, irrigated land areas increased, which led to a widespread increase in air humidity. Of course, in the zone of active influence of the sea within a radius of 70-100 km from the water's edge, a noticeable change in climate occurs it becomes sharply continental, but in the irrigated land zone as a result of the development of large tracts of desert land, there is some climate mitigation, which is of a local nature [10].

On the one hand, the reduction of the Aral Sea area leads to an increase in temperature in this region, and on the other, the expansion of irrigated land areas leads to a decrease in air temperature.

Climate, land use and hydrology are interconnected in complex ways. Any change in one of these systems causes a change in the other. For example, changes in the hydrological and vegetation cover in the basin caused changes in temperature patterns and a decrease in precipitation, when local boundary conditions dominate the large-scale circulation. On the other hand, global and regional climate change influences hydrological processes with respect to mean conditions and variability, as well as land use options. Water use is affected by climate change, and, more importantly, by changes in population, life, economics and technology; in particular, the demand for food that is being irrigated is the largest water sector globally. Significant changes in water use or the hydrological cycle (affecting water supply and water supply) require adaptation in water management [12].

Climate changes in the Aral Sea basin are a complex combination of global, regional and local processes of variable spatial and temporal scales. They are due to multiple interrelated factors, such as changes in the atmospheric circulation associated with global warming, regional hydrological changes caused by multi-glacial melting and massive passaging, land use, and hydrological, biogeochemical and meso-and microclimatic changes in the Aral Sea and its rapid expansion of the open dry bottom [12].

Recent climatic trends and variability in Central Asia tend to be characterized by an increase in surface air temperature, which is more pronounced in winter than in summer. The series of meteorological data available in the Aral Sea basin from the end of the nineteenth century show a steady increase in annual and winter temperatures in this region. Climate data studies [28-30]point to a steady warming trend of 1-2 °C per century throughout the region.

Degradation of the Aral Sea has led to significant changes in surface albedo, soil temperature and humidity, evapotranspiration, cloudiness, precipitation, wind speed and direction, atmospheric transparency and many other mesoclimatic parameters in the immediate vicinity of the sea [31-33].

Climate records from around the sea show dramatic changes in temperature and precipitation since the 1960s. The average, maximum and minimum temperatures near the Aral Sea changed by 8 °C, increasing both seasonal and daily amplitudes, as the lake effect decreased [31].

Conclusion. In this paper, we studied climate change trends in the Aral Sea and Pre-Aral region over the past 57 years, and the results have contributed to deepening our understanding of climate change in the region. The results will facilitate and inform future planning and management of climate change programs in the Aral Sea and Pre-Aral region, especially against the backdrop of global warming.

During 1960–2016, maximum temperatures experienced a marked increase at a rate of 1.5 mm/decade ((P <0.001), and minimum temperatures ((P <0.001) at a speed of 6.2 mm/decade and average temperature ((P <0.001), at a rate of 3.2 mm/decade. This figure corresponds to the rate of temperature increase in Central Asia. In general, temperatures showed weak variability.

During the same 57-year period, annual precipitation observed a significant upward trend (P <0.001) at a rate of 0.8 mm/decade. The correlation between precipitation and air temperature was R = 0.26.

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1960-2016 ЖЖ. АРАЛ ТЕҢІЗІ МЕН АРАЛ АЙМАҒЫНДАҒЫ ТЕМПЕРАТУРА МЕН ЖАУЫН-ШАШЫННЫҢ ҮРДІСІ

Аннотация. Арал теңізі және Арал аймағындағы климаттың өзгеруі жаһандық, аймақтық және жергілікті кеңістіктік және уақытша ауқымды процестердің күрделі үйлесуі болып табылады. 1960-2016 жж. Бұл мақалада Арал теңізімен Арал аймағындағы температура мен жауын-шашын туралы мәліметтер зерттеліп, Mann-Kendall критерийі (МК) арқылы үрдістер талданды. Зерттеу нәтижелері бойынша максималды температура (P<0.001) және 1,5 °C/онжылдықта көтеріліп, минималды температура да әрбір онжылдықта 6,2 °C жылдамдықпен көтерілгенін көрсетті. Манн-Кендал статикалық сынағы көрсеткендей, орташа температура үрдісі (P<0.001) және 3.2 °C/онжылдықта жылдамдығымен артты. Жылдық жауын-шашын 0,8 мм/ он жылдық жылдамдықпен айтарлықтай көтерілу үрдісін көрсетті (P <0.001). Ауа температурасы мен жауын-шашынның ара-қатынасы R = 0,265 тең. Зерттеу нәтижелері Арал теңізі мен Арал аймағындағы климаттың өзгеруін тереңірек түсінуге мүмкіндік береді.

Түйінді сөздер: климаттың өзгеруі, Арал теңізі, Арал аймағы, Манн-Кендаль сынағы.

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ТЕНДЕНЦИЯ ТЕМПЕРАТУРЫ И ОСАДКОВ АРАЛЬСКОГО МОРЯ И ПРИАРАЛЬЯ ЗА ПЕРИОД 1960–2016 ГГ.

Аннотация. Климатические изменения в регионе Аральского моря и Приаралья представляет собой сложную комбинацию глобальных, региональных и локальных процессов различного пространственного и временного масштаба. Исследуя данные о температуре и осадках Аральского моря и Приаралья за период 1960–2016 гг., были проанализированы тренды, используя критерий Манна-Кендалла (МК). Результаты исследования показали, что максимальная температура повышается на (P<0,001) и со скоростью 1,5 °C/десятилетие, а минимальная температура также повышается с каждым десятилетием со скоростью 6,2 °C. Статический тест Манна-Кендалла показал, что тенденция средних температур увеличивается на (P<0,001) и со скоростью 3,2 °C/десятилетие. Годовое количество осадков показало значительную тенденцию к росту (P <0,001) со скоростью 0,8 мм/десятилетие. Корреляция между температурой воздуха и осадками составила R = 0,265. Результаты этого исследования будут способствовать углублению понимания климатических изменений в регионе Аральского моря и Приаралья.

Ключевые слова:изменение климата, Аральское море, Приаралье, тест Манна-Кендала

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REFERENCES

[1] IPCC. The Intergovernmental Panel on Climate Change. Retrieved from https://www.ipcc.ch/. **2019**.

[2] Allen, M., Antwi-Agyei, P., Aragon-Durand, F., Babiker, M., Bertoldi, P., Bind, M., … Cartwright, A. Technical Summary: Global warming of 1.5 °C. An IPCC Special Report on the impacts of global warming of 1.5° C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.**2019**.

[3] Micklin P. The Aral Sea crisis. In *Dying and Dead Seas Climatic Versus Anthropic Causes* (pp. 99–123). Springer. https://doi.org/10.1007/978-94-007-0967-6_5. **2004**.

[4] Glanz, M. X., & Zonn, I. S.. Aral Sea: Consequences of Environmental Degradation in Central Asia. *Problems of the Post-Soviet Space*, (2), 141–156 (In Russian)**2014**.

[5] Zavyalov, P. A., Arashkevich, A., Bastide, Y., & Sapojnykov, F. Great Aral Sea at the beginning of the XXI century: physics, biology, chemistry. M.: Nauka (In Russian).**2012**.

[6] Kipshakbaev, N., Duhovny, V. A., & Malkovsky, I. M. Restoration of the ecological system in the delta of the Syr Darya and the northern part of the Aral Sea. *Almaty: "EVERO*, (In Russian).**2010**.

[7] Micklin, F., Aladin, N., Plotnikov, Y., & Yermakhanov, Z. Possible the future of the Aral Sea residual water bodies fauna. *Proceedings of the Zoological Institute RAS*, *320*(2), 221–244 (In Russian).**2016**.

[8] Aladin, N. V, & Plotnikov, I. S. Modern fauna of residual water bodies formed on the place of the former Aral Sea. In *Proc. Zool. Inst. RAS* (Vol. 312, pp. 145–154).**2008**.

[9] Zavialov, P. O., Kostianoy, A. G., Emelianov, S. V, Ni, A. A., Ishniyazov, D., Khan, V. M., & Kudyshkin, T. V. Hydrographic survey in the dying Aral Sea. *Geophysical Research Letters*, *30*(13). https://doi.org/10.1029/2003GL017427. **2003**.

[10] Kurbanbayev, E., Artykov, O., & Kurbanbayev, S. The Aral Sea and water policy in the Central Asian republics. *The Article Is Showed the Complex of Actions for Preservation of a Biodiversity of Amudarya Delta a Way of Their Decision by Consortium Erection Is Stated. Figure*, *1*, (In Russian).**2011**.

[11] Kuzmina, Z. V, & Treshkin, S. E. Climate Changes in the Aral Sea Region and Central Asia. *Arid Ecosystems*, *6*(4), 227–240.**2016**.

[12] Lioubimtseva, E. Impact of climate change on the Aral Sea and its Basin. In *The Aral Sea*, pp. 405–427. Springer.**2014**.

[13] Duhovnny, V. A. (Ed.). *Aral sea and Aral sea region*. Tashkent (In Russian).**2015**.

[14] Dimeeva, L. Mapping the dynamics of the vegetation of the dried bottom of the Aral Sea. *Bulletin of NAS RK*, (5), 81–84 (In Russian).**2010**.

[15] Mustafayev, Z. S., & Kozykeeva, A. T. Aral Sea basin: past, present and future. Taraz (In Russian).**(2012).**

[16]Micklin, P. Introduction to the Aral Sea and its region. In *The Aral Sea*. Springer.pp. 15–40. **2014**.

[17] Philip, M., Aladin, N. V., Plotnikov, I. S., Smurov, A. O., Zhakova, L. V., Gontar, V. I., & Yermakhanov, S. Possible future of the Aral Sea and its fauna. *Astrakhan Bulletin of Environmental Education*, (2 (36) (In Russian)).**2016**.

[18] Micklin, P. P. Desiccation of the Aral Sea: a water management disaster in the Soviet Union. *Science*, *241*(4870), 1170–1176. https://doi.org/10.1126/science.241.4870.1170. **1988.**

[19] GWD. Global Weather data for SWAT. Retrieved January 10, 2018, from https://globalweather.tamu.edu. **2018**.

[20] Karlykhanov, T., Ibatullin, S., Karlykhanov, O., & Daldabaeva, G. T. *Aral: past, present, future*. Astana (In Russian).**2016**.

[21] CRU. CRU TS database. Retrieved June 15, 2018, from http://wps-web1.ceda.ac.uk/submit/form?proc_id=Subsetter. **2018**.

[22] Yao, J., & Chen, Y. Trend analysis of temperature and precipitation in the Syr Darya Basin in Central Asia. *Theoretical and Applied Climatology*, *120*(3–4), 521–531.**2015**.

[23] Kadioğlu, M. Trends in surface air temperature data over Turkey. *International Journal of Climatology*, *17*(5), 511–520.**1997**.

[24] Smadi, M. M., & Zghoul, A. A sudden change in rainfall characteristics in Amman, Jordan during the mid 1950s. *American Journal of Environmental Sciences*, *2*(3), 84–91.**2006**.

[25] Yue, S., Pilon, P., & Cavadias, G. Power of the Mann–Kendall and Spearman's rho tests for detecting monotonic trends in hydrological series. *Journal of Hydrology*, *259*(1–4), 254–271.**2002**.

[26] HongBo, L., HaiLiang, X. U., JinYi, F. U., & XinHua, L. I. U. Surface runoff processes and sustainable utilization of water resources in Manas River Basin, Xinjiang, China,*4*(3), 271–280.**2012**.

[27] Zhytomyr, O. *Climatic description of the Aral Sea region*. (In Russian). **1984**.

[28] Chub, V. Climate change and its impact on the natural resources potential of the Republic of Uzbekistan. *Gimet, Tashkent (In Russian)*.**2000**.

[29] Lioubimtseva, E., & Henebry, G. M. Climate and environmental change in arid Central Asia: Impacts, vulnerability, and adaptations. *Journal of Arid Environments*, *73*(11), 963–977.**2009**.

[30] Lioubimtseva, E., Cole, R., Adams, J. M., & Kapustin, G. Impacts of climate and land-cover changes in arid lands of Central Asia. *Journal of Arid Environments*, *62*(2), 285–308.**2005**.

[31] Small, E. E., Giorgi, F., Sloan, L. C., & Hostetler, S. The effects of desiccation and climatic change on the hydrology of the Aral Sea. *Journal of Climate*, *14*(3), 300–322.**2001**.

[32] Micklin, P. The Aral sea disaster. *Annu. Rev. Earth Planet. Sci.*, *35*, 47–72. https://doi.org/10.1146/annurev.earth.35.031306.140120. **2007**.

[33] Shibuo, Y., Jarsjö, J., & Destouni, G. Hydrological responses to climate change and irrigation in the Aral Sea drainage basin. *Geophysical Research Letters*, *34*(21). https://doi.org/10.1029/2007GL031465. **2007**.

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INFANTILE CEREBRAL PALSY DEVELOPMENT FACTORS (LITERATURE REVIEW)

Abstract. The term Infantile Cerebral Palsy refers to complex of chronic neurological disorders that occur during perinatal period because of brain damage. Brain damage can occur in both ante-, intra- and postnatal periods. There are variety of reasons and it is impossible to specify the main one. Damage often occurs before birth, antenatal, during the first 6 months of pregnancy. There are at least three reasons for this: Periventricular leukomalacia (PVL). PVL is a type of lesion that affects alba due to lack of oxygen in the uterus. Abnormal brain development. The lesion may be due to mutations in genes responsible for brain development, some infections, such as toxoplasmosis, parasitic infection, herpes and herpes-like viruses and head trauma. There may be intracranial haemorrhage, when the foetus has a stroke. Haemorrhage may stop blood flow into the vital tissue of the brain, which may cause tissue injury or necrosis. Blood may thicken and damage surrounding tissue. According to various data, intrapartum lesions, such as birth asphyxia or birth trauma, account for up to 42%. In the postnatal period, brain lesion factors with development of cerebral palsy are usually considered infectious, less traumatic ones, but some works mention the hereditary component. Nevertheless, to date, the aetiology of this disease has not been fully studied and it is not clear which pathogenic factors and what conditions lead to cerebral palsy. Therefore, we can state only the multi-aetiology of cerebral palsy and need for greater attention to the study of both biological and environmental factors that have an impact on foetus and new-born.

Key words: cerebral palsy, antenatal, intrapartum, postnatal period, periventricular leukomalacia, cerebral accident, hereditary factor.

The term "cerebral palsy" unites a group of different clinical manifestations of syndromes that arise as a result of underdevelopment of the brain and its damage at various stages of ontogenesis and are characterized by the inability to maintain a normal posture and perform arbitrary movements [1]. The definition of cerebral palsy excludes progressive hereditary diseases of the nervous system, including various metabolic defects, lesions of the spinal cord and peripheral nerves [2]. Cerebral palsy is the most common cause of disability in children, affecting approximately two out of every thousand live births. The term "cerebral palsy" refers to a complex of chronic neurological disorders that occur in the perinatal period due to brain damage [3]. At present, it is clear that the term "cerebral palsy" does not reflect the diversity and essence of the neurological disorders present in this disease, but it is widely used in the world literature, since another term that comprehensively characterizes these pathological conditions has not been proposed to date. The merging of a number of neurological simptomocomplexes in nosological group allows to adequately plan the organizational actions directed on early diagnostics and treatment of cerebral palsy on the basis of high medical and social importance of the problem [4].

Population-epidemiological studies show that in industrialized countries, the frequency of cerebral palsy is 2-2.5 cases per 1000 of population [2-4]. So, in the United States, cerebral palsy affects about 764 000 [5]. Data on the prevalence of cerebral palsy change with the development of medical science. Some authors [6] note in recent years the tendency to reduce the incidence of cerebral palsy by improving obstetric techniques, prevention and treatment. Others, on the contrary, believe that for a number of years the frequency of cerebral palsy in industrialized countries remains stable [7, 8], which is probably due to

the defeat of the nervous system mainly not during childbirth, but in the prenatal period. However, the majority of authors claim that the disease began to meet much more often [9-12] and explain this reduced mortality among preterm and newborn infants with low body weight who have risk of developing cerebral palsy is highly significant.In the Republic of Kazakhstan there is no clear account of children with cerebral palsy, not clarified the reasons specific to the region. There are many different opinions about the etiology of cerebral palsy, and the disease is considered as polyetiological. Analysis of the causes leading to cerebral palsy showed that in most cases it is not possible to identify one of them, as often there is a combination of several adverse factors in both pregnancy and childbirth [2]. However, there is a popular opinion that the causes of cerebral palsy often lie in the intra-natal period, that is, associated with birth trauma, but the literature and scientific data say the opposite. The ratio of prenatal and perinatal factors of brain damage in cerebral palsy, according to various authors, varies: prenatal forms of cerebral palsy vary from 35 to 60%, intranatal - from 27 to 54%, postnatal-from 6 to 25% [2, 13, 14]. According to a number of authors [14-16], in 80% of observations the brain damage causing cerebral palsy occurs in the period of fetal development, and subsequently intrauterine pathology is aggravated by intrauterine. However, in every third case, the cause of cerebral palsy cannot be determined [17-19].

Most often, the damage occurs before birth, that is, antenatal, during the first 6 months of pregnancy. There are at least three reasons for this.

1. Periventricular leukomalacia (PVL) PVL - it is a type of damage that affects the white matter of the brain due to lack of oxygen in the uterus. This can happen if the mother has an infection during pregnancy, such as rubella or measles, low blood pressure, premature birth, or if she is taking a drug.

2. Abnormal development of the brain. The impaired development of the brain can affect how the brain communicates with the muscles of the body and other functions. During the first 6 months of pregnancy, the brain of the embryo or fetus is particularly vulnerable. Damage may be due to mutations in the genes responsible for brain development, some infections such as toxoplasmosis, parasitic infection, herpes and herpes-like viruses, and head injury.

3. Intracranial hemorrhage. Sometimes intracranial brain hemorrhage occurs when the fetus has a stroke. Bleeding in the brain can stop the flow of blood to vital brain tissue, and this tissue is either damaged or dies. Spilled blood can thicken and damage the surrounding tissue.

Several factors can cause a stroke in the fetus during pregnancy:

- A blood clot in the placenta that blocks blood flow
- Violation of blood clotting in the fetus
- Disorders of delivery of arterial blood to the fetal brain
- Untreated preeclampsia in the mother
- Inflammatory processes of the placenta (chorioamnionitis)
- Inflammatory diseases of the female genital organs

During childbirth, the risk increases due to the following factors:

- An emergency C-section
- Prolonged second stage of labor
- Use of vacuum extraction during childbirth
- Fetal or neonatal heart abnormalities
- Umbilical cord disorders

Anything that increases the risk of preterm birth or low birth weight also increases the risk of cerebral palsy [20].

More than 400 factors affecting the course of normal intrauterine development are described, the cause of cerebral pathology in 70-80% of cases is the effect of a complex of harmful factors on the fetal brain [3]. Intrauterine factors include acute or chronic extragenital diseases of the mother, primarily hypertension, heart disease, anemia, obesity, diabetes and other [1, 3, 11], occurring in cerebral palsy in 40% of cases [8]. Other"maternal" factors of perinatal risk are taking medications during pregnancy (10%) [7], occupational hazards (1-2%) [19, 21], parental alcoholism (4%) [11, 19], stress, psychological discomfort (2-6%) [7, 19], physical injuries during pregnancy (1-3, 88%) [7, 19].In recent years, great importance in the etiology of cerebral palsy is given to the effect on the fetus of various infectious agents, especially viral origin [3, 7, 15, 16, 22]. According to Potasmanet al. [26], in 22% of patients with cerebral palsy (in the control group - in 9%) antibodies to Toxoplasma gondii were found in the blood serum.

A certain role in the occurrence of cerebral palsy is given to violations of the normal course of pregnancy at various stages. There are uterine bleeding, disorders of placental circulation, placental presentation or abruption [3]. Similar complications of pregnancy occurred in 2-13% of cases [17, 19, 24]. According to the study of A. Spiniollo [28], 17.5% of the surviving children born in women whose pregnancy was complicated by premature placental abruption were diagnosed with intraventricular hemorrhage, and 11.1% - cerebral palsy.According to some authors, immunological incompatibility of mother and fetus (ABO-and RH-incompatibility) was the cause of cerebral palsy in 2.0-8.7% of cases [7, 14, 19].

Most of these adverse factors of the prenatal period leads to intrauterine fetal hypoxia and disruption of utero-placental blood circulation. Oxygen deficiency inhibits the synthesis of nucleic acids and proteins, which leads to structural disorders of embryonic development. The development of the embryo in hypoxia may be the main cause of deformities and pathology of fetal development [14].

According to a number of authors, multiple pregnancy has a history in 4% of persons suffering from cerebral palsy [11]. The incidence in situations with multiple pregnancy is 6-7 times higher than in normal pregnancy and is 7.1-8.8 per 1000 newborns [26]. The frequency of cerebral palsy in triplets is 28 per 1,000 live births, and in twins-7.3 per 1,000 live births [27]. In multiple pregnancies, the risk of cerebral palsy for low-weight infants is the same as in low-birth-weight infants born as a result of pregnancy with one fetus, and vice versa, for children with normal body weight from twins, the incidence of cerebral palsy is higher than in children with normal body weight born during normal pregnancy (4.2 per 1000 live births) [28].

Treatment of infertility using reproductive technologies (ART). Most of the increased risk is due to preterm birth or multiple pregnancies, or both; both preterm birth and multiple births are increasing among children born with ART [29].

The intranatal risk factors for cerebral palsy include various complications in childbirth, the frequency of which exceeds 40,2% [7, 11, 19]: these are weakness of contractile activity of the uterus during childbirth (23.6%), rapid labor (4%), caesarean section (11.36%), prolonged labor (24%), a long anhydrous period (5%), breech presentation of the fetus (5-6.25%), a long period of standing of the head in the birth canal (5%), instrumental obstetrics (5-14%). It should be borne in mind that in the presence of disorders of fetal development of the child, childbirth very often has a severe and prolonged course. Thus, conditions are created for the occurrence of mechanical head injury and asphyxia, which are essentially secondary factors that cause additional disorder of the primary affected brain [5, 18].

Childbirth in pelvic presentation of the fetus leads to asphyxia and birth trauma 3 times more often than conventional labor [4], and in 1% of cases leads to cerebral palsy [30]. Cerebral palsy is also correlated with low fetal body weight. Studies have shown that 12.1% of children with low birth weight continue to develop cerebral palsy [30, 32]. Its frequency is 36.7 times higher in children with a body weight of 500 to 1499 g and 11.3 times in children with a body weight of 1500 to 2499 g than in children with a body weight of more than 2500 [31].

H. Scheider [7] believes that only 10% of full-term newborns may have developed cerebral palsy due to birth asphyxia. Cerebral palsy can be predicted only in severe childbirth with asphyxia leading to tissue damage to the brain, in the presence of clinical symptoms detected from the first days of life. However, even in the presence of severe labor asphyxia, the causal relationship with the subsequently developed psychomotor deficiency is not absolutely provable, since brain damage can occur before the birth itself and cause labor asphyxia.

A significant place in the genesis of cerebral palsy is intracranial birth trauma-local damage to the fetus during childbirth as a result of mechanical influences (compression of the brain, crushing and necrosis of the brain substance, tissue tears, bleeding in the membranes and brain substance, violations of dynamic blood circulation of the brain), which can disrupt the further development of the brain and lead to many cerebral symptoms [18]. However, it should be borne in mind that birth trauma often occurs against the background of a previous defect in the development of the fetus, with pathological, and sometimes even physiological childbirth [22]. According to various authors, the incidence of birth trauma in cerebral palsy has decreased over the past few decades from 21.6% [33] to 4-5% [14, 19], what is associated with improved obstetric care.

In the postnatal period, the factors of brain damage with the development of cerebral palsy are usually considered infectious, less traumatic[18, 19, 20]. Some works mention the hereditary component in

their etiology [10, 35]. Genealogical research in the families of patients with dyskinetic (hyperkinetic) form of cerebral palsy, made N. A. Fletcher [12, 13] revealed the presence of relatives of patients with a certain proportion of affected parents and sibs. The author draws attention to the fact that in most patients the disease progressed in adulthood, which suggests the genetic heterogeneity of the disease with autosomal recessive and dominant types of inheritance. It does not exclude the existence of X-linked form, and the late age of the parents in most sporadic cases of the disease suggests dominant gene mutations. The literature describes cases when the clinical manifestations of some hereditary diseases was conducted in the form of the syndrome cerebral palsy: this is the chromosomal aberrations of the type of patau syndrome and partial trisomy of the 18th pair of chromosomes [17], X-linked chromosomal hydrocephalus [32], DORA-dependent dystonia [35].

R. Curatolo [11] studied the combination of cerebral palsy with epilepsy and mental disorders. In the genealogical history of patients with cerebral palsy were surprisingly frequent cases of epilepsy among relatives of the first degree of kinship, which, according to the author, indicates the important role of genetic factors in the development of cerebral palsy.

Of interest is the fact that in cerebral palsy there is a defeat mainly of males [6]. Cerebral palsy in boys occurs 1.3 more often and has a more severe course than in girls [14]. According to N. A. Fletcher [12], three-quarters of cases of moderate and severe tetraplegia in cerebral palsy occur among males and tend to have more severe motor disorders than in women.

Specialists in Pediatrics and neurology from the University of Bergen (Norway) during the first of its kind such a large-scale study revealed a significant genetic component in the complex of causes underlying the development of cerebral palsy. So, if there is a child with cerebral palsy in the family, the risk of having another child with such a violation increases nine times [35].

Thus, the analysis of the literature data on the risk factors of cerebral palsy indicates their diversity. However, to date, the etiology of this disease has not been fully studied and there is no clarity on what pathogenic factors and under what conditions lead to the development of cerebral palsy. Therefore, we can now talk only about some pathogenetic mechanisms of cerebral palsy, as well as the great importance of studying both biological and environmental factors that have an impact on the body of the fetus and newborn.

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БАЛАЛАР ЦЕРЕБРАЛЬДІ САЛАУРУЫНЫҢ ДАМУ ФАКТОРЛАРЫ (ӘДЕБИЕТКЕ ШОЛУ)

Аннотация. Балалар церебральді салауруы термині мидың зақымдануы салдарынан перинаталды кезеңде пайда болатын созылмалы неврологиялық бұзылулар кешенін білдіреді. Бас миының зақымдануы екі антенаталды, интранаталды және постнаталды кезеңдерде де пайда болуы мүмкін. Себептері саналуан болғандықтан ең бастысынан ықтау мүмкін емес. Зақым әдетте туылмай тұрып, яғни антенаталды кезеңде, жүктіліктің алғашқы 6 айының ішінде пайда болады. Бұған кемінде үш себеп бар. Перивентикулярлы лейкомалазия (PVL). PVL – жатырда оттегінің жетіспеуіне байланысты мидың ақ затына әсерететін зақым түрі. Мидың жалпы нормадан ауытқып дамуы. Бұл зақым мидың дамуына жауапты геннің мутацисына, оксоплазмоз, паразиттік инфекция, герпес, герпес тәрізді вирустар және бас жарақаты сияқты инфекцияларға байланысты болуы мүмкін. Бас сүйек ішіне қан құйылу, ұрықтың инсульті. Миға қан құйылу мидың өмірлік маңызды бөлігіне қанның баруын тоқтатады және қан бармайқалған тін зақымдалады немесе өледі. Аққан қан қоюланып, жан жағындағы тінді зақымдауы мүмкін. Түрлі мәліметтерге сәйкес, туабіткен асфиксия немесе туу жарақаты секілді интранаталды зақымдар 42% құрайды. Баланың церебральді сал ауруының дамуына әкелетін босанудан кейінгі факторларға жұқпалы аурулар және сирек жарақат себеп болуы мүмкін, алайда кейбір еңбектерде олардың этиологиясында тұқым қуалаушылық компонент бар екені айтылған. Дегенмен, әлі күнге дейін осы аурудың этиологиясы толық зерттелмеген және БЦСА-ға қандай қоздырғыштар және қандай жағдайлар әкелетіні анық емес. Сондықтан, біз БЦСА этиологиясы бірнеше екенін және ұрықтың

және жаңа туған баланың ағзасына әсер ететін биологиялық және экологиялық факторларды зерттеуге үлкен көңіл бөлу қажеттілігін айтуға болады.

Түйін сөздер: церебральді паралич, антенаталды, интранатлды, постнаталды кезең, перивентрикулярлы лейкомалия, церебральді инсульт, тұқымқуалаушы фактор.

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ФАКТОРЫ РАЗВИТИЯ ДЕТСКОГО ЦЕРЕБРАЛЬНОГО ПАРАЛИЧА (ОБЗОР ЛИТЕРАТУРЫ)

Аннотация. Термин "детский церебральный паралич" (ДЦП) объединяет группу различных по клиническим проявлениям синдромов, которые возникают в результате недоразвития мозга и его повреждения на различных этапах онтогенеза и характеризуются неспособностью сохранять нормальную позу и выполнять произвольные движения [1]. Определение ДЦП исключает прогрессирующие наследственные заболевания нервной системы, в том числе различные метаболические дефекты, поражения спинного мозга и периферических нервов [2]. ДЦП является наиболее распространенной причиной инвалидности у детей, затрагивая приблизительно двух из каждой тысячи рожденных живыми младенцев. Под термином «ДЦП» понимают комплекс хронических неврологических нарушений, возникающих в перинатальный период вследствие поражения головного мозга [3]. В настоящее время ясно, что термин "церебральный паралич" не отражает многообразия и сущности, имеющихся при этом заболевании неврологических нарушений, однако его широко используют в мировой литературе, поскольку другого термина, всесторонне характеризующего эти патологические состояния, до настоящего времени не предложено. Объединение целого ряда неврологических симтомокомплексов в нозологическую группу позволяет адекватно планировать организационные мероприятия, направленные на раннюю диагностику и лечение ДЦП, исходя из высокой как медицинской, так и социальной значимости проблемы [4].

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REFERENCES

[1] Familial risk of cerebral palsy: population based cohort study OPEN ACCESS Mette C. Tollånes postdoctoral fellow, Allen J. Wilcox senior investigator, Rolv T. Lie professor, Dag Moster associate professor. BMJ (Published 15 July 2014).

[2] Cerebral palsy: Symptoms, causes, and treatments Last updated Tue 21 February 2017 By Christian Nordqvist Reviewed by Karen Richardson Gill, MD, FAAP.

[3] Nygaard T.G., Waran S.P., Levine R.A., Naini A.B. Chutorian A.M. // Pediatr.Neural. 1994. Vol. 11. P. 236-240.

[4] Koike T., Minakami H., Sasaki M., Sayama M., Tamada T., Sato I. // Arch. Gynecol. Obstet. 1996. Vol. 258. P. 119-123.

[5] Meberg A., Broch H. // J. Perinat. Med. 1995. Vol. 23. P. 395-402.

[6] Hagberg B., Hagberg G., Olow 1. // Acta. Paediatr. 1993. Vol. 82. P. 387-393.

[7] Schneider H. // Geburtshilfe. Frauenheilkd. 1993. Vol. 53. P. 369-378.

[8] Aziz K., Vickar D.B., Sauve R.S., Etches P.C. Pain K.S., Robertson C.M. // Pediatrics. 1995. Vol. 95. P. 837-844.

[9] Blair E., Stanley F. // Paediatr. Perinat. Epidemiol. 1993. Vol. 7. P. 272-301.

[10] Bowen J.R., Starts D.R., Arnold J.D., Silmmons J.L., Ma P.J., Leslie G.I. // J. Paediatr. Child. Health. 1993. Vol. 29. P. 276-281.

[11] Curatolo P., Arpino C., Stazi M.A., Medda E. // Dev. Med. Child. Neurol. 1995. Vol. 37. P. 776-782.

[12] Fletcher N.A., Foley J. // J. Med.Genet. 1993. Vol. 30. P. 44-46.

[13] Fletcher N.A., Marsden C.D. // Comment in: Dev Med Child Neurol. 1996. Vol. 38. P. 871-872.

[14] Gaffney G., Flavell V., Johnson A., Squier M., Sellers S. // Arch. Dis. Child. Fetal. Neonatal. Ed. 1994. Vol. 70. P. 195-200.

[15] Groholt E.K., Nordhagen R. // Tidsskr. Nor. Laegeforen. 1995. Vol. 115. P. 2095-2099.

[16] Haverkamp F., Kramer A., Fahnenstich H., Zerres K. // Kiln. Padiatr. 1996. Vol. 208. P. 93-96.

[17] Paul A., Hensleigh M.D. // Am. J. obstet. and gunecol. 1986. Vol. 154. P. 978-980.

[18] Jorch G. // Comment in: Zentralbl Gynakol. 1995. Vol. 117. P. 167-168.

[19] Kroner J., Hjelt K., Nielsen J.E., Kardorf U.B., Verder H. // Ugeskr Laeger. 1995. Vol. 157. P. 7155-7156.

[20] Lou H.Cl. // Brain. Dev. 1994. Vol. 16. P. 423-431.

[21] MacGillivray I., Campbell D.M. // Paediatr. Perinat. Epidemiol. 1995. Vol. 9. P. 146-155.

[22] Murphy D.J., Sellers S., MacKenzie I.Z., Yudkin P.L., Johnson A.M. // Lancet. 1995. Vol. 346. P. 1449-1454.

[23] Nakada Y. // Brain. Dev. 1993. Vol. 15. P. 113-118.

[24] Petridou E., Koussouri M., Toupadaki N. Papavassiliou A. // Scand. J. Soc. Med. 1996. Vol. 24. P. 14-26.

[25] Petterson B., Nelson K.B., Watson L., Stanley F. // BMJ. 1993. Vol. 307. P. 1239-1243.

[26] Potasman I., Davidovitch M., Tal Y., Tal J., Zelnik N., Jaffa M. // Clin. Infect. Dis. 1995. Vol. 20. P. 259-262.

[27] Rumeau-Rouguette C. // J. Gynecol. Obstet. Biol. Reprod. Paris, 1996. Vol. 25. P. 119-123.

[28] Spinillo A., Fazzi E. Stronati M., Ometto A., Iasci A., Guaschino S. // Early Hum. Dev. 1993. Vol. 35. P. 45-54.

[29] Suzuki J., Ito M., Tomiwa K. // No. To-Hattatsu. 1996. Vol. 28. P. 60-65.

[30] Uldall P.V., Topp M.W., Madsen M. // Ugeskr. Laeger. 1995. Vol. 157. P. 740-742.

[31] Veelken N., Schopf M., Dammann O., Schulte F.J. // Neuropediatrics. 1993. Vol. 24. P. 74-76.

[32] Yudkin P.L., Johnson A., Clover L.M. // Paediatr. Perinat. Epidemiol. 1995. Vol. 9. P. 156-170.

[33] Yamada K. // No-To-Hattatsu. 1994. Vol. 26. P. 411-417.

[34] Causes and Risk Factors of Cerebral Palsy. References 1. Doyle L.W., Crowther C.A., Middleton P., Marret S. Antenatal magnesium sulfate and neurologic outcome in preterm infants: a systematic review // Obstet Gynecol. 2009 Jun; 113(6): 1327-33.

[35] Magnesium sulfate before anticipated preterm birth for neuroprotection. Committee Opinion No. 455. American College of Obstetricians and Gynecologists. Obstet Gynecol. 2010; 115: 669-71.

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DAIRY PRODUCTIVITY OF THE KAZAKH HORSE MARES AND THEIR CROSS BREEDS WITH ROADSTERS

Abstract. It has been established that the riding-Kazakh cross breeds in live weight (403-410 kg) outperform the local Kazakh horses (395 kg). In height at withers, the English-Kazakh hybrids (148.5±0.7 cm) are greater than the Arab-Kazakh hybrids (141.2 ± 0.5 cm) and local Kazakh (142.7±0.8 cm). In the chest girth, Arab-Kazakh hybrids (175.8±0.8 cm), on the contrary, exceed the Anglo-Kazakh hybrids (171.7±1.1 cm) and local Kazakh (171.1±1.2 cm).

The wide-body index for the English-Kazakh hybrids is 115.62, for the local Kazakh horses - 119.90, for the Arab-Kazakh hybrids - 124.50.

It was established that in riding-Kazakh crossbred mares the daily milk yield for 2-4 months of lactation is 7-10 liters. When transiting mares to 4-5-fold milking from the 2nd month of lactation, foals receive less than 2/3 of their mother's milk or 4-6 liters per day. To replenish this under-received amount of milk and to ensure the increase in live weight, the foals ration is additionally included with concentrated feed, hay and green mass.Habituation of colts to feed started from 1.5 months of age. When they are 2 months of age, young animals already consume feed very good. During the suckling period, the live weight of foals from dairy mares in the first 6 months increased by 3.96 times, and from non-milking mares - by 4.22 times. The decrease in the level of milk nutrition in young stock leads to a decrease in the average daily gain.

It was found that, on average, during the lactation, the density of milk at production from local Kazakh mares was 1.033°A, while the Arab-Kazakh and English-Kazakh had milk density of 1.032°A. The fluctuations in the fat of the mares of the Kazakh breed for six months of lactation were in the range of 1.1-1.9%, while of the Arab-Kazakh and English-Kazakh hybrids, respectively, 1.3-2.0% and 1.4-2.2 %. That is, the bloodiness of horses does not have a significant impact on the indicators of the chemical composition of the mares' milk.

Key words: Kazakh horse, riding-Kazakh hybrids, milk, milk yield, early ripeness of foals, growth and development, foals.

Introduction. The upcoming entry of Kazakhstan into the WTO imposes special requirements on the competitiveness of domestic agricultural products. Therefore, it is necessary in the future to pay special attention to the industrialization of agricultural production through the implementation of cluster initiatives in the production and processing of agricultural raw materials. It is here that the attention of the private sector should be attracted, including in line with the agrarian-industrial policy [1].

The value of horse breeding in the republic is preserved even now. With the acquisition of sovereignty, great opportunities are opening up for the wide spread of equestrian sports, tourism, national sports game and the development of horse breeding as a branch of productive livestock farming.

The possibility of activating the adaptive processes and increasing the resistance of the organism of such animals under the influence of these biostimulators to low temperatures of the habitat for protein-

carbohydrate-vitamin metabolism, the function of the hematopoietic organs and the buffer system is established [2].

Of all the agricultural units operating in Kazakhstan, more than 80% are peasant farms and households. They contain 95.5% of the livestock of horses and produce more than 90% of production. Around the major cities and industrial centers, there are many peasant horse farms for growing sports horses. Horses of local Kazakh breeds are mainly bred in these farms and they are mixed with roadster breeds, in which, along with getting young stock, it is possible to organize seasonal production of koumiss. The production of koumiss in combination with the growth of young stock for sports is of great importance in increasing the profitability of horse breeding in the conditions of peasant farms [3].

The increased interest in the development of dairy horse breeding is due to the fact that horses, being the most unpretentious animals, are able to use natural steppe, mountain and other pastures that are difficult for other farm animals to access. At the same time, the demand for koumiss, which has not only dietary and nutritional, but also antibiotic and healing properties, is constantly increasing.

Beginning from the 1950s, these purebred riding and Arabian horses were imported for crossing with local Kazakh horses under these soil-climatic and fodder conditions.

In the late 90s of the last century, the Sarsebek farm was established in the Talgar district of the Almaty region, which was formed with Kazakh horses and their crossbreeds of roadster breeds from the former Degeres stud farm. Currently, in the herd, there are horses with the blood of Arab and purebred roadster breeds.

With the organization of the production of milk and koumiss, the need for feed increases significantly, and the system for keeping horses changes. In the peasant farms that have feeding grounds, the stalled-pasture system for keeping horses is the most widespread, at which in the stall period animals are in the premises, and in the pasture period - on artificial or natural pastures..

In farms engaged in breeding of roadster breeds and their hybrids with Kazakh horses, the stall-camp or stall housing system is practiced. In the stall-camp system, in the pasture period, the horses are maintained in summer camps, which are equipped with light shelters and milking areas.

Stall-camp maintenance has a beneficial effect on animals and allows to conduct regular training work, as well as timely preventive and veterinary-sanitary measures.

In recent years, in the conditions of the south-east Kazakhstan, horses of riding breeds have positively recommended themselves in the sporting direction. Stallions of this breed are used in crossing with local Kazakh mares and other breeds of Almaty region.

Of great importance is the study of the economically useful traits of local Kazakh horses and their hybrids with roadsters and the development of an effective technology for the production of mare's milk in peasant farms. The importance of solving this problem determines the relevance of the research.

The technology of dairy production is a set of systems and methods of maintenance, feeding, milking, using animals, organizing labor, ensuring the production of the final (milk, meat, wool) or intermediate (replacements) products [4].

When breeding horses of sports direction of productivity with the simultaneous production of milk is very important to determine the method of keeping mares. When choosing a method of keeping, it is assumed that by applying various methods to reduce labor costs per unit of production, to achieve a reduction in the cost of milk and at the same time to increase the dairy productivity of mares while reducing the cost of fodder per unit of production.

The system of keeping farm animals implies a certain order of interdependent production operations and work processes that ensure the most rational and favorable conditions for the life and exploitation of animals.

A.G. Shamsiev [5], V.I. Fisinin, I.A.Egorov, I.F. Draganov [6] note that feeding of horses should be based on the modern achievements of the physiology and biochemistry of food, feed production and fodder preparation. In this regard, an important problem should be the development of the theory and practice of a complete and balanced feeding of horses of different ages, breeds and economic use directions.

Full feeding of dairy mares is one of the main factors providing high dairy productivity, which affects the growth and development of foals [7]. It is based on the knowledge of the body need for energy, nutrients necessary for the implementation of life processes [8]. A horse’s need for nutrition depends on the

nature of its use, live weight, breed, and physiological condition. Compared to other types of animals, horses are the most demanding on feed quality. They are worse than ruminants digest fiber, so for them, it is necessary to allocate good meadow, steppe, alfalfa hay, and from cereals - oats, corn and barley, from bran - wheat [9].

In contrast to herd horse breeding, where horses are kept on pasture all year round, horses of sporting direction are mainly maintained by stable or stable pasture methods [10].

The practice of advanced horse farms of the Russian Federation, the Baltic republics and Northern regions of Kazakhstan, where there is enough rainfall in summer, shows that long-term pastures, if used correctly, provide 3000-4000 feeding units from 1 hectare, and during irrigation - 6000-7000 feeding units. In recent years, the creation of long-term cultivated pastures with irrigation has been given with great importance both in areas of sufficient moisture and in areas with limited rainfall [1].

Many years of experience in using paddocks (cultivated pastures) under conditions of stud farms showed their positive aspects. The use of advanced agricultural techniques based on the regular use of fertilizers, irrigation, the use of high-yielding varieties of perennial grasses allowto receive yields of grass at 70-90 centners of dry weight, or 60-70 centners of feed units per hectare. Paddocks are used not only for pasturing horses, but also for stocking up hay, haylage, grass cutting and flour

The aim of research. Comparative study of the technology of seasonal milk production with stable and pasture maintenance of local Kazakh breed mares and their hybrids with roadster breed in the conditions of the south-east of Kazakhstan.

Materials and methods of research. Experimental studies were carried out on the Sarsebek horse farm of the Talgar district, Almaty region, on mares of the local Kazakh breed and their mixtures with roadster breeds.

The formation of groups of animals was carried out according to the method of pairs-analogues taking into account the breed, sex, age, live weight, physiological state (lactation period) [11-14].

To carry out scientific and economic experience, 3 groups of animals were formed, the I group included mares of the local Kazakh breed that were kept on natural pastures, and in the II and III groups there were mares of Arab-Kazakh and English-Kazakh cross breeds mares that were in conditions of stable and pasture maintenance.

The study of the age dynamics of live weight of young horses was carried out on the basis of data of individual weighing and determination of live weight at birth, at 6, 12, 18, 24 and 30 months of age.

In the experiment, high-Kazakh crossbred foals and purebred Kazakh foals were taken (5 heads). The latter served as a control, on which it is more obvious to reveal the characteristic features of the growth and development of crossbred horses.

The exterior and constitution of animals were studied by eye-evaluation of the articles of body measurements and the general development of the organism on the scale of the Instructions for bonitation of breeding local horses followed by taking 4 main body measurements, on the basis of which the main body indexes were calculated at the age of 6, 12, 18, 24, 30 months.

Group	Mare's breed	Conditions of maintenance
I	Local Kazakh	Pasture
II	Arab-Kazakhcross breeds	Stable and pasture
III	English-Kazakhcross breeds	Stable and pasture

Figure 1 – Experimental design

The commodity yield of mares was studied during the seasonal production of koumiss (from April to September 2018), i.e. within 6 months by the method of control milkings once a month for two adjacent days. Dairy productivity, which is made up of actually received milk and sucked by a foal milk, was calculated by the I.A. Saigin formula [11].

$$Уc = \frac{Уф*24}{В},$$

where Уc - daily productivity, l.; Уф - actually received milk, l.; В - time of mares stay in milking, h.; 24 - number of hours per day.

Chemical analysis of milk was carried out in the laboratory of milk and dairy products of the Kazakh Scientific Research Institute of Animal Breeding and Fodder Production LLP.

The chemical composition of milk was studied monthly. Milk samples for general chemical analysis were taken once a month for two adjacent days, in proportion to milk yield. In the mares' milk sample, the content of fat, total protein, milk sugar, dry matter, calcium, phosphorus, density, and acidity were determined by standard methods [12-15].

The dairy productivity of mares was estimated by the gross milk yield obtained by summing up the milk yield and the amount of milk sucked by the foal.

Biometric processing of digital material of the experiments was carried out according to the standard methods. [15].

Results of research.

Commodity and gross yield of mares. The dairy productivity of mares depends on genotypic and phenotypic factors, among which the breed, the duration of lactation, the conditions of keeping and the level of feeding have a great influence [16-19].

Gross productivity is an indicator of the physiological capacity of an animal, depending primarily on such genotypic factors as breed, individual characteristics, etc. The commodity productivity depends not only on genotypic, but also on phenotypic factors, such as technology, mode and frequency of milking [20-23].

In the farm “Sarsebek” mares massively foaled in the second half of March and in the first half of April. Milking of mares started in May, that is, a month after the colting.

It was established that the riding-Kazakh cross breeds (403-410 kg) exceed the local Kazakh breed in live weight (395 kg) (table 1).

Table 1 – Zootechnic characteristics of dairy mares by live weight and main body measurements (n = 4 heads in each)

Indicator	Local Kazakh		English-Kazakh cross breeds		Arab-Kazakh cross breeds	
	M±m	Cv %	M±m	Cv %	M±m	Cv %
Live weight, kg	395±3.2	1.62	410±5.1	2.49	403±4.3	2.13
Measurements, cm:						
Height at the withers	142.7±0.8	1.12	148.5±0.7	0.94	141.2±0.5	0.71
Oblique body length	153.8±0.6	0.78	153.4±0.5	0.65	152.2±0.3	0.39
Chest girth	171.1±1.2	1.40	171.7±1.1	1.28	175.8±0.8	0.91
Meta carpus girth	18.0±0.3	3.33	18.1±0.2	2.21	18.5±0.3	3.24

In height at withers, the English-Kazakh cross breeds (148.5±0.7 cm) outperform the Arab-Kazakh cross breeds (141.2 ± 0.5 cm) and local Kazakh cross breeds (142.7±0.8 cm). In the chest girth, Arab-Kazakh cross breeds (175.8±0.8 cm), on the contrary, exceed the English-Kazakh cross breeds (171.7±1.1 cm) and local Kazakh (171.1±1.2 cm).

To fully characterize the features of the constitution of local Kazakh mares and their crossbreeds, based on absolute indicators of body measurements, the main body indices were calculated: of format, of wide body, of compactness, of bone and of massiveness (table 2).

Table 2 – Indices of body built of in-milk mares (n = 4 heads in each)

Index, %	Local Kazakh, M±m	English-Kazakh cross breeds, M±m	Arab-Kazakh cross breeds, M±m
Format	107.78±0.5	103.3±0.5	107.79±0.5
Wide body	119.90±0.6	115.62±0.6	124.50±0.6
Compactness	111.25±0.5	111.93±0.5	115.51±0.5
Bone	12.61 ±0.2	12.19±0.2	13.10±0.2
Massiveness	136.21±0.7	125.38±0.7	143.42±0.7

The indices of body built characterize the experimental mares of the Anglo-Kazakh cross breed as shallow-bodied, rather lightweight animals, with a wide-body index of 115.62, while the local Kazakh horses have 119.90, and the Arab-Kazakh cross breeds have 124.50.

All mares had a strong type of constitution, a well-developed chest, an extended body. A strong constitution can be judged by the development of the skeleton [29, 30, 31]. Thus, the bone index was as follows: among local Kazakh - 12.61, and among riding-Kazakh - 12.19 - 13.10. It has been established that mares of shallow-bodied, dense types of constitution are distinguished by their greatest adaptability to stall-stable conditions, which must be taken into account when organizing koumiss farms. Therefore, in the zone of cultural and pasture horse breeding, it is advisable to form groups of in-milk mares taking into account the characteristics of types.

The overall dairy production of mares is directly dependent on the duration of lactation, as well as on the nature of the lactation curve. In many horse farms, milking of mares is seasonal in nature and is limited to the period from May to September.

It was found that mares of the local Kazakh breed were distinguished by the highest dairy productivity throughout the entire lactation period.

So, for 2018, their dairy productivity was 1,549 liters, and for riding-Kazakh crossbred mares - 1,364 liters and 1,431 liters (or 7-12%) lower. The lactation curve in mares does not always change in the same way. In mares kept in the stables, lactation curves differ significantly from those of pasture mares. This difference lies in the higher elevation of the apex of the lactation curve of the mares contained in the stables compared with the mares that are kept on pasture.

Studies have shown that in the same herd, there are animals with high, medium and low levels of dairy productivity. Based on the analysis and individual milkings for three months of milking (2-4 months of lactation), three groups of mares were separated for dairy productivity of high-Kazakh cross breeds in peasant farm conditions: high-milk (5 heads), in which, on average, 907 liters of milk, with fluctuations from 820 to 915 liters, medium-milk (4 heads) - 615 liters with fluctuations from 565 to 668 liters, low-milk (2 heads) - 320 liters. The coefficient of variability (C_V) ranged from 22.6% to 37.8%. That is, the dairy productivity of mares is over a wide range.

For some mares, dairy productivity during the first 4-5 months of lactation remains almost at the same level, while for others it drops sharply from 2-3 months. For example, we give the daily productivity of two mares, who were in the same conditions. The yield for May was determined by the foal growth. At the same time, it was estimated that 10 l of milk are consumed per I kg of growth (table 3).

Table 3 – Milk yield of English-Kazakh crossbred mares

Individual number	Average daily milk yield by lactation months, l					
	1	2	3	4	5	6
35	6.1	6.5	6.2	5.8	5.3	3.4
17	5.4	4.8	3.9	3.0	1.8	0.9

The established individual characteristics of animals should be necessarily taken into account in breeding and technological work, giving preference to those individuals that stably maintain the milk yield for a long time.

The impact of milking on the growth and development of foals. It has been established that in riding-Kazakh crossbred mares the daily milk yield for 2-4 months of lactation is 7-10 liters. When transferring them to 4-5-fold milking from the 2nd month of lactation, foals receive less than 2/3 of their mother's milk or 4-6 liters per day. To replenish this under-received amount of milk and to ensure the increase in live weight, the daily ration of foals additionally includes concentrated feed, hay and green mass. To habituate foals to feed started from 1.5 months of age. When they reach 2 months of age, young animals already consume feed very good. The amount of vegetable feed increases as it grows and the dairy productivity of mares decreases.

The lactation period for mares lasts up to 9 months, of which the milking process is 6 months, since the mares are in the second period of the pregnancy.

In order to study the effect of mares milking on the growth and development of foals during the suckling period, they were weighed and measured at the age of 3 days, 6, 12, 18, and 24 months. The data were compared with indicators of foals, whose mothers had not milked (tables 4, 5).

Table 4 – Age dynamics of live weight (kg) of riding-Kazakh crossbred foals from milking and non-milking mares on koumiss farms (n = 5)

Age of foals, months	From milking mares			From non-milking mares		
	M±m	6	Cv,%	M±m	5	Cv,%
3 days	45.0±0.6	1.3	3.0	45.0±0.4	0.9	2.0
6	168±3.3	7.4	4.4	196±2.0	4.5	2.3
12	245± 1.7	3.8	1.6	261±2.6	5.8	2.2
18	281±2.4	5.4	1.9	302±1.8	4.0	1.3
24	290±2.8	6.3	2.2	315±4.3	9.6	3.1

Table 5 – Age changes of the main body measurements in foals from milking and non-milking mares (n = 5)

Age of foals, months	Height at the withers, cm		Oblique body length, cm		Chest girth, cm		Meta carpus girth, cm	
	M±m	Cv,%	M±m	Cv,%	M±m	Cv,%	M±m	Cv,%
From milking mares								
3 days	95±50.3	0.7	70±0.4	1.3	78±0.3	0.8	11.5±0.2	3.8
6	124±0.4	0.7	104±0.4	0.9	124±0.6	1.1	15.1 ±0.2	2.9
12	128±0.5	0.9	125±0.2	0.4	136±0.4	0.7	16.0±0.3	4.2
18	137±1.1	1.8	141±0.3	0.5	145±0.5	0.8	16.8±0.2	2.6
24	142±1.5	2.4	145±0.5	0.8	155±0.6	0.9	17.5±0.3	3.8
From non-milking mares								
3 days	95±0.3	0.7	70±0.4	1.3	78±0.2	0.6	11.4±0.2	3.9
6	128±0.5	0.9	110±0.5	1.0	135±0.5	0.8	16.0±0.3	4.2
12	130±0.4	0.7	130±0.3	0.5	141±0.3	0.5	16.7±0.2	2.6
18	140± 1.3	2.1	145±0.2	0.3	152±0.4	0.6	17.4±0.2	2.5
24	144±1.7	2.6	148±0.8	1.2	160±0.8	1.1	18.0±0.4	4.9

During the suckling period, the live weight of foals from milking mares in the first 6 months increased by 3.96 times, and from non-milking mares - by 4.22 times. The decrease in the level of milk nutrition in young stock leads to a decrease in the average daily gain.

As can be seen from table 5, in foals of both groups, the main body measurements before the start of mares milking were the same. By 6 months of age, foals from milking mares lagged behind foals along with their mothers in height at withers by 4 cm, body length by 6 cm, chest girth by 11 cm. Finding of foals together with mothers had a positive effect on their growth and development.

The chemical composition of mare's milk. Mare's milk has a pure white color with a bluish tint, sweetish, somewhat astringent flavor, due to the high sugar content, liquid consistency.

The chemical and physical properties of milk were determined by the following indicators: density, acidity, dry matter, protein, fat, sugar and minerals.

Milk density is one of the most important indicators of its naturalness, it is determined by the content of its constituent parts, and proteins, carbohydrates, as well as minerals raise the density, while fat reduces.

Indicators of the density of milk mares, depending on the breed are given in table 6.

It was established that, on average, during lactation, the density of milk at production from local Kazakh mares was 1.033°A, while in Arab-Kazakh and English-Kazakh mares, the milk density was 1.032°A. By the sixth month of lactation, it decreased by 1°A. This decrease is due to the increased fat content in milk by the end of lactation.

Table 6 – Density of mares milk depending on the breed (°A)

Month of lactation	Breed		
	Kazakh, M±m	Arab-Kazakh cross breeds, M±m	English-Kazakh cross breeds, M±m
1	1.034±0.001	1.033±0.002	1.033±0.001
2	1.033±0.002	1.033±0.002	1.032±0.001
3	1.034±0.002	1.032±0.002	1.033±0.002
4	1.033±0.001	1.032±0.001	1.032±0.001
5	1.033±0.001	1.031±0.001	1.031±0.001
6	1.031±0.002	1.030±0.002	1.031±0.001
On average for 6 months of lactation	1.033±0.002	1.032±0.002	1.032±0.001

Natural fresh mare's milk has low acidity. According to our data, the acidity of fresh milk (two hours after milking) was 5-8°T with fluctuations from 4 to 12°T (table 7).

Table 7 – Acidity of mares milk depending on the breed (°T)

Month of lactation	Breed		
	Kazakh	Arab-Kazakh cross breeds	English-Kazakh cross breeds
1	7.5±0.01	8.2±0.02	8.0±0.02
2	7.1±0.02	7.7±0.01	7.8±0.01
3	6.9±0.01	7.3±0.02	7.5±0.01
4	7.4±0.02	8.0±0.01	8.3±0.02
5	6.5±0.02	7.6±0.01	7.8±0.01
6	6.0±0.01	7.2±0.01	7.7±0.01
On average for 6 months of lactation	6.9±0.01	7.7±0.01	7.9±0.01

It was found that the acidity of milk of riding-Kazakh crossbred mares is higher in comparison with the milk of Kazakh breed mares. By the end of lactation, the acidity of milk in all groups significantly decreases in comparison with the beginning of the lactation period. The acidity of milk is caused by the presence of phosphate salts, proteins, carbon dioxide and microflora of milk.

The amount of dry matters during lactation varies on average between 9.0 and 11.4% (table 8).

Table 8 – The dry matter content of milk depending on the breed, %

Month of lactation	Breed		
	Kazakh	Arab-Kazakh cross breeds	English-Kazakh cross breeds
1	10.8±0.03	12.0±0.02	11.4±0.02
2	11.5±0.02	11.8±0.03	11.2±0.01
3	11.0±0.02	11.8±0.02	10.8±0.03
4	10.7±0.01	11.2±0.01	10.8±0.02
5	10.2±0.02	10.9±0.02	10.5±0.01
6	9.8±0.01	10.7±0.02	10.2±0.02
On average for 6 months of lactation	10.7±0.02	11.4±0.02	10.9±0.02

It has been established that the milk content of Arab-Kazakh mares has a dry matter content higher than that of peers of the Kazakh breed and its cross breed with the English. By the end of the lactation period, a decrease in the dry matter content in milk is observed in all groups.

Along with the lactation period, these changes are influenced by the quality of the used feed and biological factors (development of fetal in the mare's body). These factors affect the whole body,

including the composition and properties of milk. According to the change in dry matters, the water content in milk also changed.

The results of studies on the fat content in the milk of mares of different breeds are shown in table 9.

Table 9 – Fat content in the mares milk of different breeds, %

Month of lactation	Breed		
	Kazakh	Arab-Kazakh cross breeds	English-Kazakh cross breeds
1	1.6±0.2	1.5±0.1	1.5±0.2
2	1.3±0.2	1.3±0.2	1.4±0.1
3	1.4±0.1	1.2±0.1	1.8±0.2
4	1.3±0.2	1.6±0.2	1.9±0.1
5	1.6±0.1	1.9±0.1	2.1 ±0.2
6	1.8±0.2	2.0±0.1	2.2±0.2
On average for 6 months of lactation	1.50±0.2	1.58±0.1	1.82±0.2

The fluctuations in the milk fat of the Kazakh breed mares for six months of lactation were in the range of 1.1-1.9%, while of the Arab-Kazakh and English-Kazakh cross breeds, respectively, 1.3-2.0% and 1.4-2.2 %.

High-milk mares, as a rule, are less fat-milk (1.2% of fat per lactation on average), and milk of medium-milk mares has a higher fat content (1.6%). The maximum daily fat content of milk - 2.2% was noted in October in the English-Kazakh crossbred mare (No. 32), the minimum of 1.1% - in May in the Kazakh breed mare (No. 21).

Table 10 shows the chemical composition of milk. The content of total protein, casein, albumin and globulin in the milk of mares, depending on the breed, is given in table 11.

Table 10 – The chemical composition of the mares milk depending on the breed, %

Indicator	Breed		
	Kazakh	Arab-Kazakh cross breeds	English-Kazakh cross breeds
Dry matter	10.7±0.02	11.4±0.02	10.9±0.02
Fat	1.50±0.2	1.58±0.1	1.82±0.2
Protein	1.98±0.05	1.89±0.05	2.00±0.06
Lactose	6.4±0.04	6.6±0.04	6.9±0.05
Density, A	1.033	1.032	1.032
Acidity, T	6.9±0.01	7.7±0.01	7.9±0.01
Ash	0.3±20.03	0.34±0.02	0.35±0.02
Ca	0.17±0.02	0.18±0.02	0.18±0.01
P	0.09±0.03	0.10±0.03	0.09±0.02

The content of total protein, casein, albumin, globulin and non-protein nitrogen in mares of all groups was virtually the same on average per lactation. An increase in the content of total protein and casein before the 4 month of lactation was noted, then their decrease before the 6 month of lactation.

Alongside the change in the total protein content of milk, the ratio of its fractions also changed. In particular, as our data showed, the content of whey proteins (albumin + globulin) in mares' milk reaches 46.0-49.5%. Its high content has a significant impact on the physico-chemical properties of milk, which play an important role as carriers of immune properties that are transmitted from mother's milk to the newborn.

When fermenting mare's milk, casein settles in the form of small, delicate flakes, which almost do not change the consistency of milk.

A positive correlation was found between the fat and protein content in milk. In mares of all experimental groups, it ranged from r = +0.53-0.57.

Table 11 – The content of total protein, casein, albumin and globulin in mares milk depending on the breed, %

Month of lactation	Total protein	Casein	Albumin± globulin	Non-protein nitrogen
Kazakh breed mares				
1	1.74±0.08	0.72±002	0.85±0.03	0.17±0.01
2	1.77±0.07	0.73±0.04	0.87±0.05	0.14±0.01
3	2.12±0.03	0.94±0.05	0.93±0.03	0.25±0.02
4	2.15±0.02	0.86±0.06	1.17±0.04	0.12±0.01
5	2.20±0.03	0.95±0.03	1.10±0.05	0.15±0.02
6	1.93±0.05	0.77±0.04	0.98±0.03	0.18±0.01
On average for 6 months of lactation	1.98±0.05	0.82±0.04	0.98±0.04	0.11±0.01
Arab-Kazakh cross breeds				
1	1.84±0.06	0.61±0.03	0.98±0.04	0.25±0.01
2	1.76±0.08	0.66±0.02	0.89±0.03	0.21±0.02
3	1.94±0.05	0.87±0.01	0.90±0.03	0.17±0.03
4	2.05±0.04	0.98±0.04	0.79±0.02	0.28±0.04
5	1.97±0.03	0.91±0.03	0.87±0.02	0.19±0.03
6	1.76±0.04	0.82±0.02	0.81±0.02	0.13±0.01
On average for 6 months of lactation	1.89±0.05	0.81±0.03	0.87±0.03	0.21±0.02
English-Kazakh cross breeds				
1	1.97±0.05	0.75±0.04	0.94±0.05	0.28±0.02
2	1.91±0.04	0.81±0.05	0.84±0.03	0.26±0.03
3	2.05±0.08	0.97±0.07	0.89±0.04	0.19±0.04
4	2.01±0.07	1.06±0.05	0.70±0.03	0.25±0.06
5	2.08±0.08	1.05±0.06	1.03±0.05	0.28±0.05
6	1.95+0.04	0.92+0.03	0.90+0.04	0.13+0.02
On average for 6 months of lactation	2.00+0.06	0.93+0.05	0.88+0.04	0.23+0.03

Milk sugar is an essential part of milk, having a specific effect on the body as a source of energy. During lactation, it is the most stable part of the mares' milk, changing only slightly - within 6.2-7.3%. In the study of milk the change in this indicator depending on the breed of mares was studied (table 12).

Table 12 – The content of milk sugar in the mares' milk by breeds, %

Month of lactation	Breed		
	Kazakh	Arab-Kazakh cross breeds	English-Kazakh cross breeds
1	6.2+0.07	6.4+0.05	6.5+0.04
2	6.4+0.03	6.8+0.04	6.8+0.05
3	6.7+0.03	6.8+0.03	7.0+0.04
4	6.5+0.04	6.7+0.04	7.3+0.05
5	6.2+0.03	6.4+0.03	7.0+0.04
6	6.2+0.04	6.3+0.04	6.8+0.05
On average for 6 months of lactation	6.4±0.04	6.6±0.04	6.9±0.05

It has been established that, in terms of the content of milk sugar in milk, riding-Kazakh crossbred mares outperform their purebred Kazakh peers by 0.2-0.5% or 3.1-7.8%. It was not possible to establish any definite pattern in the change in the amount of milk sugar by the months of lactation.

Studies of the mineral composition of the mares' milk improved by Roadster breeds are of particular interest not least because this issue is far from being fully covered in the literature (table 13).

Table 13 – The content of minerals in the mares' milk by breed, %

Month of lactation	Ash	Calcium	Phosphorus	Phosphorustocalciumratio
Kazakh				
1	0.41±0.03	0.18±0.02	0.10±0.03	0.56
2	0.36±0.02	0.21±0.03	0.12±0.04	0.57
3	0.28±0.04	0.17±0.02	0.09±0.02	0.53
4	0.29±0.03	0.17±0.02	0.10±0.02	0.59
5	0.27±0.04	0.15±0.03	0.08±0.03	0.53
6	0.28±0.03	0.15±0.03	0.08±0.03	0.53
On average for 6 months of lactation	0.32±0.03	0.17±0.02	0.09±0.03	0.53
Arab-Kazakh cross breeds				
1	0.46±0.02	0.20±0.02	0.12±0.03	0.60
2	0.40±0.03	0.22±0.03	0.12±0.04	0.55
3	0.31 ±0.04	0.19±0.02	0.10±0.02	0.53
4	0.30±0.03	0.17±0.03	0.09±0.03	0.53
5	0.28±0.01	0.17±0.02	0.09±0.02	0.53
6	0.28±0.02	0.15±0.03	0.08±0.02	0.53
On average for 6 months of lactation	0.34±0.02	0.18±0.02	0.10±0.03	0.56
English-Kazakh cross breeds				
1	0.47±0.02	0.20±0.02	0.11±0.02	0.55
2	0.40±0.02	0.21±0.02	0.11 ±0.02	0.52
3	0.35±0.03	0.20±0.01	0.10±0.01	0.50
4	0.31±0.03	0.17±0.02	0.08±0.02	0.47
5	0.30±0.02	0.17±0.01	0.08±0.02	0.47
6	0.28±0.01	0.16±0.01	0.07±0.01	0.44
On average for 6 months of lactation	0.35±0.02	0.18±0.01	0.09±0.02	0.50

Based on the obtained data, it can be concluded that the pedigree of horses does not have a significant effect on the indicators of the chemical composition of the mares' milk. The earlier opinion in the literature on the best suitability of steppe mares' milk for koumiss, due to the fact that it supposedly has more sugar and less fat, is not supported by our research. On the contrary, the milk of the steppe (Kazakh) breeds contains the same amount of fat, protein, and there is less milk sugar in it than in the milk of the riding-Kazakh crossbred mares.

According to the available literature data, and on the basis of the results of our research, it was confirmed that milk sugar is the only component of mare's milk that did not undergo drastic changes during lactation [29].

The content of minerals in the milk of mares by the end of lactation was less than at the beginning, and is 0.28%. The highest calcium content in milk was observed in the first months of lactation. Changes in the phosphorus content in milk during lactation were similar to changes in calcium. The ratio of phosphorus and calcium in milk was relatively constant during lactation.

Currently, much attention is paid to the quality of the products, as in some cases it is impossible to produce a high-quality dairy product - koumiss, from low-quality milk [30].

In this regard, in order to increase the quality of the obtained dairy products, it is advisable on koumiss farms 1 -2 times per lactation to individually determine the quality of the mares' milk according to 4 indicators: acidity, density, fat and protein content. It is reasonable to determine the quality of milk from these indicators more often, especially in connection with the transition of milking mares to pasture-stall maintenance.

Setup for milk production. In order to develop an optimal operation mode in the peasant farm, we conducted the timekeeping of daily operations on milking mares. At the same time, it has been established that it takes 7-10 hours to graze mares, 4-6 hours of which are between milkings, 3-4 hours after the last milking (table 14).

Table 14 – The optimal daily routine on the koumiss farm of the Sarsebek farm (hours, min.)

Type of activity	Start	Finish	Duration
In the 1st half of lactation			
Weaning offoals	5-00	5-30	0-30
First milking	8-00	8-30	0-30
Second milking	10-30	11-00	0-30
Third milking	13-00	13-30	0-30
Fourth milking	15-30	16-00	0-30
Fifth milking	18-00	18-30	0-30
Grazing on natural pastures and watering between milkings	8-30	18-30	8-00
Distribution of mowing and concentrated feed to foals between the milkings	8-30	16-00	5-30
Grazing of mares with foals and watering of foals	18-30	21-30	3-00
Distribution of concentrated feed for mares and foals for the night	21-30	21-45	0-15
Nightrest	22-00	5-00	7-00
Workinghours			8-00
In the 2nd half of lactation			
Weaning offoals	6-00	6-30	0-30
First milking	9-00	9-30	0-30
Second milking	12-00	12-30	0-30
Third milking	15-00	15-30	0-30
Fourth milking	18-00	18-30	0-30
Pasture on levades and watering between the milkings	9-30	18-00	7-00
Distribution of mowing and concentrated feed to foals between the milkings	9-30	16-00	4-30
Grazing of mares with foals on levadas and watering of foals	18-30	21-00	2-30
Distribution of concentrated feed to mares and foals for the night	21-00	21-15	0-15
Nightrest	22-00	6-00	8-00
Workinghours			8-00

While developing this daily routine, the time of milking, feeding, watering and resting of horses was foreseen. In order to avoid gastrointestinal diseases in early spring, horses were fed with hay before being released into pasture. During the summer, milking mares and suckling foals were kept most of the day naturally and artificially grazing. In the hot hours of the day they were driven into the premises.

The materials of our observations in the farm indicate that the single-shift 2-cyclic operational mode with four and five times milking of mares with stable pasturing maintenance and division of labor (milkmaid, herdsmen) is the most optimal.

The preferable interval between milkings of mares should be no more than 2-2.5 hours.

When concentration in a group is up to 12-15 milking mares, they are kept on the milking area for 30 minutes for each milking, as a result, there is 1 hour of time between the milkings. Therefore, it is important to conduct milking in a clear and orderly manner, strictly according to the daily routine.

Observations on the pasture of suckling mares showed that animals actively graze in one place. In spring and in the first half of summer, horses are grazed on natural pastures at a distance of 1-1.5 km from the farm, and in the second half of lactation due to the deterioration of natural pastures, they are kept on cultural pastures (levada).

Such a flexible daily routine better meets the biological characteristics of the mammary gland of Kazakh breed mares and their cross breeds with roadster horses, optimizes the work of the koumiss farm and is convenient for the staff. Milking of riding-Kazakh crossbred mares for the purpose of obtaining marketable milk is an additional reserve for increasing the production of koumiss and increasing the profitability of any horse-breeding farm. The production of mare's milk is beneficial for farms with highly productive natural and artificial pastures.

Conclusions. For the horses of the foothill zone of the south-east of Kazakhstan (purebred mares of the local Kazakh breed and their cross breeds with the roadster breeds) are there are recommended technologies that ensure the production of marketable milk and koumiss: milking of mares 1 month after the colting; weaning of foals for the night with 5 times milking of mares in the 1st half of lactation with an interval between milkings of 2 hours, and in the 2nd half of lactation- 4 times milking of mares with an interval between milkings of 2.5 hours.

In the conditions of peasant farms in the south-east of Kazakhstan, when organizing the stable-grazing maintenance of mares of the local Kazakh breed and their cross breeds with roadsters on a farm with grazing on the levadas in summer, there is an opportunity for seasonal production of koumiss. At the same time, for 6 months of lactation, the milk production of Kazakh breed mares is 1,549 liters, the commodity yield is 920 liters, and for the Arab-Kazakh and English-Kazakh cross breeds, these figures are 1,431 and 850 liters; 1364 and 815 liters respectively.

Growing of foals up to 6 month-age on cultivated pasture (levada) increases their live weight compared with stall feeding by 8.7% and allows to get 861 g of average daily gain due to maximum use of green fodder rich in valuable nutrients.

The English-Kazakh crossbred mares exceeded the mares of the local Kazakh breed in terms of fat content by 0.32 or 21.3%, protein by 0.17 or 8.9%. The dry matter content ranges from 10.7 to 11.4%. A negative correlation r = -0.28-0.31 was found between the fat content in milk and milk yield.

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ҚАЗАҚ ЖЫЛҚЫ ТҰҚЫМЫ БИЕЛЕРІНІҢ ЖӘНЕ ОЛАРДЫҢ САЛТ МІНІСТІ ЖЫЛҚЫЛАРМЕН БУДАНЫНЫҢ СҮТ ӨНІМДІЛІГІ

Аннотация. Аңықталды, салт міністі-қазақ будандары тірі салмақ бойынша (403-410 кг) жергілікті қазақ жылқыларынан (395 кг) асып түседі. Шоқтық биіктігі бойынша ағылшын-қазақ будандары (148,5±0,7 см) араб-қазақ будандарынан (141,2 ± 0,5 см) және жергілікті қазақ жылқыларынан (142,7 ± 0,8 см) жоғары. Кеуде орамы бойынша араб-қазақ будандары (175,8 ± 0,8 см), керісінше ағылшын-қазақ будандарынан (171,7 ± 1,1 см) және жергілікті қазақ жылқыларынан (171,1 ± 1,2 см) жоғары көрсеткіш көрсетті.

Ағылшын-қазақ будандарының кең денелік индексі - 115,62, жергілікті қазақ жылқылары - 119,90, араб-қазақ будандары - 124,50.

Салт-қазақтың жылқылары жоғары сүттіліктің (лактация) 2-4 айына күнделікті сүт өнімділігі 7-10 литр құрайды деп анықталды. Сүттіліктің (лактацияның) 2-ші айынан 4-5 есеге дейін сүтті емізіп жатқанда, құлындар ана сүтінің 2/3 шамасынан немесе тәулігіне 4-6 литрден төмен сүт емеді. Бұл емілмеген сүт мөлшерін толтыру және тірідей салмақты жоғарылату үшін күнделікті рационында қоспа жем, шөп және көк шөп қамтылды. Құлындарды 1.5 айдан бастап жемге үйретілді. 2 айға жеткенде жас төлдер жемді жақсы жейді. Емізу кезеңінде сүт биелерінен шыққан популяцияның тірі салмағы алғашқы 6 айда 3,96 есеге, ал сауылмаған - 4,22 есе өсті. Жас құлындардың сүтті ему деңгейі төмендеген сайын олардың орташа күнделікті салмағының төмендеуіне әкеледі.

Орта есеппен, сүттілік (лактация) кезінде жергілікті қазақ жылқыларының шыққан сүт тығыздығы 1,033 °А, ал араб-қазақ және англо-қазақ сүтінің тығыздығы 1,032 ° А болды. Сүттіліктің (лактацияның) алты айының ішінде қазақ жылқы тұқымының май деңгейінің ауытқуы 1,1-1.9%, ал араб-қазақ және ағылшын-

қазақ будандары тиісінше 1,3-2,0 және 1,4-2,2%. Яғни, жылқының қандастығы сүттің химиялық құрамы көрсеткіштеріне айтарлықтай әсер етпейді.

Түйін сөздер: қазақ жылқылары, салт міністі - қазақ будандары, сүт, сүт өнімділігі, құлындардың тез өсуі, өсу және даму, құлындар.

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МОЛОЧНАЯ ПРОДУКТИВНОСТЬ КОБЫЛ КАЗАХСКИХ ЛОШАДЕЙ И ИХ ПОМЕСЕЙ С ВЕРХОВЫМИ ПОРОДАМИ

Аннотация. Установлено, что верхово-казахские помеси по живой массе (403-410 кг) превосходят местных казахских лошадей (395 кг). По высоте в холке англо-казахские помеси (148,5±0,7 см) превосходят арабо-казахских помесей (141,2±0,5 см) и местных казахских (142,7±0,8 см). По обхвату груди арабо-казахские помеси (175,8±0,8 см) наоборот превосходят англо-казахских помесей (171,7±1,1 см) и местных казахских (171,1±1,2 см).

Индекс широкотелости у англо-казахских помесей составляет 115,62, местных казахских лошадей - 119,90, арабо-казахских помесей - 124,50.

Установлено, что у верхово-казахских помесных кобыл суточная молочная продуктивность на 2-4 месяцах лактации составляет 7-10 литров. При переводе кобыл на 4-5- кратную дойку со 2-го месяца лактации жеребята недополучают 2/3 материнского молока или 4-6 литров в сутки. Для восполнения этого недополученного количества молока и для обеспечения прироста живой массы в суточный рацион жеребят дополнительно включали концентрированные корма, сено и зеленую массу. Приучать жеребят к кормам начинали с 1,5-месячного возраста. При достижении 2-х месячного возраста молодняк уже хорошо потребляет корма. В подсосный период живая масса тела жеребят от дойных кобыл в первые 6 месяцев увеличилась в 3,96 раза, а от недойных - в 4,22 раза. Снижение уровня молочного питания молодняка ведет к уменьшению среднесуточного прироста.

Установлено, что в среднем за лактацию плотность молока составляла при продуцировании у местных казахских кобыл - 1,033°А, арабо-казахских и англо-казахских плотность была равной - 1,032°А. Колебания жира у кобыл казахской породы за шесть месяцев лактации находились в пределах 1,1-1,9%, а у арабо-казахских и англо-казахских помесей соответственно - 1,3-2,0 и 1,4-2,2 %. То есть, кровность лошадей не оказывает существенного влияния на показатели химического состава молока кобыл.

Ключевые слова: казахская лошадь, верхово-казахские помеси, молоко, удой, скороспелость жеребят, рост и развитие, жеребята.

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REFERENCES

[1] Kashtanov L.V. **(2011)** Herd Breeding: Scientific Edition. 2nd ed. Moscow. Librocom. 406 p. (in Russ.).

[2] Semenov V.G., Baimukanov D.A., Kosyaev N.I., Alentayev A.S., Nikitin D.A., Aubakirov Kh.A. **(2019)** Activation of adaptogenesis and bioresource potential of calves under the conditions of traditional and adaptive technologies. Bulletin of National academy of sciences of the Republic of Kazakhstan. Vol. 1, N 377(2019). P. 175-189. https://doi.org/10.32014/2019.2518-1467.20 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

[3] Shamsiev A.G. **(2007)** The effectiveness of various methods of raising young stock of Tajik horse breed. Horse breeding and equestrian sport. N 2. P.32-33 (in Russ.).

[4] Chikalev A.I., Yuldashbayev Yu.A. **(2012)** Breeding with the basics of private animal science: a textbook. Moscow. GEOTAR-Media. 260 p. (in Russ.).

[5] Shamsiev A.G. **(2008)** Features of the maintenance and feeding of horses of the Tajik breed. Reports of the Tajik Academy of Agricultural Sciences. № 1. Dushanbe. P. 68-70 (in Russ.).

[6] Fisinin V.I., Egorov I.A., Draganov I.F. **(2011)** Feeding of agricultural poultry: a textbook. Moscow. GEOTAR-Media. 337 p. (in Russ.).

[7] Abdullaeva L.V. **(2013)** Current issues of technical regulation of the dairy industry: [the production of milk and dairy products are regulated on the territory of the Russian Federation by the legislation of the Customs Union] // Milk processing: technology, equipment, products. N 8. P. 20-21 (in Russ.).

[8] Abrosimova S.V. **(2014)** New in the regulation of indicators of the quality of milk and dairy products // Milk processing: technology, equipment, products. N 1. P. 14-16 (in Russ.).

[9] Khazikhametov F.S. **(2011)** Rational feeding of animals: Textbook. SPb.: Lan publishing house. 368 p. (in Russ.).

[10] Krasnikov A.S. **(2012)** Horse exterior. 2nd ed. Moscow: Librokom. 352 p. (in Russ.).

[11] Kashtanov L.V. **(2012)** Pedigree work in horse breeding. 2nd ed., Corr. Moscow. Librokom. 392 p. (in Russ.).

[12] Ovsyannikova G., Gridyaeva N. **(2013)** Production, quality and suitability of milk for processing under conditions of intensive technologies // Dairy and Beef Cattle Breeding. N 7. P. 6-8: 3 (in Russ.).

[13] Baimukanov D.A., Abugaliyev S.K., Seidaliyev N.B., Semenov V.G., Chindaliyev A.E., Dalibayev E.K., Zhamalov B.S., Muka Sh.B. **(2019)** Productivity and estimated breeding value of the dairy cattle gene pool in the Republic of Kazakhstan // Bulletin of National academy of sciences of the Republic of Kazakhstan. Vol. 1, N 377(2019). P. 39-53. https://doi.org/10.32014/2019.2518-1467.5 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

[14] Baimukanov D.A., Rodionov G.V., Yuldashbayev Yu.A., Alentayev A.S., Doshanov D.A. **(2016)** Technology of dairy cattle maintenance and milk production: Textbook. (ISBN 978-601-310-197-2). Almaty: Evero, 2016. 252 p. (in Russ.).

[15] Baimukanov D.A., Tarchokov T.T., Alentayev A.S., Yuldashbaev Yu.A. **(2018)** Fundamentals of Genetics and Biometrics: 2nd Edition. Tutorial. Almaty: Evero. 128 p. (in Russ.).

[16] Larionov G.A., Semenov V.G., Baimukanov D.A., Kosyayev N.I., Alekseev I.A., Nikitin D.A., Karynbayev A.K. **(2019)** The role of plant preparations in improving the safety and quality of milk in subclinical mastitis of cows // Bulletin of National academy of sciences of the Republic of Kazakhstan. Vol. 1, N 377(2019). P. 151-161. https://doi.org/10.32014/2019.2518-1467.18 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

[17] Rzabaev S., Rzabaev T.S. **(2016)** Zootechnical characteristics of new genotypes of Kazakh Jabe horses // Horse breeding and equestrian sport. N 3. P. 27-29 (in Russ.).

[18] Urazbakhtin R.F., Yumaguzina E.E. **(2014)** Characteristics of the dairy type of Bashkir horses in the conditions of year-round herd maintenance // Horse breeding and equestrian sport. N 6. P. 14-15 (in Russ.).

[19] Omarov M.M. **(2014)** Influence of colting on the dairy productivity of Kazakh Jabe mares // Horse breeding and equestrian sport. N 6. P. 22-24 (in Russ.).

[20] Shemarykin A.E. **(2016)** Arab horse of classical Russian selection // Horse breeding and equestrian sport. N 2. P. 7-12 (in Russ.).

[21] Gladkova E.E. **(2010)** Automation of milking mares // Horse breeding and equestrian sport. N 6. P. 19-20 (in Russ.).

[22] Alentayev A.S., Baimukanov D.A., Smailov S.D., Semenov V.G., Abdrakhmanov K.T., Begaliyeva D.A., Omarov M.M. **(2018)** Efficiency of breeding of the alatau breed of brown cattle in the "Adal" agro-industrial company JSC // Bulletin of National academy of sciences of the Republic of Kazakhstan. ISSN 1991-3494. Vol. 5, N 375(2018). P. 12-29. https://doi.org/10.32014/2018.2518-1467.2 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

[23] Chindaliyev A.E., Baimukanov D.A., Karynbayev A.K., Chindaliyev E. **(2018)** Results of the targeted selective and breeding work of the simmental red-and-motley breed of dairy cattle // Bulletin of National academy of sciences of the Republic of Kazakhstan. Vol. 6, N 376(2018). P. 34-38. https://doi.org/10.32014/2018.2518-1467.24 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

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VOICE VERIFICATION USING I-VECTORS AND NEURAL NETWORKS WITH LIMITED TRAINING DATA

Abstract. This study proposes an approach to voice identification based on neural networks (DNN) for i-Vector. Modern voice identification systems based on DNN use large amounts of labeled training data. Using the LRE i-Vector Machine Learning Challenge restricts access to ready-to-use i-Vector for learning and testing the voice identification system. This poses unique challenges in developing DNN-based voice identification systems, since optimized external interfaces and network architectures can no longer be used. We propose to use the training i-Vectors to train the initial DNN to identify the voice. Next, we present a novel strategy for using this initial DNN to strip the language labels of the inappropriate set from the development data. The final DNN for voice identification is trained using the original training data and the estimated out-of-set language data. We show that augmenting the training set with out-of- set labels leads to a significant improvement in voice identification performance.

In this paper, we studied the possibility of using neural networks for speech identification. In particular, standard approaches to speech recognition were considered, the concept of an artificial neuron as an object used in speech identification was defined. A speech recognition option using a neural network was investigated, and steps were presented to perform this task. Accuracy using neural networks with limited learning data and a higher i-vector dimension is superior to others with a score of 92.1%. From this study, we can conclude that the size of the UBM and the dimension of the i-vector affect the accuracy of voice identification based on the i-vector.

Keywords: voice identification, i-Vector, deep neural network.

1. Introduction. The task of voice identification (VID) includes the automatic identification of the language in which a given speech utterance was spoken. Voice identification systems are used in a variety of applications: multilingual language translation, emergency or consumer call routing, surveillance and security applications [1, 2]. Recently, voice identification has received considerable attention, primarily due to the several NIST language Recognition Evaluations (LRE) and also partly due to programs such as the DARPA Robust Automatic Transcription of Speech (RATS).

The low-dimensional representation of speech in the so-called common variability space (TVS) obtained by factor analysis (FA) in the middle space of the Gaussian mixture model (GMM) vectors has been popular in modern voice verification systems. This representation, which is widely known as the i-vector, maps utterances of arbitrary duration into a space of small and fixed dimension [3]. Recently, I-Vector-based technologies have become the latest technologies in the field of voice identification, closely following similar developments in the field of speaker identification (SID) [4-6]. More recently, voice identification approaches based on the Deep Neural Network (DNN) and Convolutional Neural Network (CNN) have become increasingly popular, and have been reported to offer comparable, and in many cases higher performance compared with the I-Vector-based VID methods formulated using a Gaussian Mixture Model Universal background Model Framework (GMM-UBM) based framework [7-9, 28].

The I-vector contains a significant amount of information, and therefore it has been found useful in various applications. Language and especially phonetic details are among the most important information contained in this vector. Thus, several methods used this vector to identify the language [4-8]. The use of this vector for age [9, 10] and emotion estimation [11] along with accent recognition [12, 13, 25] are among other applications of this type of representation. All of these applications, as well as its main voice recognition application, show the large amount of information it contains, so it seems reasonable to reduce the unrelated information of this vector for better speaker recognition. Various methods have been proposed for modeling speakers in i-vector space [14, 15]. The Gaussian PLDA is the most common that ignores the process by which i-vectors are extracted (that is, a point estimate of hidden variables in the FA model) and instead pretends that they are random vectors generated using the PLDA method. Although in most cases, PLDA provides higher accuracy. A number of channel compensation methods such as SN-LDA, SN-WLDA, and WLDA have been proposed to improve the performance of the i-vector based on the CSS system [16]. In General, the best modeling technique for voice recognition is one that takes into account only the information related to the speaker. We propose to use the training i-Vectors to train the initial DNN to identify the voice. Next, we present a novel strategy for using this initial DNN to strip the language labels of the inappropriate set from the development data. The final DNN for voice identification is trained using the original training data and the estimated out-of-set language data. We show that augmenting the training set with out-of- set labels leads to a significant improvement in voice identification performance.

Our approach makes it possible to obtain very competitive costs (defined by NIST) in the amount of 26.56 and 25.98, respectively, for the subgroups of progress and task estimates. Our approach makes it possible to obtain very competitive costs (defined by NIST) in the amount of 26.56 and 25.98, respectively, for the subgroups of progress and task estimates. Since the amount of training data is very limited (300 i-Vectors per language), this study outlines a successful recipe for DNN-based VID using very limited resources.

This study proposes a new approach to VID using DNN. We suggest training the initial DNN for VID using i-Vectors. The rest of the paper is organized as follows: Section 2 explains parts of the i-vector based voice verification system, and then the next section briefly describes some of the related work. In 3 - the problem of learning machine LRE. Section 4 describes Deep neural network (DNN). The experiments and results are presented in section 5, and finally the conclusions are presented in Section 6.

2. Voice identification using the i- vector.

2.1. i-Vector extractor. The i-vector extractor is a system that converts a speech utterance of arbitrary duration into a vector of fixed length [1]. For this purpose, the Baum-Welch statistic should be extracted from the universal background model (UBM), which can be a GMM model or a hidden Markov model (HMM). In this system, the average super vector for an utterance can be modeled as follows:

$$s = m + Tw\ . \tag{1}$$

where m is the session-independent and channel-independent components of the mean supervector obtained froFm UBM, T is the basis matrix covering the subspace encompassing the important (both for the speaker and the session) in the super vector space, and w is the standard, normally distributed hidden variable. For each observation sequence representing an utterance, our i-vector is a point estimate of the A-a posteriori maximum (MAP) for the hidden variable w. Our I-vector extractor training procedure is based on the effective implementation proposed in [24, 26].

First it is necessary to build UBM using the utterances in the development set to use this method. Then, using this model, the zero and first order statistics (the Baum – Welch statistics) are calculated from the developmental utterances and used to evaluate the T matrix. The average UBM super vector is typically used for the super vector m, and this is not necessary for evaluation. After training the model parameters, the calculated statistics from each statement are used to extract the corresponding i-vectors to be used for the next steps. Unlike the JFA method, in the i-vector method, there is no circuit for removing channel effects. Therefore, it is necessary to remove channel effects separately after extracting the i-vector. Various methods have been adopted for this purpose, and the two most common methods are described in the next section.

2.2. DNN tandem extraction. The Deep Neural Network system serves as an acoustic modeling network used to extract the tandem function of a phonetic level. First, the DNN acoustic model is trained using acoustic characteristics and phonetic label data. Then the MFCC function is assigned to the DNN model, and we can extract the given probabilities of the associated states of triphons. We use VAD method on top of it to create low-dimensional tandem functions. Finally, the tandem function is combined with the MFCC function to generate a hybrid function.

The number of input - x_n and output- Y neurons is known. Each of the number of input neurons corresponds to one set of numbers. And on the output layer there is only one neuron, the output of which corresponds to the voice recognition value. Given n data points $\{x_1, x_2, .. x_n, \}$ sampled from the underlying submanifold Y, it is possible to construct acoustic modeling in the DNN system, in figure 1. x_n – n-th input value.

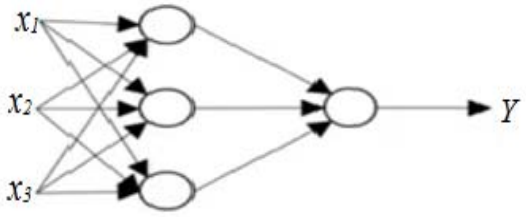

Figure 1 – Neural network with one feedback DNN system

2.3. Related works. As a rule, there are two types of errors in voice verification systems. First, it is a false reject error. The main reason for this type of error is inconsistency, which can be caused by various reasons, a change in the state of the speaker (e.g. stress [17], haste, etc.) or even intentional changes in the pronunciation, such as whispering. All these differences in speech conditions during testing and training increase the variance within the class. This leads to an increase in false deviation errors. Various compensation methods have been proposed to reduce the impact of such changes:

1. NAP: Nuisance Attribute Projection (NAP) removes nuisance subspaces.

The orthogonal projection, which depends only on the dynamics, is performed in the extra channel space using the projection matrix. This method was used both in the average super vector and in the i-vector spaces [3,18, 19] to minimize false deviations and false errors of adoption at the training stage of the support vector machine (SVM). In other words, this method scales the space to remove dimensions with a high intraclass dispersion. Consequently, this method reduces the intraclass variance [3, 20, 21].

2. JFA: The purpose of the joint factor analysis (JFA) method is to model channel effects and dynamics separately in two different subspaces. In this method, the average super vector is decomposed into two separate super vectors, where one relates to the dynamics and the other to the channel. After this decomposition, the super vector representing the channel effects is discarded and, therefore, the channel effects are excluded from the solution [22, 23, 27].

3. LDA: this method is used in pattern recognition to reduce differences between classes and to increase differences between classes. This method is also used to reduce the dimension in the classification. Since this method reduces intra-class variations, it can be used to reduce channel effects [3].

4. PLDA: this is a probabilistic method whose purpose is to decompose the i-vector space into two separate subspaces for the dynamics and the channel. This method is similar to JFA in some respects.

The second type of errors in voice verification systems is a false acceptance error. The main reason for this error is the presence of similarities between the vectors of different speakers. These similarities have different causes and can be grouped into two categories: the first is a set of similarities associated with the speaker. This type of similarity allows us to identify the speaker by his vectors. In the case of two loudspeakers with very similar voices (whether in a natural way or by emulating / converting a voice), the similarity of interconnected voices between their respective vectors increases, and this, in turn, leads to an increase in the frequency of erroneous acceptance errors. The second category of similarities is a set of non-speaking vector similarities that can be associated with different sources, such as channel similarities, a microphone, or similarities in a spoken text. As far as we know, no method has been proposed to reduce the effects of this kind of similarity. This study aims to study information fully connected direct neural network using i-Vector to reduce their impact.

3. LRE I-Vector machine learning challenge. The NIST LIR i-Vector Machine Learning challenge is aimed at developing new VID techniques employing i-Vectors for conversational/narrow-band broadcast speech [12]. The challenge consists of 3 distinct data sets: a training set with 300 i-Vectors per language, corresponding to each of the 50 insert target languages , a test set and a development set. The speech utterances corresponding to the training-set i-Vectors were chosen so that their durations exhibit a log-normal distribution with a mean duration of 35.15s. The development and test-set were unlabeled, and also contained i-Vectors corresponding to out-of-set languages.

The primary task of the challenge is to identify the corresponding language of a test i-Vector, or to assign it as an "out of set" (a single label corresponding to the out-of-set languages), if the i-Vector is deemed not to correspond to any of the 50 in-set languages. The test-set was divided randomly into progress subset (30% of the test-set) and evaluation subset (70% of the test-set). The challenge rules did not allow using the outputs corresponding to other test i-Vectors to be used in any way in evaluating the output of a given test i-Vector [12]. The performance was assessed using the following cost function defined by NIST,

$$C_{cost} = \frac{(1-P_{OOS})}{n} * \sum_k^n P_{error}(k) + P_{OOS} * P_{error}(OOS) \quad (2)$$

$$P_{error}(k) = \left(\frac{no.of\ errors\ for\ class\ k}{no.of\ trials\ for\ class\ k}\right), n = 50, P_{oos} = 0{,}23 \quad (3)$$

The cost for progress subset and evaluation subset were evaluated by NIST.

4. Deep Neural Network (DNN) for the VID using i-VECTORS. In [8], large amounts of labeled training data were used to initially train an ASR system, which was then used to generate the senone alignments to train a CNN. In this framework, the CNN/DNN replaced a GMM-UBM to compute the posteriors needed for i-Vector extraction, and subsequent steps of i-Vectors based VID essentially remained unchanged. The front-end for CNN/DNN training utilized filter-bank outputs. A more direct approach to VID using DNNs was outlined in [10], where the output layer nodes correspond to the in-set languages along with a single node for out-of-set languages. This approach also utilized large amounts of labeled training data and employed PLP features. Our study proposes to train a DNN for VID using i-Vectors unlike existing CNN/DNN based VID techniques. To account for the out-of-set data present in the test-set, we adopt a novel 2-step DNN training strategy, where the initial DNN is trained using only in-set labeled training data. The initial DNN is then used to estimate out-of-set labels from the development data. Next, we train a second DNN for VID with both in-set and estimated out-of-set labels. Moreover, since the amount of training data is very limited, we also investigate and comment on the efficacy of some popular techniques to overcome the issue of limited training data. We have used the PDNN toolkit for the experiments reported in this study [16]. The following subsections describe details of the proposed DNN based approach for VID using i-Vectors.

4.1. DNN training for in-set languages using i-Vectors. We use a fully connected feed-forward neural network for VID in the experiments reported here. The hidden-layer units use a sigmoid activation function. The output layer is a softmax layer with output nodes corresponding to the in-set languages. Let the target classes be represented as Y , W and b be the weight matrix and bias vector respectively. The output at the ith node of the output layer, corresponding to the input vector x can be expressed as,

$$P(Y = i|x, W, b) = softmax_i(W_x + b) = \frac{e^{W_i x + b_i}}{\sum_j e^{W_j x + b_j}} . \quad (4)$$

Next, the predicted language Y_{pred} is evaluated as:

$$Y_{pred} = argmax_i P(Y = i|x, W, b) \quad (5)$$

The highest score corresponding to the label evaluated in (5) can be obtained using

$$Y_{max} = max_i P(Y = i|x, W, b) \quad (6)$$

the number of tutorial data labeled is very limited, to explore several techniques to examine if they offer any improvement in the performance of our DNN based VID system. Of particular interest are techniques of dropout, and unsupervised generative pretraining, which have been reported to be very

effective when training DNN with limited amounts of data [17, 18]. In the dropout technique, certain units of the hidden layers together with their connections are dropped randomly. This, in turn, minimizes the overfitting in the DNN by reducing the co-adaptation of the network parameters [17]. Unsupervised generative pretraining allows the DNN to use more information from the training data than contained within the labels alone [18]. It has been reported to prevent overfitting by introducing regularization [19], and has been widely used in DNN based ASR techniques [18, 20]. Additionally, L2-norm regularization is also applied since it reduces overfitting by preventing the network weight parameters from assuming very large values.

4.2. Estimating out-of-set labels for training from development data. The DNN trained on the in-set languages is used to estimate labels corresponding to out-of-set languages from the development data. Specifically, corresponding values of $У_{max}$ are computed using (6) for the i-Vectors of the development set. Next, all i-Vectors with the corresponding scores ymax for some suitable threshold θ (computed using the development set) are assigned the label "out of set" (label corresponding to out-of-set data).

4.3. DNN training with "in-set" and "out-of-set" labels. In the second stage, a new DNN is trained using the i-Vectors for the in-set languages and the i-Vectors corresponding to the out-of-set languages estimated from the development data. Thus, this DNN has an extra node in the output layer compared to the initial DNN to account for the out-of-set languages. The same strategies as mentioned previously in Section 4.1 are applied to make optimal use of the limited training data. The language labels for the test i-Vectors were assigned using (5). Figure 2 presents an overview of the proposed DNN based VID approach. Since the amount of total training data available increased after including the labels for out-of-set languages, we also explored varying the architecture of the DNN compared to what was used for the initial DNN mentioned in Section 4.1. Specifically, we explored using more units in the hidden layers as well as deeper networks.

5. Experiments, results and discussions. An initial DNN for VID was trained using the i-Vectors of the training set. We employed the mini-batch Stochastic Gradient Descent (SGD) algorithm with a mini-batch size of 256, and backpropagation to train the DNN [21]. The DNN had 2 hidden layers with 1024 units each. The input layer had 400 nodes corresponding to the 400-dimensional i-Vectors provided by NIST for the challenge. A dropout factor of 0.2 was used for each of the 2-hidden layers of the DNN. The output layer had 50 nodes corresponding to all the in-set languages. For each of the in-set languages, 10% of the labeled training data (30 i-Vectors per language) was randomly set aside as a held-out set to monitor DNN training.

Table 1 – Cost obtained using the initial DNN (DNN1) trained on the in-set languages for output-labels without (No out of set), and with the out-of-set (With out of set) labels

LID System	Output-label	Cost (progress subset)
DNN1	No-out of set	37.38
DNN1	With-out of set	32.71

As can be observed from results in Table 1, detecting out-of-set languages in the output offers a big improvement by lowering the cost by 4.67% absolute (12.49% relative).

5.1. Effect of out-of-set detection on the cost. From (1), it is clear that detecting "out of set" labels correctly is critical to obtaining a competitive cost function value on the test-set. In table 1, the results for two different sets of output-labels are shown for the progress subset.

Two-step DNN training for VID obtained using the same initial DNN (DNN1) trained with the in-set languages. The output-labels for "No out of set" were obtained using (5) by using the estimated in-set output- labels for the test i-Vectors. Next, using (6), y_{max} was estimated for each i-Vector of the test-set. To obtain the output-labels for "With out of set", any $У_{pred}$ with the corresponding $У_{max} <$, for some suitable threshold estimated using the development data, was assigned the output-label "out of set".

Comparing results of tables 1 and 2, including the estimated out-of-set labels in DNN training offered a signifi- cant reduction in cost by 5.89% absolute (18% relative), when the cost obtained using DNN2 1024 (26.82) (table 2) is compared against the "with out of set" DNN1 from Table 1. Increasing the units in the hidden layers offered a marginal re- duction in cost as evident by the results for DNN2 2048. Both

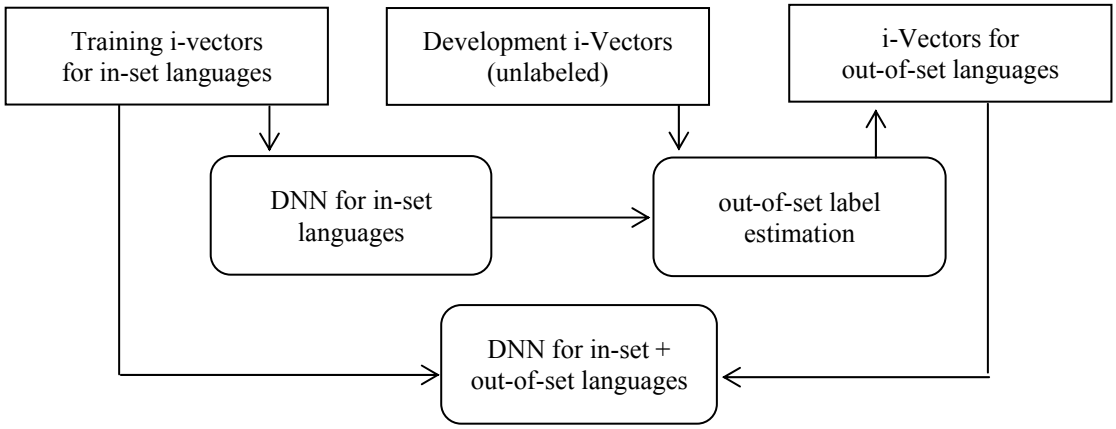

Figure 2 – 2-step DNN training for VID using i-Vectors

Table 2 – Cost obtained using the DNN with 1024 (DNN2 1024),
and 2048 (DNN2 2048) units per hidden-layer trained using the augmented (in set + estimated out-of-set)
training set compared against a CDS baseline system

LID System	Cost (progress subset)
DNN2 1024	26.82
DNN2 2048	26.56
CDS (baseline)	39.59

DNN2 1024 and DNN2 2048 are significantly better than the CDS baseline system by over 32% (relative). DNN2 2048 obtained a cost of 25.98 on the evaluation subset of the NIST LRE i-Vector ML challenge. The results obtained using the proposed DNN based VID approach are comparable to SVM based VID techniques, and offer further improvements in system fusion of the two approaches [22]. We also explored using more than 2 hidden layers for training the DNNs. Adding more layers to the DNN caused degradation in VID performance since the limited training data was insufficient to estimate the new additional parameters.

5.3. Investigating the efficacy of dropout and generative pretraining for DNN training. We investigated the use of dropout and unsupervised generative pretraining for DNN training with limited resources. It was observed that VID performance improved with progressively higher values of the dropout factor from 0.1 to 0.5, after which it started to degrade. A dropout factor of 0.5 for each of the 2-hidden layers achieved the DNN results shown in Table 2. When DNN2 1024 (trained on in-set and estimated out-of-set labels) was retrained after applying unsupervised generative pretraining (using the unlabeled development set), the cost on the progress subset degraded from 26.82 to 28.46. Evidently, pretraining did not offer any improvement to the pro- posed DNN based approach for VID. Unlike optimal acoustic features like filter-bank outputs, i-Vectors offer a more compact representation of a speech utterance. We hypothesize that this causes i-Vectors to lose much of the additional information compared to acoustic features such as filter-bank outputs. Since unsupervised generative pretraining works by utilizing the additional information contained within the features [18], it probably fails to access such information when i-Vectors are used. The limited amount of available development data could be another reason why unsupervised generative pre-training failed to offer any improvement.

6. Conclusions. This study presented a novel approach to VID using very limited training data. To explicitly detect the out-of-set lan- guages, we proposed a novel 2-step DNN training strategy, in which a DNN for VID trained using the in-set labeled training data was used to estimate out-of-set labels from an unlabeled development set. The training set augmented with the out-of-set labels was then used to train a second DNN for VID that could also detect an out-of-set language in addition to the in-set languages. This was shown to offer significantly better VID performance than a DNN utilizing only the in-set labeled data

for training. Also, the proposed approach significantly outperformed a CDS based baseline system, and obtained very competitive costs on the progress and evaluation subsets of the LRE i-Vector Machine Learning Challenge.

This study has therefore outlined a successful recipe for DNN based VID using very limited resources.

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ВЕРИФИКАЦИЯ ГОЛОСА С ИСПОЛЬЗОВАНИЕМ I-ВЕКТОРЫ И НЕЙРОННЫХ СЕТЕЙ С ОГРАНИЧЕННЫМИ ДАННЫМИ ОБУЧЕНИЯ

Аннотация. В этом исследовании предлагается подход к идентификации голоса на основе нейронных сетей (DNN) для i-Vector. Современные системы идентификации голоса на базе DNN используют большие объемы помеченных данных обучения. Используя LRE i-Vector, Machine Learning Challenge ограничивает доступ только к готовым к использованию i-Vector для обучения и тестирования системы идентификации голоса. Это создает уникальные проблемы при разработке систем идентификации голоса на основе DNN, поскольку оптимизированные внешние интерфейсы и сетевые архитектуры больше не могут использоваться. Мы предлагаем использовать обучающие i-Vectors для обучения начального DNN для идентификации голоса. Далее мы представляем новую стратегию использования этого начального DNN, чтобы лишить языковые метки несоответствующего набора из данных разработки. Окончательный DNN для идентификации голоса обучается с использованием исходных данных обучения и оценочных данных языка, не установленных. Мы показываем, что добавление тренировочного набора с несоответствующими метками приводит к значительному улучшению производительности идентификации голоса.

В данной работе была исследована возможность применения нейронных сетей для идентификации речи. В частности, были рассмотрены стандартные подходы к распознаванию речи, определено понятие искусственного нейрона, как объекта, используемого в идентификации речи. Был исследован вариант распознавания речи с помощью нейронной сети, и представлены шаги для выполнения этой задачи.

Ключевые слова: идентификация языка, i-Vector, глубокая нейронная сеть.

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REFERENCES

[1] Ambikairaj E., Li H., Van L., Yin B., Sethu V. Language Identification: A Tutorial // IEEE Circuit and Systems Journal. 2011. Vol. 11, N 2. P. 82-108.

[2] Mutusami J.C., Barnard E., Cole R. A Review of Automatic Language Identification // Signal Processing Log. IEEE. 1994. Vol. 11, N 4. P. 33-41.

[3] Dehak N., Kenny P., Dehak R., Dumushel P., Owel P. The frontal analysis of factors for the verification of speakers // IEEE Trans Audio, Speech, Lang Process 2011. 19: 788-98.

[4] Dehak N., Torres-Carrasquillo P.A., Reynolds D.A., Dehak R. Language recognition through i-vectors and reduction of dimension // Interspich. 2011. P. 857-60.

[5] D'Haro Enriquez L.F., Glembek O., Plchot O., Mateyzhka P., Sufifar M., Cordova Errald Rd and others. Recognition of phonotaxic language using i-vectors and the number of posteriorіogram phonemes. 2012.

[6] D'Haro L., Cordoba R., Caraballo M., Pardo J.M. Recognition of a low-resource language using a combination of phonogram phonograms, acoustic and glottal i-vectors // Q: 2013 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). 2013. P. 6852-6.

[7] Lee M., Narayanan S. Simplified controlled i-vector modeling with application for reliable and effective language identification and speaker verification // Comput Speech Lang. 2014. 28: 940-58.

[8] Martinez D., Pleshot O., Burget L., Glembek O., Mateika P. Language recognition in the space of i-vectors // Proceedings of Interspeech. Florence, Italy, 2011. P. 861-4.

[9] Bahari M.Kh., Maclaren M., Van Leeuwen D. Estimation of age from telephone speech using i-vectors // Interspich, 2012. P. 506-9.

[10] Bahari M.H., McLaren M., van Leeuwen D.A. Estimation of the age of speakers using i-vectors // Eng Appl Artif Intell. 2014. 34: 99-108.

[11] Xia R., Liu Ya. Using the i-vector space model for recognizing emotions // Interspich. 2012.

[12] Bahari M.Kh., Saeidi R., Van Leeuwen D. Accent recognition using the i-vector, Gaussian mean supervisor and Gaussian rear supervisor of probability for spontaneous telephone speech // Q: 2013 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). 2013. P. 7344-8.

[13] Behravan H., Hautamäki V., Kinnunen T. Detecting foreign accent in spoken Finnish using i-vectors // Interspich. 2013. P. Fourteenth.

[14] Kenny P. Bayesovsky speaker checks with heavy-tailed priors // Odyssey 2010 – Language Recognition and Speaking Workshop, Brno, Czech Republic. 2010.

[15] Burget L., Plchot O., Kumani S., Glembeck O., Mateik P., Brammer N. Discriminatory trained probabilistic linear discriminant analysis for speaker verification // Q: 2011 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). 2011. P. 4832-5.

[16] Kanagasundaram A., Din D., Sridharen S., Maclaren M., Vogt R. I-vector speaker recognition using advanced methods for compensating channels // Comput Speech Lang. 2014. 28: 121-40.

[17] Hansen J.H. Analysis and Compensation of Speech Under Stress and Noise for Environmental Sustainability in Speech Recognition // Speech Commun. 1996. 20: 151-73.

[18] Campbell V.M., Sturim D.E., Reynolds D.A., Solomonov A.A. Verification of SVM loudspeakers using the GMM supervector core and NAP variability compensation // Q: 2006 IEEE International Conference on Acoustics, Speech and Signal Processing, ICASSP 2006 Materials. Toulouse; 2006. P. II.

[19] Solomonov A., Quillen S., Campbell V.M. Channel compensation for recognition of SVM dynamics // Odyssey 04; 2004. P. 219-26.

[20] Solomonov A., Campbell V.M., Boardman I. Achievements in the field of compensation channels for the recognition of speakers SVM // B: ICASSP. 2005. Vol. 1. P. 629-32.

[23] Hatch A.O., Kayarekar S.S., Stolke A. Intraclass covariance normalization for recognition of speakers based on SVM // Interspich. 2006.

[21] Dehak N., Kenny P., Dehak R., Glembek O., Dyumuchel P., Burget L. and others. Support vector machines and joint factor analysis for speaker verification // IEEE International Conference on Acoustics, Speech and Signal Processing. 2009. ICASSP 2009; 2009. P. 4237-40.

[22] Kenny P., Bulian G., Owel P., Dumushel P. Dynamicity and variability of the session when testing the speaker on the basis of GMM // IEEE Trans Audio, Speech, Lang Process. 2007. 15: 1448-60.

[23] Kenny P., Oueleth P., Dehak N., Gupta V., Dumushel P. Study on the variability of inter-speaker speakers when verifying speakers // IEEE Trans Audio, Speech, Lang Process. 2008. 16: 980-8.

[24] Ondrey Glembeck, Lukas Burghet, Pavel Mateika, Martin Carafiat and Patrick Kenny. (2011) "Simplification and optimization of i-vector extraction" // ICASSP, IEEE Int. Conf. Acoust. The process of the speech signal. P. 4516–4519.

[25] Mamyrbayev O.Z., Kunanbayeva M.M., Sadybekov K.S., Kalyzhanova A.U., Mamyrbayeva A.Z. Ont of the methods of segmentation of speech signal on syllables // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2015. Vol. 2. P. 286-290.

[26] Ali B.B. , Wojcik W., Mamyrbayev O., Turdalyuly M., Mekebayev N. Speech Recognizer-Based Non-Uniform Spectral Compression for Robust MFCC Feature Extraction // Przeglad Elektrotechniczny. 2018. Vol. 94, Publ. 6. P. 90-93.

[27] Mamyrbaev O.Z., Muhsina K.Z. Analysis of existing systems for determination of tonnity of text // News of the National academy of sciences of the Republic of Kazakhstan. Series physico- mathematical. 2017. Vol. 5, Publ. 315. P. 149-155.

[28] Mamyrbayev O., Turdalyuly M., Mekebayev N., Alimhan K., Kydyrbekova A., Turdalykyzy T. Automatic Recognition of Kazakh Speech Using Deep Neural Networks // Intelligent Information and Database Systems 11th Asian Conference, ACIIDS, Yogyakarta, Indonesia, Proceedings. Part II, April 8–11, 2019. P. 465-474.

[29] Tasmambetov Zh.N., Rajabov N., Issenova A.A. The Construction Of A Solution Of A Related System Of The Laguerre Type // Of the National Academy of sciences of The Republic of Kazakhstan. Series Physico-Mathematical. 2019. Vol. 1(323). P. 38-45. https://doi.org/10.32014/2019.2518-1726.5

[30] Kassymova K.G., Arpentieva R.M., Kosherbayeva A.N., Triyono B.M., Sangilbayev O.S., Kenzhaliyev B.K. Science, Education & Cognitive Competence Based On E-Learning // Bulletin of National Academy of Sciences of the Republic of Kazakhstan. ISSN 1991-3494. 2019. Vol. 1, N 377. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

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INFERTILITY ASSOCIATED WITH ENDOMETRIOSIS – IS IT A "DILEMMA" OR ALL ABUNDANTLY CLEAR?

Abstract. Endometriosis is still a phenomenon that hides its true face and there is nothing surprising in the fact that this pathological condition is a "disease of mysteries and assumptions." "The problem is within the problem" is infertility on the background of endometriosis with radically different ways of its overcoming. The hypothesis that endometriosis causes infertility or reduces fertility remain controversial. The review deals with the pathogenesis, diagnosis and treatment of infertility, associated endometriosis.

Key words: infertility, endometriosis, in vitro fertilization (IVF).

Introduction. Regarding the causes of endometriosis, there are many theories, however, the true mechanisms of its occurrence are still a mystery. Existing theories of etiopathogenesis do not reveal the true essence of endometriosis-associated infertility. It is known that 176 million women of reproductive age suffer from endometriosis, of which only 15-20% have no fertility problems, but it is believed that in reality, this percentage is much lower (2-10%) [1]. In this regard, the problem of endometriosis-associated infertility is of particular relevance. At the same time, it is impossible to equate endometriosis with infertility.

It is believed that the key pathogenic links of endometriosis are closely interrelated and include excessive local production of estrogen, resistance to progesterone, inflammation and neoangiogenesis, which does not allow to inhibit the pathological process at the initial stages and explains infiltrative growth, invasion into the surrounding tissues with their subsequent destruction and the spread of lesions [2]. To explain the nature of endometriosis proposed many different theories, the most common of them is the hypothesis of J. A. Sampson on implantation of viable endometrial cells in the pelvic area during retrograde menstruation [1, 3, 4]. The most likely cause of reduced ability to conceive are anatomical changes in the pelvic organs, such as occlusion of the fallopian tubes, adhesive deformation of the fimbriae, complete isolation of the ovaries by periovarian adhesions, direct damage to ovarian tissue by endometrioid cysts[1, 3-5].

The mechanisms of the pathophysiology of endometriosis associated with infertility. Despite the large number of studies on the pathogenesis of endometriosis, which the authors are trying to reveal the most subtle, ultrastructural and biochemical the mechanisms of this disease are riddles, the reasons for the formation of both the disease and endometriosis-associated infertility still remain controversial.

In the literature you can find a description of various factors of infertility in endometriosis. **Tubal-peritoneal factor** of infertility in endometriosis is characterized by the germination of endometrioid heterotopias in their lumen, anatomical obstruction of the fallopian tubes is characterized by their obliteration against the background of adhesions in the pelvis[1, 3]. It is assumed that periovarian adhesions can complicate the rupture of the walls of the preovulatory follicle, prevent the passage of the egg from

the ovary to the ampullary part of the fallopian tube. In some cases, tubal obstruction in endometriosis may be purely functional. According to the observations, discoordinated contractile activity of the tubes was recorded in almost every second patient with endometriosis and anatomically passable tubes [1, 3]. The reason for this may be a violation of the balance of sex steroids, which is typical for endometriosis absolute or relative basal hyperestrogenia, as well as peak emissions of estradiol in the luteal phase in combination with progesterone insufficiency. Imbalance of sex hormones, causing functional tubal infertility, may be a consequence of violations of the level and secretion of gonadotropins. With endometriosis of different localizations, insufficient peak LH rises can be observed, as well as random emissions of LH and FSH into the luteal phase, accompanied by a violation of the normal dynamics of the formation of ovarian hormones with a predominance of estrogen production. An important role also belongs to the formation of local inflammation: imbalance in the formation of prostaglandins, exerts on the fallopian tubes as spastic (F2α), so and relaxing impact (E) [1, 3, 9]. The pathogenetic mechanism of formation of adhesions in endometriosis is an inflammatory reaction of the peritoneum caused by periodic menstrual-like hemorrhages in endometrioid heterotopy. Endometrioid implants have been found to secrete estradiol, progesterone, monocyte chemotactic protein (MCP-1), vascular endothelial growth factor, and proinflammatory cytokines such as interleukins (IL-1, IL-6, and IL-8) and tumor necrosis factor alpha (TNF-a) [10]. Secretion of these substances promotes proliferative and angiogenic activity, development and progression of endometriosis. Endometrial cells exposed to peritoneal fluid in patients with endometriosis have been shown to enhance expression of endothelial growth factor genes and plasminogen activator (10). Since fertilization takes place in the fallopian tube, changes in the composition of the abdominal fluid directly affect the fertilization process. As an example, these changes can disrupt sperm motility due to IL-1, IL-6 secreted by macrophages and a factor inhibiting macrophage migration (MIF) [11]. In addition, TNF-a can damage sperm DNA, due to apoptosis and the negative effects of oxidative stress [12].

Another pathogenetic mechanism in the development of infertility in endometriosis is a **violation of the receptivity of the endometrium.** In infertile patients with endometriosis revealed molecular defects associated with changes in the expression of a large number of cytokines and biologically active substances regulating the homeostasis of the endometrium, resistance to progesterone simulates the late secretory phase, leading to premature initiation of inflammation [13]. As a result, proinflammatory cytokines, chemokines and prostaglandins accumulate in the endometrium, and all these inflammatory mediators interact with each other. Abnormally elevated ER isoform, which occurs in patients with endometriosis in the secretory stage, can lead to implant failure [14]. Eutopic endometrium in women with endometriosis contains significant activity of the enzyme aromatase P450, which increases the local activity of estrogen [15]. Stromal cells obtained from the endometrium of a woman with endometriosis have a reduced ability to decidualize [16], which is probably due to resistance to progesterone and inflammatory cytokines TNF-a and IL-1 [17]. The receptivity of the endometrium is associated with expression of integrin of the endometrium, but women with endometriosis have a reduced expression of avb3, possibly due to the decrease in HOXA10 [18]. Other implantation-related biomarkers, such as glycodelin A, osteopontin,LIF, lysophosphatidic acid receptor 3 and insulin-like growth factor binding protein 1 (IGFBP1), are also addressed). As a result of the studies, the increased content of the EMX2 gene during the implantation window was revealed in patients with endometriosis, which may lead to a decrease in the frequency of implantation [19]. Unsuccessful implantation of blastocyst into the endometrium may be associated with the activation of contractile function of the myometrium caused by progesterone insufficiency, imbalance of prostaglandin production and oxidative stress, as well as exposure to autoantibodies by damage to the receptor apparatus of the endometrium [12].

Another pathogenetic link in the formation of infertility in endometriosis is the development of chronic anovulation and luteal phase insufficiency [1, 3]. One likely reason for this may be the basal hyperestrogenia, aromatase provoked by increased activity in endometriotic tissues. The relatively high level of estrogen in the proliferative phase of the menstrual cycle on the basis of feedback leads to either inhibition of production of FSH, thereby slowing down the maturation of the follicles, or contributes to a tendency to premature peak of LH occurs luteinization Novoulyanovsk of the follicle, or is accompanied by chaotic fluctuations of FSH and LH. Increased levels of estrogen in endometriosis can provoke hyperprolactinemia, which occurs in some patients with infertility. Under the influence of excess prolactin

inhibits the effect of gonadotropins on steroidogenesis in the ovaries due to the competitive binding of prolactin with receptors to FSH and LH. Increasing the level of prolactin inhibits gonadotropin secreting function of the pituitary gland, blocking the spontaneous peak of LH secretion. As a result of such changes, chronic anovulation is formed [1-3].

Often, the influence of endometrioma on the morphofunctional state of the ovary, including contralateral, which is due to the diffusion of the content of endometrioid cyst into the surrounding tissues [20]. The content of the endometrioma is a rich source of proinflammatory cytokines, iron, reactive oxygen species, and growth factors [20]. There are many publications on the negative effect of oxidative stress resulting from local inflammatory reactions on the ovarian structure adjacent to the endometrioma [21]. Both TGF-b1 and reactive oxygen species (ROS) promote fibrosis in ovarian tissue [21]. Structural changes, including loss of ovarian stroma, have a negative impact on folliculogenesis due to impaired blood supply to follicles and reduced growth factors secreted by stroma cells [22]. Reduction of ovarian reserve after surgery for ECI, especially with bilateral localization, plays an important role in reducing the reproductive potential of women with NGE. Obtaining a "poor" response may be due to reduced sensitivity to follicle stimulating hormone (FSH), including genetically determined in some infertile women with endometriosis [23]. Wnt4, FSHB and VEZT genes have been found to be the most consistently associated genes with endometriosis, but the search for mechanisms of infertility at the genetic level continues [44].

There are many reports that in endometriosis in some of the infertile patients there is a decrease in the quality of oocytes and embryos, respectively (**«embryonic factor of infertility»).** There are reports that endometriosis is a dysfunction of the mitochondria of granulosa cells, which is accompanied by a decrease in the formation of ATP. The resulting energy deficit contributes to the development of oxidative stress, resulting in damage to the genetic apparatus of oocytes, which causes a further decrease in the implantation potential of embryos [23, 45]. There are many reports of follicular fluid studies, elevated cytokine concentrations in combination with low levels of antioxidant and antiproliferative factors in some infertile patients. High levels of IL-1, IL-6, IL-8 and IL-18 were found in the evaluation of follicular fluid in patients undergoing IVF. It is shown that the presence of intrafollicular IL-1 and IL-6 can negatively affect the follicular apparatus [24], high levels of IL-8, IL-12 were negatively correlated with the number of Mature oocytes obtained and the quality of embryos [25].

In addition to the described probable mechanisms of infertility in endometriosis, some researchers also add an immune theory (**immune factor**). Endometriosis is characterized by enhanced humoral immune response with an increase in the number of B-lymphocytes and production of autoantibodies [26]. Immunohistochemical analysis and evaluation of microarrays of gene expression showed that endometrioid heterotopias of infertile women contain an increased number of plasma cells and activated macrophages, and highly expressed stimulators of b-lymphocyte cytokines [27]. B-lymphocytes belong to the cytokine family of tumor necrosis factor, which plays a major role in the differentiation of B-lymphocytes, and its excessive expression is associated with autoimmune diseases [28]. High levels of B-lymphocytes lead to the production of large amounts of autoantibodies, which include antiendometrial, antiphospholipid and anti-nuclear antibodies. The formation of immunopathological processes is facilitated by the accumulation of tissue degradation products that are not completely eliminated from the body, but are phagocytized and resorbed by tissue macrophages surrounding the foci of endometriosis. Which contributes to the induction of autoimmune reactions against the tissues of the endometrium [1, 3, 28]. In conditions of inflammation, locally formed biologically active substances and cytokines activate peritoneal macrophages, which prevent the realization of sperm function due to their phagocytosis and/or inactivation by cytotoxic mediators.

M. T. Beste et al. it was shown that in patients with endometriosis, there were changes in the cytokine profile, revealed a significant content of interleukins (IL-1, IL-1b, IL-6, IL-8, IL-10, IL-16), hepatocyte growth factor (HGF), monocytic chemotoxic factor (MCP-1), interferon gamma (IFN-g), granulocytic-colony stimulating factor (G-CSF-granulocyte). colony stimulating factor), growth-regulated oncogenes and RANTES (regulated upon Activation, Normal T cell Expressed, and Secreted chemokine secreted by T-cells upon activation). The study found that the level of cytokines directly correlates with the process controlled by macrophages associated with proto-oncogenes (NFkB - nuclear factor kappa-light-chain-enhancer of activated B cells), Jun (c-Jun), Fos (c-Fos), activator protein 1 (AP-1) and mitogen-activated protein kinase (MAPK) [29].

In addition, infertility in endometriosis to some extent contributes to the **violation of sexual function** due to severe dyspareunia, complicating regular sexual life and/or ensuring full sexual intercourse [1-4].

Diagnostic algorithm of a patient. To date, none of the existing classifications of endometriosis is not recognized as universal. One of the most widely used in the world practice was the classification proposed in 1979 by the American fertility society (since 1995 – the American society for reproductive medicine) and revised in 1996, based on the calculation of the total area and depth of lesions of endometrioid heterotopias expressed in points [1-4]. However, this classification is not without drawbacks, the main of which is the frequent mismatch of the stage of distribution, determined by counting points, the true severity of the disease and the lack of proper, in particular, an objective assessment of infiltrative forms of the disease. Based on the assessment provided, depending on the degree of prevalence, endometriosis can be described as "minimal", "mild", "moderate" and "severe" or correspond to stage I, II, III, IV, respectively [1-4].

If NGE is suspected in patients with infertility, a comprehensive examination is indicated. In the process of diagnosis, it is mandatory to clarify the state of the ovarian reserve for choosing an individual plan of treatment for overcoming infertility. Assessment of ovarian reserve include: determination of the concentration of FSH, antimullerian of the hormone concentration of estradiol in serum, and ultrasound examination (sonography) of the ovaries on 2-3rd day of the menstrual cycle counting the number of antral follicles [1, 3, 30]. In women with endometriosis, attention is drawn to the poor quality of life, due to chronic pelvic pain, as well as a combination of symptoms such as dysmenorrhea, dyspareunia, dysuria and dyschesia. It is necessary to take into account the data of anamnesis, gynecological examination and the results of instrumental methods, including ultrasound, laparoscopy and hysteroscopy. As an additional examination can be used hardware imaging techniques such as Doppler, computer and magnetic resonance imaging. In case of suspicion of a deep invasive form of the disease (defeat of the intestine or bladder) , auxiliary examinations such as colonoscopy, cystoscopy, rectal ultrasonography may be required [1-4]. Laparoscopic visualization of foci with subsequent histological examination is the "gold" standard of endometriosis diagnosis in clinical practice [1-4].

Treatment of endometriosis - associated infertility. To date, there is no "ideal" operation or universal drug that would allow complete regression of endometriosis foci and thus eliminate the possibility of recurrence.

For many years, with the goal of hormone suppressive therapy was offered a different hormonal medication (combined oral contraceptives, progestogen, gestrinone, danazol or inrg) to reduce the severity of pain associated with endometriosis [30-33, 45]. Considering the recommendations of international societies on the effectiveness and appropriateness of hormonal therapy, it is known that the suppression of ovarian function in endometriosis as monotherapy to improve fertility with minimal or moderate endometriosis is ineffective (Ia). However, before art use inrg (Ia) increases the frequency of clinical pregnancy. At the same time, suppression of ovarian function in endometriosis after surgical treatment of endometriosis with subsequent wait-and-see therapy has no positive effect on the pregnancy rate (Ia) [34]. The combination of medical and surgical therapy certainly leads to a better outcome of the treatment of chronic pelvic pain [35].

The existing set of different surgical techniques and types of energies used in surgical treatment, such as CO 2 -laser ablation, resection or cystectomy, aspiration by ultrasound and drainage of the content of endometrioid cyst in laparoscopic access [36, 37], indicate the need for a personalized approach in each specific clinical situation [38, 39]. It should be borne in mind that the most common surgical complication, especially with endometrioma cystectomy, is a decrease in ovarian reserve of the ovary and, as a consequence, the appearance of iatrogenic infertility or premature ovarian depletion [38].

The question of tactics of management of patients with endometroid ovarian formations is debatable today. According to the clinical recommendations on endometriosis approved by the Ministry of health of Russia in 2013, surgical treatment with laparoscopic access is preferred for the diagnosis and treatment of newly diagnosed ECUS for the purpose of diagnosis verification [1]. Laparoscopic cystectomy in patients with infertility and ECA with the established diagnosis on the basis of pathomorphological conclusion is recommended for the size of cysts more than 3 cm in order to clarify the diagnosis, improve access to maturing follicles in IVF, exclude the negative impact of the contents of the cyst on the process of ovulation and fertilization; in order to exclude the malignant process – at any size of formation [1-4, 30].

In modern gynecology and Reproductology urgent task is the implementation and analysis of new high-tech methods of tissue during surgical guides on the ovaries for maximum recovery of reproductive function, reduce the risk of disease recurrence and improve the quality of life of patients undergoing such operations[40].

To date, laparoscopic ablation of endometrioid foci in combination with adhesion is an effective method of treating infertility in I–II stage of NGE, and is up to 20-40 % (Ia) [34]. The effectiveness of surgical treatment of moderate and severe forms of endometriosis to improve fertility is contradictory , it is proved that the natural fertility recovery does not exceed 10 % of cases [23]. Surgical treatment in patients with infertility and NGE of moderate and severe forms does not initially aim to achieve spontaneous pregnancy, but serves only as a preparatory procedure aimed at improving the therapeutic effectiveness of IVF. According to the existing international recommendations after surgical treatment of patients with stage III–IV NGE, regardless of the state of the fallopian tubes, ovarian reserve indicators, the age of the observed, IVF is an alternative method of overcoming infertility [4, 30].

Thus, the question of choosing the most effective method of treatment, the appropriateness of its combination in the management of patients with infertility associated with endometriosis, including the role and characteristics of art programs, ways to improve their effectiveness, is currently the subject of extensive discussions.

In the development of tactics for the management of patients with endometriosis-associated infertility should take into account the state of ovarian reserve, the age of the woman, the duration of infertility, the presence of pain and the stage of the disease [4, 23, 30].

If PE is suspected in patients with infertility, diagnostic laparoscopy should be performed to clarify the stage of the spread of the endometrioid process in the pelvic area and, subsequently, the removal or destruction of endometrioid foci. In the case of established I–II stage of endometriosis, according to the domestic clinical guidelines for the management of patients with infertility from 2019 and international ESHRE-2014, it is possible to conduct wait tactics from 6 to 12 months after surgery [4, 30].

In the absence of pregnancy within 6 months, it is advisable to perform IUI against the background of induction of ovulation with gonadotropins [4, 24, 30]. According to numerous studies, IUI combined with controlled ovarian stimulation (CBS) is the most effective method of overcoming infertility in women with minimal or mild endometriosis [4, 24, 30]. Induction of ovulation and intrauterine insemination with minimal and mild endometriosis increases the incidence of pregnancy (Ib). Total CNB in subfertile women with stage I–II NGE, according to E. Kemmann et al. that was 7.3% against KOS with agonists of gonadotropin releasing hormone (inrg) and IUI, during KOS clostilbegyt and IUI – 6.6%, and the lowest values were established in the group of patients with wait-and-see tactics and 2.8%, respectively [41]. Art in infertile patients with endometriosis is an alternative method of overcoming infertility in the presence of tubal, male factor, as well as in the age of the patient over 35 years [4, 23, 30].

In the absence of pregnancy within 1 year, the use of IVF is recommended [4, 23, 30]. In particular, IVF should be considered as the 1st line therapy in patients with low ovarian reserve, older reproductive age and infertility for more than 2 years, as well as low fertility of the partner's sperm [23,30]. Some advantage may have "supergranny" Protocol using agnrs with infiltrative, disseminated endometriosis [42].

According to experts of the American society for reproductive medicine (ASRM), endometriosis, accompanied by infertility, should be considered as a disease in which it is necessary to develop a plan for the long-term management of the patient using medical treatment (according to indications!) to exclude repeated surgical interventions [1, 4, 30]. Patients with relapse of ovarian endometriosis require a personalized approach when choosing management tactics in order to achieve the desired pregnancy.

in patients with infertility, a diagnostic laparoscopy should be performed to clarify the stage of the spread of the endometrioid process in the pelvic area and, subsequently, the removal or destruction of endometrioid foci. In the case of established I–II stage of endometriosis, according to the domestic clinical guidelines for the management of patients with infertility from 2019 and international ESHRE-2014, it is possible to conduct wait tactics from 6 to 12 months after surgery.

Conclusion. The high incidence of endometriosis and not encouraging epidemiological data explain the need to search for any opportunities that increase the effectiveness of endometriosis therapy. However, neither the pathogenesis nor the diagnostics do not give a clear answer.

Thus, the choice of treatment can not fully rely on pathogenesis, and patient care consists of a set of measures. The formation of such a complex from a variety of possibilities – surgical treatment, the use of drug therapy, finally, art – only an illustration of the impotence of doctors before the disease-a mystery.

Consequently, the problem of endometriosis is so great that in the modern medical community began to spread the term "management of endometriosis", replacing the usual medical hearing "treatment". Each of these methods has accumulated Pro - and contraversions. This suggests that the key task is still the selection of patients for the application of a particular treatment strategy. So far, this selection is speculative and does not have clear criteria. This means that there is still no satisfaction with the results of treatment of endometriosis and overcoming endometriosis-associated infertility neither in patients nor in doctors in patients with infertility, diagnostic laparoscopy should be performed to clarify the stage of the spread of the endometrioid process in the pelvic area and, subsequently, the removal or destruction of endometrioid foci. In the case of established I–II stage of endometriosis, according to the domestic clinical guidelines for the management of patients with infertility from 2019 and international ESHRE-2014, it is possible to conduct wait tactics from 6 to 12 months after surgery.

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ЭНДОМЕТРИОЗБЕН БАЙЛАНЫСҚАН БЕДЕУЛІК – "ДИЛЕММА" НЕМЕСЕ БӘРІ АНЫҚ?

Аннотация. Эндометриоз әлі де өзінің шынайы бет-әлпетін жасыратын феномен болып қалады және бұл патологиялық жағдайдың"жұмбақтар мен болжамдардың ауруы" екеніне таңқаларлық ештеңе жоқ. "Мәселенің ішіндегі – мәселе" бұл эндометриозбен байланысты бедеулікті әртүрлі тәсілдермен түбегейлі жеңу. Эндометриоз бедеулікке әкеледі немесе өсімталдықты төмендетеді деген гипотеза контроверсиялық болып қалады. Шолу эндометриозбен байланысқан бедеуліктің патогенезіне, диагностикасына және еміне арналған.

Түйін сөздер: бедеулік, эндометриоз, экстракорпоралдық ұрықтандыру (ЭКО).

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БЕСПЛОДИЕ, АССОЦИИРОВАННОЕ ЭНДОМЕТРИОЗОМ – «ДИЛЕММА» ИЛИ ВСЕ ПРЕДЕЛЬНО ЯСНО?

Аннотация. Эндометриоз все еще остается феноменом, скрывающим свое истинное лицо, и нет ничего удивительного в том, что это патологическое состояние является «болезнью загадок и предположений». «Проблемой – внутри проблемы» оказывается инфертильность на фоне эндометриоза с радикально многообразными путями ее преодоления. Гипотезы о том, что эндометриоз приводит к бесплодию или снижает фертильность, остаются контроверсионными. Обзор посвящен патогенезу, диагностике и лечению инфертильности, ассоциированной эндометриозом.

Ключевые слова: бесплодие, эндометриоз, экстракорпоральное оплодотворение (ЭКО).

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REFERENCES

[1] Jendometrioz: diagnostika, lechenie i reabilitacija. Klinicheskie rekomendacii po vedeniju bol'nyh / Pod red. L. V. Adamjan. M., 2016.

[2] Adamjan L.V., Kulakov V.I., Andreeva E.N. Jendometriozy: Rukovodstvo dlja vrachej. M.: Medicina, 2006.

[3] Nacional'nye klinicheskie rekomendacii: Jendometrioz / Pod red. L. V. Adamjan. 2009.

[4] ESHRE guideline: management of women with endometriosis // Hum Reprod. 2014 Mar. 29(3). P. 400-12. doi:10.1093/humrep/det457. Epub 2014 Jan 15.

[5] Giudice L.C. Endometriosis // N. Engl. J. Med. 2010. 362: 2389-2398.

[6] Baskakov V.P. Klinika i lechenie jendometrioza. L.: Medicina, 1990. P. 230–6.

[7] Kulakov V.I., Savel'eva G.M., Manuhin I.B. Nacional'noe rukovodstvo: Ginekologija. 2009. P. 338-40.

[8] Borrelli G.M., Carvalho K.I., Kallas E.G., et al. Chemokines in the pathogenesis of endometriosis and infertility // J Reprod Immunol. 2013. 98: 1–9.

[9] Ahn S.H., Monsanto S.P., Miller C., et al. Pathophysiology and Immune Dysfunction in Endometriosis // BioMed Res Int. 2015. 2015: 795976.

[10] Rakhila H., Al-Akoum M., Bergeron M.E., Leboeuf M., Lemyre M., Akoum A., Pouliot M. Promotion of angiogenesis and proliferation cytokines patterns in peritoneal fluid from women with endometriosis // J. Reprod. Immunol. 2016. 116: 1-6.

[11] Yoshida S., Harada T., Iwabe T., Taniguchi F., Mitsunari M., Yamauchi N., Deura I., Horie S., Terakawa N. A combination of interleukin-6and its soluble receptor impairs sperm motility: Implications in infertility associated with endometriosis // Hum. Reprod. 2004. 19: 1821-1825.

[12] Mansour G., Aziz N., Sharma R., Falcone T., Goldberg J., Agarwal A. The impact of peritoneal fluid from healthy women and from women with endometriosis on sperm DNA and its relationship to thesperm deformity index // Fertil. Steril. 2009. 92: 61-67.

[13] Lessey B.A., Kim J.J. Endometrial receptivity in the eutopic endometrium of women with endometriosis: It is affected, and let me show you why // Fertil. Steril. 2017. 108. 19-27.

[14] Lessey B.A., Palomino W.A., Apparao K.B., Young S.L., Lininger R.A. Estrogen receptor-alpha (ERalpha) and defects in uterine receptivity in women // Reprod. Biol. Endocrinol. 2006. 4 (Suppl. 1). S9. Int. J. Mol. Sci. 2018. 19: 23-32.

[15] Bulun S.E., Utsunomiya H., Lin Z., Yin P., Cheng Y.-H., Pavone M.E., Tokunaga H., Trukhacheva E., Attar E., Gurates B., et al. Steroidogenic factor-1 and endometriosis // Mol. Cell. Endocrinol. 2009; 300:104-108.

[16] Klemmt P.A., Carver J.G., Kennedy S.H., Koninckx P.R., Mardon H.J. Stromal cells from endometriotic lesions and endometriumfrom women with endometriosis have reduced decidualization capacity // Fertil. Steril. 2006. 85: 564-572.

[17] Inoue T., Kanzaki H., Iwai M., Imai K., Narukawa S., Higuchi T., Katsuragawa H., Mori T. Tumour necrosis factor alpha inhibits in-vitrodecidualization of human endometrial stromal cells // Hum. Reprod. 1994; 9: 2411-2417.

[18] Du H. Taylor H.S. The role of Hox genes in female reproductive tractdevelopment, adult function, and fertility // Cold Spring Harb. Perspect. Med. 2016. 6: a023002.

[19] Troy P.J., Daftary G.S., Bagot C.N., Taylor H.S. Transcriptional repression of peri-implantation EMX2 expression in mammalian reproduction by HOXA10 // Mol. Cell. Biol. 2003. 23: 1-13.

[20] Kitajima M., DefrIIre S., Dolmans M.-M., Colette S., Squifflet J., VanLangendonckt A., Donnez J. Endometriomas as a possible causeof reduced ovarian reserve in women with endometriosis // Fertil. Steril. 2011. 96: 685-691.

[21] Kitajima M., Dolmans M.-M., Donnez O., Masuzaki H., Soares M., Donnez J. Enhanced follicular recruitment and atresia in cortex derived from ovaries with endometriomas // Fertil. Steril. 2014. 101:1031-1037.

[22] Kitajima M., DefrIIre S., Dolmans M.-M., Colette S., Squifflet J., VanLangendonckt A., Donnez J. Endometriomas as a possible causeof reduced ovarian reserve in women with endometriosis // Fertil. Steril. 2011. 96: 685-691.

[23] Krasnopol'skaja K.V. Lechenie besplodija pri jendometrioze: Vzgljad reproduktologa. 2019. P. 28-80.

[24] Altun T., Jindal S., Greenseid K., Shu J., Pal L. Low follicular fluid IL6 levels in IVF patients are associated with increased likelihood of clinical pregnancy // J. Assist. Reprod. Genet. 2011. 28: 245-251.

[25] Singh A.K., Dutta M., Chattopadhyay R., Chakravarty B., ChaudhuryK. Intrafollicular interleukin-8, interleukin-12, and adrenomedullinare the promising prognostic markers of oocyte and embryo qualityin women with endometriosis // J. Assist. Reprod. Genet. 2016. 33: 1363-1372.

[26] Riccio L.G.C., Baracat E.C., Chapron C., Batteux F., AbrJIo M.S. The role of the B-lymphocytes in endometriosis: A systematic review // J. Reprod. Immunol. 2017- 123; 29-34.

[27] Hever A., Roth R.B., Hevezi P., Marin M.E., Acosta J.A., Acosta H., Rojas J., Herrera R., Grigoriadis D., White E., et al. Human endometriosis is associated with plasma cells and overexpression of Blymphocyte stimulator // Proc. Natl. Acad. Sci. USA. 2007. 104: 12451-12456.

[28] Cancro M.P., D'Cruz D.P., Khamashta M.A. The role of B lymphocytestimulator (BLyS) in systemic lupus erythematosus // J. Clin. Investig. 2009. 119: 1066-1073.

[29] Beste M.T., Pfaffle-Doyle N., Prentice E.A., Morris S.N., Lauffenburger D.A., Isaacson K.B., Griffith L.G. Molecular network analysisof endometriosis reveals a role for c-Jun-egulated macrophage activation // Sci. Transl. Med. 2014. 6: 222ra216.

[30] Besplodie. Klinicheskie rekomendacii. M., 2019.

[31] Ferrero S., Gillott D.J., Venturini P.L., et al. Use ofaromatase inhibitors to treat endometriosis-related painsymptoms: a systematic review // Reprod Biol Endocrinol. 2011. 9:89.

[32] Brown J., Pan A., Hart R.J. Gonadotrophin-releasinghormone analogues for pain associated with endometriosis // Cochrane Database Syst Rev. 2010 (12): CD008475.

[33] Wong C.L., Farquhar C., Roberts H., Proctor M. Oral contraceptive pill for primary dysmenorrhoea // Cochrane Database Syst Rev. 2009. Oct 7;(4). CD002120. doi:10.1002/14651858.CD002120.pub3

[34] Working group of ESGE, ESHRE, and WES, Ertan Saridogan,corresponding author Christian M. Becker, Anis Feki, Grigoris F. Grimbizis, Lone Hummelshoj, Joerg Keckstein, Michelle Nisolle, Vasilios Tanos, Uwe A. Ulrich, Nathalie Vermeulen, Rudy Leon De Wilde. Recommendations for the surgical treatment of endometriosis – part 1: ovarian endometrioma // Gynecol Surg. 2017. 14(1): 27. Published online 2017 Dec 19. doi:10.1186/s10397-017-1029-x

[35] Mettler L., Ruprai R., Alkatout I. Impact of medicaland surgical treatment of endometriosis on thecure of endometriosis and pain // Biomed Res Int. 2014. 2014: 264653.

[36] Karaman Y., Uslu H. Complications and their managementin endometriosis surgery // Womens Health (Lond). 2015. 11: 685-92.

[37] Berlanda N., Vercellini P., Somigliana E., et al. Role of Surgery in Endometriosis-Associated Subfertility // Semin Reprod Med. 2013. 31:133-43.

[38] Dunselman G.A.J., Vermeulen N., Becker C., et al. ESHRE guideline: management of women with endometriosis // Hum Reprod. 2014. 29: 400-12.

[39] Afors K., Murtada R., Centini G., et al. EmployingLaparoscopic Surgery for Endometriosis // Womens Health (Lond). 2014. 10: 431-43.

[40] Dubinskaja E.D., Gasparov A.S., Fedorova T.A., Lapteva N.V. Rol' geneticheskih faktorov, sistemy detoksikacii i oksidativnogo stressa pri jendometrioze i besplodii (Obzor literatury) // Vestnik Rossijskoj akademii medicinskih nauk. 2013. 68(8). P. 14-19.

[41] Kemmann E., Ghazi D., Corsan G., Bohrer M.K. Does ovulation stimulation improve fertility in women with minimal/mild endometriosisafter laser laparoscopy? // Int J Fertil Menopausal Stud. 1993. JanFeb. 38 (1): 16-21.

[42] May K.E., Conduit-Hulbert S.A., Villar J., et al. Peripheral biomarkers ofendometriosis: a systematic review // Hum Reprod Update. 2010. 16: 651-74.

[43] ESHRE guideline: management of women with endometriosis // Hum Reprod. 2014. 29 (3): 400-12.

[44] Matalliotakis M., Zervou M.I., Matalliotaki C., Rahmioglu N., Koumantakis G., Kalogiannidis I., Prapas I., Zondervan K., Spandidos D.A., Matalliotakis I., Goulielmos G.N. The role of gene polymorphisms in endometriosis // Mol Med Rep. 2017 Nov. 16(5): 5881-5886. doi:10.3892/mmr.2017.7398 Epub 2017 Aug 29.

[45] Shu J., Xing L., Ding G., Luo Q., Liu X., Yan Q., Sheng J., Huang H. The effect of peritoneal fluid from patients with endometriosis on mitochondrial function and development of early mouse embryos // PLoS One. 2013 Dec 26; 8(12): e82334. doi:10.1371/journal.pone.0082334 eCollection 2013.

[46] Orazov M.R., Radzinsky V.E., Khamoshina M.B., Lokshin V.N., Demyashkin G.A., Toktar L.R., Tokayeva E.S., Chitanava Yu.S. Agonists and antagonists of gonadotropin-releasing hormone: effect on neuroangiogenesis and apoptosis in eutopic endometrium in the treatment of pelvic pain recurrence caused by external genital endometriosis // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2018. Vol. 6. P. 19-33. ISSN 2518-1467. ISSN 1991-3494.

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MARE'S MILK: THERAPEUTIC AND DIETARY PROPERTIES (Review article)

Abstract. The review article is devoted to therapeutic and dietary properties of mare's milk. Literature review is carried out, historical facts of application of this product at various diseases and conditions are resulted, qualitative composition of milk and the research conducted by foreign and domestic authors about application of mare's milk medical-dietical product are described. Large-scale production of sublimated pasteurized mare's milk in Kazakhstan will give a new impetus to the expansion of clinical trials in various aspects and the use of this product with a long shelf life.

Keywords: mare's milk, therapeutic and dietary properties of mare's milk, sublimated mare's milk.

The unique health-improving properties of mare's milk and its derivatives have been known to people for a long time. Since ancient times, nomads called fresh mare's milk "Saumal" (Saumal in Kazakh language means fresh, paired milk). In addition to traditions and legends, confirmation of the unique beneficial properties of mare's milk and its derivatives are noted in ancient chronicles and medical treatises of Hippocrates and Abu Ali Ibn Sina, known in the west as Avicenna [1].

A team of British archaeologists reported that horses were domesticated a millennium earlier than previously thought. It was about 3500 BC on the territory of northern Kazakhstan. Scientists have found traces of mare's milk fat on ceramic dishes, which is proof that they even then used mare's milk as food. Saumal was not only drink by adults, but it also given to children. No only adults drunk Saumal, but it was aslo given to children [2, 3].

It was considered a healing and sacred product 3000 years ago in China. Hippocrates (circa 460-377 BC) also attributed the product its therapeutic properties, in particular, he considered it an effective remedy for consumption, i.e. tuberculosis. In the East, it was called "medicine blessed by Allah." Avicenna noted the healing effect and properties of mare's milk, together with its "amazing similarity to human nature" [1].

Legend has it that Cleopatra bathed in donkey's milk to soften and whiten her skin [4]. Recently, scientists have discovered that donkey milk is indistinguishable from mare. "Mare's milk is the strength of my warriors, the beauty of my women and the health of my children," said Genghis Khan [4]. There was even a special order issued by Chinghiz Khan: when his soldiers went on a campaign, they had to take two

water skins with them: with milk and koumiss. They drunk koumiss and added milk, which immediately began to ferment [5].

European literature considers mare's milk as a balm for digestive problems, an elixir for the liver, and a tonic for general malaise. It is a healthy food, which can reduce or completely prevent the symptoms of many diseases. It strengthens the body, boosts immunity, increases energy and stamina, which provides a better quality of life [4].

The value of the product is determined, first of all, by its chemical composition similar to that of maternal breast milk [4, 5]. In the 19th century, Russian doctor A.A. Ostorumov believed that mare's milk, as approaching in its composition to breast milk, is better assimilated. This is the basis for breastfeeding infants with mare's milk. During the Great Patriotic War in the sanatorium "Mtsyri" it was used to feed infants [6].

Freshly milked mare milk is a natural food product of bluish-white color, with a neutral reaction (pH 7.0-7.2), slightly tart and sweet taste, possessing high dietary and medical properties. In terms of protein quality, mare's milk, like breast milk, belongs to the so-called "albumin milk" because of the high content of albumin in relation to casein, according to different data, respectively, an average of 45:55, while in cow's milk this ratio is 15:85. Therefore, the coagulation of mare's milk does not form a dense clot, the protein falls into the sediment in the form of delicate small flakes [1].

The composition of mares' milk varies throughout the year and depends on the stage of lactation, feeding conditions and maintenance, as well as a number of other external factors, and is most complete in midsummer [1].

The total amount of protein in mare's milk is equal to 1.85-2.20%, and casein of mare's milk, unlike cow's milk, is easily dissolved in water, which indicates better digestibility, absorption and digestibility [1,4]. In addition, mare's milk proteins are well balanced in terms of amino acid composition, and there is no allergic reaction to it [7,8]. The amino acid composition of mare's milk is presented in table 1.

Table 1 – Amino Acid Composition of Mare's Milk Proteins

Indicators	Content (g/100 g protein)
Total Protein	1,93
Essential Amino Acids:	37,62
Lysine	8,24
Threonine	4,81
Valin	5,88
Methionine	0,65
Isoleucine	5,14
Leucine	7,56
Phenylalanine	5,34
Nonessential Amino Acids:	62,38
Histidine	2,72
Arginine	9,45
Asparagic acid	9,64
Serine	6,44
Glutamic acid	15,30
Prolene	7,20
Glycine	2,14
Alanine	4,63
Cystine	следы
Tyrosine	5,86
Total Amino Acids	**100,00**

Mare's milk also contains lactoferrin, lysozyme and immunoglobulin. Lysozyme and lactoferrin, which are components of the body's immune system, protect against pathogens and destroy them in the milk itself and the digestive system. In particular, lysozyme, which is 5% of total protein, plays a decisive role in the bactericidal action of mare's milk. In contrast, cow's milk contains six times less lysozyme. The content of lysozyme (mg / 100 ml): mare's milk - 80, breast milk - 50, cow's - 13. In addition to its enzymatic effect, lysozyme has anti-inflammatory, antiviral, immunostimulating, antitumor and anti-cancer properties [9, 10].

The study of lysozyme and amylase content in mare's milk showed their identity in breast milk, and in cow's milk, there were only traces of them (*t*able 2) [1, 4, 10].

Table 2 – Enzyme Composition of Milk

Dairy Product	Lysozyme, mg/l	Amylase, unit.
Breast Milk	60–250	26–98
Mare's Milk	64–126	32–64
Cow's Milk	Traces	–

In addition to lysozyme, mare's milk also containes other enzymes: amylase, catalase, lipase, peroxidase, phosphatase, malate and lactate dehydrogenase, lactotransferrin, which contribute to the digestive process and support the body's defense system. Lactoferrin in milk has an antibacterial and antioxidant effect, as well as a positive effect on inflammation and has an immunoregulatory function [9, 10].

Immunoglobulins – proteins of complex structure, which perform the function of immune protection of the body. Depending on the structure and properties of the immunoglobulin (Ig) contained in milk, divided into 5 main classes: Ig D, Ig E, Ig M, Ig A, Ig G. Milk is dominated by the fractions of the last three classes, which neutralize by viruses and toxins, prevent the fixation of bacteria on the surface of the epithelium and activate leukocyte phagocytosis [9,10]. The content of different Ig in milk varies and depends on the type of mammal, its age and other factors. For example, mare's milk contains about 20% Ig, which is 1% more than breast milk [10].

The composition of fat in mare's milk also differs in a number of ways. The fat of mare's milk is characterized by a higher biological value than that of cow's milk. Nutritionists have found that the lower the melting point of fat, the more fully it is absorbed and digested (the melting point of mare's milk's fat is 30 ° C, and of cow's milk's is 34 ° C). The fat of mare's milk is not stable, it is quickly oxidized and has a relatively high iodine number (Gyuble number) - 71.5. The iodine number of cow's milk varies between 25 and 35, depending on the type of feed, which also indicates the high therapeutic value of mare's milk lipids [11, 12].

All the above properties of mare's milk are conditioned by the fact that the fatty balls contained in it are rich in polyunsaturated acids (PUFAs), which are mainly represented by the essential fatty acids linolenic and linoleic. Their specific weight in the total fat molecule is 10-12%. Table 3 shows that these acids predominate in mare's milk, and then in breast milk. They are essential fatty acids and are not synthesized in the human body, and enter the body only with food [10, 11, 13].

Of the mono- and polyunsaturated fatty acids, the highest content in mare's milk was linoleic, linolenic, oleic, and palmitic acids (*t*able 3).

Table 3 – PUFA Content of Differnt Types of Milk
(in % of total fatty acids)

	Breast Milk	Mare's Milk	Cow's Milk
Linoleic Acid	13,0	14,9	2,4
Linolenic Acid	1,4	12,6	0,8

The content of monounsaturated fatty acids (MUFAs) is approximately equally represented in breast and mare's milk (table 4). MUFAs are partially synthesized in the human body. However, for the full course of metabolic processes, it is important to eat them daily with food [13, 14].

Table 4 – The content of monounsaturated fatty acids in various types of milk (in % to the total amount of fatty acids)

	Breast Milk	Mare's Milk	Cow's Milk
Palmitoleic Acid	5,7	7,8	2,3
Oleic Acid	46,4	20,9	29,8

The content of saturated fatty acids (SFAs) in higher in cow's milk than in mare's and breast milk (table 5).

Table 5 –Milk content of MFR in different typess of milk
(in % of total fatty acids)

	Breast Milk	Mare's Milk	Cow's Milk
Oil Acid	—	—	3,3
Capron Acid	traces	traces	1,6
Caprylic Acid	traces	1,8	1,3
Capric Acid	1,3	5,1	3,0
Lauric Acid	3,1	6,2	3,6
Myristinic Acid	5,1	5,7	9,5
Palmitin Acid	20,2	23,8	26,3
Stearic Acid	5,9	2,3	14,6

Thus, the qualitative differences in the physical properties of fat and fatty acid composition of mare's milk compared with cow's milk are more noticeable. This is especcially true for the physical properties of mare's milk fat, density, melting point and solidification, which are very important in nutrition, as well as for the content of mono-, polyunsaturated fatty acids, which characterize the high therapeutic value of milk fat. Their presence in the human diet is extremely important, since they are not synthesized in the body and have therapeutic and vitamin properties. Such fat in the stomach, intestines is easily emulsified, easier to digest, assimilate, the tension of digestive glands decreases [1, 13, 14].

Carbohydrates in mare's milk are mainly lactose, but a number of monosaccharides, particularly, glucose and maltose have been found in mare's milk during chromatography. It is known that milk sugar also differ in the structure of lactose. For example, breast milk predominantly contains β-lactoses, while cow's milk containes α-lactose. Thinking into account the similarity of mare's milk and breast's milk in terms of the total amount of carbohydrates, as well as other parameters of physicochemical properties, we can conclude that lactose of mare's milk consists mainly of β-lactoses [1, 15].

Table 6 – Lactose Content of Different Types of Milk (g/100 g)

	Lactose Content
Breast Milk	6,5
Mare's Milk	5,2

β-Lactose in the small intestine, in contrast to α-lactose, is absorbed more slowly, therefore it has time to enter the large intestine, where it stimulates the growth of microflora, mainly Gram-positive bacteria, characteristic of the intestine. Thus, β-lactoses in mare's milk has a bifidogenic effect, normalizing the microecological status of the intestine and is actually a bifido- and lactogenic prebiotic [1].

Mare's milk is unique for its vitamin and mineral composition, which is closest to the maternal breast milk. Saumal is rich in A, B, D, E vitamins, as well as vital trace elements (Ca, K, Na, I, Co, Zn, Mn, Cu, Fe, Al). It is the champion among animal products in terms of vitamin C content (250 ml is the daily dose for humans) [11]. Besides, Croatian scientists proved the presence of Cr, Li, Mo, Sb, Sr and Fr in the composition of Saumal [16].

Mare's milk contains more vitamins E, B, B12, and niacin than cow's milk. The physiological combination of these vitamins with ascorbic acid is probably one of the mechanisms of the beneficial effect of Saumal on chronic diseases [1, 10].

Thus, the above mentioned qualitative composition of mare's milk allows to make a conclusion that the unique and optimally balanced composition of biological components of Saumal makes this product an important complex component of the prevention and treatment of a wide range of diseases with different etiologies. Saumal can contribute to the restoration of impaired functions of damaged organs, tissues, and play a pathogenetic role, especially in chronic diseases of the digestive system.

According to the leading scientists of Kazakhstan and European countries, Saumal has an incredible potential in the treatment of the most common diseases of the digestive system. It is considered a therapeutic product and is used in the treatment of metabolic disorders, as a means of preventing colds and curing cancer. Mare's milk improves blood circulation, increases male potency, accelerates the process of organ regeneration, increases hemoglobin, regulates the immune status, slows down the aging process.

Healing drink is recommended for diseases of the stomach, liver, intestines, skin, immune system disorders, treatment of peptic ulcer disease. Positive results were obtained by using whole mare's milk in the treatment of patients with chronic hepatitis.

Further, we present examples of recent clinical studies on the therapeutic properties of mare's milk. In 2005, a study was carried out with patients suffering from eczema at the Jena University Dermatological Clinic (Germany). The effect of mare's milk on the severity of eczema, intestinal microflora and on immunological parameters was studied. Patients took 250 ml of Mare's milk daily in control from placebo for 16 weeks. As a result, the symptoms (itching and hyperemia) of the disease faded in 1/3 of the study participants up to 30–55%. In these patients, the proportion of bifidobacteria in the stool increased 8 times. Thanks to regular consumption of mare's milk, some patients were able to reduce or even stop taking their medicine [10, 12].

In 2009, patients with Crohn's disease and ulcerative colitis (University of Jena, Germany) participated in the clinical study. During 8 weeks the young participants took 250 ml of mare's milk two times a day in the control with placebo. As a result, mare's milk helped to calm the pain, reduce the amount of blood in the stool, and reduce the consumption of essential medicines [10, 12].

In an anonymous questionnaire survey on the intake of mare's milk from 500 respondents who regularly took Saumal for a long time, doctors confirmed the efficacy of mare's milk intake in skin and intestinal diseases. Consumers with skin diseases in 91% of cases showed improvement: inflammation decreased, itching calmed down, and sleep improved. Also, 74% of patients with intestinal, respiratory, liver, cancer, cardiovascular and other diseases had positive effects. Thanks to regular consumption of mare's milk, some patients were able to reduce or even stop taking their medication [10, 12].

European experts state on the basis of research that “Mare's milk is one of the healthiest and most nutritious and healthy drinks that nature has to offer us”.

Despite the fact that mare's milk is recognized as a dietary and therapeutic product all over the world, there are currently no large-scale clinical and research works on therapeutic properties of mare's milk in the literature. The possibilities of using mare's milk in the diet therapy of specific nosological forms have not been studied at all, in particular, in the pathology of the cardiovascular system, digestive organs, hepatobiliary system and urological diseases [1]. The reason for this may be not only the poor awareness of the therapeutic properties of mare's milk among the medical and scientific community, but also the instability of the product itself. Mare's milk after milking, when exposed to air, begins to oxidize, and after 3-4 hours (at room temperature) it becomes no longer suitable for consumption [1]. Therefore, new technologies for the production of mare's milk are now required, while preserving therapeutic and dietary qualities of the product for the long term.

The solution to this issue is to create a sublimated pasteurized mare's milk, which has a long shelf life, even at room temperature. The process of sublimation is that the mare's milk is frozen at a temperature of -55 °C, and then ice under certain conditions, bypassing the liquid phase, evaporated, i.e. there is a certain canning of mare's milk with the help of negative temperatures. At the same time, the qualitative composition of mare's milk is preserved to the maximum extent, respectively, and its therapeutic property. In addition, the dried mare's milk quickly recovers when dissolved in water in certain proportions.

Pasteurization helps to ensure product safety not only for adults, but also for children and pregnant women. Currently, this sublimated mare's milk is produced by Kazakhstani entrepreneurs of Eurasia Invest Ltd LLP, which is implementing a large-scale program for the production of mare's milk with the participation of a large German horse-breeding company Hans Zollmann. Each process of production of biomilk in this company is certified, and the products fully comply with European quality standards [17].

The benefits of Sublimated Mare's Milk (SMM) have been proven by numerous clinical and laboratory studies by reputable international medical organizations. National Research Medical Organizations of Kazakhstan confirm the conclusions of their foreign colleagues. Clinical studies of the therapeutic and dietary properties of SMM in non-alcoholic steatohepatitis, cirrhosis of the liver of various etiologies, psoriasis, and pediatrics are currently being conducted in the country. The results of the study after the completion will be published in domestic and foreign literary sources.

People who have already tried SMM note its effective impact in everyday life in the form of the normalizing the stool, improving the quality of sleep and appetite, and feeling vivacity. The general tonic effect of mare's milk allows it to be used in the so-called “chronic fatigue syndrome”, in recovery from injuries, operations (or in preparation for them), intensive sports training, etc.

SMM is also applicable in cosmrtology – regular consumption of mare's milk strengthens the hair follicle, improves hair structure, gives shine and volume, accelerates growth. Regulat consumption of the product normolizes the function of the sebaceous glands, improves skin elasticity and color.

Thus, the study of therapeutic and dietary properties of mare's milk will continue not only abroad, but also in its historical homeland – Kazakhstan. Systematic ingestion of mare's milk in the diet can increase the effectiveness of treatment and prevention of various diseases, improve the immune system function, prevent cancer and prolong active longevity.

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КОБЫЛЬЕ МОЛОКО: ЛЕЧЕБНО-ДИЕТИЧЕСКИЕ СВОЙСТВА
(обзорная статья)

Аннотация. Обзорная статья посвящена лечебно-диетическим свойствам кобыльего молока. Проведен литературный обзор, приведены исторические факты применения данного продукта при различных заболеваниях и состояниях, описаны качественный состав молока и проведенные научные исследования зарубежных и отечественных авторов о применении кобыльего молока как лечебно-диетического продукта. Масштабное производство сублимированного пастеризованного кобыльего молока в Казахстане даст новый толчок в расширении проведения клинических исследований в различных аспектах и применении данного продукта с длительным сроком хранения.

Ключевые слова: кобылье молоко, лечебно-диетические свойства кобыльего молока, сублимированное кобылье молоко.

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БИЕ СҮТІ: ЕМДІК ҚАСИЕТТЕРІ (шолу мақала)

Аннотация. Мақала бие сүтінің емдік қасиеті жайында, әдеби шолу жасалған. Саумалды әртүрлі сырқаттар мен жағдайлар кезінде қолдану жөнінде маңызды тарихи деректер келтірілген. Бие сүтінің құрамы

мен ол жайында отандық және шет елдік ғалымдардың оның емдік қасиеті жайында жүргізген ғылыми зерттеу жұмыстары жайында мәліметтер келтірілген. Қазақстанда ірі көлемде сублимацияланған және пастерленген құрғақ бие сүтін өндіру зор маңызға ие. Бұл технология саумалдың сақтау мерзімін ұзартып қана қоймай, әр түрлі саладағы клиникалық зерттеу жұмыстарын кең көлемде жүргізуге септігін тигізеді.

Түйін сөздер: бие сүті, бие сүтінің емдік қасиеті, сублимацияланған бие сүті.

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REFERENCES

[1] Zhangabylov A.K. Saumal, kumys – isceljajushhie svojstva. Almaty: Dajk-Press, 2015. 182 p.

[2] New York Times. 3/18/2009. Vol. 158. Issue 54618. P. 26.

[3] IQAP.KZ – onlajn-zhurnal o duhovno-nravstvennom nasledii Velikoj Stepi, 19/10/2017 00:01.

[4] Mare's milk // New Scientist, UK. 02624079, 6/16/2007, Vol. 194, Issue 2608,

[5] Gladkova E.E. Jeleksir voinov i mladencev.http://avtorskie.by/products

[6] Kudajarova R.R., Gil'mutdinova L.T., Jamaletdinov K.S., Gil'mutdinov A.R., Gabdelhakova L.T., Zinnatullin R.H. Istoricheskie aspekty primenenija kumysa v medicine // Bjulleten' sibirskoj mediciny. 2010. N 5. P. 186-190.

[7] Malacarne M., et al. Protein and fat composition of mare's milk: some nutritional remarks with reference to human and cow's milk // International Dairy Journal. 2002. Vol. 12, N 11. P. 869-877.

[8]Businco L.**,** et al. Allergenicity of mare's milk in children with cow's milk allergy // Journal of Allergy and Clinical Immunology. 2000. Vol. 105, N 5. P. 1031-1034.

[9] Priv.-Doz. Dr. R. Schubert. Stutenmilch-diätetische Eigenschaften. Friedrich-Schiller-Universität Jena.

[10] http://avtorskie.by/products

[11] Markiewicz-Kęszycka Maria, Wójtowski Jacek, Czyżak-Runowska, Grażyna et all. Concentration of selected fatty acids, fat-soluble vitamins and β-carotene in late lactation mares' milk // International Dairy Journal Sep2014.

[12] http://congressminsk.by/congress1february2015/кобылье-молоко-и-кумыс

[13] Haddad Imen, Mozzon Massimo, Strabbioli Rosanna, et al. Fatty acid composition and regiodistribution in mare's milk triacylglycerols at different lactation stages // Dairy Science & Technology. Jul2011. Vol. 91. Issue 4. P. 397-412.

[14] Hoffman Rhonda M., Kronfeld David S., Herbein Joseph H. et al. // Journal of Nutrition. Dec1998. Vol. 128. Issue 12. P. 2708S-2711S.

[15] Mjet'ju Shakal, Jendrju Brezovečki, Nataša Mikulec, Neven Antunac. Sostav i svojstva kobyl'ego moloka horvatskogo porody loshadej. Zagrebskij universitet. Departament Dairy Science. Zagreb, Horvatija.

[16] Nina Bilandžić, Mjeri Sedak, Đokić, Ivana Varenina, et al. Koncentracii mikrojelementov Al, Co, Cr, Li, Mo, Ni, Sb i Sr v moloke kobyl Horvatskoj porody Coldblood. Laboratory for Residue Control, Department for Veterinary Public Health, Croatian Veterinary Institute, Zagreb, Croatia.

[17] http://www.saumal.kz

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ANTITUMOR INHIBITION OF NATURAL DRUGS IN COMBINATION WITH CYTOSTATICS FOR DRUG-RESISTANT TUMORS

Abstract. Drug-resistant Pliss lymphosarcoma strains are resistant to both herbal and cytostatics, and sarcoma 45 is resistant only to synthetic drugs. Manifestation of cross, multiple resistance to both natural and well-known anticancer drugs in resistant strains of Pliss lymphosarcoma, sarcoma 45, lymphocytic leukemia L 1210 has place. Collateral sensitivity to known chemotherapy drugs was revealed in drug-resistant variants of Pliss lymphosarcoma and in new natural preparations in resistant strains of sarcoma 45, L 1210. Induced drug resistance of Pliss lymphosarcoma, sarcoma 45 and L 1210 is removed by new herbal compounds or their combinations with antitumor drugs, changing the dose and number of combinants.

The results of experimental studies for overcoming the emerged drug resistance with natural drugs in 1/2 MTD in a few (2 and 4) hours before the start of treatment with nitrosomethylurea, platidiam and adriamycin serve as a criterion for predicting clinical efficacy in patients with drug resistance to these drugs.

Key words: Sarcoma 45, Pliss lymphosarcoma, lymphocytic leukemia L1210, anticancer drugs, collateral sensitivity.

Drug resistance of tumors to various anticancer agents reduces the effect of treatment of oncological patients. At the same time, tumor cells may arise not only to a specific drug, but also to other compounds with different chemical structure and other mechanism of action. This phenomenon is called multiple drug resistance (MDR). Of undoubted interest to understand the mechanisms of MDR is the research of cross-resistance (CR). CR circle includes a large number of substances [1]. Therefore, the possibilities of drug treatment of malignant neoplasms are still very limited [2, 3]. In this regard, the present topical development is optimal mode of using drugs, doses and combinations of antineoplastic compositions to enhance their therapeutic effect and reduce the general toxicity effects on the body [4, 5], the search for potential antineoplastic drugs, particularly of natural origin [2, 6, 7].

In the experiments, new natural preparations such as alhidin, alnusidine, sodium salt of 1, 2-3-keto-18-dehydroglycyrrhetic acid (GA), leucoefdine and known compounds: platidiam, cyclophosphamide, sarcolysin, prospidin, nitrosomethylurea, 5-fluorouracil, 6-mercaptopurine, methotrexate, vincristine, adriamycin, rubomycin, and their combinations were used. Herbal preparations were administered daily, intraperitoneally: nitrosomethylurea (NMU) - once, other cytostatics - double with an interval of 96 hours in different doses. In the event of a change in their regimes and schemes of injection, the references in the notes of the corresponding figures were cited. To determine the nature of the interaction of drugs (potentiating or summation) [5, 8, 9], when combined, the smaller doses than in monotherapy were used.

The pharmacological effect of the drugs and their combinations on the growth of transplantable tumors of rats and mice was estimated by the coefficient of their growth inhibition (GI), the average life expectancy (ALE) and the extension of the life expectancy of animals (ELE). In the study of the general effect of drugs, the death of animals was taken into account.

A pronounced anticancer pharmacological effect with the resolving of tumors in 80% of rats was obtained using the combination of alhidin + platidiam + methotrexate in experiments with Pliss lymphosarcoma resistant to prospidin and rubomycin.

As a result, CR to Pliss lymphosarcoma in C 45 resistant to sarcolysin, and in Pliss lymphosarcoma resistant to rubomycin was overcome, the death of animals was not observed.

In control rats with Pliss lymphosarcoma resistant to rubomycin, the tumor was represented by cells of various sizes and shapes. The nuclei of cells are hyperchromic, pictures of mitosis are rare. Tumor tissue is poor in vessels and stroma. With the combined treatment (alhidin + platidiam + methotrexate) of this substrain, extensive necrosis and dystrophy of cells is observed. While using sarcolysin there was revealed the collateral sensitiveness in Pliss lymphosarcoma resistant to leucoefdine (with tumor resolving in 60% of rats). With a combination of sarcolysin and alhidine in half the maximum tolerated doses (> / MTD), a deep block of DNA synthesis was noted (synthesis suppression by 91.4-97.1%).

This combination, moreover, didn't reduce peripheral blood counts. While using another combination with alhidin (alhidin + prospidin + platidiam + cyclophosphamide) there was took away LR with cyclophosphamide on C 45 resistant to 5- fluorouracil, CR to Pliss lymphosarcoma resistant to prospidin and rubomycin, CR in platidiam to Pliss lymphosarcoma resistant to leucoefdine (with tumor resolving in 60% of rats).

A similar result for MDR was obtained when the combination (alhidin + platidiam + vincristine + adriamycin) was applied to LCP and its drug-resistant variants without side effects.

On C 45, resistant to 5-fluorouracil, a potentiating result was noted with the resolving of tumors in 60% of rats from combinations of alhidin + adriamycin; alhidin + vincristine and alhidin + 5-fluorouracil + adriamycin.

For this purpose, we used cyclophosphamide and NMU [10, 11] in combination with herbal preparations. NMUs have a fairly wide spectrum of action on human tumors, and their ability to pass through the blood-brain barrier is used to treat brain tumors and brain metastases, breast tumors, lung tumors and melanomas [10, 11]. They are also characterized by the absence of CR to anticancer agents from other classes. The promising results on the combined use of methyl and chloroethyl N-alkyl nitrosoureas (ANU) indicate the promise of using NMUs in the combined therapy of tumors [2] with the development of optimal regimens for the treatment of neoplastic diseases. This requires additional studies in animals with experimental tumors [4].

In this regard, we studied the effect of NMUs separately and in combination with plant compounds on drug-resistant C 45 variants and Pliss lymphosarcoma. NMU showed cross-resistance (CR) to all drug-resistant substrains, except C 45, resistant to prospidin and rubomycin.

The results of the treatment of tumors with a combined effect of half the MTD NMU with alnusidin, alhidin and MTD, as well as at intervals between the preparations (2, 4 and 24 hours) showed that the first interval (2 hours) was optimal. At the same time, there arises the overcoming of emerging drug resistance of C 45 to prospidin, 5-fluorouracil, and Pliss lymphosarcoma to prospidin and rubomycin (with resolving of tumors in 60% of rats, without side effects). The injection of the first NMU, and then herbal preparations reduces the antitumor activity and increases toxicity.

A morphological study of sarcoma 45 (spindle-cell sarcoma) resistant to 5-fluorouracil (95-generation without drug exposure) noted polymorphism of cells with hyperchromic nuclei. Cells form into bundles, randomly intertwining with each other. It is found in the tumor a lot of mitoses. The stroma is well developed and envelops cells in the form of thickened collagen fibers.

The histological picture of the cells of this strain during treatment with alhidine and nitrosomethylurea (with an interval of 2 hours) in comparison with the control showed a rarer distribution of small, pycnotic, polymorphic cells in tissue without a clear structure. Cells are non-compact. There are separate cells with hyperchromic nuclei. The foci of extensive necrosis are noted. There is a significant increase in connective tissue in the form of cords that enhance the anti-tumor effect of NMU and other chemotherapy drugs.

Similar data were obtained by us earlier with the combination of alhidin + vincristin + vinblastin with an interval of 2 hours after the injection of alhidin to animals with K. Guérin and CSU. Apparently, alnusidin, by increasing the content of thyroid hormones, contributes to enhancing the effectiveness of chemotherapy for drug-resistant tumors. The mechanism of the therapeutic action of herbal preparations (alhidin, alnusidin, sodium salt of 1.2-3-keto-18-dehydroglycyrrhetic acid) in case of hypersensitivity may be due to a certain influence through changes in the immune-hormonal balance of the animal organism.

In addition, being antioxidants, they reduce the toxicity of cytostatics and contribute to ELE of animals [10]. The results obtained are consistent with the research of L.B. Gorbacheva et al. [10, 11]. While studying the combinations of 1-methyl-1-nitrosourea with 1,3-bis- (2-chloroethyl) -1-nitrosourea along with positive results, they observed an increase in the overall toxic effect of the drugs. In this regard, they suggested the expediency of searching for compounds among synthetic and natural bioantioxidants that can reduce toxic effects.

A high inhibitory pharmacological effect was obtained in the treatment of alkydine, alnusidine and leucoeftin in the combined treatment of the original mouse tumors. Alhidin and alnusidin in MTD have a significant inhibitory effect on cervical cancer and LL (60 and 73%, respectively, $P < 0.05$). These results are enhanced by combining them with 1/2 MTD and platidiam, vincristine, adriamycin, 5-fluorouracil. A moderate antitumor effect on these strains was obtained by the preparation of sodium salt of 1,2-3-keto-18-dehydroglycyrrite acid, both individually and in combination with the antitumor compounds mentioned.

In addition, we also studied the effect of herbal preparations (alhidin, alnusidine, sodium salt of 1,2-3-keto-18-dehydroglycyrrhetic acid) and their combinations with known cytostatics on lymphocytic leukemia P-388, L 1210 and its medicinal resistant options.

When exposed to alhidin, the ELE of animals reaches up to 90% with L 1210 resistant to nitrosomethylurea. The minimum activity of alhidine is noted on L 1210, the initial (up to 30% ELE) and its drug-resistant variant to methotrexate (up to 37% UPZH). Vincristine and platidiam moderately influenced the animals ELE on both the initial and drug resistant variants with L 1210. However, when exposed to the combination of alhidine with anticancer drugs, the ELE of animals with L 1210 increases: alhidine + vincristine -114% in experiments with a resistant variant to NMU; alhidin + platidiam in 1/2 MTD on resistant variants to methotrexate (117%), NMU (114%) and 6-mercaptopurine (134%). The therapeutic effect of the triple combination (alhidin + vincristine + cyclofosfan) at 1/2 MTD (ELE up to 209%) is stronger than double (alhidin + vincristine and alhidin + cyclophosphamide). Combinations of the four drugs (alhidine + vincristine + cyclophosphamide + platidiam) were less effective than of the three, apparently due to increased toxicity.

When treating alnusidine, the drug-resistant variants of L 1210 (up to 81% of ELE) in comparison with the initial (up to 33% of ELE) turned out to be more sensitive to it. The effects of 6-mercaptopurine, vincristine, platydiam, adriamycin were moderately sensitive to both the initial (up to 55% of ELE) and drug-resistant variants L1210 (up to 60% of ELE) compared with the effects of NMU (up to 122% of ELE).

ELE was noted up to 203% with the combination of alhidin + cyclophosphane + methotrexate in L 1210, resistant to NMU, and up to 152% to 6-mercaptopurine. A similar result was obtained from the triple combination (alhidin + vincristin + platidiam) on these strains (up to 193% of ELE) compared with double combinations. However, alnusidine + ELE + methotrexate in animals with the triple combination of animals in the comparison with the double (alnusidin + NMU) were not found, respectively. L 1210, resistant option to metrotrexate. However, no special changes in the ELE of animals with the triple combination alnusidine + HMM + methotrexate in comparison with double (alnusidine + NMU) were not found, although in both cases a significant (up to 131 and 127%, respectively) animals ELE with L 1210, resistant option to metrotrexate.

As it is known, vincristine is one of the components of the chemotherapy of hemoblastosis patients. Its antitumor efficacy is especially high in the treatment of acute lymphoblastic leukemia (ALL). Nevertheless, there are options for ALL, resistant to chemotherapy with vincrastine, and, conversely, variants of acute myeloblastic leukemia, which can be successfully treated with a combination of drugs, including vincristine. Despite the widespread clinical use of vinca-alkaloids, the mechanism of their antitumor action is still not clear. In connection with this, a number of authors have established that tumor cells and blood (mice and patients with hemablastosis) sensitive to vincristine are associated with a greater amount of the drug than are resistant to it [7, 12].

On the basis of literature and our own data, it can be assumed that the herbal preparations studied by us increase the accumulation of vincristine in the cells of the initial and, especially, drug-resistant variants.

The injection of the preparation of sodium salt of 1,2-3-keto-18-dehydroglycyrretic acid in the triple combination (sodium salt of 1,2-3-keto-18-dehydroglycyrrite acid + vincristine + cyclophosphamide) in

MTD was expressed by inhibitory effect on both the initial L 1210 (up to 160% ELE) and drug-resistant variants (up to 167% ELE). Individually, the preparation of sodium salt of 1,2-3-keto-18-dehydroglycyrrite acid is active with respect to only L 1210, resistant to 6-mercaptopurine (up to 77% of ELE), without toxic manifestations.

The results obtained correspond to the goal of modern chemotherapy of a number of tumor diseases [7], where there is a need not only to achieve clinical remission, but also to increase life expectancy [2.4].

It has been established that the three main principles of polychemotherapy (the activity of each of the drugs in a given tumor, the different mechanism of their action and the different nature of toxicity) cannot explain all the rational combinations, predict the doses of the combined means and the modes of their injection. To identify the correlation of side and antitumor effects of new drugs and their combinations in order to reduce toxicity and increase the therapeutic effect and to overcome cross-and multi-drug resistance, special experimental studies are needed.

Cross, multidrug resistance to known and new herbal preparations in experiments on rats with resistant substrains of Pliss lymphosarcoma and sarcoma 45, and mice with resistant lymphocytic leukemia L 1210 were noted. Collateral (or increased) sensitivity of drug-resistant substrains to the new herbal medicines is revealed.

Induced drug (acquired) resistance to known chemotherapy drugs is removed when they are combined with 2-3 plant compounds (alhidin, alnusidine, sodium salt 1.2-3-keto-18-dehydroglycyrrite acid) when changing the treatment regime and dose of drugs. Often, herbal preparations, without expressing antitumor activity, when combined with chemopreparations, reduce the pharmacotoxic and depressive effects on blood formation and the immune system of cytostatics. At the same time, a sharp suppression of DNA synthesis, a decrease in the content of SH-groups and some steroid hormones with an increase in the content of thyroid hormones in drug-resistant tumors.

Thus, cross-drug, multiple drug resistance, collateral or (increased) sensitivity to known anti-tumor substances in drug-resistant substrains of rats and mice have been established. Induced drug resistance is removed with the help of combinations of new natural herbal preparations with known antitumor compounds in the optimal variants of the reception regime, their combination, dose and synergy of their combinants.

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ТАБИҒИ ПРЕПАРАТТАРДЫ ЦИТОСТАТИКТЕРМЕН БІРІКТІРГЕН КЕЗІНДЕГІ ДӘРІГЕ ТҰРАҚТЫ ҚАТЕРЛІ ІСІКТЕРДІ ТЕЖЕУІ

Аннотация. Плисс лимфосаркомасы өсімдік және цитостатиктерге, ал саркома 45 тек химиопрепараттарға дәрілік тұрақтылық көрсетті. Плисс лимфосаркомасында, саркома 45, лимфолейкоз L1210 жаңа табиғи препараттарына және белгілі ісікке қарсы препараттарға айқаспалы, көпжақты тұрақтылық байқалады. Плисс лимфосаркомасында белгілі фармакопрепараттарға ал саркома 45, L1210 жаңа табиғи өсімдік препараттарына жоғарғы коллатералды сезімталдық анықталды. Плисс лимфосаркомасының, саркома 45, L1210 дәріге тұрақтылығын жаңа өсімдік қосылыстарымен немесе оларды ісікке қарсы синтетикалық препараттармен біріктіріп, біріктірілген заттардың мөлшерін және санын өзгерту арқылы жоюға болады. Табиғи препараттарына және оның белгілі цитостатиктермен біріктірілуінде нитрозометилмочевинаға және 6-меркаптопуринге тұрақты лимфоидты лейкемия L1210 сезімталдық көрсетті.

Тәжірибелік зерттеудің нәтижесінде табиғи отандық жаңа дәрілік препараттардың көмегімен бірнеше сағат бұрын (2 және 4) жоғары көтере алатын (жануарлар) мөлшерде пайда болған дәрілік тұрақтылықты жою үшін нитрозометилмочевина, платидиам және адриамицин дәрілеріне тұрақтылығы бар науқастарға енгізудің алдындағы клиникалық тиімділігін жоспарлау критериіне жатады.

Түйін сөздер: саркома 45, Плисс лимфосаркомасы, лимфолейкоз L1210, қатерлі ісікке қарсы препараттар, коллатералды сезімталдық.

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ПРОТИВООПУХОЛЕВОЕ ИНГИБИРОВАНИЕ ПРИРОДНЫХ ПРЕПАРАТОВ В СОЧЕТАНИИ С ЦИТОСТАТИКАМИ НА ЛЕКАРСТВЕННО-РЕЗИСТЕНТНЫЕ ОПУХОЛИ

Аннотация. Лекарственно-резистентные подштаммы лимфосаркомы Плисса устойчивы как к растительным, так и цитостатикам, а саркома 45 – только к синтетическим препаратам. Проявляется перекрестная, множественная резистентность как к новым природным, так и известным противоопухолевым препаратам у резистентных подштаммов лимфосаркомы Плисса, саркомы 45, лимфолейкозу L 1210. Выявлена коллатеральная чувствительность к известным химиопрепаратам у лекарственно-резистентных вариантов лимфосаркомы Плисса и к новым природным препаратам у резистентных подштаммов саркомы 45, L 1210. Индуцированная лекарственная резистентность лимфосаркомы Плисса, саркомы 45 и L 1210 снимается новыми растительными соединениями или их комбинациями с противоопухолевыми препаратами, изменяя дозы и количество комбинантов. Результаты экспериментальных исследований по преодолению возникшей лекарственной резистентности с помощью природных препаратов в 1/2 МПД за несколько (2 и 4) часов до начала лечения нитрозометилмочевиной, платидиамом и адриамицином служат критерием для прогнозирования клинической эффективности у больных с лекарственной резистентностью к данным препаратам.

Ключевые слова: саркома 45, лимфосаркома Плисса, лимфолейкоз L1210, противоопухолевые препараты, коллатеральная чувствительность.

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REFERENCES

[1] Abdryashitov R.I., Stavrovskaya A.A.Features cross resistance of tumor cells with high levels of resistance to kolhitsin // Byul. experim. biology and medicine. 1989. N 10. TS P. 490-492 (in Rus.).

[2] Rakhimov K.D. New natural compounds in chemotherapy against drug resistant tumors. Thesis of Dr. scient. med. Moscow, 1991. P. 455 (in Rus.).

[3] Belousov A.K. Molecular mechanisms of action of alkylating agents and anti-metabolites // Chemotherapy of malignant tumors // Under. The editors N. N. Blokhin. M.: Medicine, 1977. P. 61-117 (in Rus.).

[4] Rakhimov K.D. Pharmacological research of natural compound of Kazakhstan. Almaty, 1999. P. 270 (in Rus.); Rakhimov K.D. The secrets of pharmacology. Almaty, 2012. P. 536 (in Kaz.).

[5] Bogomolova N.S., Losev G.A., Chernov V.A. Combined use spirobromina with vincristine, methotrexate, and prospidina fatrinom rats with sarcoma Jensen // Actual problems of experimental tumor chemotherapy. 1987. P. 137-139 (in Rus.).

[6] Montsevichyute - Eringene E.V. Changes immunobiological properties of tumors under the influence of alkylating agents. M.: Medicine, 1975. P. 215 (in Rus.).

[7] Skipper H., Scabel F.M. Tumor stem cell heterogeneity: implications with respect to classification of cancers by chemotherautic effect // Cancer Treat-Rep. 1984. Vol. 68. P. 43-62 (in Eng.).

[8] Sirkin A.B. Clinico-pharmacological characteristics of antitumor agents // anticancer chemotherapy // Edited by NI Perevodchikova. M., 1986. P. 14-20 (in Rus.).

[9] Nikonov G.K., Tikhonov L.K., Artomonova N.A., Vermenichev S.M., Rakhimov K.D. A method for isolating (3,7-dimethyl -3-vinyl-7-oksiokta-1,4-dienyl)-phenol from fruits psoralea stone berry. Certificate of authorship // The USSR. № 1205506. 1985 (in Rus.).

[10] Gorbacheva L.B., Kukushkina G.V. The role of 0 (6)-alkylguanine DNA alkyltransferase in the implementation of the antitumor activity of N-nitrosourea // Chemical Pharmaceutical Journal. 1989. Vol. 24, N 4. P. 389-396.

[11] Kamchibekova Ch. Development of a new anticancer drug glycosyl-nitrosomethylurea-1: Dissertation for the degree of doctor of medical sciences. Bishkek, 2019. P. 43 (in Rus.).

[12] Semenov A.A. Natural antineoplastic compound (structure and mechanism of action). Novosibirsk: Nauka, 1979. P. 222 (in Rus.).

[13] Under the scientific editorship of Doctor of Medicine, Academy of Russian Natural Sciences, prof. V. F. Korsun. Modern problems of phytotherapy and herbalism // Proceedings of the 4th International Congress phytotherapeutists and herbalists. M., 2016. P. 238 (in Rus.).

[14] Adjei A. A.Review of pharmacology and clinical activity of new chemotherapy agents for the treatment of colorectal cancer // Clinical Pharmacology. 1999. Vol. 48. P. 265-277 (in Eng.).

[15] Rakhimov K.D. Pharmacology natural drugs. Almaty, 2014. P. 483 (in Kaz.) .

[16] Rakhimov K.D. New drugs at tumor chemotherapy // Russian national congress “Human and drug”. M., 1998. P. 609 (in Rus.).

[17] Pylayeva-Gupta Y., et al. RAS oncogenes: weaving a tumorigenic web // Nat Rev Cancer. 2011; 11: 761-774. [PMC free article] [PubMed].

[18] Jemal A., Siegel R., Xu J., Ward E. Cancer statistics, 2010 // CA Cancer J Clin. 2010; 60(5): 277-300. [PubMed: 20610543] (in Eng.).

[19] Berdinskikh N.K., Draga N.V., Zaletoc S.P. Influence of cyclophosphamide on polyamine excretion in rats with the guerin carcinoma and Pliss Lymphosarcoma // Experimental oncology. 1989. P. 69 (in Rus.).

[20] Rakhimov K.D., Kabyev O.K., Kuralasov A.K., Togaybaeva Z.I., Vermenitchev S.M. Mediated action of some antitumor drugs of plant-origin on rats with Pliss lymphosarcoma // Experimental oncology. 1986. P. 68-70 (in Rus.).

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ESTRUS INDUCTION IN DAIRY SHEEP DURING THE ANESTROUS PERIOD

Abstract. The aim of the research was to investigate the possibility of estrus induction in dairy sheep during the anestrous period using various hormonal preparations and finding out the effectiveness of this biotechnological method.

Experiments on the estrus induction were conducted in the Nikolaev M.I. peasant farm of Krymsky region, Krasnodar Krai. The object of the research was lactating and dry sheep of the dairy breed "Lacaune" with a total number of 332 heads between the ages of 2.5 and 5 years.

It is shown that in the anestrous season (from February to August) in the climatic conditions of the Krasnodar Krai with sufficiently high effectiveness (54.3-63.2%), it is possible to induce estrus in the Lacaune dairy sheep breed. In this case, the object of stimulating estrus can be both lactating and dry females. High fertility (75.0%) in sheep with induced estrus was established in the summer period. In the winter and spring seasons, this figure was 69.3% and 60.7%, respectively. The greatest effectiveness of estrus induction was established during hormonal stimulation of sheep during the summer period when the largest number of lambs (0.71) per one ewe was received. In the spring and winter seasons, this indicator was 0.37 and 0.58, respectively.

Effective technology of hormonal estrus induction in the unsexual season allows for the planned reproduction of dairy sheep throughout the year for year-round rhythmic milk production.

Key words: dairy ewes, anestrous period, estrus cycle, hormone therapy, estrus induction, progestagens, insemination, fertility.

Introduction. Sheep are polycyclic animals with a pronounced sexual season. Outstanding scientist A.I. Lopyrin believed that in the northern hemisphere, sheep start to be tupping in 8-10 weeks after the longest day of light. Therefore, the sexual (estrus) season in almost all sheep breeds occurs in autumn, as a rule, from September to December [1]. At this time, they are inseminated, while the period of mass young stock production falls on February-May. In economic conditions, when the most important product of sheep farming was high-quality wool, which was sheared once a year, the seasonality of sheep breeding was not decisive. Currently, in connection with the transfer of sheep farming to the priority meat direction and the initiation of dairy sheep farming in the country, the biologically determined seasonality of sheep breeding has become a critical point limiting the increase in the efficiency of the industry. This is due to the fact that the market requires the receipt of meat and dairy products and their delivery throughout the year [2, 3]. Accordingly, the technology for year-round sheep reproduction is needed.

Scientists and experts all over the world try to overcome the biological barrier to the seasonality of sheep breeding. As a rule, they are divided into two directions. The first is sheep breeding improvement in

order to ensure polyestrous, i.e. the ability to be tupping and become fertile at any time of the year was a genetically determined trait. Such fairly common breeds as the Romanov, Il-de-France, Dorper, Finnish Landrace, East Frisian, Merinoland and, partly, Dorset have practically no breeding season. However, the process of breeding polyestrous sheep breeds is long and it is not always possible to get a predictable result. In addition, even in polyestrous sheep breeds, there is significant variability of cyclicity in the seasons of the year. [4].

The second direction is the use of various factors of external influence on the female's organism, based on a detailed knowledge of the mechanisms of the neurohumoral regulation of the reproductive function in sheep.

In order to induce estrus in sheep during the anestrous period, two methods are used - light and hormonal, each of which has its own advantages and disadvantages, determining the appropriateness and extent of their use in specific economic conditions.

The light method of estrus induction in sheep is based on the fact that the hypothalamic centers that regulate the release of gonadotropic hormones are adapted to light effects and are stimulated by the natural light difference when changing a long summer day to a shorter autumn one. Creating a so-called "artificial autumn", as shown by numerous experiments, stimulates estrus in some sheep [5]. However, the majority of authors agree that the number of sheep that have been tupping varies widely (from 16 to 80%), excluding the predicted and successful application of this method with a practically significant result. [1].

The classic method of estrus induction in the off-season is the induction of estrus with the help of hormonal drugs, based on the prolongation of the luteal phase of the estrus by progestagens [1, 6]. Some authors mistakenly believe that "progesterone, affecting the pituitary gonadotropic cells, stimulates the synthesis and release of follicle-stimulating hormone (FSH) and luteinizing hormone (LH), which are involved in the regulation of ovarian function and the formation of follicles" [4]. On the contrary, progestagens inhibit the secretory function of the hypothalamus and the release of releasing hormone, which leads to suppression of the function of the posterior pituitary and release of follicle-stimulating hormone. Low concentration of FSH and LH in the peripheral blood leads to inhibition of the generative function of the ovaries, respectively, the growth and development of follicles are suppressed. As a result of hormonal treatment with progestagens, in animals, the stages of the estrus cycle are equalized, and after their action ceases, the physiological status of the generative apparatus of the females comes close to the post-luteal (or preovulatory) phase of the estrus cycle, the gonadotropic cells of the posterior lobe of hypophysis are activated, and the growth and maturation of the follicles in the ovaries are enhanced in all treated animals and, accordingly, animals are simultaneously tupping [7-9].

As noted above, year-round rhythmic milk production is the main technological aspect of effective dairy sheep farming. This requires the breeding of dairy sheep in both the estrous and anestrous periods. However, for different breeds of sheep, their age and physiological state, the adopted technology of production in different climatic conditions, hormonal treatment to induce estrus and its effectiveness may vary significantly [8,9,10]. In this regard, the study of the possibility of estrus induction in dairy sheep and finding out the effectiveness of this biologically-inspired technique is relevant, which determined the aim of this investigation.

Materials and research methods. Own experiments on the estrus induction were conducted in the Nikolaev M.I. peasant farm of the Krymsky district of Krasnodar Krai (figure 1). The object of the research was lactating and dry sheep of the dairy breed "Lacaune". For the induction of estrus, several drugs were used, injected and intravaginally. For the treatment of one group of sheep, the common drug “progesterone” was used, which was administered intramuscularly at a dose of 0.7 ml for 11 days. For hormonal treatment of two other groups of sheep, intravaginal pessaries of domestic production were used, impregnated with AMOL, the active ingredient of which is the synthetic analogue of progesterone 17a-mepregenol acetate and imported Syncro-part pessaries (France), containing 30 mg of active ingredient fluogestone acetate (Flugestone acetatum).

In all groups of sheep, to stimulate the growth of follicles in the ovaries after the removal of the progestogenic preparation, pregnant-mare serum (PMS) (Syncro-part Pmsg 6000me France) and the Follimag drug were used in different doses. Studies were conducted from February to August. In order to determine the impact of the season on the effectiveness of estrus induction, experiments with a certain degree of conditionality were divided into winter (February-March), spring (April-May) and summer (June-August).

Figure 1 – Interior design of the premises for the maintenance and milking of the Lacaune breed sheep in Nikolaev M.I. peasant farm of Krasnodar Krai

The methodological features of individual experiments are given in the description of experimental results.

Results and discussion.

Experiment 1. The first experiment was conducted in February-March 2017. 3 groups of animals were formed.

In the first group of sheep (lactating ewes in the amount of 85 heads), pessaries impregnated with the AMOL preparation at a dose of 30 mg AS were intravaginally administered for 12 days. After sponge removal, all the animals were intramuscularly injected with PMS at a dose of 600 units.

The second group of sheep was formed from dry ewes in the number of 51 heads, which were treated similarly to group 1.

For the treatment of the third group sheep, also consisting of dry females (n = 17), the "progesterone" drug was used, which was administered intramuscularly at a dose of 0.7 ml for 11 days. After treatment with progestagens in order to stimulate folliculogenesis, the Follimag drug was administered once intramuscularly at a dose of 500 units.

In all groups of sheep, sampling in estrus was not carried out, insemination of sheep was conducted after 55 hours, using freshly obtained semen for quality that meets the minimum requirements of the "Manual on the operating procedures of organizations of artificial insemination and transplantation of embryos of farm animals" (M., 2000).

The following results were attained. In the first group, 61 sheep were fertilized (71.2%), 62 lambs were born (fertility - 101.6%). In the second group, 34 sheep (66.6%) were fertilized, from which 36 lambs were obtained (fertility - 105.8%). In the third group, insemination performance was 64.7% (11 out of 17 inseminated sheep were fertilized), from which 11 lambs were obtained (fertility 100%).

Thus, in winter, out of 153 treated females, 106 sheep were fertilized fruitfully (average fertility 69.3%), from which 109 lambs were obtained (average fertility 102.8%). There was no significant difference in fertility between lactating and dry ewes. The average number of lambs obtained per 1 treated sheep was 0.71.

Experiment 2. The second experiment was performed in April - May 2017. Two groups of sheep were formed.

The first group, consisting of lactating ewes (n = 58), was treated with the intravaginal injection of sponges impregnated with the AMOL preparation at a dose of 30 mg AS. The intravaginal exposure period of progestagens was 12 days.

The second group ewes (dry ewe, n = 45) were also intravaginally injected for 12 days with Syncro-part pessaries (France) containing 30 mg of active substance of fluogestone acetate (Flugestone acetatum).

After removing the sponges, all animals were intramuscularly injected one time: in the first group, PMS was administered at a dose of 600 units. (Syncro-part Pmsg 6000me France), in the second group - "Follimag" at a dose of 500 units.

In order to carefully establish the estrus-inducing effect of the drugs used in this experiment, after the administration of gonadotropin, sheep were controlled for the state of estrus. To do this, with the help of sheep-samplers with tied up aprons, sheep were selected in the estrus. For a more accurate determination of the estrus onset, the sample was carried out every 4 hours.

The following results were obtained.

In the first group of 58 sheep, during the first 20 hours after the PMS injection, no one ewe has been tupping. After sampling after 24 hours, 2 heads in estrus were selected, after 28 hours - 3 heads, after 32 hours - 6 heads, after 36 hours - 10 heads, after 40 hours - 11 heads, after 44 hours - 2 heads. Sampling after 48 hours and further till insemination, which was carried out 55-56 hours after the PMS administration, did not give positive results.

Therefore, in the first group of 58 lactating ewes, after progestagens + PMS treatment, 34 sheep were tupping within 44 hours (58.6%). At the same time, of these 34 animals, 27 sheep (79.4%) have been tupping in a period from 28 to 40 hours after the gonadotropin administration.

All animals in the estrus were inseminated with freshly obtained semen with a mobility of 7-8 points, a concentration of 2.6-2.8 billion/ml. Of the inseminated 34 heads, 22 sheep lambed (fertilization rate was 64.7%). 24 lambs were born (fertility was 109.1%).

In such a way, analyzing the results obtained in the first group of animals, we came to the conclusion that, out of 58 lactating ewes, after the estrus induction in spring, 22 heads were fruitfully inseminated (37.9%), with a yield of 0.41 lamb per 1 treated ewe.

In the second group of 45 sheep, within the first 24 hours after the PMS injection, no one single ewe was tupping. After sampling, after 28 hours, 3 blissom sheep were selected, after 32 hours - 3 heads, after 36 hours - 13 heads, after 40 hours - 2 heads, after 44 hours - 1 head. As in the first group, 48 hours later, before insemination, which was carried out 55-56 hours after the Follimag administration, the sample did not reveal blissom ewes.

In this group of 45 dry ewes, after treatment with progestogen + Follimag, 22 heads were tupping within 44 hours. (48.9%). At the same time, out of these selected 22 sheep in estrus, 21 animals (95.5%) have been tupping between 28 and 40 hours after administration of gonadotropin.

As in the first group, all the sheep in the estrus were inseminated with freshly obtained semen with a mobility of 8–9 points, a concentration of 2.8–3.0 billion/ml. Among 22 animals, 12 sheep lambed (fertilization rate was 54.5%). 14 lambs were born (fertility was 116.6%).

In such a manner, in the second group of animals of 45 dry ewes, after the estrus induction in the spring period, 12 heads were fruitfully inseminated (26.6%), with a yield of 0.31 lamb per 1 treated ewe.

For a more objective assessment of the effectiveness of estrus induction in sheep in spring, we found it possible to summarize the data obtained for two groups and to derive the averages. Of 103 estrus-induced ewes, estrus was recorded in 56 animals (54.3%), of which, after insemination, 34 sheep lambed (fertility rate was 60.7%). 38 lambs were obtained (fertility was 111.8% for a sheep that gave birth, or 65.5% for an inseminated sheep). The estrus induction in the spring season resulted in 0.37 lamb per treated sheep.

Experiment 3. The third experiment was conducted in June-August 2017. As in the second experiment, 2 groups of sheep were formed.

The first group, consisting of lactating ewes (n=36), was treated with the intravaginal injection of sponges impregnated with the “AMOL” at a dose of 30 mg AS. The progestagens exposure period was 14 days.

The second group of ewes (dry ewe, n = 40) was also intravaginally injected for 14 days with pessaries Syncro-part (France) containing 30 mg of fluogestone acetate (Flugestone acetatum).

After sponge removal, all animals were injected intramuscularly with gonadotropin: in the first group, PMS at a dose of 600 units. (Syncro-part Pmsg 6000me France), in the second group - “Follimag” at a dose of 400 units.

In the third experiment, as in the second one, in order to accurately determine the stimulating effect of the used drugs after the gonadotropin administration, sheep were sampled into the estrus state with the help of sheep samplers with tied up aprons. To accurately determine the onset of estrus, sampling was performed every 4 hours.

In this experiment, the following results were obtained.

In the first group of sheep, during the first 20 hours after the PMS injection, no one single ewe was tupping. After sampling after 24 hours, 1 head in estrus was selected, after 28 hours - 2 heads, after 32 hours - 7 heads, after 36 hours - 6 heads, after 40 hours - 5 heads after 44 hours and then before insemination, which was carried out 55-56 hours after the PMS administration, ewes in estrus were not detected.

Thus, in the first group of 36 sheep, after estrus induction, within 40 hours, 21 heads were tupping (58.3%). At the same time of these 21 heads, in the time period from 28 to 40 hours, estrus was induced in 20 sheep (95.2%) after the PMS administration. All animals in estrus were inseminated with freshly obtained semen with a mobility of 8-8.5 points, a concentration of 2.5-3.0 billion/ml. Among 21 sheep, 15 animals lambed (fertility rate was 71.4%). 18 lambs were obtained (fertility was 120.0%). Consequently, in the first group of animals of 36 lactating ewes, after the induction of estrus in the summer season, 15 of them were fruitfully inseminated (41.6%), in this case, 0.5 lamb was obtained per 1 treated ewe.

In the second group, sheep in estrus were detected only 28 hours after the Follimag administration, when 2 heads in a state of estrus were selected. After 32 hours, 2 heads were selected, after 36 hours - 10 heads, after 40 hours - 12 heads, after 44 - 1 head. Sampling after 48 hours and further did not reveal any ewes in estrus. In this group of 40 dry ewes, after progestagens + Follimag treatment, 27 animals were tupping within 44 hours (67.5%). At the same time, 26 selected sheep in estrus (96.2%) were tupping in the time period from 28 to 44 hours after the Follimag use.

As in the first group, all the sheep in estrus were inseminated with freshly obtained semen, the quality of which corresponded to the minimum requirements of the Instruction. Of 27 sheep, 21 animals lambed (fertilization rate was 77.7%). 26 lambs were born (fertility was 123.8%).

Thus, in the second group of animals of 40 dry ewes, after the estrus induction in the summer, 21 animals were fruitfully inseminated (52.5%), 0.65 lamb was obtained per 1 treated ewe.

As in the second experiment, we think it possible to summarize the data obtained in two groups and to derive the averaged indicators of the effectiveness of estrus induction in sheep in the summer period. Of 76 estrus-induced ewes, estrus was detected in 48 heads (63.2%), of which, after insemination, 36 sheep lambed (fertilization rate - 75.0%). A total of 44 lambs were obtained (fertility - 122.2% in terms of lambed sheep, or 0.9 lamb per inseminated ewe) (figure 2). The induction of estrus in the summer season resulted in a yield of 0.58 lamb per treated sheep.

The summarized data for the three experiments are presented in table.

Figure 2 – Breeding, estimation of growth and development of lambs got from ewes with induced estrus in the summer period

Indicators of the effectiveness of estrus induction in "Lacaune" dairy sheep breed in the anestrous period by the seasons

Season	Treated sheep, heads	were tupping		Of them lambed		Number of lambs		Obtained lambs per 1 treated sheep
		heads	%	heads	%	heads	%	
Winter (February-March)	153	–*	–*	106	69.3	109	102.8	0.71
Spring (April-May)	103	54	54.3	34	60.7	38	111.8	0.37
Summer (June-August)	76	48	63.2	36	75.0	44	122.2	0.58
*Sampling of ewes in estrus was not carried out. Frontal insemination of all sheep was used 55 hours after finishing the treatment with progestagens.								

Comparison of data shows that the greatest fertilization rate (75.0%) in sheep with induced estrus was established in the summer period. In the winter and spring seasons, this figure was 69.3% and 60.7%, respectively.

Conclusions. The obtained results indicate that in the anestrous season (from February to August) in the climatic conditions of the Krasnodar Krai, with high efficiency, it is possible to induce estrus in the sheep of the Lacaune dairy breed. In this case, the object of estrus induction can be both lactating and dry females. At the same time, some of the resulted indicators, in our opinion, require more careful analysis in order to make possible adjustments in terms and estrus induction scheme in sheep.

The best fertilization rate of sheep during induced estrus was found in the summer period. The smaller value of this indicator was recorded in the winter period and the smallest - in the spring. However, it should be noted that in the winter experiment, no sheep in estrus were sampled, the frontal insemination was applied 55 hours after the administration of the gonadotropic hormone. In this regard, it is difficult to judge the effectiveness of estrus induction. At the same time, the main resulting indicator of our experiments in the winter period is 0.71 lamb per treated sheep. It can be assumed that a sufficiently high rate of fruitful insemination is connected with the fact that the winter group of animals could get a part of the sheep that were before the very end of the estrous season, in which, apparently, the natural hormonal background allowed to sensibilize the sexual centers with endogenous progesterone, and the administration of exogenous progesterone (vaginal pessaries) coincided with the preovulatory phase of the estrus cycle, which led to the manifestation of estrus and successful fertilization.

In a similar way, it is possible to explain the high fertilization rate of females (69.3%) in the summer experiment (June-August). It could also happen that sheep with regenerating natural hormonal background (especially in August) fell into this group, which, after saturation of the body with exogenous progesterone followed by stimulation of folliculogenesis in the ovaries, showed a full estrus which was confirmed by obtaining 0.58 lamb per one treated sheep.

The smallest number of lambs (0.37 per one treated ewe) was obtained in the spring (April-May) treatment period. Apparently, out of the estrous season, the function of the pituitary and ovaries under the influence of unfavorable environmental factors (prolonged light day, insolation) noticeably weakens and even under the influence of exogenous gonadotropic hormone (PMS or Follimag), the developing ovarian follicles do not reach ovulation maturity and undergo partial luteinization without rupture and release of the egg. It may also happen that during this period so-called abortive ovulation when the selected eggs are defective and cannot be fertilized.

It is believed that in lactating females, the effectiveness of estrus induction and fertilization rate is lower than in dry (non-lactating) animals [6]. In our experiments, this pattern is quite clearly seen only during hormonal treatment in the summer.

Obviously, the obtained data are preliminary, and their analysis is not exhaustive. Moreover, the reproductive indicators obtained in our experiments are significantly lower than in the experiments of other authors [6]. In part, this can be explained by the fact that the data on fertility in these authors are given not by lambing, but by the early diagnosis of pregnancy of ewe by the ultrasound method, i.e. without taking into account possible fetal mortality. It is also possible the impact that the experiments were conducted in other climatic conditions and with other sheep breeds using various induction schemes [11-15]. For a more complete analysis and justification of the laws obtained, further research is needed, first of all, of the natural hormonal background in sheep of different age groups and physiological state in the context of the seasons of the year. Selective laparoscopy (using endoscopic equipment) to assess the state of the internal genital organs in treated animals could be a good diagnostic test to determine the effectiveness of estrus induction.

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АНЭСТРАЛЬДЫ КЕЗЕҢДЕ СҮТТІ ҚОЙЛАРДЫҢ ЭСТРУС ИНДУКЦИЯСЫ

Аннотация. Зерттеудің мақсаты әртүрлі гормоналды препараттарды қолдану арқылы анестралдық кезеңде сүт қойларында сүтқоректілерді индукциялау мүмкіндігін зерттеу және биотехнологиялық әдістердің тиімділігін анықтау болды.

Жыныстық күйіт ынталандыру жөніндегі эксперименттер Қырым аймағы Краснодар өлкесінің. Николаев М.И. Шаруа (фермер) шаруашылығында өтті. Зерттеудің нысаны 2,5 жылдан 5 жылға дейінгі кезеңде жалпы 332 басы бар сүт тұқымының «Лакон» ("Lacaune") лактация кезеңінде және суалу кезеңіндегі қойлары болды.

Краснодар өлкесінің климаттық жағдайында анэстральдық маусымда (ақпаннан тамызға дейін) жеткілікті жоғары тиімділікпен (54,3-63,2%) сүт қойларында «Лакон» күйіт табуға болады деп көрсетілген. Бұл жағдайда эструсты ынталандыратын зат сүтті және суалу кезеңіндегі аналық болуы мүмкін.. Жазғы кезеңде индуцирленген күйіт кезде қойлардағы жоғары өнімділік (75,0%) белгіленді. Қысқы және көктемгі мезгілдерде бұл көрсеткіш тиісінше 69,3% және 60,7% құрады. Күйітті ынталандырудың ең тиімділігі жазғы кезеңде қойлардың гормоналды ынталандыруы кезінде анықталды, ол бір қойға ең көп қозы (0,71) алынды. Көктемгі-қысқы мезгілдерде бұл көрсеткіш тиісінше 0,37 және 0,58 құрады.

Мерзімді кезеңде эструстың гормоналды индукциясының тиімді технологиясы жыл бойына ритмді сүтті өндіруге сүт қойларын жоспарлы көбейтуге мүмкіндік береді.

Түйін сөздер: сүт аналықтары, анэстральдық кезеңі, эстрогендік цикл, гормондық терапия, эструс индукциясы, прогестогендер, ұрықтандыру, өнімділік.

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ИНДУКЦИЯ ЭСТРУСА У МОЛОЧНЫХ ОВЕЦ В АНЭСТРАЛЬНЫЙ ПЕРИОД

Аннотация. Целью исследования являлось изучение возможности индукции эструса у молочных овец в анэстральный период применением различных гормональных препаратов и выяснение эффективности этого биотехнологического приема.

Эксперименты по стимуляции половой охоты проведены в КФХ Николаев М.И. Крымского района Краснодарского края. Объектом исследований были лактирующие и сухостойные овцы молочной породы «Лакон» ("Lacaune") общей численностью 332 гол. в возрасте от 2,5 до 5 лет.

Показано, что в анэстральный сезон (с февраля по август) в природно-климатических условиях Краснодарского края с достаточно высокой эффективностью (54,3-63,2%) можно индуцировать половую охоту у овец молочной породы «Лакон». При этом объектом стимулирования эструса могут быть как лактирующие, так и сухостойные самки. Высокая оплодотворяемость (75,0%) у овец с индуцированной охотой установлена в летний период. В зимний и весенний сезоны этот показатель составил соответственно 69,3% и 60,7%. Наибольшая эффективность вызывания половой охоты установлена при гормональной стимуляции овец в летний период, когда было получено наибольшее число ягнят (0,71) на одну обработанную овцематку. В весенний и зимний сезоны этот показатель составил соответственно 0,37 и 0,58.

Эффективная технология гормонального индуцирования эструса в неполовой сезон позволяет проводить плановое размножение молочных овец в течение всего года для круглогодового ритмичного получения молока.

Ключевые слова: молочные овцематки, анэстральный период, эстральный цикл, гормональная терапия, индукция эструса, прогестогены, осеменение, плодовитость.

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REFERENCES

[1] Lopyrin A.I. **(1971)** Sheep breeding biology. Moscow. 320 p. (in Russ.).

[2] Selionov M.I., Bobryshova G.T., Gadzhiev Z.K., Izmalkov S.A. **(2017)** Sheep farming economy: pros and cons // Sheep, goats, wool business. N 1. P. 5-9 (in Russ.).

[3] Aibazov M.M., Malakhova L.S., Trubnikova P.V. **(2006)** The results of the estrus induction in dairy goats in the anestrous period // Sheep, goats, wool business. N 2. P. 34-35 (in Russ.).

[4] Tikhona G.S., Bezvesilnaya A.V., Khmelkov V.N. **(2013)** Influence of hormonal drugs on folliculogenesis in sheep in the anestrous period // Scientific and Technical Bulletin IT NAAN. N 109. P. 277-282 (in Russ.).

[5] Kazakov V.M. **(1962)** On the artificial induction of estrous in sheep. Livestock, 1962. N 8 (in Russ.).

[6] Chekunkova Yu.A. **(2016)** Stimulation of hunting in sheep in the spring period // Bulletin of the Altai State Agrarian University. N 8 (142) (in Russ.).

[7] Karynbaev A.K., Akynbekova R. **(2013)** Effect of gonadotropic hormones on the production of eggs of the Karakul ewes of different ages // Sheep, goats, wool business. N 3. P. 31-32 (in Russ.).

[8] Baimukanov D.A., Abugaliyev S.K., Seidaliyev N.B., Semenov V.G., Chindaliyev A.E., Dalibayev E.K., Zhamalov B.S., Muka Sh.B. **(2019)** Productivity and estimated breeding value of the dairy cattle gene pool in the Republic of Kazakhstan // Bulletin of National academy of sciences of the Republic of Kazakhstan. Vol. 1, N 377. P. 39-53. https://doi.org/10.32014/2019.2518-1467.5 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

[9] Bogdan L., Groza I., Pop R., Petrean A., Bogdan S. **(2011)** Induction and oestrus synchronization in sheep during the breeding and nonbreeding season // Bulletin UASVM. Veterinary Medicine. 68 (2): 1843-5270.

[10] Maraček I., Vlčková R., Kaľatová J., Sopková D., Klapáčová K., Valocký I., Pošivák J. **(2009)** Effect of assisted oestrus on the ovulation rate and reproductive performance of Tsigai sheep // Slovak J. Anim. Sci. 2009. 42, SUPPLEMENT 1: 51-55 CVŽV Nitra ISSN 1337-9984.

[11] Omontese B.O., Rekwot P.I., Rwuaan J.S., Ate I.U., H. Makun J. **(2014)** Induction of oestrus in Nigerian Ouda ewes with different oestrus synchrony protocols // Revue Méd. Vét. 165. 7-8, 240-244.

[12] Stoycheva I., Kirilov A. **(2015)** Induction of synchronic oestrus, impregnancy and fertility of female lambs at 18 months of age and female lambs at 7-8 months of age, after treatment with PMSG // Bulgarian Journal of Agricultural Science. 21 (No 5). P. 1044-1048.

[13] Hernández-Marín J.A., Cortez-Romero C., Corredor C.A.H. Sánchez J.G. **(2018)** Male effect and temporary weaning in synchronization of post-partum ovarian activity in Pelibuey ewes // South African Journal Of Animal Science. 48(4): 743-750. doi:10.4314/sajas.v48i4.16

[14] Letelier C., Contreras I., Garcia-Fernandez R.A., Matildo Sanchez A.M. **(2011)** Effects of oestrus induction with progestagens or prostaglandin analogues on ovarian and pituitary function in sheep // Animal reproduction science. 126 (1-2): 61-9. Doi:10.1016/j.anireprosci.2011.04.012

[15] Ashour G., El-Bassiony M.F., Dessouki Sh.M., El-Wakeel M.A. **(2018)** Application of different hormonal protocols for improving reproductive performance of Barki ewes // World's Veterinary Journal. 8 (3): 55-64.

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QUALITY OF COLOSTRUM IN DAIRY BREED COWS WITH DIFFERENT DAIRY PRODUCTIVITY

Abstract. When the primary immunity is formed in the body of a newborn calf, the main source of immunoglobulins, lysozyme, functionally active leukocytes, and lymphocytes is colostrum. A very important condition for the formation of complete immunity is the quality of colostrum. A number of scientists claim that cows of different dairy breeds differ significantly in terms of dairy productivity, while the mass fraction of immunoglobulins negatively correlates with the amount of colostrum during the first milking.

The main task of research was to study the dynamics of the quality of colostrum, depending on the size of the milk yield of cows for lactation. The object of the research was the cows of four breeds ща the Samara region: Black-and-white, Bestuzhev, Holstein, Ayrshire. It has been established that the content of immunoglobulins in the colostrum of the first milk yield in cows of different breeds changes under the influence of the level of dairy productivity, as well as with the age of animals. The highest content of immunoglobulins was in the colostrum of the Bestuzhev breed - 103.35-81.38 g/l, and the lowest in the Holstein breed - 74.52-42.29 g/l.

Colostrum immunoglobulins are divided into three classes - IgG, IgA, IgM. In the colostrum of the first milk yield of the Black-and-white cows, the IgG level is 84.1-85.5%, Bestuzhev - 85.7-86.3%, Holstein 83.9-84.4%, Ayrshire - 85.7-86, 6%. There is a tendency to increase of IgG level, with increasing milk yields of cows for lactation. It was found that with an increase in the dairy productivity of cows, the quality of colostrum decreases and the incidence of calves grows. As a result, the average daily gain in live weight of the young stock is reduced proportionally. Based on the obtained results, we recommend assessing the quality of colostrum of the first milk yield using an optical or digital refractometer as well as to conduct targeted breeding work in the direction of improving the quality of colostrum.

Keywords: breed, cow, calves, colostrum, quality, lactation, milk yield, immunoglobulins, incidence.

The relevance of the topic. From birth of calf until the moment it reaches physiological maturity, significant changes occur in the structure of all organs and body systems. The principal and responsible is the neonatal period. It is important, first of all, as an adaptation, associated with the activation of the immune system of the body, which protects the calf from the negative effects of the environment and pathogenic microflora. A calf is born almost sterile, while there is completely no immune in its body, since antibodies are not transmitted to the calf directly in the mother's organism. The placenta, being a natural biological barrier, not only protects the body of the fetus from pathogenic microbes, but also blocks the flow of antibodies to it, which are the basis of calf immunity. Antibodies enter the calf organism with colostrum, where they get from the mother's blood several days before calving [1, 2-7].

Colostrum is the staple food for newborn calves. Colostrum contains all the components necessary for the functioning of the calf body: proteins, fats, macro and microelements, vitamins, enzymes, water. For the formation of the initial colostral immunity, colostrum is the main source of immunoglobulins, lysozyme, functionally active leukocytes, and lymphocytes. In addition, it contains a large number of growth factors and cytokines. Therefore, the calf should receive the first portion of colostrum as early as possible and no later than one hour after the birth. Getting into the digestive tract, colostrum creates favorable conditions for the development of lactic acid bacteria, the product of which is lactic acid, inhibits the development of putrefactive and pathogenic microflora. At the same time, the colostrum itself has a high active acidity of 40-60 °T, which also inhibits the activity of pathogenic microflora [8-16].

A crucial condition for the immunity formation in the calf body is the quality of colostrum. This is especially true for the first portion of colostrum after calving. A number of scientists claim that the quality of colostrum is influenced by various genotypic and paratypical factors. In the experiments of Hartmann P.E. (1973), Scammell A.W. (2001), Akers R.M. (2006) it was found that in cows of different breeds, the volume of the first milk yield varies from 2.2 to 17.6 kg. Herewith Morin D.E. (1997) claims that the mass fraction of immunoglobulins negatively correlates with the amount of colostrum during the first milking. In Pritchett L.C. experiments (1991) in cows with milk yield in the first milking of 8 kg, in 23% of animals in colostrum, the IgG level was below the physiological norm (60 g/l). With an increase in milk yield of more than 8 kg, the percentage of cows with colostrum of this quality increased [2, 15, 17-20].

Since the productivity of cows all over the world is constantly growing, this is accompanied by an expansion in the amount of colostrum with a reduced content of immunoglobulins in the first milk yield. According to Zarcula et al. (2010), in the colostrum of local Romanian cows, the mass fraction of protein was 22.1-23.6%, and in the colostrum of Holstein breed selected for high yields - only 13.4-17.6%. A number of scholars have come to the conclusion that long-term breeding for increasing the level of dairy productivity affects the quality of the offspring, its viability as well as indicators of the reproductive function of cows. In some herds of the United States, up to 10% of calves die in the first days after birth. About 80% of the dead animals do not have anatomical abnormalities. These facts are related to the breed of cows and the level of their dairy production. On large dairy complexes, the overall incidence of calves reaches 91.32%, including respiratory organs - 50.98% and digestive organs - 31.96% [21-25].

Despite the considerable study of the problem of the quality of colostrum and the influence of various factors on it, the results are rather contradictory. The mechanisms regulating the composition of colostrum and allowing to affect its quality have not yet been deciphered, although the influence of many factors on this indicator is considered proven.

Therefore, this topic is still relevant and requires additional research.

Material and methods. Scientific and economic experiment was carried out in the breeding farms of the Samara region and the Republic of Bashkortostan. The object of the research was the cows of four dairy breeds, 50 animals in each group: Group I - Black-and-white breed, Group II - Bestuzhev breed, Group III - Holstein breed, Group IV - Ayrshire breed. Black-and-white and Bestuzhev breeds were bred in the climatic zone of the Middle Volga region, Holstein breed was brought to Russia from Germany, Ayrshire - from Finland.

Studies were conducted in the conditions of modern complexes for milk production. The maintenance of cows is free stall, in sections with access to the loafing area. The calvings are held in special maternity wards. Milking of cows was carried out in the maternity ward on the “Yolochka” milking machine, in the “Europarallel” milk production workshop with a quick yield. The feeding of cows is of the same type year-round, the type of ration is hay-silage. The ration of cows consists of hay, alfalfa haylage, corn silage, grain mixture, sunflower cake, soybean meal, molasses, and premix.

Calving took place in October - November. On the first day after birth, the calves were kept with the mother in the delivery room. Calves received the first portion of colostrum by the suckling method no later than 45 minutes after the birth. During the first day, the calves sucked their mother 5-7 times. In the colostral period, the young stock was weighed daily. The first weighing was carried out immediately after the birth, then at the end of each working day on electronic scales.

Laboratory studies of the quality of cow colostrum were conducted in a licensed animal husbandry laboratory at the Faculty of Biotechnology and Veterinary Medicine of the Samara State Agricultural Academy within the common standards [26]. The selection of medium samples of colostrum for labo-

ratory studies was performed on the first day after calving until the first calf sucking, on the following days in the morning after the first milking.

Research results. Studies were conducted on first-calf heifers until complete retirement from the group with age. It was established that from the first to the sixth lactation for various reasons in the group of Black-and-white, Holstein and Ayrshire cows, all 100% of the animals dropped out. In the Bestuzhev breed group, by the 7th lactation, 9 heads (18%) remained, the last two heads (4%) were rejected after the 10th lactation (table 1).

Table 1 – Dynamics of livestock and milk yield of cows for lactation in experimental groups with age

Lactation	Breed							
	Black-and-white		Bestuzhev		Holstein		Ayrshire	
	n	Milk yield, kg	n	Milk yield, kg	n	Milk yield, kg	n	Milk yield, kg
1	50	4365±187	50	4047±148	50	6553±214	50	5267±178
2	42	4748±169	46	4293±156	34	7281±179	41	5739±217
3	34	5164±154	41	4545±132	21	7768±236	36	6347±244
4	19	5497±176	32	5031±169	14	7487±253	23	6744±192
5	13	5534±211	27	5267±157	10	6802±188	19	6441±210
6	5	4918±183	15	5050±171	–	–	7	5830±189

Table 2 – Dynamics of livestock and milk yield of cows for the lactation in the experimental subgroups with age

Lactation	Breed							
	Black-and-white		Bestuzhev		Holstein		Ayrshire	
	n	Milk yield, kg	n	Milk yield, kg	n	Milk yield, kg	n	Milk yield, kg
1st lactation								
Up to 4000	14	3524	15	3052	1	3847	3	3654
4001-5000	22	4230	30	4365	7	4913	15	4669
5001-6000	11	5103	5	5129	10	5796	22	5481
6001-7000	3	6218	–	–	23	6918	10	6175
7001-8000	–	–	–	–	8	7934	–	–
More than 8000	–	–	–	–	1	8879	–	–
3rd lactation								
Up to 4000	3	3756	6	3110	1	3990	1	3879
4001-5000	9	4331	25	4487	1	4981	3	4795
5001-6000	14	5248	7	5315	1	5899	6	5624
6001-7000	5	6119	3	6092	2	6934	20	6576
7001-8000	3	7088	–	–	12	7958	6	7493
More than 8000	–	–	–	–	4	9246	–	–
5th lactation								
Up to 4000	3	3580	4	3445	–	–	–	–
4001-5000	4	4754	7	4511	1	4879	3	4953
5001-6000	4	5361	12	5979	2	5796	3	5815
6001-7000	1	6173	3	6032	4	6990	9	6587
7001-8000	1	7099	1	7018	3	7864	4	7698
6th lactation								
Up to 4000	3	3947	4	3881	–	–	–	–
4001-5000	2	4913	5	4895	–	–	3	4536
5001-6000	–	–	4	5658	–	–	4	5748
6001-7000	–	–	2	6572	–	–	–	–

In groups, different dynamics in the dairy productivity level of cows are observed with age. In Black-and-white and Bestuzhev breeds, the milk yield per lactation increases to the 5th lactation, respectively, by 1169 and 1220 kg of milk (26.8-30.1%; P<0.001). Holstein cows show maximum milk yield for the 3rd lactation, Ayrshire - for the 4 lactation. The increase in milk yield is 1215 and 1477 kg of milk, respectively (18.5-28.0; P<0.001). The maximum productivity was observed in animals of the Holstein breed - 7768 kg of milk, which exceeded their mates of the Black-and-white breed by 2234 kg of milk (40.4%; P<0.001), of the Bestuzhev breed - by 2501 kg (47.5%; P<0.001), of the Ayrshire breed (15.2%; P<0.001).

By the moment of maximum milk yield in the Black-and-white breed group, 13 heads (26%) remained, in Bestuzhev group - 27 heads (54%), in Holstein group - 21 heads (42%), in Ayrshire group - 23 heads (46%) of cows. It should be noted that by the third lactation, when the cows become full-aged, 68%, 82%, 42% and 72% of the animals remain from the initial population in the groups, respectively.

Having distributed cows for the first lactation by the volume of milk yield, it is stated that the studied breeds vary considerably in terms of the level of dairy productivity (table 2).

In the group of cows with milk yield up to 4000 kg, 28% of animals of the Black-and-white breed are registered, 30% of the Bestuzhev, 2% of the Holstein, and 6% of the Ayrshire breed. The productivity of more than 5000 kg of milk was respectively in 28%, 10%, 84%, 64% of cows in groups, more than 6000 kg - 6%, 0%, 64%, 20%. The productivity of more than 7000 kg of milk for the first lactation was observed only in 18% of Holstein cows.

Observations have shown that with age, primarily the most productive animals leave the herd. At the same time, as noted above, with age, there is an increase in milk yields in accordance with the breed characteristics and the level of the genetic potential of the dairy productivity of cows. As a result, for the third lactation, more than 6000 kg of milk in the Black-and-white breed group showed 23.5% of animals, in the Bestuzhev breed group - 7.3%, in the Holstein - 85.7%, in the Ayrshire - 72.2%. The level of more than 8000 kg of milk was overcome only by 4 Holstein cows with an average yield of 9246 kg.

With age, along with the amount of milk yield, the quality of colostrum and milk changes. Variations also occur in accordance with the biological and breed characteristics of the animals of the studied breeds (table 3).

Colostrum, especially the first after calving, is a major product for newborn calves, providing them with a full set of nutrients necessary for the maintenance of vital functions, as well as antibodies that provide in the organism colostral immunity.

It is established that the chemical composition of colostrum varies significantly under the impact of the dairy productivity level of cows. Since the amount of milk yield and the mass fraction of fat in colostrum have an inverse correlation, the fat content decreases with increasing milk yield per lactation.

The data for the third lactation were studied, because, at this age, cows become adults, reaching physiological maturity. The difference in the fat mass fraction in colostrum between cows with a yield of up to 4,000 kg and a maximum yield of up to 8,000 kg and more was 1.0% (P<0.001) in the group of the Black-and-white breed, 1.0% in Bestuzhev (P<0.001), in Holstein - 1.5% (P<0.001), in Ayrshire breed - 1.4% (P<0.001). The highest fat content of colostrum was in the Ayrshire and the Bestuzhev cows, and the lowest in the Black-and-white and the Holstein cows.

Even more significant differences between the breeds were identified by the protein mass fraction in the colostrum of the first milk yield. The highest content of total protein is found in the colostrum of Bestuzhev (24.5-22.5%) and Ayrshire (23.9-22.1%) breeds, and the lowest among Holstein (18.4-16.3%) and Black-and-white (18.9-16.6%) breeds. At the same time, in the colostrum of cows with milk yield up to 4000 kg the highest protein content was established, and with milk yield up to 8000 kg and more - the lowest content. The difference was, respectively, by breed, 2.3% (P<0.001), 2.3% (P<0.001), 2.1% (P<0.001), 1.8% (P<0.001).

Colostrum protein is a very complex substance in its structure and composition, which can be divided into three main fractions: caseins, albumins, and globulins. Caseins are acidic and well coagulated with rennet, forming a casein clot. Albumins and globulins belong to the group of whey proteins, which do not coagulate under the action of rennet, but are well digested in the stomach of calves and are absorbed by the body. In addition, globulins provide for the formation of colostral immunity, performing a protective function and protecting the body of newborns from the effects of opportunistic pathogenic microflora.

Table 3 – The chemical composition of colostrum of the first milk yield in cows with different levels of dairy productivity (III-lactation)

Milk yield per lactation, kg	Fat mass fraction, %	Protein mass fraction, %	Including, %			Lactose, %
			casein	albumin	globulin	
Black-and-white						
Up to 4000	6.9±0.08	18.9±0.09	6.4±0.05	5.3±0.04	7.2±0.05	1.9±0.01
4001-5000	6.7±0.05	18.3±0.11	6.3±0.06	5.1±0.03	6.9±0.07	2.1±0.01
5001-6000	6.4±0.06	17.8±0.13	6.1±0.04	4.9±0.06	6.8±0.10	2.0±0.01
6001-7000	6.3±0.05	17.1±0.10	6.0±0.05	4.7±0.04	6.4±0.06	2.2±0.01
7001-8000	5.9±0.03	16.6±0.07	5.8±0.03	4.6±0.03	6.2±0.04	2.1±0.01
Bestuzhev						
Up to 4000	8.4±0.04	24.2±0.10	7.0±0.05	6.7±0.05	10.5±0.12	2.2±0.01
4001-5000	8.1±0.06	23.7 ±0.13	6.8±0.07	6.6±0.06	10.3±0.13	2.0±0.01
5001-6000	7.9±0.05	23.3±0.15	6.7±0.08	6.3±0.04	10.3±0.15	2.1±0.01
6001-7000	7.4±0.05	22.5±0.11	6.5±0.06	6.1±0.05	9.9±0.08	2.3±0.01
Holstein						
Up to 4000	7.5	18.4	5.9	5.1	7.4	2.3
4001-5000	7.3	17.9	5.7	5.0	7.2	2.1
5001-6000	7.1	17.5	5.6	4.8	7.1	2.3
6001-7000	6.8	16.8	5.4	4.6	6.8	2.3
7001-8000	6.4±0.06	16.4±0.12	5.4±0.05	4.5±0.05	6.5±0.13	2.4±0.01
More than 8000	6.0±0.04	16.3±0.13	5.4±0.06	4.4±0.03	6.5±0.10	2.6±0.01
Ayrshire						
Up to 4000	8.5	23.9	7.0	7.1	9.8	2.0
4001-5000	8.3±0.06	23.6±0.14	7.0±0.03	7.1±0.05	9.5±0.07	2.2±0.01
5001-6000	8.2±0.08	22.9±0.18	6.9±0.04	6.8±0.06	9.2±0.10	2.3±0.01
6001-7000	7.7±0.06	22.6±0.17	6.8±0.07	6.9±0.04	8.9±0.09	2.4±0.02
7001-8000	7.1±0.03	22.1±0.13	6.8±0.04	6.7±0.03	8.6±0.08	2.5±0.01

It is established that the colostrum of cows of the studied breeds differs widely in the structure of protein and protein fractions depending on the amount of milk yield per lactation. In the colostrum of the first milk yield, the casein content decreases with increasing dairy productivity level of cows in the Black-and-white breed group by 0.6% ($P<0.001$), in Bestuzhev - by 0.5% ($P<0.001$), in Holstein - by 0.5 % ($P<0.005$), in Ayrshire - by 0.2% ($P<0.005$). At the same time, the proportion of casein in the structure of a total protein is, respectively by breed, 33.9-35.1%; 28.7-28.9%; 31.8-33.1%; 29.7-30.8%. The mass fraction of albumins and globulins also decreases with the increase in milk yields per lactation. In the structure of the total protein, in contrast to casein, there is a tendency to decrease the share of albumin in the Black-and-white breed from 28.0 to 27.5%, in Bestuzhev - from 27.7 to 27.1%, in Holstein - from 40.2 to 39.6%, in Ayrshire - from 41.0 to 38.9%. In the first days of the life of calves, the globulin fraction plays a crucial role in the life support of the body and protecting it from the negative environmental effects. In the structure of colostrum proteins, the globulin fraction is the largest and ranges from 37.3% (Black-and-white) to 44.2% (Bestuzhev). Compared with other proteins, the dynamics of globulins under the effect of milk yield in cows of different breeds occurs in different ways. In the Black-and-white breed, an insignificant but stable decrease in the share of globulins is observed, in Bestuzhev, on the contrary, there is an increase in the share of globulins from 43.4 to 44.2%, in Holstein cows with a yield of up to 6000 kg of milk, the highest proportion of globulins is noted - 40.6 %, after which it decreases to 39.6%, and Ayrshire cows have a dynamic tendency to reduce the share of globulins from 41.0 to 38.9%.

In contrast to the protein and fat content in the colostrum of cows, the mass fraction of lactose in the dry matter is 2.4-1.8 times less than that in natural milk. This is very important from a biological point of view since the body of calves does not yet produce the lactase enzyme, which helps digest lactose. The high content of lactose in colostrum leads to digestive disorders and the emergence of various gastrointestinal diseases.

The high content in the colostrum of the first milk yield of the main components provides a high content of dry matter in it (table 4).

Table 4 – Dynamics of density and acidity of cow colostrum depending on the dairy productivity level (III lactation)

Milk yield per lactation, kg	Breed			
	Black-and-white	Bestuzhev	Holstein	Ayrshire
Colostrum density, ^{0}A				
Up to 4000	57.1	78.5	52.7	78.6
4001-5000	56.8	78.2	51.9	78.4
5001-6000	56.6	77.6	51.5	77.5
6001-7000	56.5	76.8	51.3	77.0
7001-8000	56.3	–	51.1	76.4
More than 8000	–	–	51.0	–
Colostrum acidity, ^{0}T				
Up to 4000	53.5	60.4	52.8	58.5
4001-5000	52.8	59.6	51.7	57.3
5001-6000	51.3	60.2	50.1	56.7
6001-7000	50.5	58.9	48.5	55.8
7001-8000	49.4	–	48.0	54.5
More than 8000	–	–	47.3	–

The analysis of the obtained results showed that the colostrum of the first milk yield of cows of different dairy breeds has significant differences in the dry matter content. The highest density of colostrum, on average of 78.2^{o}A was in animals of the Bestuzhev breed, which exceeded the Black-and-white breed in this indicator by 21.7^{o}A (38.4%; P<0.001), Holstein - by 26.9^{o}A (52.4 %; P<0.001), Ayrshire - by 0.6^{o}A (0.8%).

Along with the breed characteristics, the colostrum density is significantly affected by the amount of the milk yield of cows during lactation, i.e. the level of dairy productivity of animals, due to the intensity of activity of all organs and body systems. It was established that as milk yields increase in cows, the colostrum density decreases in the group of Black-and-white breed by 0.8oA (1.4%), in Bestuzhev breed - by 1.7oA (2.2%), in Holstein - by 1.7oA (3.2%), in Ayrshire - by 2.2oA (2.8%). This again explains the difference between the breeds on the dry matter of colostrum, since the breeds vary considerably in the amount of milk yield per lactation (table 1).

Due to the fact that most of the dry matter of colostrum are proteins, respectively, by breeds of 63.5%; 67.4%; 61.5%; 65.8%, which have an acid reaction, its active acidity is quite high. Since as milk yield increases, the protein mass fraction in colostrum decreases, there is a reduction in titrated acidity in the Black-and-white breed by 4.1 °T (7.7%; P<0.001), in Bestuzhev- by 5.0 °T (8.3%; P<0.001), in Holstein - by 5.5 °T (10.4%; P<0.001), in Ayrshire - by 4.0 °T (6.8%; P<0.001). At the same time, the colostrum acidity decreased below the maximum permissible rate (48 °T) in the group of Holstein cows with a yield of more than 8000 kg of milk per lactation.

In the globulin fraction of colostrum proteins, a special role is given to immunoglobulins, which entering the calf organism contribute to the formation of colostral immunity, thereby ensuring a protective function, preserving the newborn from the negative effects of the environment and the effects of pathogenic microflora (table 5).

Table 5 – Changes in the content of immunoglobulins in colostrum with the age of cows, depending on the dairy productivity level, g/l

Milk yield per lactation, kg	Breed			
	Black-and-white	Bestuzhev	Holstein	Ayrshire
1st lactation				
Up to 4000	41.50±0.53	69.73±0.64	42.11	67.84±0.36
4001-5000	35.84±0.39	62.95±0.57	35.26±0.48	60.15±0.69
5001-6000	31.68±0.44	56.39±0.51	30.18±0.63	55.47±0.73
6001-7000	26.80±0.75	–	25.94±0.79	48.81±0.57
7001-8000	–	–	21.73±0.56	–
More than 8000	–	–	19.36	–
3rd lactation				
Up to 4000	79.06±0.42	103.35±0.53	74.52	99.03
4001-5000	70.57±0.64	99.24±0.69	64.74	93.78±0.81
5001-6000	65.21±0.59	92.27±0.83	55.76	86.88±0.73
6001-7000	60.38±0.68	81.38±0.71	52.65	78.45±0.64
7001-8000	53.06±0.76	–	47.66±0.69	65.35±0.52
More than 8000	–	–	42.29±0.38	–
5th lactation				
Up to 4000	83.84±0.49	131.36±0.88	–	110.88
4001-5000	79.90±0.55	126.12±0.93	66.91	101.76±0.69
5001-6000	68.73±0.61	118.57±0.79	61.66	94.11±0.78
6001-7000	61.35	109.68	57.94±0.54	87.49±0.47
7001-8000	58.86	96.53	48.59±0.45	79.37±0.39
6th lactation				
Up to 4000	64.31±0.67	108.57±0.54	–	–
4001-5000	58.64	100.39±0.62	–	98.17±0.46
5001-6000	–	94.76±0.59	–	83.95±0.55
6001-7000	–	88.48	–	–

It has been established that the content of immunoglobulins in the colostrum of the first milk yield in cows of different breeds changes under the influence of the level of dairy productivity, as well as with the age of animals. The highest content of immunoglobulins for the first lactation was in the colostrum of Bestuzhev cows (63.4 g/l), and the lowest - in the Holstein breed (29.8 g/l). The difference is 33.6 g/l (112.8%; $P<0.001$), which is caused by the difference between these breeds in milk yield per lactation, which was 2506 kg of milk (61.9%; $P<0.001$). It should be noted that the minimum threshold for the content of immunoglobulins in high-quality colostrum is 60 g/l. According to the first lactation, these requirements only met colostrum of Bestuzhev and Ayrshire breeds with a milk yield per lactation of up to 5000 kg. This again confirms that the colostrum of cows after the first and second calving is not recommended to feed calves due to the low content of immunoglobulins.

After the third calving, when the cow becomes full-grown, the quality of colostrum is significantly improved. Colostrum of the first milk yield in cows of Bestuzhev and Ayrshire breeds fully satisfies the requirements for the content of immunoglobulins. At the same time, there is a tendency to decrease the content of immunoglobulins with the increase in milk yield per lactation. In Black-and-white cows with a yield of more than 7,000 kg, the content of immunoglobulins was below the minimum threshold for quality requirements. In the Holstein breed group, only cows with a yield of up to 5,000 kg of milk met the requirements for the quality of colostrum. The difference between the maximum and minimum values for the content of immunoglobulins in colostrum was 26.0 g/l in Black-and-white cows (49.0%; $P<0.001$), in

Bestuzhev - 21.97 g/l (27.0%; P<0.001), in Holstein - 32.23 g/l (76.2%; P<0.001), in Ayrshire - 33.68 g/l (51.5%; P<0.001). The highest content of immunoglobulins was in the colostrum of the Bestuzhev breed cows - 103.35-81.38 g/l, and the lowest in the Holstein breed - 74.52-42.29 g/l. The difference between the maximum immunoglobulin content was 28.83 g/l (38.7%; P<0.001), the minimum - 39.09 g/l (92.4%; P<0.001). Consequently, with the increase in milk yield for lactation, not only the content of immunoglobulins in the colostrum of cows decreases, but also the difference between breeds increases.

Investigations have shown that the increase in the content of immunoglobulins in the colostrum of the first milk yield of cows continues until the fifth lactation. It should be mentioned that before the fifth lactation the number of cows in the groups decreased by 74%, 46%, 80%, 62%, respectively. At the same time, all highly productive animals, which are characterized by a low content of immunoglobulins in colostrum, first of all, dropped out of the groups. In the group with milk yield up to 4,000 kg, the content of immunoglobulins increased in Black-and-white breed by 4.78 g/l (6.1%; P<0.001), in Bestuzhev - by 28.01 g/l (27.1%; P<0.001), in Holstein - all animals droped out, in Ayrshire - by 11.85 g/l (12.0%); in the group with a yield of up to 5,000 kg - by 9.33 g/l (13.2%; P<0.001), 26.88 g/l (27.1%; P<0.001), 2.17 g/l (3.4%), 7.98 g/l (8.5%; P<0.001) respectively, in the group with a milk yield of up to 7000 kg - by 0.97 g/l (1.6%), 28.30 g/l (34.8%; P<0.001), 5.29 g/l (10.1%), 9.4 g/l (11.5%; P<0.001) respectively, in the group with 8000 kg milk yield - by 5.80 g/l (10.9%), in the group there was one cow which indicator increased by 15.15 g/l (18.6%), 0.9 g/l (2.0%), 14.02 g/l (21.5%). By the sixth lactation in the Black-and-white cows group, 5 heads remained (10%), in Bestuzhev group - 15 heads (30%), in Ayrshire group - 7 heads (14%), in the Holstein breed group, for various reasons, 100% of the animals dropped out. The content of immunoglobulins in the colostrum of cows began to decline, regardless of the breed and level of dairy productivity. The minimum requirements for the content of immunoglobulins in the colostrum were met by cows of all groups of Bestuzhev and Ayrshire breeds, and Black-and-white breed with a yield of up to 4000 kg.

Colostrum immunoglobulins are divided into three main classes - IgG, IgA, IgM. It has been established that about 81% of immunoglobulins (antibodies) of colostrum are synthesized from the blood serum of cows (table 6).

Table 6 – The content of immunoglobulins in colostrum, depending on the dairy productivity level of cows (III lactation)

Milk yield per lactation, kg	Breed			
	Black-and-white	Bestuzhev	Holstein	Ayrshire
G class immunoglobulins, g/l				
Up to 4000	66.72±0,38	88,53±0,73	62,85	85,76
4001-5000	59.46±0,47	85,39±0,69	54,62	80,37±0,56
5001-6000	54.81±0,63	79,61±0,78	46,94	74,59±0,64
6001-7000	51.10±0,59	70,12±0,62	44,36	67,84±0,70
7001-8000	45.34±0,44	–	40,22±0,47	56,44±0,53
More than 8000	–	–	35,49±0,52	–
A class immunoglobulins, g/l				
Up to 4000	8.24±0.31	9.33±0.22	7.69	9.04
4001-5000	7.58±0.27	8.79±0.30	6.75	8.53±0.32
5001-6000	7.11±0.36	8.24±0.27	5.93	7.95±0.27
6001-7000	6.40±0.33	7.56±0.31	5.64	7.10±0.38
7001-8000	5.36±0.24	–	5.13±0.25	6.22±0.26
More than 8000	–	–	4.68±0.42	–
M class immunoglobulins, g/l				
Up to 4000	4.10±0.25	5.49±0.34	3.98	4.23
4001-5000	3.53±0.29	5.06±0.31	3.37	4.88±0.4,3
5001-6000	3.29±0.33	4.42±0.25	2.89	4.34±0.35
6001-7000	2.88±0.27	3.70±0.29	2.65	3.51±0.42
7001-8000	2.36±0.21	–	2.31±0.33	2.69±0.29
More than 8000	–	–	2.12±0.24	–

The main part of colostrum immunoglobulins is G class immunoglobulins. It has been established that in the colostrum of the first milk yield of Black-and-white cows, the IgG level of the total content of immunoglobulins is 84.1-85.5%, in Bestuzhev breed - 85.7-86.3 %, in Holstein - 83.9-84.4%, in Ayrshire - 85.7-86.6%. At the same time, there is a tendency to increase the IgG level with increasing milk yields of cows for lactation. This is a kind of protective reaction of the body to the increase in the dairy productivity of cows. The higher the milk yield in cows, the more weak calves are born, with a low level of natural resistance of the organism, which are more susceptible to the influence of the environment and pathogenic microflora. Many scientists have found that it is IgG that is the main protective factor neutralizing up to 98% of infectious pathogens that enter the body of an animal.

On the other hand, the results showed that the breed belonging of cows and the level of their dairy productivity have a significant effect on the content of immunoglobulins. The highest content of IgG in the colostrum is noted in cows of Bestuzhev breed, and the lowest in Holstein. It was found that in all breeds there is a reduction in the IgG content with increasing milk yields per lactation. The difference between the maximum and minimum IgG content in Black-and-white breed is 21.38 g/l (47.2%; $P<0.001$), in Bestuzhev - 18.41 g/l (26.3%; $P<0.001$), in Holstein 27.36 g/l (77.1%; $P<0.001$), in Ayrshire 29.32 g/l (51.9%; $P<0.001$).

A Class immunoglobulins are considered to be a factor in the primary response, as they are contained in the mucous secretion of the eyes, mouth and nasal cavity, respiratory tract, gastrointestinal tract, urinary system, linking microbes and viruses on these areas of the body and preventing them from penetrating into the internal organs (lungs, heart, liver, kidneys).

The highest IgA level is found in the colostrum of Bestuzhev breed cows, and the lowest - in Holstein breed. The difference was 1.64-2.88 g/l (21.3-61.5%; $P<0.001$). As the milk yield for cows increases, the IgA level of the Black-and-white breed reduces by 2.88 g/l (35.0%; $P<0.001$), in Bestuzhev breed - by 1.77 g/l (19.0%; $P<0.001$), in Holstein breed - by 3.01 g/l (39.1%; $P<0.001$), in Ayrshire breed - by 2.82 g/l (31.2%; $P<0.001$). At the same time, the IgA level from all immunoglobulins, on the contrary, slightly increases, in the Black-and-white breed - from 10.4 to 10.9%, in Bestuzhev - from 8.9 to 9.3%, in Holstein - from 10.3 to 11.1 %, in Ayrshire - from 9.1 to 9.5%.

M Class immunoglobulins are protected from the initial encounter with bacteria and viruses, preventing the infection from developing, i.e. blocking it in the early stages of development. The peculiarity of IgM is that they have an immunological memory, and when they meet again with the same infection, class M antibodies are able to recognize the microbe and give it a powerful rebuff. The graft reaction mechanism is based on this property.

M Class immunoglobulins are the smallest ones. The IgM level in the total structure of colostrum immunoglobulins of Black-and-white cows is 5.2-4.5%, of Bestuzhev cows - 5.3-4.6%, of Holstein - 5.3-4.8%, of Ayrshire - 5.2- 4.1%. The highest IgM level is found in the colostrum of Bestuzhev breed cows, and the lowest - in Holstein breed cows. The IgM level reduces as milk yields per lactation increase, but, in contrast to IgG and IgA, the level in the total content of immunoglobulins also decreases. The difference between the maximum and minimum IgM levels in the Black-and-white breed is 1.74 g/l (73.7%; $P<0.01$), in Bestuzhev - by 1.79 g/l (48.4%; $P<0.05$), in Holstein - by 1.86 g/l (87.7%; $P<0.01$), in Ayrshire - by 1.54 g/l (57.2%; $P<0.05$).

The various quality of the colostrum of the studied breed cows, due to the amount of milk yield per lactation, differently influenced the formation of colostral immunity in newborn calves and, as a result, their health in the colostral period (table 7).

The poor quality of colostrum of the first milk yield in the first-calf heifers did not provide the necessary protection of the body of newborn calves from the negative impact of the environment and pathogenic microflora. Of 50 calves obtained in the group of Black-and-white cows, 44.0% of the animals became ill, in the Bestuzhev group - 18.0% of cows became ill, in Holstein - 60.0%, in Ayrshire - 32.0%. At the same time, the number of diseased calves in the subgroups increased with the growth in the dairy productivity level of the cows, respectively by breed, from 21.4% to 100%; from 6.7 to 60.0%; from 57.1 to 100%; from 36.7 to 60.0%.

As noted above, the quality of colostrum in cows improves with age, but it also has breed differences depending on the amount of milk yield per lactation. On the other hand, by the third calving in the experimental group, for various reasons, most of the highly productive cows dropped out, the quality of

Table 7 – The number of calves from cows with different yields, sick during the colostral period

Milk yield per lactation, kg	Breed							
	Black-and-white		Bestuzhev		Holstein		Ayrshire	
	heads	%	heads	%	heads	%	heads	%
1st lactation								
Up to 4000	3	21.4	1	6.7		0		0
4001-5000	9	40.9	5	16.7	4	57.1	4	26.7
5001-6000	7	63.6	3	60.0	6	60.0	6	27.3
6001-7000	3	100.0	–	–	14	60.9	6	60.0
7001-8000	–	–	–	–	5	62.5	–	–
More than 8000	–	–	–	–	1	100.0	–	–
Total in the group	22	44.0	9	18.0	30	60.0	16	32.0
3rd lactation								
Up to 4000		0		0		0		0
4001-5000		0		0		0		0
5001-6000	4	28.6	2	28.6		0	1	16.7
6001-7000	4	80.0	3	100.0	2	100.0	4	20.0
7001-8000	3	100.0	–	–	8	66.7	3	50.0
More than 8000	–	–	–	–	4	100.0	–	–
Total in the group	11	32.4	5	12.2	14	66.7	8	22.2

colostrum in which was below the physiological norm [26]. It has been established that from cows with a milk yield up to 5,000 kg per lactation, a stronger young stock is born. In addition, the high quality of colostrum provides newborns with 100% protection from the negative effects of the environment and pathogenic microflora.

The increase in milk yield of more than 6000 kg per lactation is accompanied by a significant decrease in the quality of colostrum and the birth of weaker young stock, which leads to enhancing in the incidence of calves in the experimental groups. Even among the calves of Bestuzhev and Ayrshire breeds, of which in the colostrum of mothers, the content of immunoglobulins does not decrease less than 60 g/l, the number of cases reaches 50-100%. This suggests that an increase in milk yields to the maximum level due to the genetic potential of cows is achieved by using internal reserves and the hard work of all organs and body systems. As a result, there is a weakening of the immune system of cows, a decrease in the concentration of antibodies in the blood and, as a result, a reduction of their content in colostrum, where they arrive several days before calving.

Being born, the calf gets into aggressive environmental conditions. Being almost sterile, the body of newborns begins to intensively adapt to these conditions [27]. Therefore, how intensively the initial immunity will be formed in the body depends on further growth, development, and resistance to diseases in the calf (table 8).

Table 8 - Growth intensity of calves in the colostral period, depending on the dairy productivity level of mothers (III lactation)

Milk yield per lactation, kg	Breed			
	Black-and-white	Bestuzhev	Holstein	Ayrshire
Average daily gain in live weight, g				
Up to 4000	186.3±4.38	253.8±5.67	169.5	238.1
4001-5000	188.1±5.64	236.0±6.45	164.6	217.4±5.47
5001-6000	164.5±5.93	199.4±4.79	155.8	181.3±5.93
6001-7000	137.2±3.21	187.5±5.88	121.7	166.8±4.80
7001-8000	101.4±4.39	–	99.8±4.26	139.9±5.34
More than 8000	–	–	87.9±5.61	–

Newborn calves of the studied breeds, by virtue of their breed characteristics, the dairy productivity level of mothers and the quality of colostrum, differed considerably in their adaptive abilities. The strongest and most viable were born from Bestuzhev and Ayrshire cows. In the colostral period, after the first calving, 18.0% of the calves of the Bestuzhev breed became ill, after the third calving - 12.2% of animals, in Ayrshire breed - 32.0% and 22.2%, respectively. Holstein calves were born weaker and melancholic, the incidence after the first calving was 60.0%, after the third - 66.7%. The situation with the Black-and-white breed is somewhat better; the incidence of calves is 44.0 and 32.4%, respectively.

The incidence of calves in subgroups, depending on the yield of mothers, significantly affected their growth and development. It has been established that with an increase in the dairy productivity of cows, the quality of colostrum decreases and the incidence of calves increases. As a result, the average daily gain in live weight of the young stock is reduced proportionally. In sick calves, especially in the case of gastrointestinal diseases, there is even a reduction in live weight due to dehydration.

Conclusion. Analysis of the research results showed that in dairy cows, the quality of the first milk yield of colostrum is affected by the genetic potential of animals, along with breed characteristics. The best in quality colostrum, with a high content of immunoglobulins, was noted in Bestuzhev breed cows. The lowest content of immunoglobulins was in the colostrum of Holstein cows. Regardless of the breed belonging of animals, the quality of colostrum decreased as their level of dairy productivity increased. It has been established that there is an inverse correlation dependence between the indicators characterizing the quality of colostrum and the yield amount. Reducing the quality of colostrum, especially a decrease in the content of immunoglobulins, leads to an increase in the incidence of newborn calves, which ultimately affects the growth and development of young animals. Therefore, to improve the quality of growing young stock, we recommend assessing the quality of colostrum of the first milk yield using an optical or digital refractometer as well as conducting targeted breeding work in the direction of improving the quality of colostrum.

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ТҮРЛІ ДЕҢГЕЙДЕГІ СҮТ ӨНІМДІЛІГІ БАР СҮТТІ ІРІ ҚАРАНЫҢ АҚУЫЗЫНЫҢ САПАСЫ

Аннотация. Бастапқы иммунитет жаңа туылған бұзаудың ағзасында қалыптасқанда, иммуноглобулиндердің, лизоцимнің, функционалды белсенді лейкоциттердің және лимфоциттердің негізгі көзі ақуыз болып табылады. Толық иммунитетті қалыптастырудың өте маңызды шарты - ауыз қуысының сапасы. Бірқатар ғалымдар сүтті ірі қараның түрлі сүт өнімділігі жағынан айтарлықтай ерекшеленетінін айтады, ал иммуноглобулиндердің жаппай үлесі алғашқы ауыру кезінде ішек ауруының мөлшерімен теріс байланысады. Зерттеудің басты мақсаты - сүтті сүт өнімдерінің лактация көлеміне байланысты ақуыз сапасының динамикасын зерттеу. Зерттеу нысаны Самара облысының төрт тұқымының сиыры болды: Қара-ала, Бестужевская, Гольштин, айрширская. Әртүрлі ірі қара тұқымдарындағы алғашқы сауын сүттің иммуноглобулиндердің көлемі сүт өнімділігінің деңгейімен, сондай-ақ жануарлардың жасы әсерімен өзгергені анықталды. Иммуноглобулиндердің ең көп мөлшері Бестужев тұқымының уызында - 103.35-81.38 г/л, ал ең төменгі голштиндік тұқымы - 74.52-42.29 г/л. Ақуыз иммуноглобулиндері үш класқа бөлінеді: IgG, IgA, IGM. Қара-ала сиырдың алғашқы сүтінен алынған ақуызIgG үлесі 84,1-85,5%, Бестужевская - 85,7-86,3%, гольштин 83,9-84,4%, айршир - 85,7-86,6%. Лактация кезінде сиыр сауынының сүт мөлшерінің жоғарылауы арқылы IgG үлесін ұлғайту үрдісі байқалады. Сиырдың сүт өнімділігінің артуымен уыздың сапасы төмендейді және бұзаулардың ауру саны артады деп анықталды. Нәтижесінде, жас төлдің тірі салмағының орташа күнделікті өсуі пропорционалды түрде төмендетіледі. Алынған нәтижелерге сүйене отырып, біз оптикалық немесе цифрлы рефрактометрді қолданып, сүт ақуызының сапасын бағалауды ұсынамыз. Ақуыз сапасын жақсарту бағытында тұқыммен сұрыптау мақсатты асыл тұқымды жұмыс жүргізу.

Түйін сөздер: тұқым, сиыр, бұзау, ақуыз, сапасы, лактация, сүт өнімділігі, иммуноглобулиндер, ауру.

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КАЧЕСТВО МОЛОЗИВА КОРОВ МОЛОЧНЫХ ПОРОД С РАЗНЫМ УРОВНЕМ МОЛОЧНОЙ ПРОДУКТИВНОСТИ

Аннотация. При формировании в организме новорожденного теленка первоначального иммунитета основным источником иммуноглобулинов, лизоцима, функционально активных лейкоцитов и лимфоцитов является молозиво. Очень важным условием для формирования полноценного иммунитета является качество молозива. Ряд ученых утверждают, что коровы разных молочных пород значительно различаются по уровню молочной продуктивности, при этом массовая доля иммуноглобулинов отрицательно коррелирует с количеством молозива при первом доении. Основной задачей исследований было изучение динамики качества молозива в зависимости от величины удоя коров за лактацию. Объектом исследований служили коровы четырех пород, разводимых в Самарской области: черно-пестрая, бестужевская, голштинская, айрширская. Установлено, что содержание иммуноглобулинов в молозиве первого удоя у коров разных пород изменяется под влиянием уровня молочной продуктивности, а также с возрастом животных. Самое высокое содержание иммуноглобулинов было в молозиве бестужевской породы – 103,35-81,38 г/л, а самое низкое у голштинской породы – 74,52-42,29 г/л. Иммуноглобулины молозива делятся на три класса – IgG, IgA, IGM. В молозиве первого удоя коров черно-пестрой породы доля IgG составляет 84,1-85,5%, бестужевской – 85,7-86,3%, голштинской 83,9-84,4%, айрширской – 85,7-86,6%. Отмечена тенденция увеличения доли IgG, по мере увеличения удоев коров за лактацию. Установлено, что при увеличении уровня молочной продуктивности коров снижается качество молозива и увеличивается число заболеваемости телят. В результате величина среднесуточных приростов живой массы молодняка пропорционально снижается. На основании полученных результатов рекомендуем оценивать качество молозива первого удоя при помощи оптического или цифрового рефрактометра. Вести целенаправленную селекционную работу с породами в направлении повышения качества молозива.

Ключевые слова: порода, корова, телята, молозиво, качество, лактация, удой, иммуноглобулины, заболеваемость.

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REFERENCES

[1] Kruse V. **(1970)** Yield of colostrum and immunoglobulin in cattle at the first milking after parturition // Anim. Prod., 1970, 12: 619-626.

[2] Morin D.E., McCoy G.C., Hurley W.L. **(1997)** Effects of quality, quantity, and timing of colostrums feeding and addition of a dried colostrums supplement on immunoglobulin Gi absorption in Holstein bull calves // J. Dairy Sci., 1997, 80(4): 747-753.

[3] Coulon J.-B., Hurtaud C., Remond B., Verite R. **(1998)** Factors contributing to variation in the proportion of casein in cows' milk true protein: a review of recent INRA experiments // J. Dairy Res., 1998, 65(3): 375-387.

[4] Afanasyeva A.I., Oguy V.G., Myakushko N.V., Taranenko V.N. **(2006).** Monograph. Barnaul: AGAU. 319 p. (in Russ.).

[5] Stanhefel I. **(2007)** The First Days decide everything // New agriculture. N 2. P. 75-78 (in Russ.).

[6] Faizrakhmanov D.I., Nurtdinov M.G., Khairullin A.N. et al. **(2007)** The organization of dairy cattle breeding on the basis of technological innovations. Kazan: Kazan State University Publishing House. 352 p. (in Russ.).

[7] Zlobin S. The quality of colostrum and the safety of calves // Animal Husbandry of Russia. 2008. N 3. P. 57-58 (in Russ.).

[8] Brooucecr J., Brestonsky H., Szabova G. **(1989)** Vpeyv skupinoveno ustajnenia s padstilanim a fixadou pri napajani na rast spotrebu krmio teliat. polnohospodarstvo. 35. P. 739-744.

[9] Hesecke D. **(1991)** Matabolische Litungagrenzen bei kuhen. Berlin: Medizin. P. 531-535.

[10] Quigley J.D., Martin K.R., Dowlen H.H., Wallis L.B., Lamar K. **(1994)** Immunoglobulin concentration, specific gravity, and nitrogen fractions of colostrum from Jersey cattle // J. Dairy Sci. 77(1): 264-269.

[11] Quigley J.D., Drewry J.J. **(1998)** Nutrient and immunity transfer from cow to calf pre- and postcalving // J. Dairy Sci. 81(10): 2779-2790.

[12] Quigley J.D. **(2010)** Passive immunity in newborn calves. <http://www.weds.ca>

[13] Georgiev I.P**. (2008)** Differences in chemical composition between cow colostrums and milk // Bulg. J. Veter. Med. 11(1): 3-12.

[14] Kreider R.B. **(2000)** The colostrums edge? // Muscular development. 37(10). <http://www.docstoc.com/docs/102506069/rbkreider>

[15] Scammell A.W. **(2001)** Production and uses of colostrum // Austr. J. Dairy Techn. 56(2): 74-82.

[16] Fox A., Kleinsmith A. **(2010)** Scientific and medical research related to bovine colostrums. Its relationship and use in the treatment of disease in humans. Selected publishers abstracts. http://www.immunetree.com

[17] Hartmann P.E**. (1973)** Changes in the composition and yield of the mammary secretion of cows during the initiation of lactation // J. Endocrin. 59: 231-247.

[18] Akers R.M. **(2002)** Lactation and the mammary gland. Iowa State Press, Blackwell Publishing Company. 278 p.

[19] Kers R.M. **(2006)** Major advances associated with hormone and growth factor regulation of mammary growth and lactation in dairy cows // J. Dairy Sci. 89(4): 1222-1234.

[20] Pritchett L.C., Gay C.C., Besser T.E., Hancock D.D. **(1991)** Management and production factors influencing immunoglobulin Giconcentration in colostrums from Holstein cows // J. Dairy Sci. 74: 2336.

[21] Zarcula S., Cemescu H., Mircu C., Tulcan C., Morvay A., Baul S., Popovici D. **(2010)** Influence of breed, parity and food intake on chemical composition of first colostrum in cow // Anim. Sci. Biotechn. 43(1): 154-157.

[22] Singleton W. **(1973)** Housing the caloes at Ioodwood // Big Farm Management.4:41-42.

[23] Kune D. **(1980)** Zdrovoth: problem atika odehovu telat v pod- minkach continualniho a Tumusoveho provsu VKT // Oeterunarstvi. 30.4: 150-152.

[24] Trielk J., Wilke A., Schifler R., Ebertus C. **(1985)** Qariation von Merkmalen in der Kalberaufsucht des SMR variation bei konzertrieren Haltung // Tiersucht. 39. 4: 163-165.

[25] Alois Zoge**.(1997)** Uber die Beeinflussung der individuellen Disposition zu Infektionskrankheiten durch Warmentzungang I. Ab- handlung, Archiv f. Hygiene. Bd. 28. P. 344-396.

[26] Mamaev A.V., Samusenko L.D. **(2013)** Dairying. SPb.: Lan publishing house. 348 p. (in Russ.).

[27] Baimukanov D.A., Abugaliyev S.K., Seidaliyev N.B., Semenov V.G., Chindaliyev A.E., Dalibayev E.K., Zhamalov B.S., Muka Sh.B. **(2019)** Productivity and estimated breeding value of the dairy cattle gene pool in the Republic of Kazakhstan // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1, N 377. P. 39-53. https://doi.org/10.32014/2019.2518-1467.5 ISSN 2518-1467 (Online), ISSN 1991-3494 (Print).

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ABOUT THE METHODOLOGY OF THE LEGAL SERVICE IN THE REPUBLIC OF UZBEKISTAN

Abstract. In the entire countries of the world priority directions creation of perfect legislation, providing its steady execution, increase of legal culture of population and public servants, clear determination of rights and duties of the citizens, public and management authorities were considered. Legal service of public organs and organizations, managing subjects has an important value in this process. Legal service actively participates in the preparation of projects of normative-legal acts, in realization of the legal examination, since the process of acceptance to providing of their execution; change, stopping and execution of economic agreements; in providing legal facilities of property safety; in the observance of labor legislation and strengthening of labor discipline; in defense in courts and other organizations of rights and legal interests of corresponding organs and managing subjects. In the developed states of the world scientific researches carefully investigate the field of legal service and providing of legal help in the process of perfection of legal frameworks of the legal state and civil society. An important value has research of the concepts "Legal service" and "legal help", perfection of bases of the legal adjusting of activity of legal service, research on the basis of new approaches of the system of legal service, legal status and basic directions of activity, participating of legal service in providing of supremacy of law and legality in activity of public organs and managing subjects, in law-making, increase of legal consciousness and legal culture of citizens.

Keywords: legal assistance, legal service, democratic reforms,supreme of law, modernization of state building, system of legal service, wide reforms, modernization of the country, state sector, regional administration.

Legal profession - the legal institution including independent, voluntary, professional associations of persons who are engaged in lawyer activities and the individuals who are engaged in private lawyer practice. The legal profession according to the Constitution of the Republic of Uzbekistan gives legal aid to citizens of the Republic of Uzbekistan, foreign citizens, stateless persons, the companies, organizations, the organizations.

The citizen of the Republic of Uzbekistan having the higher legal education and who obtained in accordance with the established procedure the license for the occupation right lawyer activities can be the lawyer in the Republic of Uzbekistan [1].

Persons recognized in accordance with the established procedure incapacitated are not allowed to lawyer activities or it is limited capable, and also having the outstanding or not removed criminal record.

The lawyer has no right to be engaged in other types of paid activities, except:

scientific and pedagogical activities;

activities in Chamber of lawyers of the Republic of Uzbekistan (further - Chamber of lawyers) and its territorial administrations;

activities as the patent agent and mediator;

activities as the employee of legal service of state bodies, bodies of economic board, the state companies, organizations and the organizations on the contractual legal basis;

activities as the judge in reference tribunals and the international commercial arbitrations (courts).

The license is granted by the Ministry of Justice of the Republic of Karakalpakstan, justice departments of areas and the city of Tashkent (further judicial authorities) based on decisions of the relevant qualification commissions.

For receipt of the license person applying for acquisition of the status of the lawyer (further - the applicant), shall have length of service on legal specialty at least two years, including with passing of training in lawyer forming (lawyer bureau, law firm, Bar, legal advice bureau) at least three months, and shall pass qualification examination.

Person having years of service on legal specialty at least three years as the employee of legal service of state bodies, bodies of economic board, the state companies, organizations and the organizations in judgeship, the investigator, the investigator or the prosecutor has the right to participate in qualification examination without passing of training in lawyer forming [2, p. 21].

The applicant who did not pass qualification examination is allowed to its repeated delivery not earlier than in six months.

The applicant who successfully passed qualification examination within three months shall address to relevant organ of justice for receipt of the license. The applicant who passed this term can address to judicial authority for receipt of the license only after repeated passing qualification examination.

The procedure for licensing of lawyer activities is determined by the Cabinet of Ministers of the Republic of Uzbekistan.

The applicant who obtained in accordance with the established procedure the license within three months shall take the oath of the lawyer and individually or together with other persons having the license, to create lawyer forming or to enter one of the operating lawyer forming.

From the moment of registration of lawyer forming or obtaining by judicial authority of the documents confirming the introduction of the applicant in the operating lawyer forming the certificate of the lawyer is issued to the applicant within three working days [3, p. 29].

From the date of certification of the lawyer the applicant receives the status of the lawyer what in three-day time the judicial authority notifies the relevant territorial administration of Chamber of lawyers on. From the moment of receipt of such notification the lawyer becomes the member of Chamber of lawyers.

The legal profession performs the activities on the basis of rule of law, independence and other democratic principles.

Person who obtained in accordance with the established procedure the license having the right to perform lawyer activities individually, opening the lawyer bureau, or to form with other lawyers (partners) law firm or on the basis of membership Bar, or to enter one of such operating lawyer forming, or to be engaged in lawyer activities, working in legal advice bureau. The lawyer has the right to perform the activities only in one lawyer forming.

The aim of the articleto develop proposals and recommendations for improving the organizational and legal framework of the system and the activities of the legal service, as well as providing legal assistance to business entities by state relations, arising in the course of rendering legal aid to subjects of the entrepreneurship from non-state non-profit organizations and state bodies and also the organization and implementation of activity of legal service.

The scientific novelty of the article as follows:

it is substantiated that the legal service is an independent structural unit, created on a mandatory basis with a view to legal support of the activities of a state body and organization, it reports directly to the head of a state body and organization;

it is substantiated that the definition in law of the function of conducting legal review of drafts of regulatory legal acts by the legal service serves to identify the existence or absence of norms that can create conditions for corruption or other offenses;

it was determined that the establishment of the procedure for the attestation and advanced training of legal service employees in a situation serves to deepen theoretical and practical knowledge in the field of jurisprudence; objective assessment of their level of professional compliance, increased responsibility for the implementation of the tasks assigned to them;

it is substantiated that the definition in the laws of the procedure for pre-trial settlement of a dispute (complaint and mediation) serves to enable prompt restoration of the violated rights and legitimate interests of state bodies and economic entities;

the importance of expanding the powers of the Chamber of Commerce and Industry in enhancing guarantees of protection of the rights and legitimate interests [4, p. 82].

The scientific results obtained from the study of the theoretical and legal problems of the legal service in the Republic of Uzbekistan were used in the following:

Proposals to further strengthen the rule of law in the activities of state bodies and organizations, consistently strengthening the role and responsibility of the legal service in carrying out democratic and legal reforms were taken into account in paragraphs 4, 5, 9, 15, 16, 18 "Regulations on the legal service of state bodies and organizations, approved by the Decree of the President of the Republic of Uzbekistan dated January 19, 2017 No. PP-2733 (certificate of the Administration of the President of the Republic of Uzbekistan No. 06/2-239 of January 22, 2019). The use of scientific results served to define the requirements for the legal service of state bodies and organizations, their rights, duties and responsibilities, as well as the concept of "legal service.

Participation of legal services in the implementation of legal expertise of draft regulations were included in Article 22 of the Law of the Republic of Uzbekistan "On Regulatory Acts" (new edition), in Article 24 of the Law of the Republic of Uzbekistan "On the procedure for drafting laws and introducing them to the Legislative Chamber of the OliyMajlis of the Republic of Uzbekistan "(certificate of the Committee on Legislation and Judicial and Legal Issues of the Legislative Chamber of the OliyMajlis of the Republic of Uzbekistan No. 06/1-05 of January 22, 2019). The use of scientific results has served to improve the quality of the lawmaking process, the establishment of legislative participation of the legal service in the implementation of legal expertise of draft legal acts;on the basis of proposals on the need to determine the procedure for attestation and advanced training of employees of legal services of state administration bodies and local authorities, economic management bodies, state enterprises, institutions and organizations, the "Provision on the procedure of attestation and advanced training of employees of legal services" was adopted, approved by the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated November 22, 2007 No. 244 (certificate of the Ministry of Justice republics of Uzbekistan № 2 / 1-10-6 of 23 January 2019). The use of scientific results served as the basis for the attestation of legal service workers to objectively assess their professional competence, increase their responsibility for carrying out the tasks and functions entrusted to them, and at advanced training they deepen and update their theoretical and practical knowledge in the field of jurisprudence [5, p. 276].

Proposals aimed at increasing the efficiency of the procedure for pre-trial (claim) settlement of the dispute were included in Articles 107, 149 and 151 of the Economic Procedural Code of the Republic of Uzbekistan (reference of the Committee on Legislation and Judicial and Legal Issues of the Legislative Chamber of the OliyMajlis of the Republic of Uzbekistan №06 / 1-05 from January 22, 2019). The use of scientific results served to comply with the pre-trial procedure for resolving disputes, promptly restoring violated rights and legitimate interests of state bodies and economic entities, as well as saving money spent on the judicial process and time of legal service employees;

proposals on mediation, including requirements for the mediator, basic principles of mediation, mediation agreement, agreement on mediation procedure, agreement on mediation application, as well as on the possibility of using mediation in the dispute resolution process in the arbitration court were taken into account in Articles 4, 5, 7, 12, 14, 15, 16, 22 of the Law of the Republic of Uzbekistan "On Mediation" (certificate of the Committee on Legislation and Judicial and Legal Issues of the Legislative Chamber of the OliyMajlis of the Republic of Uzbekistan No. 06/1-05 dated January 22, 2019). The use of scientific results served as the definition in law of basic concepts of mediation based on scientifically grounded conclusions and experience of foreign countries, determining in the law the provision that a mediator can be not only a lawyer, but also a person engaged by the parties to conduct mediation, including legal counsel;proposals on the tasks of the legal service of economic entities, aimed at the organization of legal support of contractual relations, as well as on the claim, statement of claim and court order are taken into account in Articles 17, 18, 19, 20, 21 of the Law of the Republic of Uzbekistan "On the legal framework of activities economic entities "(certificate of the Committee on Legislation and Judicial and Legal Issues of the Legislative Chamber of the OliyMajlis of the Republic of Uzbekistan No. 06/1-05 dated January 22, 2019). The use of the results of the research served to determine in the law the participation of the legal service of economic entities in the organization of legal support for contractual relations, as well as the procedure and timing for filing and considering a claim, the right to file a claim and an application for a court order;

the proposals of the researcher to strengthen the guarantees of reliable protection of the rights and legitimate interests of business entities, improve legislation in the field of entrepreneurship and empower the Chamber of Commerce and Industry were taken into account in paragraphs a) and b) - paragraph 1, paragraphs 4, 5, 11 of the Decree of the President of the Republic of Uzbekistan of July 19, 2017, No. UP-5087 "On measures to fundamentally improve the system of state protection of the legitimate interests of business and the further development of entrepreneurial activity" (certificate of the Chamber of Commerce and Industry of the Republic of Uzbekistan No. 11 / IL-39-641 dated January 21, 2019). The use of scientific results served to improve the mechanism for protecting the rights and legitimate interests of business entities;

proposals for improving the structure of the Executive Committee of the Chamber of Commerce and Industry of the Republic of Uzbekistan and organizing an independent legal service therein were taken into account when adopting Presidential Decree of June 19, 2017 No. PP-3068 "On Improving the Organization of the Chamber of Commerce and Industry of the Republic of Uzbekistan" (reference Chamber of Commerce and Industry of the Republic of Uzbekistan No. 11 / IL-39-641 dated January 21, 2019). The use of scientific results allowed the creation of a Law Office under the Executive Committee of the Chamber of Commerce and Industry, reporting directly to the Chairman of the Chamber, which serves to increase the effectiveness of ensuring the rule of law and the rule of law in the Chamber.

Legislation must reflect the folk traditions, customs, and moral norms rooted in the daily life of the population and inherited from centuries of history of interpersonal and inter-nationality communion and profession of faith which are not contrary to universal humanitarian values, rights, and freedoms of people [6, p. 68]. One cannot turn back the River of Time, nor return a civil secular society to the era of the dominance of norms of the Shari'ah. The Shari'ah is an absolutely concrete historical phenomenon. It is hardly necessary in a modern society to elevate it to an absolute, to treat it literally. This would be contrary to the very pragmatic philosophy of the Shari'ah, where the spirit is raised above the letter, the new is not rejected and is agreed with the known. It would be reasonable to take into account the conciliatory experience of the regulation of certain spheres of private law by the Shari'ah when building a rule-of-law society in Uzbekistan.

This entry provides the description of a country's legal system. A statement on judicial review of legislative acts is also included for a number of countries. The legal systems of nearly all countries are generally modeled upon elements of five main types: civil law (including French law, the Napoleonic Code, Roman law, Roman-Dutch law, and Spanish law); common law (including United State law); customary law; mixed or pluralistic law; and religious law (including Islamic law). An additional type of legal system - international law, which governs the conduct of independent nations in their relationships with one another - is also addressed below. The following list describes these legal systems, the countries or world regions where these systems are enforced, and a brief statement on the origins and major features of each [7, p. 74].

The most widespread type of legal system in the world, applied in various forms in approximately 150 countries. Also referred to as European continental law, the civil law system is derived mainly from the Roman *Corpus JurisCivilus*, (Body of Civil Law), a collection of laws and legal interpretations compiled under the East Roman (Byzantine) Emperor Justinian I between A.D. 528 and 565. The major feature of civil law systems is that the laws are organized into systematic written codes. In civil law the sources recognized as authoritative are principally legislation - especially codifications in constitutions or statutes enacted by governments - and secondarily, custom. The civil law systems in some countries are based on more than one code.

A type of legal system, often synonymous with "English common law", which is the system of England and Wales in the UK, and is also in force in approximately 80 countries formerly part of or influenced by the former British Empire. English common law reflects Biblical influences as well as remnants of law systems imposed by early conquerors including the Romans, Anglo-Saxons, and Normans. Some legal scholars attribute the formation of the English common law system to King Henry II (r.1154-1189). Until the time of his reign, laws customary among England's various manorial and ecclesiastical (church) jurisdictions were administered locally. Henry II established the king's court and designated that laws were "common" to the entire English realm. The foundation of English common law is "legal precedent" - referred to as *stare decisis*, meaning "to stand by things decided". In the English

common law system, court judges are bound in their decisions in large part by the rules and other doctrines developed - and supplemented over time - by the judges of earlier English courts.

A type of legal system that serves as the basis of, or has influenced, the present-day laws in approximately 40 countries - mostly in Africa, but some in the Pacific islands, Europe, and the Near East. Customary law is also referred to as "primitive law", "unwritten law", "indigenous law", and "folk law". There is no single history of customary law such as that found in Roman civil law, English common law, Islamic law, or the Napoleonic Civil Code. The earliest systems of law in human society were customary, and usually developed in small agrarian and hunter-gatherer communities. As the term implies, customary law is based upon the customs of a community. Common attributes of customary legal systems are that they are seldom written down, they embody an organized set of rules regulating social relations, and they are agreed upon by members of the community. Although such law systems include sanctions for law infractions, resolution tends to be reconciliatory rather than punitive. A number of African states practiced customary law many centuries prior to colonial influences. Following colonization, such laws were written down and incorporated to varying extents into the legal systems imposed by their colonial powers.

A sub-discipline of international law known as "supranational law" in which the rights of sovereign nations are limited in relation to one another. Also referred to as the Law of the European Union or Community Law, it is the unique and complex legal system that operates in tandem with the laws of the 27 member states of the European Union (EU). Similar to federal states, the EU legal system ensures compliance from the member states because of the Union's decentralized political nature. The European Court of Justice (ECJ), established in 1952 by the Treaty of Paris, has been largely responsible for the development of EU law. Fundamental principles of European Union law include: *subsidiarity* - the notion that issues be handled by the smallest, lowest, or least centralized competent authority; *proportionality* - the EU may only act to the extent needed to achieve its objectives; *conferral* - the EU is a union of member states, and all its authorities are voluntarily granted by its members; *legal certainty* - requires that legal rules be clear and precise; and *precautionary principle* - a moral and political principle stating that if an action or policy might cause severe or irreversible harm to the public or to the environment, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action.

A type of civil law that is the legal system of France. The French system also serves as the basis for, or is mixed with, other legal systems in approximately 50 countries, notably in North Africa, the Near East, and the French territories and dependencies. French law is primarily codified or systematic written civil law. Prior to the French Revolution (1789-1799), France had no single national legal system. Laws in the northern areas of present-day France were mostly local customs based on privileges and exemptions granted by kings and feudal lords, while in the southern areas Roman law predominated. The introduction of the Napoleonic Civil Code during the reign of Napoleon I in the first decade of the 19th century brought major reforms to the French legal system, many of which remain part of France's current legal structure, though all have been extensively amended or redrafted to address a modern nation. French law distinguishes between "public law" and "private law". Public law relates to government, the French Constitution, public administration, and criminal law. Private law covers issues between private citizens or corporations. The most recent changes to the French legal system - introduced in the 1980s - were the decentralization laws, which transferred authority from centrally appointed government representatives to locally elected representatives of the people.

The law of the international community, or the body of customary rules and treaty rules accepted as legally binding by states in their relations with each other. International law differs from other legal systems in that it primarily concerns sovereign political entities. There are three separate disciplines of international law: public international law, which governs the relationship between provinces and international entities and includes treaty law, law of the sea, international criminal law, and international humanitarian law; private international law, which addresses legal jurisdiction; and supranational law - a legal framework wherein countries are bound by regional agreements in which the laws of the member countries are held inapplicable when in conflict with supranational laws. At present the European Union is the only entity under a supranational legal system. The term "international law" was coined by Jeremy Bentham in 1780 in his *Principles of Morals and Legislation*, though laws governing relations between states have been recognized from very early times (many centuries B.C.). Modern international law

developed alongside the emergence and growth of the European nation-states beginning in the early 16th century. Other factors that influenced the development of international law included the revival of legal studies, the growth of international trade, and the practice of exchanging emissaries and establishing legations. The sources of International law are set out in Article 38-1 of the Statute of the International Court of Justice within the UN Charter.

The most widespread type of religious law, it is the legal system enforced in over 30 countries, particularly in the Near East, but also in Central and South Asia, Africa, and Indonesia. In many countries Islamic law operates in tandem with a civil law system. Islamic law is embodied in the sharia, an Arabic word meaning "the right path". Sharia covers all aspects of public and private life and organizes them into five categories: obligatory, recommended, permitted, disliked, and forbidden. The primary sources of sharia law are the Qur'an, believed by Muslims to be the word of God revealed to the Prophet Muhammad by the angel Gabriel, and the Sunnah, the teachings of the Prophet and his works. In addition to these two primary sources, traditional Sunni Muslims recognize the consensus of Muhammad's companions and Islamic jurists on certain issues, called ijmas, and various forms of reasoning, including analogy by legal scholars, referred to as qiyas. Shia Muslims reject ijmas and qiyas as sources of sharia law.

Also referred to as pluralistic law, mixed law consists of elements of some or all of the other main types of legal systems - civil, common, customary, and religious. The mixed legal systems of a number of countries came about when colonial powers overlaid their own legal systems upon colonized regions but retained elements of the colonies' existing legal systems.

A type of civil law developed in ancient Rome and practiced from the time of the city's founding (traditionally 753 B.C.) until the fall of the Western Empire in the 5th century A.D. Roman law remained the legal system of the Byzantine (Eastern Empire) until the fall of Constantinople in 1453. Preserved fragments of the first legal text, known as the Law of the Twelve Tables, dating from the 5th century B.C., contained specific provisions designed to change the prevailing customary law. Early Roman law was drawn from custom and statutes; later, during the time of the empire, emperors asserted their authority as the ultimate source of law. The basis for Roman laws was the idea that the exact form - not the intention - of words or of actions produced legal consequences. It was only in the late 6th century A.D. that a comprehensive Roman code of laws was published (see Civil Law above). Roman law served as the basis of law systems developed in a number of continental European countries.

All this different systems are needed to know and be used in daily practice by the legal servants in the Republic of Uzbekistan [8, p. 127]. Especially the Roman Law as well.

In the conclusion we would like to remind that Administrative law is the authority delegated to state executive agencies. Case law, also referred to as common law, covers areas where constitutional or statutory law is lacking. Legal servants are the representatives of the authorities in the whole country and must to work in accordance with the Constitution and national legislation.

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ӨЗБЕКСТАН РЕСПУБЛИКАСЫНДАҒЫ ЗАҢГЕРЛІК ҚЫЗМЕТТІҢ ӘДІСНАМАСЫ ЖАЙЫНДА

Аннотация. Әлемнің барлық елдерінде басымдық бағыт деп, жетілген заңнамаларды қалыптастыру есептеледі, соның әсерінен халықтың құқықтық мәдениеті көтеріледі және қызметкерлердің өз қызметтерін жүзеге асыру, құқықтық нормаларды іске асыру орындалады, азаматтардың құқықтары мен міндеттері белгіленеді, сол сияқты мемлекеттік басқарушы биліктің де қызметі заңды түрде нақтыланады. Бұл процессте мемлекеттік мекемелердің заңгерлік қызметі өте маңызды роль атқарады. Заңгерлік қызмет нормативтік-құқықтық актілерді жобалауда, дайындауда белсенді қызмет атқарады, оны қабылдаудан бастап жүргізетін барлық процесстерде оларға түзетулер еңгізуде, әртүрлі шаруашылық келісімдер жүргізуде, меншікті құқықтық аспаптармен қорғауды жүзеге асыруда, еңбек кодексін сақтауда, еңбек тәртібін күшейтуде әртүрлі

шаруашылықтардың заңды құқықтарын соттар мен басқа да ұйымдарында қорғауды жүзеге асырады. Осы бағытта заңгерлік қызмет түсінігінің әдіснамалық аспабын зерттеу маңызды роль атқарады. Сонымен қатар «заңгерлік көмек» түсінігінің мәнін ашуда қоғамдағы қатынастарды құқықтық негізде жетілдіруге заңгерлік қызметтің негізін зерттеуге және онда болып жатқан жаңалықтардың мәнін ашуға көмектеседі, сол сияқты оның іс-қимылының құқықтық статусын ашуға, негізгі бағыттарын көрсетуге,заңгерлік қызметтің құқықтық басымдылығын жүзеге асыруында, мемлекеттік мекемелердің, шаруашылық субъектілердің, азаматтардың құқықтық білімдерін көтеруге тікелей әсеретеді.

Түйін сөздер: заңгерлік көмек, құқықтық қызметтер, демократиялық реформалар,заңның басымдығы, мемлекеттік құрылысты жетілдіру, заңгерлік қызмет жүйесі, кеңкөлемді реформалар,елді модернизациялау, мемлекеттік сектор, аймақтық әкімшілік.

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О МЕТОДОЛОГИИ ЮРИДИЧЕСКОЙ СЛУЖБЫ В РЕСПУБЛИКЕ УЗБЕКИСТАН

Аннотация. Во всех странах мира приоритетными направлениями считаются создание совершенного законодательства, обеспечение его неуклонного исполнения, повышение правовой культуры населения и должностных лиц, четкое определение прав и обязанностей граждан, органов государственной власти и управления. В этом процессе важное значение имеет юридическая служба государственных органов и организаций, хозяйствующих субъектов. Юридическая служба активно участвует в подготовке проектов нормативно-правовых актов, в проведении правовой экспертизы, начиная с процесса принятия до обеспечения их исполнения; в заключении, изменении, прекращении и исполнении хозяйственных договоров; в обеспечении правовыми средствами сохранности собственности; в соблюдении трудового законодательства и укреплении трудовой дисциплины; в защите в судах и других организациях прав и законных интересов соответствующих органов и хозяйствующих субъектов. В развитых государствах мира осуществляются научные исследования в сфере юридической службы и оказания юридической помощи в процессе совершенствования правовых основ правового государства и гражданского общества. Здесь важное значение имеет исследование понятий «юридическая служба» и «юридическая помощь», совершенствование основ правового регулирования деятельности юридической службы, исследование на основе новых подходов системы юридической службы, правового статуса и основных направлений деятельности, участие юридической службы в обеспечении верховенства закона и законности в деятельности государственных органов и хозяйствующих субъектов, в правоприменении, повышении правового сознания и правовой культуры граждан.

Ключевые слова: юридическая помощь, правовые услуги, демократические реформы, верховенство закона, совершенствование государственного строительства, система юридической службы, широкомасштабные реформы, модернизация страны, государственный сектор, региональная администрация.

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REFERENCES

[1] Saidov A.Kh. Comparative Law.Main Legal Systems of Modern Time. M., 2003. http://dx.doi.org/10.18411/a-2018-008 (in Rus.).

[2] Gubaidullin A.R. Succession in Development of the Legal System // Scientific Messages of the Kazan University. Humanitarian Sciences. 2016. Vol. 155, chapter 4. P. 21-30. http://doi.org/10.17803/2311-5998.2017.32.4.081-090 (in Rus.).

[3] Denisenko V.V., Trikoz E.N. Typology of the Mixed Legal Systems // Bulletin of Nizhegorodskyi Academy of the Ministry of Internal Affairs of Russia. 2018. Vol. 2(42). P. 29-35. http://doi.org/10.24411/2078-5356-2018-10004 (in Rus.).

[4] Verkhoturov D.A., Verkhoturov A.A. Comparative jurisprudence: Roman-Germanlegal Systems in the countries of Asia Pacific Region // Comparative politics. 2013. Vol. **2(12).** P. 82-91. http://doi.org/10.18611/2221-3279-2013-4-2- (12)-82-86 (in Rus.).

[5] Ayupova Z.**K**., Kussainov D.U. To the problem of creation of law-abiding state in the Republic of Kazakshstan // Bulletin of the academy of sciences of the Republic of Kazakhstan. 2017. N 1. P. 276-281. https://doi.org/10.32014/2018.2518-1467 (in Rus.).

[6] Ayupova Z.**K**., **K**ussainov D.U., Bekbergenova A.K., Winston Nagan. Major Ideas and Main Values of the Universal Un Declaration on Human Rights: the 70-years Experience // Bulletin of the academy of sciences of the Republic of Kazakhstan. 2019. VOL. 1. P. 68-74. https://doi.org/10.32014/2019.2518-1467.8 (in Eng.).

[7] Ayupova Z.**K**., **K**ussainov D.U. Role and place of mediation in the legal tradition of the people of Kazakhstan // Bulletin of the academy of sciences of the Republic of Kazakhstan. 2018. N 6. P. 74-81. https://doi.org/10.32014/2018.2518-1467.30 (in Eng.).

[8] Tasheva Madina, Bakhtgalieva Aigerim, Benjamin Chan Yin-Fah. Female Entrepreneurship in Uzbekistan // Bulletin Of the academy of sciences of the Republic of Kazakhstan. 2018. Vol. 6. P. 127-133. https://doi.org/10.32014/2018.2518-1467.35

[9] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[10] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[11] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[12] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[13] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[14] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[15] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state regulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[16] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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RISK MANAGEMENT, AUDIT AND INTERNAL CONTROL

Abstract. Micro and micro risk management has become more relevant in recentyears due to increased turbulence in the markets and global financial instability. Acceleration of technology-related innovation processes also makes a definite contribution to increasing relevance of the topic. The pace of production processes and the speed of management decision-making are increasing. Company risk management can be vividlycompared to a brake gear of racecar. The task of effective risk management system is not about slowing down the pace, but rather ensuring safety in tight bends.

Key words: risk management, audit, internal control.

Introduction. The article serves to board of directors (the board) of national companies. It is no secret that extensive professional knowledge in this area requires special education and subject knowledge, varying greatly within subject and industry specifics. Understanding the general principles of risk management allows decision makers to address risk management topic properly and undertake right steps establishing a supervisory system to ensure competent risk management.

Methods. The article provides a general understanding of risk management, describes the role of individual management bodies in national companies, defines the main elements of a risk management system (RMS) and describes the phased actions of the board.

Results. Whatever risk management approach the board takes the most important is to form a proper control environment of the risk management culture, establish appropriate risk assessment procedures and provide support for control processes ensuring reasonable confidence in achieving company goals. The board (including non-executive and independent directors) takes ultimate responsibility for monitoring company's risks and prioritising resources of risk management.

1. Effective Risk Management. All companies face uncertainty at different stages of their development. This can be financial market fluctuations, changes in key resource value, new competition and political changes. These events may have both positive and negative effect on company development. Company success depends largely on the ability of its leadership to use the emerging opportunities, turning them into an advantage, and, at the same time, ensuring the viability and long-term business growth.

Any company is committed to creating value for shareholders and key stakeholders. However, companies inevitably face uncertainty setting strategic goals. The main challenge for the management is to achieve an optimal balance between the growth rate of shareholder value and risks.

This type of uncertainty generally contains both risks of value loss and opportunities for value creation. A company achieves value maximisation by maintaining optimal balance between growth rates, profitability and associated risks.

These qualities of RMS help a company management to achieve strategic goals and the desired level of profitability and prevent losses. RMS also should ensure effective accountability and compliance with laws and regulations and prevent damage to the company reputation.

Risk management is generally defined as the measures of identifying and assessing potential threats to a company’s capital undertaken by the board, management and employees of the company in order to

maintain an acceptable level of risk appetite and to ensure reasonable confidence in achieving company goals.

2. The Role of Management Bodies in RMS. Well-developed organisations have their risk management naturally built in the decision-making system at all levels, from the board all the way to low-level employee.

Following the best practice, the board determines principles and approaches to the organisation of risk management and internal control systems, approves the management policy, exercises control over the risk management and internal control system.

The Corporate Governance Code emphasises the need to achieve a balance between risk and profitability for the society as a whole, while complying with the legislation, the requirements of internal documents and the company charter, the development of adequate incentives for the company executive bodies, its structural department and individual employees. The code recommends the board to analyse and assess the risk management and internal control systems at least once a year. The analysis should be based on both management reports and internal and external audit reports. Some companies invite independent external consultants periodically (once every three years) to evaluate the risk management and internal control systems.

According to the Code, the board takes responsibilities for controlling risk disclosure and the role of the board in risk management and internal control.

The Principles of Corporate Governance emphasise the role of the board in determining risk management policies, approving risk appetite, and controlling risk disclosure.

An area of growing importance to the board that is closely related to corporate strategy is risk policy. The policy determines the types and degree of risk that the company is ready to accept to achieve its goals. Thus, it is crucial for management that must manage risks in order to maintain the desired risk profile of the company.

The board is responsible for ensuring the accuracy of company accounting and financial reporting systems, conducting independent audits and internal control systems, including risk management, financial and operational control systems, and compliance with legal requirements and relevant standards.

The board should also ensure proper oversight by the executive management. However, the board takes ultimate responsibility for ensuring the accuracy of the accounting and financial reporting systems. In some countries the chairperson of the board shall provide a report on the internal control system.

Financial information users and market participants want to be informed about significant risks that are reasonably amenable to forecasting.

Some companies create a separate risk management committee of the board. Basel Committee on Banking Supervision strongly recommends establishing such a committee in the large financial institutions. The committee can work together with company management, analysing key risk factors, identifying risk concentration scenarios, giving a more accurate risk assessment. Although the committee can be very useful in the assessment process, it should not be a substitute for the board, which should understand and feel the most significant risks for the company. If there is not a special risk committee of the board, the audit committee shall perform the risk management functions.

The risk management committee shall:

– Supervise the quality, efficiency and objectivity of control systems and the risk management and effectiveness of established risk management policies and strategies;

– Overview the culture, philosophy and strategy of risk management and establishment of policies, risk management procedures and requirements for risk notification used in the management and risk notification;

– Review information on the most significant risks and actions undertaken by management and department to control these risks within acceptable limits;

– Ensure compliance with risk policies and the overall risk profile;

– Receive and review reports from any risk assessment group, including the risk management committee and the internal audit service.

The company executive management is primarily responsible for establishing and functioning of the effective risk management and internal control system. At the same time, the relevant procedures should provide for timely notification of significant shortcomings in the internal control system.

Some companies establish the risk management committee under executive board. The committee is accountable to executive board and operates under the authority granted by the board. Committee within its competence provide advice to executive board.

The risk committee of executive board may perform the following:

1. Assist identifying significant risks by:

– submitting any material risks for consideration identified during the past assessment periods;

– considering any internal or external circumstances that may increase the risk or cause new risks.

2. Manage the work on periodic risk assessment by:

– identifying participants in the risk assessment process;

– ensuring that a risk assessment is carried out at least once a year or when significant changes in external or internal factors occur;

– analyse risk assessment results to identify areas of high risk, significant concentrations of associated risks and any deviations in results that may require further study or analysis;

– prepare reports on risk assessment results for the audit committee of the board.

3. Analyze, prioritize, and approve risk mitigation strategies by:

– analysing risk management reports and identifying areas requiring risk mitigation strategies;

– providing relevant assistance in developing measures or action plans to reduce unacceptable risks;

– analyse and / or develop risk mitigation options to control significant risks;

– approve those projects that are necessary for the implementation of risk reduction measures.

4. Monitor the implementation of risk mitigation measures by:

– receiving reports and follow-up requests for the implementation of a risk mitigation plan;

– providing recommendations for the modification and adaptation of the risk management process to ensure compliance with the requirements of the board and management.

Some companies (typically large ones) establish a risk management department. The risk management department can:

– organise the work of a risk management unit;

– create action plan for RMS annually;

– control the implementation of internal risk management documents by the company departments;

– control the process of identifying risks / organise the process of identifying the risks (identifying risks and creating a registry and identifying and registering new risks);

– form proposals assigning risk owners;

– control annual update of the risk register and risk map;

– make proposals to the audit/risk committee regarding the level of acceptable risk appetite;

– monitor the implementation of the identified risks assessment / implement risk assessment process with company experts.

There is also a practice of appointing so-called risk leaders. The risk leader acts as a risk management coordinator within each company department which is identified as a participant in the risk assessment process. Risk leaders do not have to be the leaders of their departments. They are usually appointed from among the heads of these departments. Risk leaders must fully understand the activities, processes and personnel of department, be able to organise projects and manage them. If the risk leader is not the head of the department, once appointed one receives full support from the head of the relevant department.

Risk leaders perform or delegate and manage the following activities:

– coordinating with the department management;

– supporting the activities of the risk management committee;

– identifying and analysing department risks;

– drawing up reports on identified risks of a department;

– developing risk mitigating strategies, plans, measures etc.;

– monitoring and reporting to the risk management committee on implementation risk mitigating strategies, plans, measures etc.

3. RMS Elements. Effective company risk management is not necessary to reassure shareholders or investors, but primarily to increase the likelihood of achieving company goals. Let us consider the ‘brick’ elements of effective RMS.

Firstelement is a control environment, which is the general atmosphere and company attitude regarding internal control. What do staff members think about the importance of control? Do they perceive the internal audit service and regular inspections a necessary thing, or rather an “inevitable evil” that waste the time? Do they consider honesty and transparency to be a requirement in their activities, or rather they share the idea “innocent till proven guilty”?

The control environment is the foundation for the entire system of internal control and risk management. The factors affecting the quality of the control environment are ethical principles, competence, honesty of employees, ethics and management style, power and responsibility distribution, and attitude of top management and the board to control issues. To establish an effective control environment the board should:

– Form the culture projecting the right attitude to the internal control and risk management top-down. If board members and the top management fail not follow the established principles, rules and procedures, the employees will hardly ever follow them as well.

– Ensure that the principles and rules are clearly articulated and understood by company employees. To this end, the board can initiate an internal survey, establish or revise internal documents like regulations, procedures, code of ethics.

– Establish a transparent organisational structure and power and responsibility distribution in the company.

The second element is a clear process for defining company objectives. In this regard, the board should ask the following questions:

– Is vision, mission and priorities of the company defined clearly?

– Are the goals properly communicated to the employees?

– Are the goals and objectives of the company clear?

The third element is risk assessment. It provides for identifying and analysing events that can possibly affect the achievement of company objectives. This is necessary to develop an adequate risk response. Effective risk assessment assumes that company management and the board:

– Identify, assess internal and external factors that may adversely affect the achievement of the company goals. The risks are usually assessed on the scale of "significance" (estimated amount of potential financial damage) and "probability" (in points, categories or percentages).

– Establish acceptable levels of risk (risk appetite), which the company and its divisions can (should) assume to achieve their goals (considering the strategy and shareholders' opinions).

– Develop relevant procedures and processes aimed at identifying and tracking changes and controlling risks.

Generally, this is the stage when a company forms the risk register, that classifies risks into groups (eg. by risk sources). What does a typical organization risk map look like today? What risk groups are the boards of the largest companies facing?

There are multiple sources of strategic risks like political events, technological and social changes, the macroeconomic situation, industrial changes, competition, etc.

Financial risks are, perhaps, the most common subject of discussion at the board meetings. How will the change in interest rates affect business? What factors influence credit ratings? What is the financial sustainability (debt to EBITDA ratio), is there enough cash flow to service the debt? What are the possible threats to the company liquidity?

Operational risks can be associated with personnel, cost management, production capacity, suppliers and contractors, quality inventory management, information technology, etc.

Compliance risks may be associated with compliance with regulatory requirements and changes in legislation.

For several companies, the environment interaction risks, which may be caused by natural phenomena or otherwise are beyond their control, are of great importance.

Most often, companies utilise an expert method to identify, classify, and assess risks. A company usually choses experts from among the top management (eg. the risk committee of the board) or board members. Another effective approach is to organiыe the board independent discussion and assessment of key risks, and then compare them with management's assessment. As a result of a joint discussion, the board members produce a common understanding of the company's risk matrix. When all stakeholders

provide their reasonable estimates, they compile and discuss the results to find out how different group members assess the risks of the company and why.

Risk assessment should be completed annually. If some areas are highly exposed to specific risks, their assessment should be done more often. If the board considers certain risks particularly significant, it can monitor and reassess these risks at each board meeting. Thus, during the financial crisis, many companies that were exposed to credit and investment risks carried out this activity.

Some companies create so-called "heat maps", highlighting the most significant and probable risks that requires increased attention of the board and senior management.

Determining company risk appetite is an important step. When establishing risk appetite, the board should consider their own business judgment and additional factors:

– What stage of the life cycle is the company in? It is typical of start-ups to be more risky ventures than of mature companies.

– Opinion of key stakeholders. Shareholders, lenders, bondholders, etc., may have a different opinion about risk appetite. The board should consider their opinion when establishing risk appetite.

– Environmental factors. For example, an economy recession or a significant regulation change, fundamental structural changes in the industry can significantly affect risk appetite.

There is a simple principle in establishing risk appetite – do not bite more than you can chew. Companies of different industries and different life cycle stage can formulate the risk appetite quantitatively (the sum of potential losses, limit values or coefficient corridors, etc.) or qualitatively (description). For example:

– capital adequacy to cover damage of a certain level;

– range for debt coverage (debt / EBITDA);

– solvency i.e. the company must be able to fulfil its obligations;

– income structure i.e. the company considers critical the loss of more than a certain percentage of income or wants to establish a maximum percentage of income depending on one or several large customers.

The fourth element is a risk-response development that involves developing a strategy for responding to each identified risk. Basic risk-response strategies usually involve:

– Risk avoidance. The company decides not to start or stop projects or activities that lead to a risk that goes beyond the risk appetite.

– Risk minimisation. The company takes measures to reduce the impact or probability of risk by developing and implementing an appropriate strategy, action plan, and relevant control procedures. In this case, several companies also estimate the level of residual risk – risk after applying control procedures and risk reduction measures.

– Risk acceptance. The company decides that minimising risk is not feasible or economically viable, and the benefits derived from projects, procedures or activities are worth the accepted risk.

– Risk transfer. The company shares possible losses or benefits from a risk with other party.

Managers and / other key company positions related to risk management activities take the responsibility for the development of measures for managing priority risks.

The board shall exercise control over the implementation of key risk management measures, while the management shall control the risks of the "yellow" and "green" zones ensuring adequate control procedures for managing all risks.

Thus, the next important element of RMS are control procedures that ensure acceptable range for the risks. The board shall do the following to exercise adequate control:

1. Create the necessary infrastructure to ensure the effectiveness of control procedures:

– control procedures are implemented at all levels of management;

– control measures are built into daily routine;

– adequate separation of duties and absence of conflicts of interest in operation.

2. Ensure periodic company checks on the compliance with the established policies and procedures for all areas of activities.

3. Ensure adequacy, completeness and accuracy of financial and management reporting, information at all levels of management.

4. Ensure compliance with the legislation.

There are several forms of control procedures: preliminary control, current control, follow-up control.

Preliminary controls may include:

– appointing a responsible officer;

– setting quality standards;

– establishing strict procedures for tender and commercial proposals of calculating the cost of construction;

– creating the management accounting and reporting system.

Current control may include:

– verifying materials and goods as they progress through the production process;

– ensure feedback of production and responsible persons on the implementation of planned indicators for a shift, day, month, quarter, year;

– ensure feedback to employees on quality indicators during the production process;

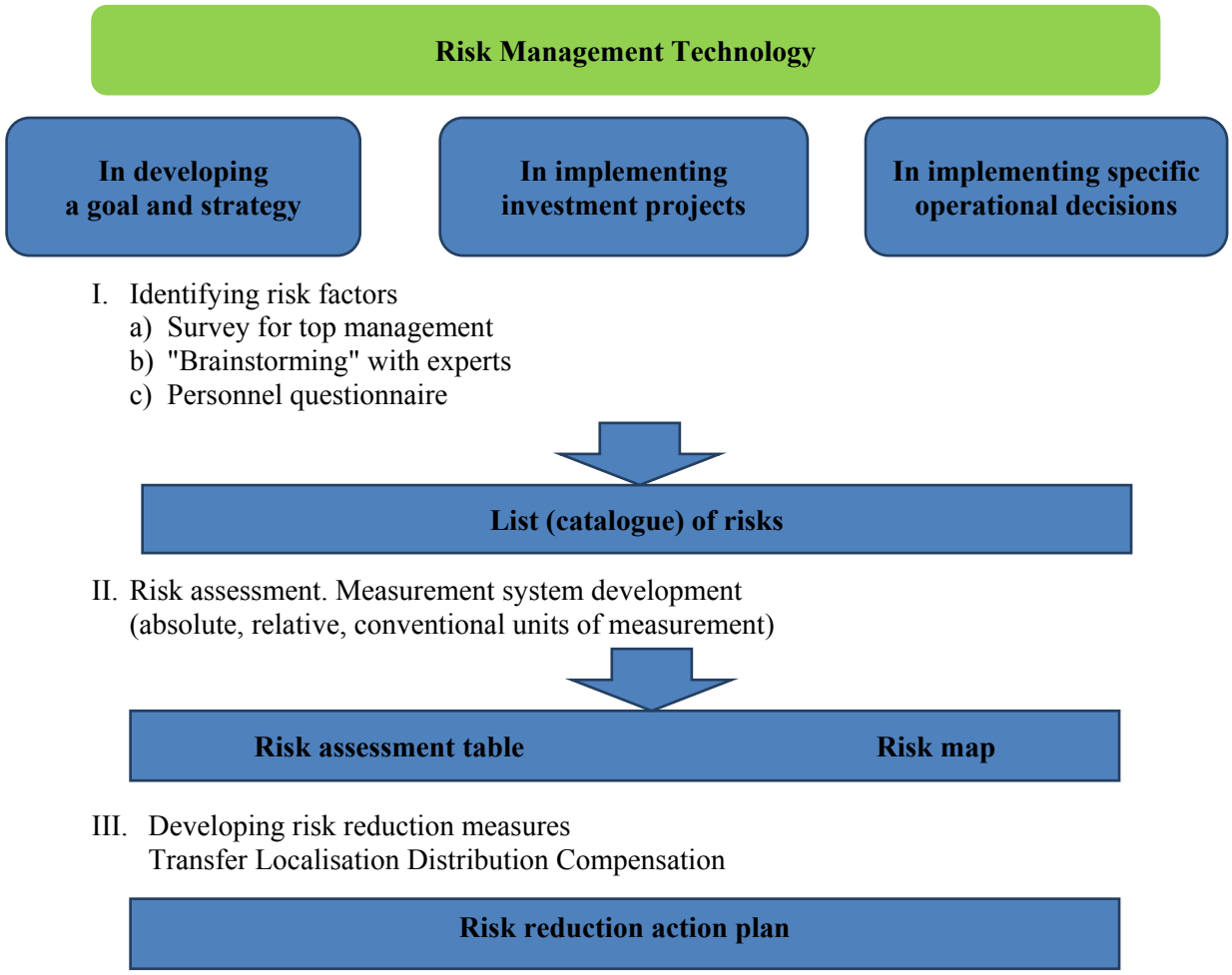
– creating a business performance assessment system;

– monitoring key performance indicators.

Follow-up control may include:

– ensuring quality control of finished products and services by quality service to determine the amount of flaw;

– assessing production volumes to determine the bonus for a department for implementing key performance indicators (KPIs) and targets.



Risk Management Technology.

An adequate monitoring system is also a necessary element of effective RMS. The board may initiate creating an early warning system – a system of key risk indicators that signal the upcoming risk events. Each company has its own set of risks, but there are some common elements:

– excessive self-confidence of the higher management;

– changes in accounting rules or statements that improve the picture;

– reduction of work efficiency and change in the cash flow structure in favour of one-time sources;

– outpacing growth of costs (especially overhead costs) in relation to revenues;

– negative reports of financial analysts, rating agencies, negative reactions of investors to the company results;

– unwillingness of creditors to provide additional financing;

– high staff turnover, including managerial;

– strange and unexpected actions of competitors (eg. withdrawal of investments or atypical investments);

– public sentiment, which can stimulate the actions of regulators;

– tangible customer dissatisfaction;

– substantial criticism in the media (monitoring of so-called websites of disgruntled employees or customers may be useful);

– unreasonably high activity in merging and acquisitioning.

Each company chooses its own path, which is optimal at this stage of development. At the same time, figure displays one of the options for risk management technology.

For effective monitoring, the board can take advantage of its extensive control toolkit. Each company uses several processes to obtain information about its activities and market conditions. Generally, this data gathering allows for early warning signals of a possible crisis.

Thus, adequate information and communication is also a necessary element of effective RMS. Relevant information should be collected, analysed and provided in time to company management for decision making.

The information from the following sources shall be analysed and used in strategic decision-making:

1. Reports of external auditors. Audit reports, especially the so-called letters of the auditors to the management of the company. The external auditors voice their conclusions and results that go beyond a simple verification of figures, which can be very informative. It is important for the board to communicate with external auditors directly and study their findings. The external auditors shall be appointed by the board of directors, not by the executive board to ensure their independence and critical point of view [20].

2. Reports of internal auditors and compliance reports. They can draw the board's attention to dangerous trends in operating activities (rather than individual incidents) that can put the company at significant risk (eg. systematic fraud in the form of a growing gap between the book value and the actual value of goods in stock) [21].

3. Reports of regulatory actions that track company problems with regulatory compliance or issues related to compliance with established rules (eg. fines for breach of safety standards by the BP's Deepwater Horizon oil platform were well above the industry average even before the rig accident).

4. Reports on industry trends. Industry trends (ascending and descending) can often be tracked even before they affect a company, which makes it possible to take the necessary precautions and avoid both excess and insufficient capacity problems.

4. Implementation of RMS

The level RMS depends certainly on company size, industry, development stage, etc. Here are general stages of introducing RMS:

1. Appointing a responsible person (risk manager) for system management;

2. Developing risk maps, models and risk indicators, approving the level of risk appetite by the board;

3. Introducing regulations for risk monitoring and identification within the approved control procedure;

4. Developing a mechanism for registering and accounting values of risk indicators in the company databases.

5. Establishing a system of staff motivation, considering the risk they assume.

6. Creating documentary reports on current values of risk indicators for company management and employees responsible for that.

7. Regular hearing of reports by top management on the actual values of risk indicators and monitoring their location within the established standards.

The board is responsible for the long-term company development. Therefore, monitoring the existence and efficiency of RMS is one of the most important priorities of the board. Based on the specifics of the business and its priorities, the board can develop various requirements for RMS.

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ТӘУЕКЕЛДЕРДІ БАСҚАРУ, АУДИТ ЖӘНЕ ІШКІ БАҚЫЛАУ

Аннотация. Соңғы жылдары тәуекелдерді басқару тақырыбы өзекті болып отыр, бұл нарықтардағы турбуленттілік пен жаһандық қаржылық тұрақсыздықтың өсуіне байланысты. Технологиядағы инновациялық процестерді жеделдету де тақырыптың өзектілігін арттыруға нақты үлес қосады. Өмірдің қарқыны мен шешім қабылдау жылдамдығы артып келеді.Компаниядағы тәуекелдерді басқару рөлін көрсету үшін келесі салыстыруды пайдалана аласыз. Ең жылдам машиналар ең жақсы және ең сенімді тежегіштермен жабдықталғаны белгілі. Осылайша, тәуекелдерді басқарудың тиімді жүйесінің міндеті қозғалысты бәсеңдетпеу емес, керісінше, күрт бұрылыстарда қауіпсіздікті қамтамасыз ету болып табылады.

Түйін сөздер: тәуекелдерді басқару, тәуекелдерді басқару, аудит, ішкі бақылау.

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УПРАВЛЕНИЕ РИСКАМИ, АУДИТ И ВНУТРЕННИЙ КОНТРОЛЬ

Аннотация. Тема управления рисками на микро- и макроуровнях в последние годы становится актуальней, это связано с повышенной турбулентностью на рынках и мировой финансовой нестабильностью. Свой определенный вклад в повышение актуальности темы вносит также ускорение инновационных процессов в технологиях. Темп производственных процессов и скорость принятия управленческих решений нарастает. Чтобы проиллюстрировать роль управления рисками в компании, можно использовать следующее сравнение. Известно, что самые быстрые автомобили снабжены самыми лучшими и надежными тормозами. Так, задача эффективной системы управления рисками – не затормозить движение, а, наоборот, обеспечить безопасность на крутых поворотах.

Ключевые слова: риск менеджмент, управление рисками, аудит, внутренний контроль.

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REFERENCES

[1] Guide to Enterprise Risk Management – http://www.ucop.edu/enterprise-risk-management/_files/protiviti_faqguide.pdf

[2] COSO Enterprise Risk Management Standards. http://www.coso.org/documents/coso_erm_executivesummary.pdf

[3] John Harper. Chairing the Board: A Practical Guide to Activities and Responsibilities. London, 2007.

[4] OECD Corporate Governance Principles. 2004. www.oecd.org

[5] Corporate Governance Code. 2014.

[6 McCarthy M.P., Flynn T. Risk Management by Top Managers and the Board of Directors. M., 2005.

7) Charan R. Board of Directors. Technologies for Effective Work. M., 2006.

[8] Company Crisis Management. Manual for Board Members. International Finance Corporation, 2010.

[9] Filatov A., Dzhuraev E. The of Work the Board of Directors: Practical Advice. M.: Alpina, 2014.

[10] The Law of the Republic of Kazakhstan "Ob auditorskoj dejatel'nosti" [On Auditing Activity] dated November 20, 1998 (with amendments and additions).

[11] Kolcheeva O.O. Audit of Efficiency in the System of Public Financial Control // Bulletin of Moscow university of the Ministry of Internal Affairs of Russia. 2006. N 7. 0.3. Edition recommended by State Commission for Academic Degrees and Titles of Russia.

[12] Raizberg B.A., Lozovsky L.Sh., Starodubtseva Ye.B. Modern Economic Dictionary. M.: Infra, Moscow, 2001. P. 404. https://dic.academic.ru/dic.nsf/ruwiki/498637

[13] Karyakina L. Comparative Analysis of Performance Audit Methods in Foreign Countries.

[14] Romanova T.F. Karepina A.I. Performance audit of budget utilisation // Financial Studies. 2004. N 9.

[15] Performance Audit of Budget Utilisation Efficiency – a modern form of financial control Performance audit definition.

[16] Saunin A.N. Performance Audit in State Financial Control. Financial control. 2004.

[17] Voronina L.I. Audit Activities: The Foundations of The Organization. M.: Eksmo, 2007. 336 p.

[18] Ivanov E.I., Melnik M.V., Shleinikov V.I. Performance Audit in a Market Economy. KnoRus. 2007. P. 328.

[19 Bulyga R.P., Melnik M.V. Business Audit: Practice And Problems of Development. M.: Unity-Dan, 2013. 263 p.

[20] Ussabayev A.K., Pontoppidan C.A., Ussabayev D.K. **(2019)** Actual problems of accounting of concession assets and liabilities in the Republic of Kazakhstan // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 2, N 378. P. 28-36. ISSN 1991-3494. https://doi.org/10.32014/2019.2518-1467.37

[21] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[22] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[23] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[24] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[25] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[26] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[27] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state regulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[28] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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STATE AUDIT OF ENVIRONMENTAL PROTECTION

Abstract. The article considers the introduction of the state audit of environmental protection in the republic in connection with the reform of the financial control bodies in accordance with international best practice. The purpose of the article is to reveal the essence of the state audit of environmental protection. As a result of the study, the authors found that at present there is no single definition of an audit of environmental protection at both the international and national levels. On the basis of a comparative analysis of scientific and special literature, it has been revealed that three approaches have emerged in the formation of the concept of environmental audit. The features of the audit of environmental protection conducted by the state audit bodies are disclosed and, taking into account the results of a comparative analysis of the literature, its author's definition is given. To ensure efficiency, economy, productivity and effectiveness indicators of the use of natural resources and budget funds it has been identified the need for adoption of a regulatory document governing the conduct of an audit of environmental protection by state auditors and the use of its results.

Keywords: state audit, environmental protection audit, environmental audit, environmental performance audit, sustainable development.

Introduction. As a result of the reform of the financial control system in line with the best world practice, the new regulatory documents of the country have been assigned to the state audit bodies new functions that have not been previously reported. One of the key points is the mandate of the supreme audit body in the field of state audit - the Audit Committee to carry out an audit of environmental performance [1]. This is directly related to the integration of Kazakhstan into the international ecological security system, as well as strengthening the environmental legislation. At present, theoretical and practical aspects of the environmental audit are not fully studied and this issue is relevant in many CIS countries. For example, Russian scientist Chkhutiashvili L.V. in his work today showed that the audit of the environment and sustainable development in Russia is not regulated legally, and there is no clear methodological framework for criteria for determining the effectiveness, efficiency and effectiveness of budget expenditure for environmental protection, rational utilization of natural resources and environmental safety [162-164b]. Therefore, the study of the essence of the environmental audit is one of the topical issues of our time.

Research methods. Induction and deduction, analysis and synthesis, theoretical generalizations were used during the research.

Discussion and results. To determine the essence of environmental audit, let's look at the concept of "ecological audit" in scientific and specialized literature (table).

Our research has shown that the concept of environmental audit is currently being implemented in three ways [3, 197 p.; 4, 59-60 p.; 5, 30 p.].

The first is based on the traditional audited definition of audits (such as the "State Audit Theory" issued by the Accounts Committee for Control over Execution of the Republican Budget, and Malinovskaya N.V.), as well as audit of financial statements and other relevant information on business entities.

Defining the ecological audit

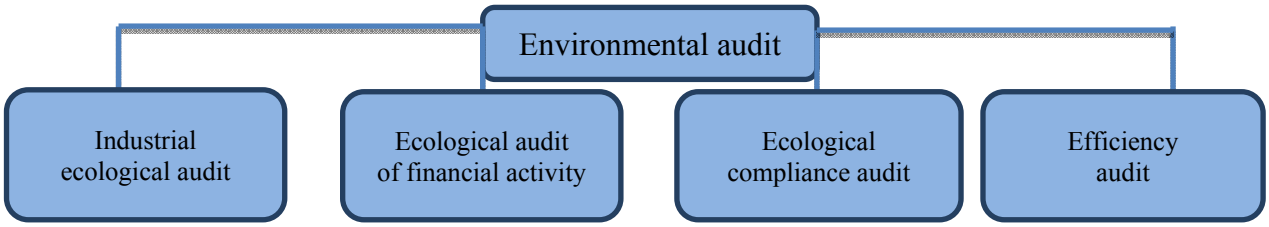
Authors and sources of information	Definition
State audit theory	Part of a steady financial inspiration, focusing on environmental issues [3, 198p];
Utemis Z.E.	Systematic verification of objective evidence of obtaining and evaluating audit evidence to determine whether it conforms to specific environmental auditing criteria [4, 59-61p];
Malinovskaya N.V.	An independent review of the environmental aspects of the audited entity, certain procedures and rules, as well as the effectiveness of the procedures and methods of operating the business environment in the environmental field in order to express an opinion on the correctness of environmental issues in the financial statements [5, 33p];
Zabelina A.A.	a systematic documented system of economic entities audits with a view to establishing compliance of the business entity with the management system, the types and conditions of economic activities with regulatory requirements and environmental protection criteria [6, 36-39p];
Chkhutiashvili L.V.	the system of measures to ensure the compliance with environmental legislation, implemented by business entities, in compliance with environmental, environmental and environmental safety standards [7, 24-25p];
Potravniy I.M.	independent assessment of compliance with regulatory and legal requirements in the field of environmental protection and preparation of proposals for environmental services [8, 9p].
Ecological Code of the Republic of Kazakhstan	an independent verification of economic and other activities of audited entities aimed at identifying and evaluating environmental risks and elaborating recommendations on improving the environmental safety of their activities [9];
The Law of Ukraine "Ecological Audit"	a documented, systematic independent process of evaluating the object of environmental audit, including collection and objective assessment of certain types of activities, activities, contracts, environmental management systems and information on these matters with regard to compliance with environmental laws and other environmental auditing standards [10];
Federal Law of the Russian Federation "Environmental Protection"	Preparation of recommendations for legal, individual or individual entrepreneur to comply with environmental requirements, including independent, comprehensive, documented assessment and compliance with regulatory requirements, federal rules and regulations, international standards [11];
The Law of the Republic of Belarus "Environmental Protection"	economic and other activities of legal entities and individual entrepreneurs in accordance with the requirements of environmental protection, including compliance with the standards and technical regulations, requirements of international standards, and preparation of recommendations on reducing (elimination) of adverse environmental impacts of such activities [12];
The Law of the Kyrgyz Republic "Environmental Protection"	(inspection, evaluation) of the environmental status, property or activities of an enterprise for the purpose of identifying past or present problems, potential environmental risks and responsibilities [13];
The concept of the National Agency for Environmental Protection developed by the US federal agencies in 1994	Systematic, documented, periodic and objective review of the activities and practices of facilities related to compliance with environmental requirements [14].
Note. Authors are based on sources of literature.	

The second one considers environmental audits as an organizational-legal mechanism of the enterprise's security in the environment (Chkhituashvili L.V., the US National Environmental Protection Agency's 1994 Concept for the Federal Agencies and the Russian Federation’s, Belorussia’s, and the Kyrgyz Republic’s legislative acts).

Third is aimed at recognizing ecological audit as entrepreneurial activity (Utemis Z.E., Zabelina A..A, Potravniy I.M., legislative acts of Ukraine and Kazakhstan in the field of ecology).

The collective work of the Accounts Committee includes four types of environmental audits.

Among these types of environmental audits, the country's industrial ecological audit is well developed. Russian scientist Kozlova NN in her work illustrates the ability to develop environmental audits in the light of Kazakhstan's experience as an example of environmental audits, to substantiate its investment projects for mining and utilizing mineral resources. At the same time, the Ecological Code of the country focuses on all aspects of organization and conduct of environmental audits (purpose, purpose, basis of implementation, implementation procedures, etc.) [17, 232-236p].



Structure of the environmental audit [3]

However, the state environmental audit has its own peculiarities (normative legal regulation, implementation procedures, etc.).

Competence of carrying out of the environmental audit is in the Republic of Kazakhstan exclusively by the Supreme Audit Institution - the Accounts Committee [1]. Since the Accounts Committee is an external public audit body, its main task is to analyze, assess and verify the effective and legitimate management of national resources to ensure the rapid growth of the quality of life of the population and national security of the country. Since the environmental audit is considered as an effect auditor, the performance of the public audit object should be evaluated and analyzed efficiently, economically, efficiently and effectively. Given these specifics, by defining the findings of the above-mentioned scientists, the following can be deduced from the scope of the environmental audit: State regulation of the environment, the management of the environment and the implementation of environmental policy documents to ensure a sustainable population growth and national security quality. efficiency, and other environmental impact assessment programs.

Conclusion. At present, ecological audit in the country is developed as a industrial activity. And the state environmental audit has specific features. Therefore, it is necessary to adopt a specific regulatory legal document that regulates the procedure for the use of environmental audit procedures and conclusions by public auditors in order to maintain the efficiency, efficiency, productivity and performance indicators of the use of natural resources and budgetary funds. A qualitative and honest environmental audit, which will help address sustainable development challenges, can be an important factor in increasing the efficiency of the use of budgetary funds and environmental management. Also, by conducting an environmental audit, we can provide a cleaner society to the next generation by reducing the environmental impact of business entities.

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МЕМЛЕКЕТТІК ҚОРШАҒАН ОРТАНЫ ҚОРҒАУ АУДИТІ

Аннотауция. Мақалада қаржылық бақылау органдарын озық әлемдік тәжірибеге сәйкес реформалау нәтижесінде елімізде мемлекеттік қоршаған ортаны қорғау аудитінің енгізілуі қарастырылған. Мақаланың мақсаты – мемлекеттік қоршаған ортаны қорғау аудитінің мәнін ашу. Авторлар зерттеу нәтижесінде қазіргі таңда халықаралық және ұлттық деңгейлерде қоршаған ортаны қорғау аудитінің біріңғай айқын анықтамасы жоқ екендігін анықтаған. Ғылыми және арнайы әдебиеттерді компоративтік талдау негізінде экологиялық аудит ұғымын қалыптастыру үш тұрғыдан жүргізілетіндігін көрсеткен. Мемлекеттік аудит органдары жүргізетін қоршаған ортаны қорғау аудитінің ерекшеліктері айқындалып, компаративтік талдау нәтижелері ескеріле отырып негізделген авторлық анықтама берілген. Алдағы уақытта табиғат ресурстарын және бюджет қаражаттарын пайдаланудың тиімділік, үнемділік, өнімділік және нәтижелілік көрсеткіштерін сақтау үшін мемлекеттік аудиторлардың қоршаған ортаны қорғау аудитін жүзеге асыру процедуралары мен қорытындыларын пайдаланудың тәртібін реттейтін нақты нормативті-құқықтық құжат қабылдау қажеттілігі анықталған.

Түйін сөздер: мемлекеттік аудит, қоршаған ортаны қорғау аудиті, экологиялық аудит, қоршаған ортаны қорғаудың тиімділік аудиті, тұрақты даму.

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ГОСУДАРСТВЕННЫЙ АУДИТ ОХРАНЫ ОКРУЖАЮЩЕЙ СРЕДЫ

Аннотация. В статье рассмотрено введение в республике государственного аудита охраны окружающей среды в связи с реформированием органов финансового контроля в соответствии с передовой мировой практикой. Цель статьи – раскрыть сущность государственного аудита охраны окружающей среды. В результате исследования авторами установлено, что в настоящее время отсутствует единое определение аудита охраны окружающей среды как в международном, так и национальном уровнях. На основе компоративного анализа научной и специальной литературы выявлено, что в формировании понятия экологического аудита сложились три подхода. Раскрыты особенности аудита охраны окружающей среды, проводимого органами государственного аудита и, с учетом результатов компаративного анализа литературы, дано его авторское определение. Для обеспечения показателей эффективности, экономичности, производительности и результативности использования природных ресурсов и бюджетных средств определена необходимость принятия в будущем нормативно-правового документа, регулирующего процедуры проведения государственными аудиторами аудита охраны окружающей среды и использования его результатов.

Ключевые слова: государственный аудит, аудит охраны окружающей среды, экологический аудит, аудит эффективности охраны окружающей среды, устойчивое развитие.

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REFERENCES

[1] The Law of the Republic of Kazakhstan on Public Audit and Financial Control 12/11/2015 № 392-V ҚРЗ. http://adilet.zan.kz/kaz/docs/Z1500000392

[2] Chkhituashvili L.V. Environmental audit as an effective tool for environmental supervision of the environmental and economic activities of Russian organizations // Audit and financial analysis. 2016. N 1.

[3] State Audit Theory. Astana: Accounts Committee for Control over Execution of the Republican Budget. 2018. 328 p.

[4] Utemis Z.E. Features of environmental auditing in international practice // State Audit. 2018. N 1(38).

[5] Malinovskaya N.V. The development of environmental auditing in Russia // International Accounting. 2013. N 43(289). https://cyberleninka.ru/article/n/razvitie-ekologicheskogo-audita-vrossii-

[6] Zabelina A.A. Ecological audit as a direction of state audit // Scientific notes of OrelGIET. 2016. N 4(16).

[7] Chkhituashvili L.V. Industrial environmental control as an important condition for the sustainable development of enterprises-users of natural resources // Audit. 2016. N 10.

[8] Potravny I.M. Ecological audit. Theory and practice: a textbook for university students. M.: UNITY-DANA, 2015. 583 p.

[9] The Environmental Code of the Republic of Kazakhstan // January 9, 2007. N 212. http://adilet.zan.kz/kaz/docs/K070000212_

[10] The Law of Ukraine "On Ecological Audit" // June 24, 2004. N 1862-IV. https://online.zakon.kz/Document/?doc_id=30754053#pos=9;-60

[11] Federal Law of the Russian Federation "On Environmental Protection" // January 10, 2002. N 7-FZ. http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=LAW&n=301549&fld=134&dst=100012,0&rnd=0.12595324869277558#07164749696618988

[12] The Law of the Republic of Belarus // On Environmental Protection. November 26, 1992. N 982-XII. http://www.pravo.by/document/?guid=3871&p0=v19201982

[13] The Law of the Kyrgyz Republic // On Environmental Protection. June 16, 1999. N 53. http://cbd.minjust.gov.kg/act/view/ru-ru/218

[14] EPA 300-B-96-011 Environmental Protection Enforcement Spring 1997
Environmental Audit Program Design Guidelines For Federal Agencies. https://www.epa.gov/sites/production/files/documents/envaudproguidemas.pdf

[15] Rakayeva A.N., Zhumataeva B.A., Uspambaeva M.K., Doskalieva B.B. Ecological accounting as a stage of development of the enterprise economy in Kazakhstan // News of the National academy of sciences of the Republic of Kazakhstan. 2018. N 5(321).). https://doi.org/10.32014/2018.2224-5294.24

[16] Sabirov R.K., Utepkalieva K.M., Kabakov S.B. Ecological aspects of agricultural economics in Kazakhstan // News of the National academy of sciences of the Republic of Kazakhstan. 2018. N 5(321). https://doi.org/10.32014/2018.2224-5294.15

[17] Kozlova N.N. The development of environmental auditing in Russia in the light of international auditing standards // Audit and financial analysis.

[18] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[19] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[20] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[21] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[22] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[23] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[24] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state regulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[25] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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PROSPECTS AND PROBLEMS OF DEVELOPMENT OF CASPIAN REGION

Abstract. In the Republic of Kazakhstan, the development of the oil and gas sector is one of the most important branches of the national economy, which has its own historical roots and traditions, in connection with that, it is possible to trace the patterns and features of the functioning of the national economy.

The article has a literature review conducted by Kazakhstani and foreign authors, which had a research on the issues of economic and environmental development of the national economy, including the oil and gas complex in various aspects. The article explores one of the topical issues of Kazakhstan's economy - prospects and problems of development of the western region. The characteristic features of modern management processes in the field of industry development are shown.

The authors of the article conducted a study of the oil and gas industry in Kazakhstan as a component of the national economy, there is analyzed the current state of the industry, taking into account the innovative processes taking place in the development of the region. As a result of the studies, the theoretical and methodological aspects of the development of the oil and gas complex are systematized, on the basis of which conclusions are drawn.

Key words: Caspian Sea, ecology, investments, national economy, oil and gas complex, region.

1. Introduction. The global oil and gas sector as a whole remains the most attractive area for direct investment. First of all, the inflow of investments into the oil and gas sector is caused by the stable growth of the world demand for oil. The average annual rate of world oil consumption (including gas condensate and other liquid hydrocarbons) exceeded 90 million barrels per day.

At the same time, according to forecasts, in the next few years demand for oil will continue to grow by an average of 1.3-1.5% per year. Leaders in attracting foreign direct investment (FDI) as well as the world's major investors in the world have traditionally been the United States and China. Russia increased the inflow of FDI into its economy by 84%, coming out on the third place in the world. At the same time, the events of the current year in Ukraine dramatically changed the trend of the past year: there was started a massive outflow of investments from Russia (Intymakova A.T., 2015).

The Caspian Sea is the second Persian Gulf, therefore many energy corporations were interested in bringing investments to these countries for large-scale development, primarily of oil and gas fields. And such investments have come to the Caspian region. Nowadays many world economic entities are involved in subsoil development of the Caspian states, and they are engaged not only in subsurface operations, but also provide services and provide infrastructure for the fields. Such a rapid invasion of world energy companies, influential financial lobbyists, representatives of the highest governmental circles of the West in the Caspian region is explained by the following:

1) the ever increasing importance of energy resources in the economies of developed countries compelling them to ensure their energy security;

2) the disunity of the Caspian states with insufficiently developed political systems, insecurity with an effective collective agreement, for example, as the OPEC countries. All of them are experiencing the political and economic difficulties of the protracted transition period;

3) profitability of the oil business and the presence of fierce competition in the sphere of capital application in this sector.

At the same time, despite some stabilization of the situation in the oil and gas industry, a number of problems of the current period remain in the industry. The logic of further environmental and economic transformation in the sectoral component requires a transition to a qualitatively new level of environmental management.

Oil pollution differs from other human impacts with its "immediate" load to environment, causing a rapid response. In assessing the effects of such pollution, we cannot always surely state if the ecosystem will return to a steady state or continue irreversible degradation. Self healing and land restoration are inseparable biogeochemical processes (Sainova G.A., Bayseytova B.A., Kurbaniyazov S.K., 2016).

2. Materials and methods. Currently Kazakhstan needs to determine the optimal aggregate level of oil production in the country. The most effective methods in solving the issue under study are public administration, from the point of view of state support, in the development of a promising sector of the economy.

The state regulation of the oil and gas sector is based on the methods and forms of state participation in the implementation of macroeconomic policies. There are two main forms: administrative methods of state regulation through expansion of state ownership of material resources, management of state enterprises, lawmaking and economic methods of state regulation through various macroeconomic policies. With direct intervention, the state has capital in a variety of forms, provides loans, takes equity participation, owns enterprises, and adopts legislative acts designed to streamline and develop relations between all elements of the market system.

Indirect intervention involves the implementation of state regulation through the use of the main instruments of state economic policy, which are fiscal and monetary policy. Currently, the Government of the Republic of Kazakhstan actively adopts various methods for improving the state regulation of the oil and gas sector.

In this regard, at the level of state management of the economy, specialists developed long-term strategic directions of the state policy of oil production until 2050.

At the present stage, the possibility of accelerated oil recovery from the first years of development of the Kashagan field, as well as high production at Tengiz from 2020 to 2021, is being considered in connection with the expansion of production.

Thus, according to the forecast, a significant increase in oil production is expected in the next 10 years.

Under this scenario, by 2020, production growth may increase to 106.5 million tons, while the peak of Kazakhstan's production will reach 134.7 million tons (2.7 million b/s) by 2026 (figure 1) (These ministries of energy of RK, 2014).

However, after passing the peak of production, the indicators will rapidly decline and by 2037 the production will drop to 97.8 million tons, and by 2050 the production will decrease to 40.9 million tons (the level of 2001), which in the future may lead to negative social and economic consequences.

In the optimal scenario, subject to the implementation of Phase 2 of the development of the Kashagan field and the TCO future development project, taking into account the optimal annual oil production, and without considering the development of new fields currently in the early stages of exploration or not yet open, the largest the volume of oil production is expected in 2031 and should be about 113 million tons. After 2031, a moderate decline in oil production is expected, and in the years 2040 and 2050, oil production in the country as a whole is projected at 91.5 million tons and 62 million tons, respectively.

Under the Optimal scenario, it is planned to exceed the production level of 100 million tons by 2020 (as in the Forced scenario), by 2024 the figure will reach 109.8 million tons, and the peak of production will be in 2030-2031 - 112.7-113.5 million tons, followed by a smooth decline to 62 million tons per year by 2050 against 40.9 million tons in the Forced version.

At the same time, with the successful implementation of the Eurasia project, annual oil production in Kazakhstan can be maintained at 100 million tons per year for a longer period (Figure 3) (These ministries of energy of RK, 2014).

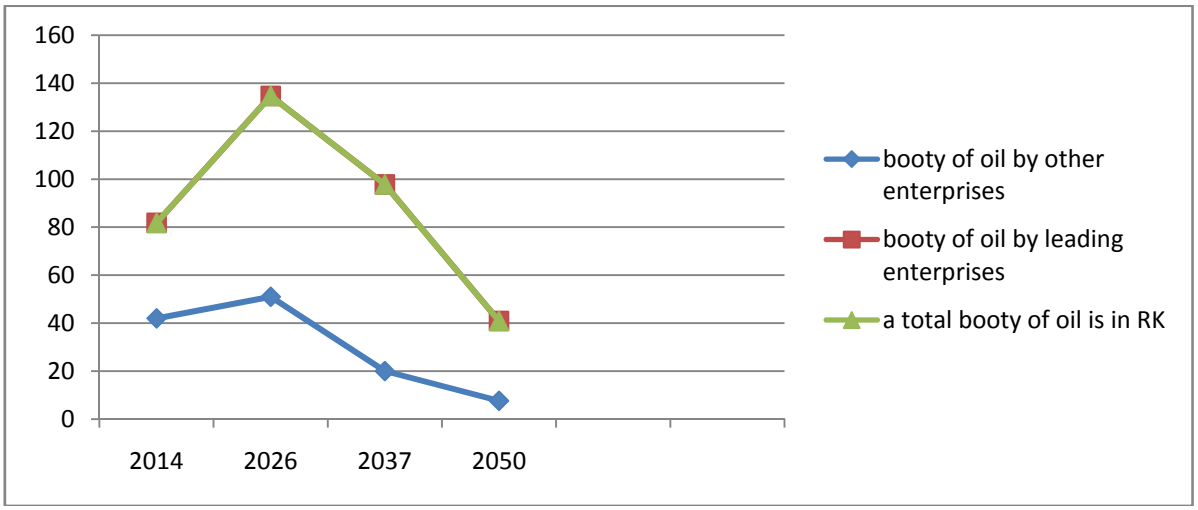

Figure 1 – Forced oil production up to 2050, million tons

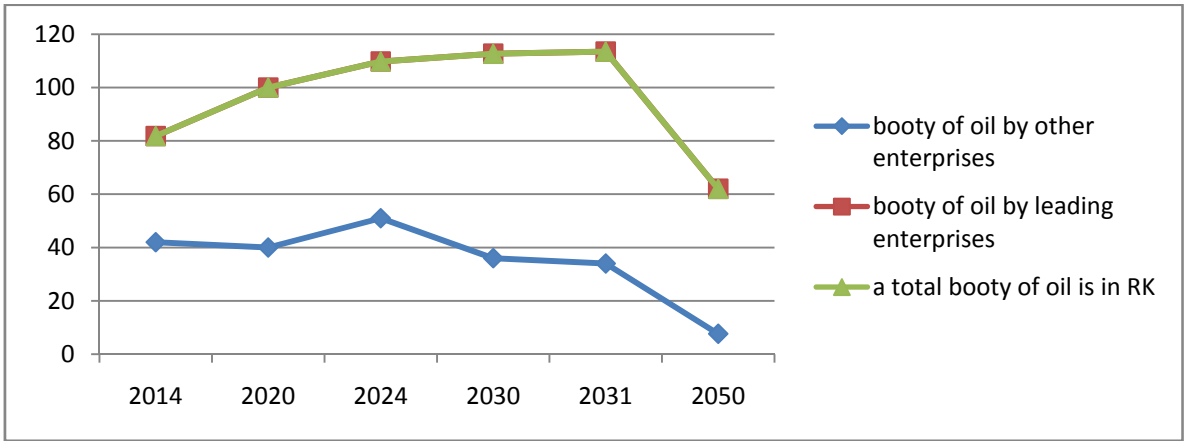

Figure 2 – Optimal oil production up to 2050, million tons

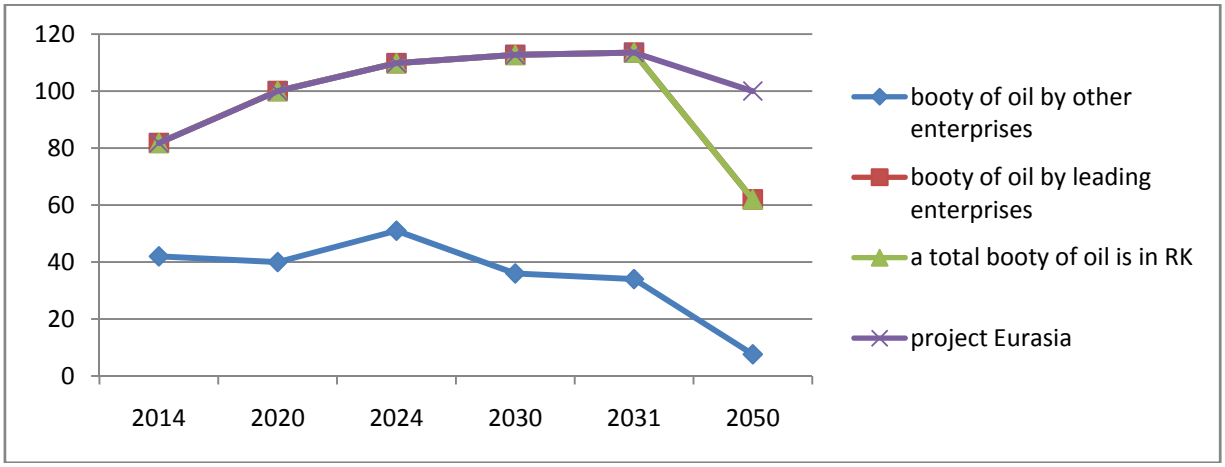

Figure 3 – Optimal oil production up to 2050, taking into account the project "Eurasia", mln.tons

Thus, the most effective scenario will be the Optimal scenario, in which oil production will be at the level of 2 million barrels per day.

This option is more effective from the point of view of price trends, since the main growth of quotations is planned for the horizon 2025-2030 (These ministries of energy of RK, 2014).

3.Results. The problem of the Caspian Sea is very actual today, but regardless of how the question of the international legal status of the Caspian Sea and the division of oil resources between the Caspian states will be resolved, the Caspian remains a common ecological object of the region. The crisis in one of its parts will result in a common, inseparable ecological catastrophe, which, ultimately, will affect the personal plans of each state and its development prospects.

The State program for the development of the Kazakh sector of the Caspian Sea provides for special studies to determine the maximum possible level of hydrocarbon production without damaging marine and coastal ecosystems, perform geodynamic monitoring, liquidate abandoned oil wells and other historical pollution, take measures to stop associated gas flaring and unauthorized disposal of oil pipes and equipment with radioactive contamination.

The oil and gas future of Kazakhstan is directly connected with three deposits - Tengiz, Karachaganak and Kashagan. It is Kashagan with reserves of about 7-9 billion barrels will be the main engine of economic growth, when Tengiz and Karachaganak pass the peak production level. In addition, in the long term it is planned to increase gas production in Karachaganak to 25 billion cubic meters per year, and on Tengiz - to 8-9 billion cubic meters per year. By this time, Kashagan should become the largest source of gas in the RK, as its recoverable reserves amount to 1 trillion cubic meters. At Kashagan, associated gas, like Tengiz, has a high sulfur content. The deposit itself is characterized by high temperature and pressure. Drilling is conducted from an artificially created island.

One of the main sources of pollution in the process of exploration and exploitation of oil, gas and gas condensate fields are products from flaring associated petroleum gas in flares, therefore, utilization of associated gases in oil and gas fields of the country has acquired state significance in recent years.

In accordance with the Law of the Republic of Kazakhstan "On Subsoil and Subsoil Use" dated June 24, 2010 No. 291-IV 3PK, the Ministry of Energy of the RoK constantly monitors the implementation of approved programs for utilization of associated gas by subsoil users of the RK.

According to paragraph 8 of Article 86 of the Law of the Republic of Kazakhstan "On Subsoil and Subsoil Use," subsoil users are obliged to envisage programs for the development of associated gas processing, which must be updated every three years, in order to rationally use associated gas and reduce the harmful impact on the environment by reducing the volume of its combustion or Re-injection into the formation (disposal).

Thus, in recent years, the implementation of measures for the utilization of gas has contributed to a reduction in the volume of combusted gas from 3.1 to 0.9 billion cubic meters, i.e. by 2.2 billion cubic meters, with the increase in oil production from 64.9 million tons over the past period to 81.8 million tons for the current time and gas from 27.0 to 42.3 billion cubic meters, respectively . At the same time, the volume of utilized gas increased from 23.9 billion cubic meters to 41.4 billion cubic meters, i.e. by 17.5 billion cubic meters.

During the reporting period. in the course of the Program implementation, the volume of flared gas fell by 70% compared to the expired period and amounted to 0.9 billion cubic meters.

4. Discussion. Diversification of the economy is a serious challenge for many oil-exporting countries. However, for Kazakhstan, the diversification of the economy is a vital necessity, especially given the limited oil reserves and ambitious goals of the country's entry into the world's 30 most developed countries by 2050.

In this regard, great importance is given to the current state of the Caspian region.

The Caspian region belongs to the main oil and gas bearing belt of the earth: the Persian Gulf, the West Siberian and Caspian regions. Russian scientists have estimated the significant resource potential of the Caspian depression. According to their data, up to 40 billion tons of conventional fuel is located in the Caspian Sea, and there is also the possibility of detection for as yet undiscovered, lying in great depths. In the Caspian depression, experts predict the discovery of about two dozen large hydrocarbon deposits with reserves of up to 300 million tons.

In Kazakhstan, the extraction of "light" oil is coming to an end. Since the 1970s. in the RK, wells were drilled to a depth of 5 km. Thus, the Tengiz and Karachaganak fields were discovered at a depth of 4 to 5.5 km. At present, resources and open fields at this depth have been depleted, and the main emphasis in the development of deep deposits was made on the Caspian Basin, the main region where oil and gas are extracted, both in Kazakhstan and in Russia (Dodonov V. (2017).

Taking into account the long-term development prospects of the country's oil and gas industry and the need to replenish the reserves of hydrocarbon resources, Kazakhstan initiates a new international project "Eurasia" to explore the deep-lying horizons of the Caspian depression, both onshore and offshore in Kazakhstan and Russia. It is planned to create a consortium of oil and gas companies to participate in the project and finance the program. The development of the project "Eurasia", conducted by two countries - Russia and Kazakhstan will create reliable data on reserves.

Nowadays Kazakhstan successfully develops oil production projects on the Caspian shelf. Therefore, the first confirmation of the presence of hydrocarbon resources on the sections of the Pearl project, where the exploration work of NC KazMunayGas, Shell and Omanoil are being conducted as part of the work program, has already been received. Based on the results of the exploration, the oil and gas content of the Khazar and Auezov structures was also proved.

The commissioning of a number of large projects, as well as the expansion of oil production to existing ones, will allow to significantly increase of the oil export potential of Kazakhstan.

The project "Eurasia", the implementation of which is scheduled for 2015-2020. includes 3 stages: collection and processing of geological and geodetic materials of the past years of the Soviet period, carrying out large-scale geodesic research on new projects and the last stage - drilling of a new support-parametric well of the Caspian Sea. The estimated cost for these works will be about 500 million dollars. The Caspian depression is 2/3 in Kazakhstan, and 1/3 in Russia. It is one of the richest deposits in Kazakhstan.

Great prospects are also associated with the increase in production capacity at the Tengiz field as part of the project of future expansion. After its completion in 2019-2020, it will provide an opportunity to increase oil production in the field from 26.5 million tons to 38.6 million tons per year.

At the same time, further geological studies of the remaining sedimentary basins are required, where significant hydrocarbon reserves are forecasted, and systematic geological studies of the oil and gas potential of the Kazakhstan shelf of the Caspian Sea should be continued. At the present stage of the development of Kazakhstan's oil and gas sector, positive changes are observed, but from the standpoint of oil and gas production, there are significant negative indicators of environmental pollution.

The environmental problems of the Caspian and its coasts are a consequence of the whole history of extensive economic development in the countries of this region. Both long-term natural changes and acute social and economic problems of the day are superimposed on this.

During the development and production of hydrocarbon deposits, about 70-80% of the vegetation is destroyed in a radius of 500-800 m. The emissions of pollutants into the atmosphere and oil spills represent the greatest threat of pollution during the development of the field. Large volumes of associated gas associated with oil production remain one of the most serious environmental and human health problems. Over 800 million cubic meters are burned annually in Kazakhstan. m associated gas. The main reason for bottling oil is associated with corrosion, construction defects and installation work. The loss accounting system at various stages of production, collection, storage, transportation and processing does not meet modern requirements for resource efficiency.

At present, the Caspian's ecological situation is in a difficult state. In the shelf zone of the sea, the situation is more unfavorable, since Dead zones were formed on these territories. In some places, pollutant estimates are 10-20 times higher than normal. In addition to oil proper, associated water is an important risk factor for biota. As a rule, separation (separation of water and oil) takes place on land, after which the water merges into so-called 'evaporation ponds', which are used as natural relief depressions (takyrs and solonchaks, less interbarhanic depressions). Since the associated waters have high mineralization (100 and more g/l), they contain oil residues and heavy metals, instead of evaporation, there is a spill on the surface, slow percolation into the ground, and then along the direction of groundwater movement to the sea.

The share of river pollution tends to decrease, to a lesser extent due to a reduction in production in the river valleys, to a greater extent by increasing offshore oil production. It is expected that in the future 2010-2020. the ratio of river-sea pollution will reach 50:50.

Analysis of the situation with pollution shows that they have relatively little impact on the development of environmental legislation, the introduction of modern technology, the availability of emergency equipment, improvement of technology, the presence or absence of environmental authorities, etc. The only indicator with which the level of Caspian pollution is correlated is the volume of industrial production in its basin, primarily the extraction of hydrocarbons.

At the same time, the logic of further economic and environmental transformations in the industry requires a transition to a qualitatively new level of management.

5. Conclusion. To further strengthen the status of the Republic of Kazakhstan as one of the leading players in the global oil and gas market, an increase in hydrocarbon reserves is required.

In expanding the resource base, it is necessary to combine extensive and intensive approaches. Within the framework of the extensive approach, it is necessary to search for and involve new deposits in the industrial turnover. The intensive approach assumes wide application of methods of increase in resources and oil production on operating deposits. Given the strategic nature of this issue, it is proposed to consider the following measures:

- Increase in financing and/or subsidizing loans for exploration and exploration projects by the National Company in cooperation with the leading oil companies of the near and far abroad;
- Introduction of incentives and incentives for subsoil users who are engaged in geological exploration of mineral resources and receive positive results;
- The introduction of incentives and incentives for subsoil users who are engaged in the extraction of hard-to-recover and marginal reserves.

Considering the strategic importance of maintaining and increasing the resource base, we consider it necessary to establish the following key indicators for authorized bodies/companies:

1. Implementation of the required amount of geological exploration to ensure a stable level of increment of hydrocarbon reserves in a volume that outstrips the extraction of oil, gas and condensate for the relevant period.

2. Implementation of measures to increase economically sound hydrocarbon recovery factors.

The implementation of these proposals will prevent the reduction of hydrocarbon reserves, increase the investment attractiveness and stability of the oil and gas complex and the Republic as a whole.

Environmental protection of the Caspian Sea poses unique legal problems for both governments and private entrepreneurs. Although in some respects the interests of the state and the private sector are significantly different, in the case of environmental protection they have a common interest - to develop a mechanism for regulating the environmental protection of the Caspian Sea based on cooperation and coordination of efforts of all stakeholders. Without such a coordinated approach, it is difficult to imagine how the governments of the countries of the Caspian region will be able to exploit the wealth of the Caspian Sea while ensuring the safety of its unique ecological resources. In developing a rational and coordinated mechanism for environmental regulation, which could be applied by the Caspian littoral states to reduce the number of disputable legal issues, international oil and gas companies conducting operations in the region are also very interested. At the present time, on the way to developing vast oil and gas reserves of the Caspian Sea, there are unsolved legal problems with environmentally sound methods, both for governments and for entrepreneurs.

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КАСПИЙ АЙМАҒЫНЫҢ ДАМУ МӘСЕЛЕЛЕРІ МЕН БОЛАШАҒЫ

Аннотация. Қазақстан Республикасында мұнай-газ секторын дамыту ұлттық экономиканың маңызды салаларының бірі болып табылады, ол өзінің тарихи тамыры мен дәстүріне ие, сондықтан ұлттық экономиканың жұмыс істеу ерекшеліктері мен ерекшеліктерін байқауға болады.

Мақалада отандық экономиканың экономикалық және экологиялық дамуы, соның ішінде мұнай-газ кешені түрлі аспектілер бойынша зерттеулер жүргізілген қазақстандық және шетелдік авторлар жүргізген әдеби шолу бар. Мақалада Қазақстан экономикасының өзекті мәселелерінің бірі – батыс өңірінің даму болашағы мен проблемалары қарастырылады. Индустрияны дамыту саласындағы заманауи басқару процестерінің тән ерекшеліктері көрсетілген.

Түйін сөздер: Каспий, экология, инвестициялар, ұлттық экономика, мұнай-газ кешені, аймақ.

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ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ КАСПИЙСКОГО РЕГИОНА

Аннотация. В Республике Казахстан развитие нефтегазового сектора является одной из важнейших отраслей национальной экономики, которая имеет свои исторические корни и традиции, в связи с чем можно проследить закономерности и особенности функционирования национальной экономики.

В статье представлен литературный обзор, проведенный казахстанскими и зарубежными авторами, в котором были проведены исследования по вопросам экономического и экологического развития национальной экономики, в том числе нефтегазового комплекса в различных аспектах. В статье исследуется один из актуальных вопросов экономики Казахстана – перспективы и проблемы развития западного региона. Показаны характерные черты современных процессов управления в сфере развития отрасли.

Ключевые слова: Каспий, экология, инвестиции, национальная экономика, нефтегазовый комплекс, регион.

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REFERENCES

[1] Belogoriev A.M., Bushuev B.B., Gromov A.I., Kurichev N.K., Mastepanov A.M., Troitsky A.A. Trends and scenarios for the development of world energy in the first half of the 21st century. M.: ID Energia, 2011. 68 p.

[2] Bushuyev V.V., Gromov A.I., Kurichev N.K., Nikolaev M.A., Soloviev D.A., Timatkov V.V., Chernikov A.A. Energy sources and consequences of the global crisis of the 2010s. M.: Information Center "Energia", 2012. 88 p.

[3] The Caspian region: actual development problems (expert view): collective monograph / Under the general editorship of B. K. Sultanov: KISI under the President of the Republic of Kazakhstan. Almaty: KISI under the President of the Republic of Kazakhstan, 2013. 212 p.

[4] Intymakova A.T. Republic of Kazakhstan in the index of environmental efficiency. Problems and prospects // Bulletin of Karaganda University. Series "Economy". 2015. N 1(77). P. 182-185.

[5] Sainova G.A., Bayseytova B.A., Kurbaniyazov S.K. A method of purification of oil contaminated soil with the help of californian worms // Bulletin of National academy of sciences of the Republic of Kazakhstan. ISSN 1991-3494. 2016. Vol. 5. P. 42-45.

[6] Syrlybekkyzy S., Syleimenova N.Sh., Kenzhetaev G.Zh., Nurbayeva F.K. The study of the quality of atmospheric air in the coastal zone of the Caspian Sea // Bulletin of KazNU. The series is ecological. 2015. Vol. 43, N 1/1.

[7] Kenzhetaev G.Zh., Nurbaeva F.K., Bisembaeva G. Ocenka vozdejstvija neftjanyh promyslov na zagrjaznenie pochvy v pribrezhnoj zone Kaspija // Mezhdunarodnyj nauchnyj zhurnal «Poisk». 2013. N 4(1). P. 85-90.

[8] Dodonov V. Economic mechanisms of realization of strategy of low-carbon development of Kazakhstan // Scientific journal "Spectrum". 2017. Vol. 1(79). P.68-88.

[9] Chernyuk L.G. Placement of productive forces. K.: TsUL, 2002. 470 p.

[10] Smerichevsky S.F., Tatarinov A.V. Use of tools of ecological marketing for increase of level of ecological safety of region // Bulletin of the University "Turan". 2012. N 4(56). P. 43-49.

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SOME ASPECTS OF INTERNATIONALIZATION OF HIGHER EDUCATION (illustrated on the example of FRG [Federal Republic of Germany] and the Republic of Turkey)

Abstract. The article is devoted to a comparative analysis of the development of international cooperation in the area of higher education carried out by German and Turkish universities, its strategic planning, measures for its implementation and the results achieved. Based on the experience of two countries in organizing cooperation in education at all levels of its acceptance, the article presents the existing aspects of the internationalization of education. It is noted that the internationalization of higher education through the implementation of joint educational projects contributes not only to improving the quality of education, but also to establishing social and cultural, economic and business contracts between countries, and assists in maintaining and strengthening of interactions between the peoples of the world.

The purpose of this paper abstract is to study the multidimensionality of integration processes in higher education. The growing interconnection and interdependence of the countries and peoples of the modern world, the internationalization of education, science, economics and culture, the exacerbation of global problems that cannot be resolved without going beyond the national framework and state borders - all this makes it extremely important to study world experience in various areas of public life and scientific knowledge areas.

Keywords: internationalization, higher education, globalization, mobility, dual education.

Introduction. In the modern world, close interaction between science, education and production is becoming a strategic goal and necessary condition for the innovative development of the economy and, thus, increasing the competitiveness of the state.

One of the most important trends in the development of modern higher education throughout the world is the process of internationalization, which is determined by the factors of economic and social and political rapprochement between countries and implies the necessity to ensure compatibility of education, the formation of a common educational space. Increasing global trends of internationalization of education inevitably lead to a revision of educational paradigms with the prospect of creating a single open educational space.

Methods. The methodological basis of the research was philosophical concepts in the area of education; modern methodological developments on the history of education; works on the methodology of comparative pedagogical research. The theoretical basis of the research included scientific papers on the problems of modern development of higher education; researches on the development of higher vocational education in Turkey and Germany.

Actually, education is becoming open and accessible in the country and international space, a global information and educational environment is being formed, education is acquiring a transboundary character. Under these circumstances, the transition to the model of internationalization of higher education is becoming a natural process. It seems necessary to consider the emergence of the concept of internationa-

lization of higher education, to analyze the existing definitions of this process and to identify a particular definition.

Researches in the area of studying the internationalization process began in the 1970 s. One of the first researchers in the area of internationalization of higher education is M. Harari, who classifies internationalization as “numerous activities, programs and services, in the framework of international research, international exchanges in the area of education and technical cooperation” [1]. This definition focuses on three components: “the international aspect of academic programme, international mobility of scientists and students, and international programs of technical cooperation and mutual assistance”. Later, in the 1990s professor of the University of Toronto (Canada) J. Knight formulates the concept of the internationalization process “as a process of integrating the international aspect into the teaching and research activities of a university or college to improve their quality [2]. J. Knight describes globalization as a process of technology, economy, knowledge, people, values, ideas beyond the state border and notes that the impact of globalization on each country is different and depends on the peculiarities of historical development, traditions, culture, priorities of this nation, and internationalization in higher education, this is one of the ways in which a country responds to globalization while maintaining respect for the uniqueness of its own people.

One of the outstanding scientists in the area of education and internationalization, Hans de Wit, a professor in the area of internationalization of higher education, defines it with the help of all existing definitions and describes it as “a complex of processes whose combined effect is aimed at strengthening of the international aspect in higher education”. Wit claims that many factors have always influenced the process: “Several factors such as the fall of “the iron curtain“, the process of European states uniting, and the development of globalization of European economies and societies have played a role in this transition from scattered“ international education ” to a more integral, "comprehensive" concept of internationalization "[3].

Other foreign researchers point out such factors of internationalization as globalization, academic mobility, the international component of the content of education. In some papers of foreign authors, the concepts of internationalization and globalization are combined, because globalization is a factor influencing the process of internationalization [4].

The internationalization of higher education is the integration of the university into the external educational market, including with the aim of recruitment foreign students and foreign scientists and teachers. The phenomenon of internationalization in education has historical premises that determine the transformation in the process of university management.

In 1999, the Bologna Process starts in Europe, aimed at developing the internationalization of higher education through the creation of united qualifications, transparent, comparable and, consequently, more competitive learning outcomes. Competitiveness becomes the motivation for the development of the internationalization of higher education. Internationalization becomes such a phenomenon of international relations, which has an independent value and in this capacity has an impact on the activities of states in various areas. In this concept, internationalization can be viewed as a stage of globalization within a state. The important factor in the internationalization of higher education is the language in which learning is conducted.

In connection with the accelerated pace of world development, there is a necessity for comparative researches in all areas related to the modernization of education and changes in society as a whole. In recent decades, the world has noted a significant increase in interest and expansion of the geography of comparative studies, both in theoretical and in practice-oriented aspect. In many aspects, increased attention to comparative studies is caused by the factors of globalization and the development of information technologies, which require both theoretical understanding and the research of the possibilities and methods of practical adaptation of educational systems to new conditions [5].

Taking into account the state and features of approaches in the area of comparative studies, we focused on studying the experience of rapidly developing Turkey and Germany.

Results. ***Federal Republic of Germany*****.** Today, Germany is the leading country in the area of internationalization of higher education. Every tenth student in Germany is a foreigner, and every twentieth is studying abroad. Herein, that ten years ago, Germany lagged far behind its competitors. This success was made possible through a combination of sound state policy in the area of education at the federal and

regional level, aimed not only at improving the quality and accessibility of higher education, but also at its international attractiveness, and at developing and implementing internationalization strategies by German universities themselves. The main organizations, responsible for the internationalization of science and education in Germany are the Conference of University Rectors, the German Research Society, the Alexander von Humboldt Foundation and the German Academic Exchange Service.

It should be noted that the process of internationalization in Germany is developing very dynamically, which is confirmed by the data of the British Council research, during which Strategy 2020 of the German Academic Exchange Service (Strategy DAAD 2020) was recognized as the most successful in recruitment of international students and internationalization. In this research, data from 26 countries, including Kazakhstan, were used and evaluated in three categories, which received high marks for the policy of internationalization of higher education [6].

Germany has long been known as a center for the development of science and culture. The first university in medieval Europe appeared in Germany. The basic principle of higher education in Germany is the principle built on the concept of W. Humboldt: the interconnections of the educational process and academic research, which is important for the Kazakh system of higher education. Due to their comprehensive support, German universities have always enjoyed success among students in most countries. In 2012, the countries participating in the Bologna process signed the Mobility Development Strategy, which identified common goals and directions for activities of individual universities, among which it should be noted - the development of a system for receiving and integrating foreign students and visiting scientists carried out in accordance with the National Code of Teaching students in German universities [7] and the European Charter for Researchers and the Code on the Rules for Hiring Researchers [8], increasing foreign academic mobility and German students and teachers, increasing the attractiveness of German universities as a place of education and science, inviting talented young scientists from other countries to develop scientific cooperation, exchange experience, increase motivation to study at foreign universities with German students, etc.

In Germany, a two-tier system of selection of international students is formed, characteristic for many modern Western countries. The first level covers the scope of scientific and educational policy, the second - refers to the sphere of immigration policy. At the first level, the main objectives of the state policy are promotion of the international activities of higher education institutions, strengthening of the processes of internationalization of higher education and to strengthen the image of Germany as a leading educational and scientific center. At the second level, conditions are created for the integration of foreign students after graduation and their successful entry into the labor market. In 2005, the country carried out a reform of immigration legislation, which established more liberal rules for the entry and stay of foreign students from the third countries.

Today in Germany there are over 340 higher educational institutions, where more than 1 million 800 thousand students are studying. According to the report “Wissenschaft weltoffen” (“Science opened to the world”), in 2015, 321,000 foreign students attended German universities and by 2020 it is predicted that this number will increase to 350,000 people [9]. According to the report of 2016, the Minister of Education and Research, together with DAAD and the German Center for Research in Science and Higher Education, in 2014, in German universities and Scientific and Research Institutes taught, more than 85 thousand foreign scientists were engaged in research work, 43 thousand of German scientists worked abroad [10].

The mandatory document for admission to any university in Germany is a Certificate of maturity - "permission to study" - "Hochschulzugangsberechtigung". Depending on the type of Certificate of maturity, German official statistics and German law distinguish two categories of foreign students: Bildungsinländer and Bildungsinländer and Bildungsaländer. The category “Bildungsinländer” includes international students, enrolled in a German university with a Certificate of maturity, obtained after graduating from a German school in Germany or abroad. The Certificate of maturity of the German school, obtained abroad, must be equivalent to the German Certificate of completion of secondary education, that is, in accordance with the German law on education, it must confirm 13 years of secondary education. The group of foreign students “Bildungsausländer” includes foreign citizens who have received the Certificate of maturity abroad, not equivalent to the German HZB.

One of the forms of international educational cooperation at the end of the XX century was the opening of bi-national universities abroad on the basis of intergovernmental agreements and treaties. The specific feature of the activities of such universities are joint diplomas, integrated courses.

Germany is one of the first countries to use the principles of the dual education system. The educational process is carried out by synthesizing of production as an intern and studying the theoretical part in an educational institution, which leads to the effectiveness and efficiency of using the knowledge and skills gained. At the same time, the training of specialists at various levels of the profile is based on the demands and requirements of the personnel market, which makes it possible to ensure professional mobility and competitiveness. The system is funded by the state and enterprises. The competence of the state includes training at the enterprise, and the competence of the region includes training in a professional university.

Consequently, in recent years Germany has accumulated serious experience in the area of internationalization of higher education, as evidenced by the significant legal and regulatory framework, regulating this process. The analysis of the considered German initiatives to recruit foreign students shows that they are important for German society. It is commonly agreed that their presence contributes to the international exchange of knowledge and intercultural competences, therefore, improves the quality of German education. Foreign graduates are even more important as highly qualified specialists who speak German language, know the culture and methods of work in Germany, have skills that can significantly accelerate their social and economic integration into German society.

The Republic of Turkey. Particular states, due to their historical, economic, and cultural characteristics, understand internationalization in a different way. For Asian states, internationalization derives from the strategic necessity for radical changes and reforms aimed at "catching up" with the West; accordingly, they are seeking to expand the international student population, increase international activity and use English more frequently. This is typical for Turkey due to the historically established orientation towards the Europeanization of the country. Over time, the internationalization of education as an active and effective international cooperation for the purpose of mutual enrichment and exchange of experience in the area of education has become part of the development strategy of this state.

Today, Turkey, having achieved some success in the development of higher education, participates in the creation of a European higher education area on equal terms with other countries and, thus, is seeking to move to a higher level of development in order to adequately respond to the challenges of time. The growing and diversifying demand for higher education accessibility, in new areas of study and interdisciplinary research, new training requirements, the accelerated development of modern information and communication technologies determine the innovative nature of the educational and scientific path of Turkey. In Turkish system of higher education, academic mobility is carried out in the context of the free movement of students, researchers and teachers in the framework of cooperation agreements, study abroad and circulation of brain resources.

The international aspects of mobility and internationalization in the higher education system are determined by Turkey's policy in accordance with the national social and economic and historical context, capabilities, resources, priorities and implemented on the basis of consultations of the Higher Education Council and the Parliament of the country. The analysis of regulatory documents in the area of higher education shows that all initiatives of state universities regarding the expansion of mobility at the national and institutional levels are implemented under the supervision of the Council in order to promote cooperation and coherence between foreign and Turkish higher education institutions.

After the signing of the Bologna Declaration in Turkey, the growth of academic and scientific mobility and its improvement is constantly observed. Turkish universities have adopted readily, implemented and use positively European mobility schemes and tools, such as ECTS, the Lisbon Convention, the Diploma Supplement, the NARIC and ENIC networks. The particular importance is the participation of Turkey in the EU -SOCRATES program, aimed at supporting European cooperation in eight areas of education, from pre-university to the highest level, from new technologies to adult education.

Turkey also implements bilateral exchange programs for students and teachers together with European countries and the United States, the CIS countries, and promotes international joint programs. In 2003, an integrated program "Double degree diploma of joint degrees SUNY-YOK" was launched between the State University of New York (SUNY) and the Turkish Council of Higher Education (in Turkish YOK) at the bachelor's level [11].

The expansion of academic mobility creates favorable conditions for the cooperation of Turkish scientists with their European colleagues, conducting research and internships in the specialty abroad. 46 Turkish universities are members of the Association of European Universities (EUA), and 56 are members of the International Association of Universities (IUA). Cooperation with European universities contributes to the globalization of science in Turkey, as well as the implementation of joint research and dissemination of their results. The country has become a full member of the Sixth Framework Program of the European Union, which unites the efforts of not only universities, but also private and public research centers, representatives of large and medium-sized businesses and other participants in the research process, thereby contributing to the creation of united European scientific space [12].

The Council of Turkey for Scientific and Technical Research (TUBITAK) and the Council of Turkey for Research in Social Sciences (TUBA), Turkish Academy of Sciences, are active in developing scientific exchange programs, organizing international scientific conferences, scientific publications in international publications. Under these circumstances, special attention is paid to the support and promotion of young scientists who have completed and already completed graduate school and who are at the beginning of their career as a scientist. Graduate students at Turkish universities receive financial assistance to conduct the part of their research and post-doctoral studies at foreign universities as part of the expansion of the country's research potential [13].

In Turkey, there are programs for awarding public and private scholarships to graduate students who obtain master's and doctoral degrees at foreign universities. The government support program covers students at state universities only; private universities do not participate in mobility programs. Turkish government provides similar support to foreign students studying at Turkish universities. Today there are about 15,000 of them from 115 countries of the world, but mainly from the CIS countries, in particular, Kazakhstan, Arab countries.

The intensification of mobility in the Central Asian region is due to Turkey’s considerable attention to the international geopolitical trends of the 20th century, especially the disintegration of the Soviet cartel, and Turkey’s geographical location at the junction of Turkic and post-Soviet regions and Eastern part of Europe. Due to active collaboration in the early 1990s in the area of higher education with the Turkic groups and the former Soviet republics, Turkey has become a kind of regional “center” that welcomes students and academic figures from these countries. The similarity of languages stimulates student exchange.

The analysis of foreign literature, analytical documents and materials in the area of internationalization and academic mobility shows that today Turkish universities are actively expanding their international influence, developing new forms of international cooperation for the purpose of mutual enrichment and exchange of experience in the area of education and science. All this contributes to the globalization of science and education in Turkey and the creation of united European educational space. Being interested, on the one hand, in preserving its own national and cultural identity, and on the other hand, in making optimal use of the experience of European countries in modernizing higher education, Turkey has gained experience in solving problems related to the general context, which has great interest for our country.

The formulation and research of the problem of the development of modern higher education in Turkey is determined by the actual continuity and relevance of studying and understanding foreign experience in defining strategies that the domestic higher education school faces in processes similar in its orientation and content.

Conclusion. Consequently, the research of the experience of Turkish and German higher education led to the identification of constructive ideas and strategies, the inclusion of which acquires special meaning and expediency in the process of reforming domestic Kazakhstani education in the context of European integration and interaction with science and industry.

In the context of united educational space, international cooperation changes its forms and types of activity, accumulating potential for solving tasks: achieving a level of higher education that would meet the needs of a modern international society; balancing the level of national educational systems; ensuring mutual understanding between nations. The 21st century is not accidentally called the century of education. In the modern world, that needs the harmonizing of human relations with everything that surrounds him, it is education that allows you to develop a new outlook on life, namely, education can become a unique global value system recognized in any part of the Earth. And it is education that becomes the

driving force that brings together representatives of different countries and continents in the preservation of the planet and human civilization [14].

Based on the above approaches in the area of comparative studies, we did not aim to identify specific solutions or models that should be adapted to Kazakhstan. We also agree with the point of view expressed by many scientists that the problem of taking over foreign experience is a special subject of research and requires different approaches, methodology, tools and research methods. We set ourselves the task of identifying, describing, generalizing knowledge that is related to the characteristics of the essence, the features of the development strategies of the education system of both countries, their dependence on the context in which each of the systems functions and develops; search for general patterns in the choice of solutions and development models for Kazakhstan.

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ЖОҒАРЫ БІЛІМДІ ИНТЕРНАЦИОНАЛДАНДЫРУДЫҢ КЕЙБІР АСПЕКТІЛЕРІ (ГФР мен Түрік Республикасы мысалында)

Аннотация. Мақала неміс және түрік жоғары білім оқу орындарының халықаралық ынтымақтастықты дамытудағы стратегиялық жоспарлауымен жүзеге асырушараларына, сондай-ақ қол жеткізілген нәтижелеріне салыстырмалы талдау жүргізуг еарналған. Мақалада білім берудің интернационалдандыруа спектілері, екі елдің барлық білім беру деңгейінде жинақталған ынтымақтастық орнықтыру тәжірибелеріне сүйеніп қарастырылған

Бірлескен білім беру жобаларын іске асыру арқылы жоғары білім беруді интернационалдандыру білім беру сапасын жақсартуға ғана емес, сонымен қатар елдер арасындағы мәдени-әлеуметтік, экономикалық және іскерлік байланыстарды орнатуға, әлем халықтарының өзара байланысын сақтауға және нығайтуға көмектеседі. Бұл жұмыстың мақсаты жоғары білім берудегі интеграциялық процестердің көп өлшемділігін зерттеу болып табылады. Қазіргі таңда халықаралық байланыстардың дамуы, ғылым, экономика және мәдениет салаларының интернационалдануы, шешілмейтін жаһандық проблемалардың күшеюі – әлемдік тәжірибені зерттеудің маңыздылығын тағы бір мәрте дәлелдейді.

Түйін сөздер: интернационализация, жоғарғы білім, жаһандану, мобильділік, дуалды білім.

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НЕКОТОРЫЕ АСПЕКТЫ ИНТЕРНАЦИОНАЛИЗАЦИИ ВЫСШЕГО ОБРАЗОВАНИЯ (на примере ФРГ и Турецкой Республики)

Аннотация. Статья посвящена сопоставительному анализу процесса развития международного сотрудничества в сфере высшего образования, осуществляемого немецкими и турецкими вузами, его стратегическому планированию, мерам по его осуществлению и достигнутым результатам. На основе опыта двух стран по организации сотрудничества в образовании на всех уровнях его получения, в статье представлены существующие аспекты интернационализации образования. Отмечено, что интернационализация высшего образования через реализацию совместных образовательных проектов содействует не только повышению качества обучения, но и установлению социально-культурных, экономических и деловых связей между странами, и оказывает содействие сохранению и укреплению взаимодействий между народами мира.

Целью данной работы является исследование многоаспектности интеграционных процессов в высшем образовании. Растущая взаимосвязь и взаимозависимость стран и народов современного мира, интернационализация образования, науки, экономики и культуры, обострение глобальных проблем, решение которых невозможно без выхода за национальные рамки и государственные границы – все это обусловливает первостепенную важность изучения мирового опыта в разных сферах общественной жизни и областях научного знания.

Ключевые слова: интернационализация, высшее образование, глобализация, мобильность, дуальное образование.

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REFERENCES

[1] Internacionalizacija vysshego obrazovanija v stranah OJESR: Prilozhenie/Centr OJESR // VShJe. M. 2005. P. 8-13 (in Rus.).

[2] Knight J. Internationalization Remodeled: Definition, Approaches, and Rationales // Journal of Studies in International Education. 2004. P. 8-20 (in Eng.).

[3] Wit Hans de Globalisation and Internationalisation of Higher Education [introduction to online monograph] // Revista de Universidad y Sociedad del Conocimiento (RUSC). 2011. Vol. 8, N 2. P. 241-248 (in Eng.).

[4] Pevzner M.N., Sherajzina R.M., Petrjakov P.A. Strategii upravlenija mnogoobraziem v uslovijah globalizacii i internacionalizacii obrazovanija // V sbornike: Tradicii i innovacii v obrazovanii. Sankt-Peterburg, 2017. P. 126-135 (in Rus.).

[5] Tokareva E.S. Process razvitija internacionalizacii v oblasti obrazovanija na gosudarstvennom urovne // Pravo i obshhestvo v uslovijah globalizacii: perspektivy razvitija: sbornik nauchnyh trudov / Pod red. V.V. Beher, N.N. Lajchenkovoj. Saratov, 2017. Vyp. 5. P. 13-19 (in Rus.).

[6] Strategie der Wissenschaftsminister/innen von Bund und Ländern für die Internationalisierung der Hochschulen in Deutschland (Beschluss der 18. Sitzung der Gemeinsamen Wissenschaftskonferenz am 12. April 2013 in Berlin) [online]. 11 p.

[7] Nationaler Kodex für das Ausländerstudium an deutschen Hochschulen (2016) [online]. 4 p.

[8] Europäische Charta für Forscher: Verhaltenskodex für die Einstellung von Forschern. Brussels, 2005. 65 p.

[9] Burkhart S., Chehab van den Assem N., Grützmacher J., Heublein U. Wissenschaft weltoffen 2016: Daten und Fakten zur Internationalität von Studium und Forschung in Deutschland. Facts and Figures on the International Nature of Studies and Research in Germany. Fokus: Internationale Mobilität von Wissenschaftlern International Mobility of Academics and Researchers / S. Burkhart, N. Chehab-van den Assem, J. Grützmacher, U. Heublein, S. Kammüller, J. Kercher. Bielefeld, 2016.

[10] Kercher J. Deutschland zieht immer mehr ausländische Wissenschaftler an/J. Kercher.-Режим доступа: http://www.dzhw.Eu/ aktuell/presse/material/ pressemitteilungen/

[11] Dual-Degree K. Cooperation between the Turkish University System and the State University of New York: A Model for International Student Mobility in the Global Knowledge Economy/Paper presented at the Association International Education Administrators (AIEA) Annual Conference, February 1619, Washington, DC, 2005 (in Eng.).

[12] Kirecçi M. The internationalization of Higher Education in Turkey: Creating an Index // Education and Science. 2016. Vol. 41, N 187. P. 1-28. ISSN 1300-1337 (in Eng.).

[13] Şener G. Türkiye'de Yaşanan Eğitim Sorunlarına Güncel Bir Bakış // Milli eğitim dergisi. 2018. 47 (218). P. 187-200 (in Eng.).

[14] De Wit H. Quality Assurance and Internationalization. Trends, challenges and opportunities // Proceedings of INQAAHE conference (Chicago, U.S., 30 March – 3 April 2015). Chicago, 2015. P. 3-30 (in Eng.).

[15] Abdul Aziz Farid Saymeh, Harbi Ariqat, Saeid Aqel. Higher Education and Scientific Research of Third World Countries Need Professional Support: Case of Jordan // Education Journal. 2014. Vol. 3, N 4. P. 245-255. doi:10.11648/j.edu.20140304.17 ISSN: 2327-2600 (Print). ISSN 2327-2619 (Online) (in Eng.).

[16] Toybazarova N.A., Nazarova G. The modernization of education in Kazakhstan: trends, perspective and problems // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2018. Vol. 6, N 376. P. 104-114. ISSN 1991-3494. https://doi.org/10.32014/2018.2518-1467.33 (in Eng.).

[17] Tlessova E., Khoich A., Kurash N. Scientific innovation potential of the Republic of Kazakhstan and its perspectives // News of the National academy of sciences of the Republic of Kazakhstan. Series of social and human sciences. 2018. Vol. 5, N 321. P. 89-94. ISSN 2224-5294. https://doi.org/10.32014/2018. 2224-5294.16 (in Eng.).

[18] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[19] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[20] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[21] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[22] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

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ANCIENT SARYNS OF THE GREAT STEPPE

Abstract. In the program article “Seven Facets of the Great Steppe”by N.A.Nazarbayev the assignments are designated, which assume the implementation of a set of measures aimed at their informational support and phased implementation. It emphasizes that “... weneed to publish a collection “Ancient motifs of the Great Steppe”- a collection of significant works created for traditional Kazakh musical instruments: kobyz, dombyra, sybyzgy, saz-syrnay etc. The folklore and melodies of the Great Steppe should acquire “a new breath” in a modern digital format” [1, 4 p.]. Currently the main goal of the joint efforts of scholars in folklore studies (philology and art history) is to collect the ancient motifs of the Kazakh people, determine their best variants in rites and customs, kuy for kobyz, dombyra, sybyzgy and sazsyrnay, epic and song poetry, present selected patterns in musical notation, audio, video materials and scientific comments in three languages (Kazakh, Russian and English) in digital format as relevant intellectual products.

The proposed “steps”, which have a humanitarian focus, are significant at national and international scale. The best patterns of musical heritage of the Kazakh people, first presented in digital format in the Anthology “Uly dalanyk kone saryndary” (“Ancient Saryns of the Great Steppe”) with notation texts, adapted scientific comments in three (Kazakh, Russian and English) languages (with online application), are in demand not only in educational and pedagogical activities of the academic and teaching staff of various universities, in general publicity, but also in the process of their popularization in the global space.

Key words: motive, song, kuy, epic, folklore, rite, tradition.

Introduction. At present, in the context of globalization, the process of accumulation of published ethnographic collections, scientific monographs is obvious, while the published materials are used theoretically and practically. As a result of constant efforts of famous scholars and art history specialists, who worked for many years at the M.O. Auezov Institute of Literature and Art, its rare foundation represents a treasury of Kazakh (including musical) folklore. The collection of materials to the foundation began approximately in 1932. At the same time, until 1955, the fixation and recording of music (and accompanying information) was done directly from the performers. Since 1955, the preservation of the heritage was provided by sound recording on tape. In addition, the field materials have been reflected in musical ethnographic collections.

So, the following collections have been published - B.G. Erzakovich “Folk songs of Kazakhstan" (1955) [2], Z. Zhanuzakova “Instrumental music of the Kazakh nation. Kuy for dombra, kobyz and sybyzgy” (1964) [3], T. Bekhozhina“200 songs of the Kazakhs” (1967) [4], T. Mergaliyev “Domby-rasazy”(1972) [5], A. Temirbekova “Kazakh folk songs”(1975) [6], B. Erzakovich, B. Karakulov, Z. Kospakov “Kazakh musical folklore”(1982) [7], etc. For example, the collection of A. Temirbekova of 1975 “Kazakh folk songs” included materials of expeditions of 1958-1959. E. Rakhmadiyev, Z. Nazh-medenov, S. Kuzembay, T. Bazarbayev and others participated in it.

In the 1980s, from the data on the trips of the Institute staff, we see that part of them were devoted to the creative works of specific personalities. For example the collections published later aboutthe indivi-duals: Sugir Aliyev – “Zhanadauirzhyrshysy” (1980) [8], Birzhansal - “Lailimshyrak” (1983) [9], Zhayau Mussa - “Aksisa” (1985) [10], Abay Kunanbayev – “Aitymsalem, Kalamkas” (1986) [11], Akan sere – “Manmanger” (1988) [12], Aset – “InzhuMarzhan” (1992) [13], UkiliIbrai – “Gakku” (1995) [14], etc. At

present, all these collections are still actively used in educational process in almost all educational institutions of the Republic of Kazakhstan on subjects related to the national culture and music. However, unfortunately, the fact that a lot of work has been done in preparing them for publication by the researchers on folklore of the M.O. Auezov Institute of Literature and Art, remainsun known: nowhere and nobody mentions it, and the next generations don't know.

Methods. In this article a set of methods, including scientific and cognitive, scientific and educational, as well as those associated with musical and ethnographic activities and chronological systematics of the material is used. In the implementation of the research, the attention is paid to the development of scholars in philologywho wrote about the Kazakh worldview, mentality, life style, customs and art. In this series, we should mention the names and valuable works of A.S. Pushkin, A. Baitursynov, M. Zhumabayev, S. Seifullin, M. Auezov, S. Mukanov, Z. Akhmetov, S. Kirabayev, S. Kaskabassov, R. Berdibayev, M. Myrzakhmetov, B. Uakhatov and many others.

In view ofdata processing for this article, the works of researchers who laid the scientific foundations of the world level were taken into account. They are -B. Basilov [15], R. Brandle [16], A. Chekanovskaya [17], D. Klabe [18], T. Levin [19], S. Merriam [20], and others. In addition, the research work of the Hungarian scholar János Šipos, who collects Kazakh folk songs and published musical and ethnographic work, was taken as a basis [21].

In studying the topic, the fundamental developments of Russian scientists are taken into account in terms of generalization and systematization. We should mention, E. Gippius [22], E.M. von Hornbostel [23], S. Shin [24], and others - their works can serve as the basis for the proposednew publication. From this point of view, such approach, which reveals the lines of continuity of the epochs, starting from antiquity, has not been implemented at the global level until today. Since the main idea of the undertaken activities is fundamentally different from the existing ones, the support and funding from the State is assumed.

Scientific novelty lies in the study of ideological and semantic content of the chosen concept, as well as in the definition of genre-compositional specifics. It is important that in the artistic discourse the national spiritual values are fixed, which reveal their content.

Study. The expedition records and numerous transcripts presented in the musical-ethnographic collections by B. Erzakovich, Z. Kospakov, B.I. Karakulov, A.Z. Temirbekova, T. Mergaliyev, T. Bekhozhin, K. Zhuzbasov and others should be indicated as prerequisites for the development of this research topic, as well as the collections "Kazakh musical folklore", "Kazakh folk instrumental music", published as a result of the planned expeditions and trips of the staff of the M.O. Auezov Institute of Literature and Art.

These collections include the works performed by unique performers, which are stored in the Institute's fund. So, in this regard, the question arises whether the skill of prominent artists is limited only by musical notation and preservation in the recordings on tape recorders?

Cassette	Expedition	Who made a recording	Performer	Materials
ILA -74	1970, December, Kyzylorda region, Syrdarya district, collective farm October	B.Karakulov, Z.Zhanuzakova	Aubakirov Bekbergen Born 1897 - baksy	Medical songs: Baqsısarını (1-10). Keregeboyıkerjılan. Shubar at sarını. Közbenbettiñsarını
ILA-67	1965, August Omsk Region, Moskalensky District	T. Bekkhozhina	Alzhanov Aitybay - singer, performer	Ritual songs saryns: Qulağın dombıranıñ burağanda. Jastıqtı eske alayıq. Buralıp änge salıp. Oynap,oynap,oynap qoy. Eslamnıñ qoştaswı. Rıspaydıñjastayswğaketkeni. Arman. Qanatınqarşığa da şalmaydı. QurdasımĬsağaäzil. JalqawYaqsan. Birneşesizgearnapjazdımxat. Almaty.

Currently, the novelty of the work lies in the study of the invaluable heritage in a new aspect and presentation of the results as intellectual product, in which, notation patterns in digital format, development of audio and video materials and publishing a joint musical and ethnographic work-the Anthology (with online application) in three languages – Kazakh, Russian and English. Unlike the first collections, informative and educational comments should be given in three languages in a scientifically accessible form, and in view of the wide coverage of academic publications – it is important to select the best works of the spiritual heritage of Kazakhstan, for the first time in such format and present them to the world community.

The message of N. Nazarbayev: "it is necessary to actively transfer archival data into digital format, so that not only to accumulate them, but also make them available to all interested researchers and wide publicity" [1, p. 4] – results at the revival of the heritage accumulated and preserved in the Institute's rare foundation, which allows to take a fresh look at the ancient motifs of the Kazakh people.

Ancient motifs -are also ancient times of national culture, which, in turn, in accordance with the requirements of the life, have evolved over the centuries, developed in their own way, covering several historical periods. These are the first folklore patterns, which reflected the basics of ritual, epic genres, as well as folk music, which predetermined the relevance of lyrical songs, traditions of aytys, instrumental music, which had a significant impact on the work of folk composers – sal, sere, akyns, kuishi. Therefore, their place in the history of our cultural heritage is very firm and unique. From this point of view, the words of E. Taylor (1832-1917), English scientist, cultural expert and ethnographer, are noteworthy, who in his famous work "First Culture" emphasized: "different stages of culture, demonstrating its gradual development, represent a legacy of the past century and play an important role in shaping the future" [25, p.18].

To reveal its (ancient folklore) artistic and structural features, genesis, unique and regional features of national music, to show the evolutionary development of genre and compositional types – is a complex historical and theoretical issue in the study of traditional art.

The materials presented in the rare foundation of the Institute (7000 storage units) should be systematized in a following way:

1. "The ancient saryns of the Great Steppe" (ritual motifs, folk songs and melodies of sal and sere). The history of Kazakh customs, daily life and rituals dates back to the time when the Kazakh community was just beginning its independent identity. Spiritual values which formed from this period spread orally and reached our time. This section will be composed of wedding motifs – the songs "Toi Bastau", "Jar-Jar", "Synsu", "Aryz Olen", especially "Betashar", in funeral rite - songs "Estirtu", "Joktau", "Zhubatu", "Zar", "Konil aytu"etc. In addition, variants of the models "Besik zhyry", "Tusau kesu zhyry", "Sanamak", "Alip-bi", "Zhumbak", "Otirik olen", which emerged in connection with children's folklore.

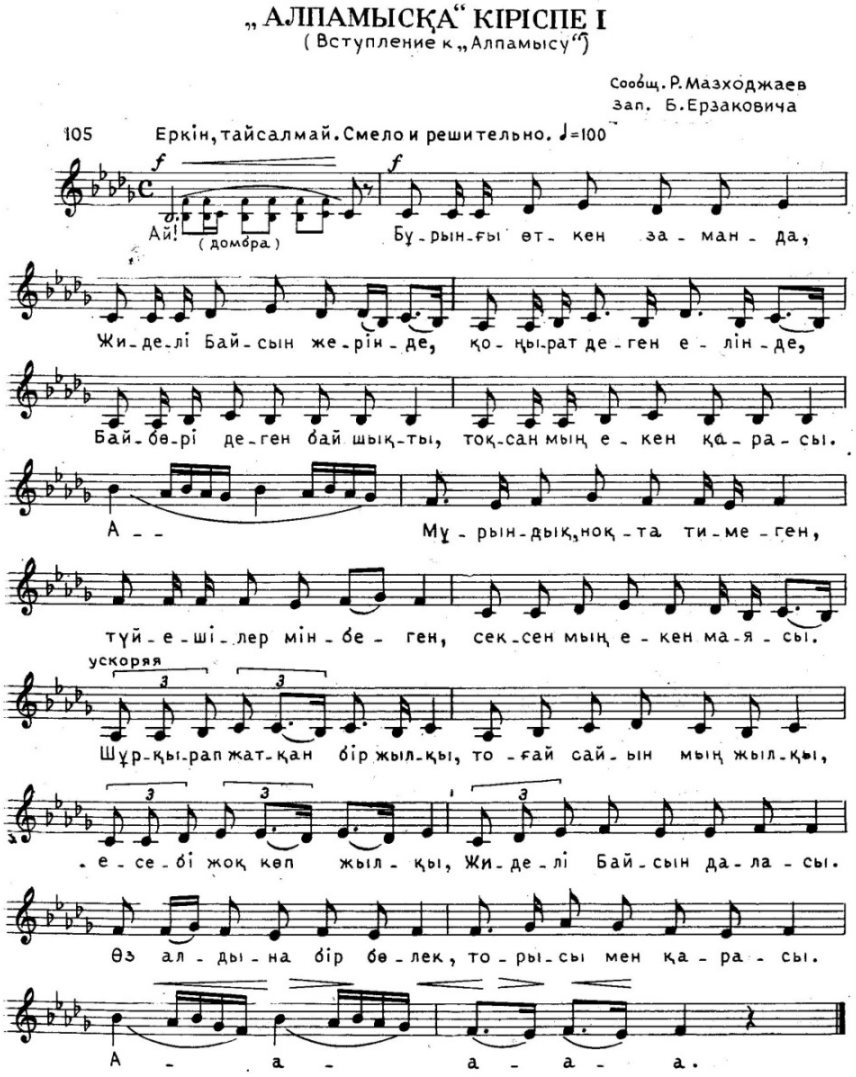
Folklore patterns that appeared in connection with celebration of Nauryz, Oraza ayt, Kurban ayt, calendar songs "Badik", "Kulyapsan", which refer to certain traditions associated with ancient beliefs, require new consideration. The future publication assumes conducting the coordinated works on regional specifics of folk songs. At the same time, when classifying them, "simple songs" ("Kara olen"), lyrical songs, historical songs, etc. should be taken into account to a certain extent.

Representatives of traditional art reached the XIX century with a high level of oral professional composer creativity. During this period, it was also distinguished by original and individual style of the poets and singers. In view of modern requirements, the songs of Birzhan sal, Akan sere, Abay, Shakarim, Zhayau Mussa, Mukhit, Baluan Sholak, Aset, Madi Estay can be categorized as relevant and studied. At present, the works by well-known Kazakh performers are presented, including: Estai Berkimbaev, Zhambyl Zhabayev, Kenen Azerbayev, Issa Baizakov, Kosymzhan Babakov, Kuan Lekerov, Kalka Zhapsarbayev, Kurmanbek Zhandarbekov, Manarbek Yerzhanov, and others. Their voices are fixed in the records of the Rare Foundation of the Institute.

Currently, the authors of Master's and PhD thesis are interested in the creativity of these people, but the inconvenience is that the applicant who is directed from the University, which issued a letter of permission, also is unable to use these materials for listening. On the one hand, there is a shortage of technical equipment which is produced in the last century, and on the other hand, the decks are outdated and unsuitable for use. In this regard, and taking into account the capabilities of the new equipment, before re-recording, it is necessary to do selection and work to achieve sound purity.

2. “The Ancient Saryns of the Great Steppe” (folk kyu and motifs of famous kyuishi). The heritage of the Kazakh nation is unique, its specificslies in music patterns for kobyz, dombyra, sybyzgy, sazsyrnay, etc. There are legends and stories which are accompanied by these kyu. In this direction, it is foreseen to undertake a careful selection of legends and musical versions of kuy into the collection of the selected works. Regional kyu have developed in instrumental music on the basis of folk kuy. Author’s kuy testify on the outstanding representatives of each region. These are Abay, Makhambet, Kurmangazy, Daulet-kerey, Tattimbet, Ykylas, Esir, Kazangap, Sarymalay, Dina, Sugur-kyuyshi, who represent the unique values of our nation.

3. “Ancient Saryns of the Great Steppe” (motifs of the epic and epic songs). Inthe Rare Foundation of the M.O. AuezovInstitute of Literature and Art, the records of the motifs of the epic, dastans, zhyr, terme, and wills that make up a special part of the spiritual heritage of the Kazakh people are preserved. Among them there are variants of the epic “Alpamys” performed by Rakhmet Mazkhojaev and Sergazy Kalym-betov, “Kobylandy batyr” performed by Sungat Kalybayev, “Kozy Korpesh - Bayan sulu” performed by Shakir Abenov, which were recorded by the corresponding member of the NAS RK B.G. Erzakovich.



The activities on systematizing and defining the performing versions of the heroic epic, lyrical epos, social and dailylife epicby genre character of these epic works will be continued. At the same time, the proposed system requires a search among the population of the existing patterns of the epic “Kyz Zhibek”, which is part of the lyric epic, and “Ayman-Sholpan”, which is recognized as social-daily life. Therefore, trips to certain regions of Kazakhstan have been planned.

This work, carried out on the basis of N. Nazarbayev's idea “Ancient motives of the Great Steppe”, undoubtedly, can further promote the authority of our State at global level, use the eternal heritage of our nation in a modern format which is accessible to different generations.

Conclusion. The results of this work will be in demand in the educational process precisely in this direction (on a national and international scale), since they have a general humanitarian focus. It is a well-known fact that representatives of the intelligentsia will receive State support through the restoration of Humanitarian Departments in the Universities of the country: “We need not only engineers and physicians, but also educated people who are able to deeply understand modern period and the future”. Based on this, the amount of work that is significant for several areas of humanitarian sphere is important for the implementation and isoriented towards all genres of Kazakh traditional musical art. Folklore patterns and notation texts presented in three languages, in Kazakh, Russian and English, available in digital format and as a scientific-musical-ethnographic work – the Anthology (with online application) are relevant as supplementary means to the publicity and current faculty of various educational institutions, including specialized secondary and creative universities. The need to study them is obvious “in view of modernization in the globalization era of “the national code” and “national culture” in traditional music, through the identification of negative aspects, the designation of the advanced competitive achievements” [26, p.171].

The impact of the expected results on the development of science and technology and the expected social and economic effect are quite obvious. The national Anthology will be published based on the results a scientific publication. The proposed collection will be digitized, open and accessible for active use in public and social areas.

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ҰЛЫ ДАЛАНЫҢ КӨНЕ САРЫНДАРЫ

Аннотация. Н. Назарбаевтың: «Ұлы даланың жеті қыры» мақаласында ақпараттық қолдау және біртіндеп атқарылатын іс-шаралардың міндеттері белгіленген. Бұл ретте: «...қазақтың қобыз, домбыра, сыбызғы, сазсырнай және басқа да дәстүрлі музыкалық аспаптармен орындауға арналған маңызды туындылар топтамасын – «Ұлы даланың көне сарындары» басып шығару қажет. Ұлы даланың фольклоры мен әуендері заманауи цифрлық форматта «жаңа тыныс» алуы тиіс» [1, 4 б.] – деген.Қазіргі уақытта, фольклортанушы ғалымдардың (филологтар мен өнертанушылар)ұжымдық күшімен қолға алынған негізгі мақсаты– қазақ халқының көне сарындарын жинақтап, әдет-ғұрып және тұрмыс-салт әндерінің, қобыз, домбыра, сыбызғы және сазсырнай күйлерінің, эпос және жыр мақамдарының, сал-серілер мен дәуескер күйшілер туындыларының үздік нұсқасын айқындап, таңдамалы үлгілердіңноталық және аудио материалдарын және үш тілде (қазақ, орыс және ағылшын) ғылыми түсініктемесін жазып, зияткерлік өнім ретінде цифрлық форматта шығару.

Ортақ гуманитарлық бағыта тұжырымдар мен нәтижелердің ұлттық және халықаралық ауқымдылық маңызы ерекше деп қысқаша түйіндейміз. Тұңғыш рет, қазақ халқының таңдамалы музыкалық мұрасы «Ұлы даланың көне сарындарында» музыкалық үлгілері мен нота мәтіндері және үш тілде, яғни қазақ, орыс және ағылшын тілдерінде ғылыми түсініктемесі цифрлық форматта ұсынылып, арнайы орта және жоғары оқу орындарында, көпшілік қауым мен арнайы шұғылданатын профессорлық құрамға көмекші құралы ретінде кеңінен қолданылады. Еліміздің салт дәстүрін қайта жаңғырту мақсатында күнделікті тұрмыс тіршілікте және зияткерлік өнім ретінде шетелдік нарыққа ұлттық дәстүрді дәріптеу мақсатында да сұранысқа ие болады.

Түйін сөздер: сарын, ән, күй, эпос, фольклор, тұрмыс-салт, дәстүр.

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ДРЕВНИЕ САРЫНЫ ВЕЛИКОЙ СТЕПИ

Аннотация. В программной статье «Семь граней Великой степи» Н. А. Назарбаева обозначены поручения, предполагающие осуществление комплекса мероприятий, направленных на их информационную поддержку и поэтапную реализацию. В ней подчеркнуто, что «...нужно выпустить сборник «Древние мотивы Великой степи» – коллекцию значимых произведений, созданных для традиционных казахских музыкальных инструментов: кобыза, домбры, сыбызгы, сазсырная и других. Фольклор и мелодии Великой степи должны обрести “новое дыхание” в современном цифровом формате» [1, 4 с.]. Главная цель предпринимаемых в настоящее время коллективных усилий ученых-фольклористов (филологов и искусствоведов) – собрать древние мотивы казахского народа, определить лучшие их варианты в обрядах и обычаях, кюйях для кобыза, домбры, сыбызгы и сазсырная, эпоса и песенной поэзии, представить избранные образцы в нотной записи, аудио-, видеоматериалах и научных комментариях на трех языках (казахском, русском и английском) в цифровом формате как актуальную интеллектуальную продукцию.

Анонсируемые положения и результаты, имея общегуманитарную направленность, значимы в национальном и международном масштабе. Лучшие образцы музыкального наследия казахского народа, впервые представленные в «Ұлы даланың көне сарындары» («Древние сарыны великой Степи») в цифровом формате с нотными текстами, адаптированными научными комментариями на трех (казахском, русском и английском) языках, востребованы не только в учебно-образовательной и педагогической деятельности профессорско-преподавательского состава разнопрофильных ВУЗов, в широких кругах общественности, но и в процессе их популяризации в мировом пространстве.

Ключевые слова: мотив, песня, кюй, эпос, фольклор, обряд, традиция.

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REFERENCES

[1] Nazarbayev N. Seven Facets of the Great Steppe // Kazakhstan Zaman. 22.11.2018. P. 4.

[2] Erzakovich B. Folk songs of Kazakhstan. Almaty, 1955. 242 p.

[3] Kazakh folk instrumental music. Kyu for dombra, kobyz and sybyzgy. Compiled by Z. Januzakova. Alma-Ata: Science, 1964. 248 p.

[4] Bekkhozhina T. 200 songs of the Kazakhs. Almaty: Kazakhstan, 1967. 232 p.

[5] Mergaliev T. Dombyra sazy. Dombra music. Almaty: Gylym, 1972. 316 p.

[6] Temirbekova A. Kazakh folk songs. Alma-Ata: Zhazushy, 1975. 130 p.

[7] Kazakh musical folklore. Almaty: Ylym, 1982. 264 p.

[8] Mergaliev T. Zhana dauir zhyrshysy. (The narrator of the new time). Almaty, 1980. 128 p.

[9] Birzhan sal Kozhagululy. Lailim Shyrak: Ander. Songs/Compiled by B.G. Erzakovich, A. Derbisalin, Z. Kospakov. Almaty: Oner, 1983. 168 p.

[10] Zhayau Mussa. Aq Sisa: Ander men kuyler. Songs and Kuy / Compilation, introduction message and musical edition by Z. Kospakov. Almaty: Oner, 1985. 112 p.

[11] Abay Kunanbayev. Aitym salem, kalam қas / Compilation, musical edition by B.G. Erzakovich. Almaty: Oner, 1986. 95 p.

[12] Akan Seri. Manmanger: Ander. Songs. 2-edition / Compilation, musical edition by K. Zhuzbasov. Almaty: Oner, 1988. 120 p.

[13] Inzhu-Marzhan: Ander / Compiled by K. Zhuzbasov. Almaty: Oner, 1992. 144 p.

[14] Ykili Ybyray. Gakku: Ander. Songs / Compiled by K. Zhuzbasov and Z. Kospakov. 2nd ed. Almaty: Oner, 1995. 128 p.

[15] Basilov V. The Scythian Harp and Kazakh Kobuz: In Search of historical Connections // Foundations of Empire Archaeology and Art of the Eurasian Steppes. Los-Anseles, 1992. P. 77-100.

[16] Brandl R. Der Bordun und seine Entwicklung in der Volksmusic des Dodekanesanhandeigener Feldaufnamen 1965-1971 // Der Bordun in der Europaiscen Volksmusic. Berichtuber das 2.Seminar fur europaische Musikethnologie. Wien: Verlag A. Scendl, 1973. P. 24-40.

[17] Czekanowska A. Kulturytradycyjnewobecwspolczesnosci. Muzyka, poezja, taniec. Warszawa: Wydawnictwi Trio, Collegium Civitas, 2008. 304 p.

[18] Klebe D. Effeminate Professional Musicians in sources of Ottoman-Nurkish Court Poetry and Music of the Eighteenth and Nineteenth Centuries // Music in Art. International Journal for Music Iconography. Vol. XXX, N 1-2. Ed. Zdravko Blazekovic. The Graduate Center of the City Universityof New York. Spring-Fall. 2005. P. 97-116.

[19] Levin T. The Hundred Thousend Fools of Got: Musical Travels in Central Asia. Bloomington: Indiana Univerity Press, 1999. 346 p.

[20] Merriam A.P. The Anthropology of Music. Evanston: Northwestern Un3versity Press 1980. 358 p.

[21] Sipos J. Kazakh folksongs // From the two ends of the steppe. CD by Janos Sipos. Budapest: AcademiaiKiado, 2001. 304 p.

[22] Gippius E. General theoretical view on the issue of making catalogueof folk melodies // Relevant issues of modern folklore studies. L.: Music, 1983. P. 23-36.

[23] Hornbostel E.M. background. Notes on the Kyrgyz [Kazakhstan] musical instruments and melodies / Translation from German, ed. and comm. by A. Samarkin. Uralsk: RIO WKSU, 2003. 42 p.

[24] Shin S. The principle of symmetry in music and its manifestation in the folk tune: Author. thesis. .... PhD Art History. Kiev: IIFE, 1980. 24 p.

[25] Taylor E. Primitive Culture. M.: Politizdat, 1989. 572 p.

[26] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy. Procedia - Social and Behavioral Sciences 89, 2013. P. 886-889. https://doi.org/10.1016/j.sbspro.2013.08.950

[27] Gafurbekov T.B., Omarova A.K., Kaztuganova A.Zh. Modernization of traditional musical culture of the kazakhs in the era of globalization // The Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2018. Vol. 6. N 376. P. 165-171. ISSN 1991-3494. https://doi.org/10.32014/2018.2518-1467.41

[28] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[29] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[30] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[31] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[32] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[33] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[34] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state regulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[35] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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PROTECTIVE COATINGS FOR WALLS AND ROOF OF TANKS MADE OF GRANULAR FUSED NON-COMBUSTIBLE SUBSTANCES AGAINST FIRE EXTENSION

Abstract. As a result of the research, there has been improved the technology of applying new foaming agents and means of limiting the spread of the flame during fires in storage facilities. The analysis of putting out flammable liquids indicates that if the fire is not eliminated at the initial stage, the fire passes to a prolonged stage, where an additional amount of forces and means will be required. To eliminate this stage, an additional amount of forces and means will be required. There have been developed and experimentally tested protective coatings for the walls and roofs of tanks made of granular fusible non-combustible substances as additional passive protection against fire extension. Besides, in laboratory and semi-industrial conditions, there were studied the possibilities of using internal and external coatings. Protective coatings possess fire-resistant properties. They allow reducing the temperature of the walls of vertical steel tanks. The given protective coatings prevent the occurrence of static electricity charges.

Key words: fire protection, fire protection technology, oil products, tank, combustible mixture, granular materials, heat flow, film thickness, foam destruction, highly inflammable liquid.

The program of industrial and innovative development of the Republic of Kazakhstan implies serious structural changes in economic growth due to the development of various sectors of the economy, including those that may present a potential danger to the population, one of which is fire and explosion hazard of the oil and gas industry of the Republic of Kazakhstan. Damage from fires and explosions at refineries has enormous proportions and a tendency of constant growth. As the level of technical equipment of production increases, its fire risk also increases.

Emergencies at oil and gas facilities are often accompanied by fires that cause economic, environmental, material damage to the state. During fires at these sites, a large amount of thermal energy is released, that by means of radiation affects the objects around the fire and forms new fire areas [1].

Fires of flammable liquids in vertical steel tanks are of complex and prolonged nature. The analysis of putting out flammable liquids indicates that if the fire is not eliminated at the initial stage, the fire passes to a prolonged stage, where an additional amount of forces and means will be required. Putting out flammable liquids in vertical steel tanks is very rarely achieved at the first stage. This is accompanied by many reasons, one of which is the poor efficiency of the physicochemical properties of the foaming agent [2].

In case of accidental spills of oil products, when risk of fire arises in storage facilities, it is necessary to assess the degree of danger. Oil products are divided into highly flammable liquids and flammable liquids, the vapors of which can form explosive mixtures with air. In case when the flash point of these oil products is higher or equal, a combustible mixture appears above the open surface of the liquid fuel. If this

mixture is set on fire, the flame will spread across the surface of the liquid fuel at a speed of 1.2-1.4 m/s. In a closed container, the flame spreads at a speed of 0.3-0.7 m/s.

The assessment of the fire hazard of spills is characterized by the following main criteria:

– self-ignition temperature;

– flash point;

– flammability potential;

– concentration limits of explosive mixtures.

The flash point is closely related to the boiling point, i.e. with evaporation. The lighter oil product is, the better it evaporates, and its flash point will be lower. For instance, gasoline fractions have negative flash points (up to - 40 °C), kerosene fractions have flash points within 28-62 °C, diesel fuel fractions - 50-80 °C.

Fire extinguishing and fire prevention equipment that currently exists do not fully ensure the safety of tanks. Systems and devices designed to extinguish fire in tanks do not allow them to be quickly extinguished in a short period of time, leading to an explosion and subsequent fire extension [3].

Theoretical and experimental studies using reliable calculation methods aimed at developing and applying constructive and planning solutions, technologies, devices and means of limiting the spread of fires are still in demand in the oil and gas industry [4].

In this regard, the research aimed at developing a set of fire protection and extinguishing agents for highly flammable liquids technologies is relevant and timely

The development of stable foams is formed on the complex use of foaming solutions of polymeric substances that coagulate when contact with organic solvents and surfactant mixtures, where a special role is given to fluorine-containing compounds with high surface activity [5].

For the research, there was used a wide range of substances produced by industry and synthesized in the laboratory. Fluorinated surfactants were synthesized at the Institute of Chemistry of the Ministry of Education and Science of the Republic of Kazakhstan and K.I. Satpayev Kazakh National Technical University. There were conducted the experiments on extinguishing the flame of oil products and determining the fire extinguishing efficiency of the foam with the subsequent verification of the results of extinguishing fires of flammable liquids in various storage tanks and trays at the chair of operational and tactical disciplines of Kokshetau Technical Institute of the Ministry of Emergency Situations of Kazakhstan.

In modern practice, there are used internal and external coatings, which lower the temperature of the walls of the tanks, prevent the occurrence of static electricity, and also have fire-resistant properties. There is also the possibility of using fusible coatings, which in case of temperature increasing inside the tank during combustion will become liquid and spread over the surface of the liquid in the tank. In this case, high temperature will be an important requirement for these coatings. To determine the range of the required melting point, in table 1 there are given oil and oil products ignition temperatures, as well as the temperature of flame combustion.

Table 1 – Flash point, flash ignition and flame combustion temperature of oil and oil products

Type of the product	Temperature, °C				Notes
	Flash point	Flash ignition	Autoignition	Flame combustion	
Oil	130...320	35...121	300...350	1100...1300	
Gasoline AI-95	39	39	255...370	1300...1400	
Gasoline AI-92	32	39	255...370	1300...1400	
Gasoline AI-80	27	39	255...370	1300...1400	

The range of the melting point at the upper limit is determined by the temperature above 1000 °C. The lower melting limit of the material must be higher than the temperature. Currently, there are many non-combustible materials that can be used as coatings for the inner walls and roof of the tank. There were selected the following materials to compare:

– foam glass;

– sodium liquid glass;

– polybutylene terephthalate;
– silica gel.

Since these coatings will be constantly present on the surface of the inner walls and on the roof of the tank, it is necessary that they should meet the following requirements:

1. Chemical resistance to stored products;
2. Work in the temperature range of the tank service treatment;
3. The melting point is lower than the flame combustion temperature of the product, but higher than the operating temperature;
4. The combustion temperature is higher than the flame combustion temperature of the oil product.

Thus, all the given materials, with the exception of polybutylene terephthalate, can be used as coatings to protect the tank. There were developed and experimentally tested two coating schemes: on the walls of the tank and on the roof. The properties of the materials are given in table 2.

Table 2 – Characteristics of the materials for internal coating of the walls and roof of the tank

Characteristics	Foam glass	Sodium liquid glass	Polybutylene terephthalate	Silica gel
Melting point, °C	730	1200	225	1610
Combustion temperature, °C	–	–	–	–
Chemical resistance	high	high	High in temperature range from 20°C to 60°C	high

Thus, all the given materials, with the exception of polybutylene terephthalate, can be used as coatings to protect the tank. There were developed and experimentally tested two coating schemes: on the walls of the tank and on the roof. Both variants are optimal for using. The most effective tank extinguishing system is fire subsurface suppression system, but the speed of this system response does not often allow coping with a rapidly spreading flame. To solve this problem, there was offered to use granular materials with high fire resistance and lower melting point. The design of these coatings is shown in figure 1.

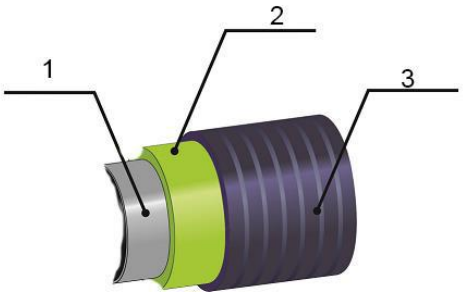

Figure 1 – Multi-layer protective coating:
1 – tank metal; 2 – adhesive layer; 3 – main protective layer

As it has been noted above, the combustion temperature of oil and oil products exceeds 1000 °C, which enables to choose materials with the required melting point and the missing or sub-missing boundary of combustion. The principle of operation of the given system is as follows: when the temperature in the tank 1 rises, the temperature sensor transmits a signal to the automatic signal processing system 6, which in turn sends a command to start the injection pump 4. The transfer of the granulated substance from the tank 8 is done with the help of using nitrogen or carbon dioxide to prevent oxygen from entering the fire zone. The fire extinguishing system is shown in figure 2.

When the temperature inside the tank rises, the granulated material melts and then spreads over the surface of the burning liquid, thus preventing oxygen from entering the combustion zone. The advantages of fire foam subsurface suppression are the following factors:

– lack of particles catching of burning liquid by granular material;

– the system response speed is much higher than the subsurface suppression extinguishing system due to the absence of need to pass through the volume of burning liquid;

– the possibility of use, both in the presence of an open fire, and in its absence, but with a significant increase in temperature.

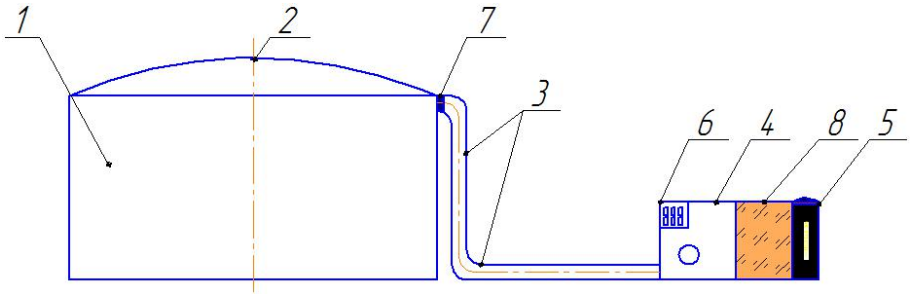

Figure 2 – Scheme of tank fire extinguishing system:
1 – the tank; 2 – tank temperature sensor; 3 – supply pipeline; 4 – injection pump; 5 – nitrogen or carbon dioxide containers;
6 – automatic signal processing system; 7 – valve; 8 – the container with granular material

Limiting the fire spread in tanks is actual, because when a single tank catches fire, the flame can reach the adjacent tanks, which will lead to an increase in damage to the set of tanks [6].

To limit the spread of the flame in a horizontal position, it is proposed to use horizontal metal grids. Initially, to study the possibility of using this device, it is necessary to determine the heat flux passing through these grids. Since metal grids have a small reflectivity, the decrease in heat flux passing through the grids will be insignificant. The best way the heat flux is shielded by grids with a wire of large diameter and a small grid size. Let us consider the design of the grid as a multilayer wall consisting of two parallel planes located at a short distance from each other. This design is characterized by a change in temperature in the form of a broken line with straight segments, which show the change in temperature in the layers. Thus, the heat flux decreases significantly when passing through several grids [7].

To conduct an experiment to determine the reduction of heat flux, there was offered a construction, as shown in figure 3.

The principle of operation is as follows: muffle furnace 1 produces a constant heat flux of 3.5 kV/m^2, which passes through the grid 2, is fixed by a thermocouple type TXA 3 and sensor 4.

According to the results of the experiment, it was determined that the obstruction of the heat flux by grids located at a distance of 20 cm regarding each other is the most effective, which in turn shows that when the flux passes through a certain medium, its intensity decreases.

There were conducted further studies to determine the dependence of the cell size on the stability of the foam. Studies were conducted to determine the optimal size of the cell structure, so that the foam does not settle inside it and does not go beyond its limits. The tests were carried out for horizontal grid construction with a round shape to install vertical steel grids of various sizes in tanks [8].

To determine the effectiveness of foaming agents, there was chosen an additional foaming agent. «Multipurpose», which is our innovation. In addition to it, there were used the following brands of foaming agents: PO-6SП, PO-6RP, PO-6VAS, « Multipurpose»; as well as the grids of sizes 1,1; 0,9; 0,44; 0,1 and 0,094 mm.

It was determined that the smaller the cell size is, the longer the foam stability in the grid volume and the higher the percentage of filling the volume of the construction. The most optimal cell size – 0,094 mm. See the figure 3.

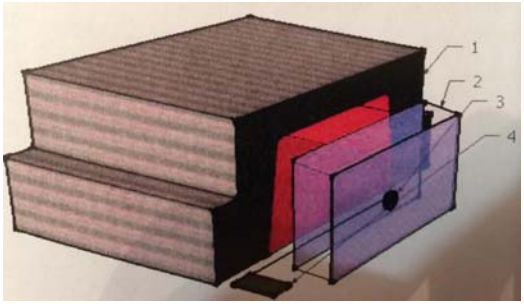

Figure 3 – The construction for determining the amount of heat flux passing through the metal grids:
1 – muffle furnace 1, 2 – grid, 3 – thermocouple TXA, 4 – sensor

The next stage in the development of a fire limiting system was a research to establish the optimal foam multiplicity in relation to its stability. Finding the optimal value of the multiplicity at maximum durability depends on the following factors:

– foam agent properties;
– foam agent concentrations;
– method of producing a foaming agent;
– weather conditions;
– other factors.

It has been established that with increasing foam multiplicity, the foam stability time increases, and at the same multiplicity, the foam stability directly depends on the degree of its dispersion. But with increasing degree of dispersion, the film thickness also decreases, which leads to the destruction of the foam. The next research stage of the possibility of using structures limiting the spread of fire was the study of foam stability in a grid structure when exposed to heat flow.

There were carried out the tests to determine the effect of temperature using a tray, and AI-80 gasoline was used as a combustible liquid, poured onto the water cushion with a layer of 10 cm. A grid structure was installed on the top, and free burning was made during 5 minutes, after which there was made filling with mechanical foam, then there was measured time of 50% foam volume destruction. The combustion temperature was 800 °C. The stability time of the average multiplicity foam is higher than that of the high-multiplicity foam; moreover, the resistance time is reduced by 30–35% regarding air tests. However, it should be noted that the "Multipurpose" foam agent has better performance than the widely used foam agents [9, p. 256].

The final stage of the research was the determination of the degree of heat flux retention by the construction filled with air-mechanical foam. Based on the fact that when radiant energy is affected the flammable liquid, there can happen spontaneous combustion, the radiant flux must not exceed the radiation density for this liquid.

The tests consist in measuring the temperature on the outer and inner surfaces of the enclosing structure in conditions close to a real fire. The combustible liquid was AI-80 gasoline that was set on fire and there was allowed open burning. Due to the inhomogeneity of the flame burning, according to the construction area there was defined average temperature on the outer and inner surface of the construction, which was determined using thermocouple TXA at 5 points of the construction in order to achieve reliable results [10, p. 197].

Thus, decrease in temperature is due to the expenditure of heat for heating both the grid construction and the air-mechanical foam. Obviously, with an increase in the amount of combustible material, the maximum temperature and duration of combustion increase.

According to the results of the test, for the effective operation of the enclosing structures, it is necessary to ensure a continuous supply of foam to the grid structure. In addition, to establish the optimal number of sections within the grid structure, there were made tests with round structures of various heights: 450, 500, 550 and 600 mm to establish the time of thermal resistance and the average temperature on the outer surface.

It should be noted that the given horizontal construction for limiting the spread of fire has a high resistance to thermal effects, which allows its use to fight fires in tanks. There was made the analysis of the experiment results using a mathematical model, there was obtained a small discrepancy between mathematical model data and the results of the experiment. But despite this, these results confirm the effectiveness of finding the foam in the protective structure. But despite this, these results confirm the effectiveness of foam presence in the protective structure.

Thus, as the result of the research, there were developed protective coatings for the walls and roofs of tanks made of granular fusible non-combustible substances as an additional passive protection against the fire spread. In the course of the laboratory tests, there was determined that the offered horizontal grid construction for fire extinguishing in a tank, together with the use of the Multi-Purpose foam agent that was developed by us, can prevent fire spreading to the nearest tanks and other structures.

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ӨРТТІҢ ТАРАЛУЫНАН ҚОРҒАУ ҮШІН ТҮЙІРШІКТЕЛГЕН БАЛҚИТЫН ЖАНБАЙТЫН ЗАТТАРДАН ЖАСАЛҒАН РЕЗЕРВУАРЛАРДЫҢ ҚАБЫРҒАЛАРЫ МЕН ШАТЫРЛАРЫНА АРНАЛҒАН ҚОРҒАНЫШ ЖАБЫНДАРЫ

Аннотация. Зерттеу нәтижесінде мұнай-газ өнеркәсібі объектілерінің тік болат резервуарларында өрт туындаған кезде жаңа көбік түзетін құрамдар мен жалынның таралуын шектеу құралдарын қолдану технологиясы жетілдірілді. Тез тұтанатын сұйықтықтарды сөндіруге талдау жүргізілді, егер бастапқы кезеңде өртті жою жүргізілмесе, өрт ұзаққа созылатын сатыға ауысатынын куәландырады. Резервуарлық парктердегі өрт салдарын жою үшін осы кезеңде қосымша күштер мен құралдар қажет болады. Өрт таралуынан қосымша пассивті қорғаныс ретінде түйіршіктелген балқитын жанбайтын заттардан жасалған резервуарлардың қабырғалары мен шатырларына арналған қорғаныс жабындары әзірленді және эксперименталды сынақтан өткізілді. Сонымен қатар, зертханалық және жартылай өнеркәсіптік жағдайларда ішкі және сыртқы жабындарды пайдалану мүмкіндіктері зерделенді. Тік болат резервуарлардың қабырғалары мен шатырларына арналған қорғаныс жабындары отқа төзімді қасиеттерге ие болады. Олар тік болат резервуарлардың қабырғаларының температурасын төмендетуге мүмкіндік береді. Сонымен қатар түйіршіктелген балқымалы жанбайтын заттардан жасалған тік болат резервуарлардың қабырғалары мен шатырларына арналған ұсынылып отырған Қорғаныс жабындары жалынның таралуын шектеуге және оларды оңтайлы оқшаулауына ықпал етеді, сондай-ақ статикалық электр разрядтарынан өрттердің туындауын болдырмайды.

Түйін сөздер: өртке қарсы қорғаныс, өрттен қорғау технологиясы, мұнай өнімдері, резервуар, жанғыш қоспа, жылу ағыны, көбік тұрақтылығы, пленка қалыңдығы, көбіктің бұзылуы, тез тұтанатын сұйықтық.

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ЗАЩИТНЫЕ ПОКРЫТИЯ ДЛЯ СТЕНОК И КРОВЛИ РЕЗЕРВУАРОВ ИЗ ГРАНУЛИРОВАННЫХ ПЛАВКИХ НЕГОРЮЧИХ ВЕЩЕСТВ ДЛЯ ЗАЩИТЫ ОТ РАСПРОСТРАНЕНИЯ ПОЖАРА

Аннотация. В результате исследования была усовершенствована технология применения новых пенообразующих составов и средств ограничения распространения пламени при возникновении пожаров в вертикальных стальных резервуарах объектов нефтегазовой промышленности. Проведен анализ тушения легковоспламеняющихся жидкостей, который свидетельствует, что, если не произведена ликвидация пожара в начальной стадии, пожар перейдет в затяжную стадию. Для ликвидации последствий пожара в резервуарных парках, этой стадии потребуется дополнительное количество сил и средств. В качестве дополнительной пассивной защиты от распространения пожара разработаны и экспериментально апробированы защитные покрытия для стенок и кровли резервуаров из гранулированных плавких негорючих веществ. Кроме того, в лабораторных и полупромышленных условиях были изучены возможности использования внутренних и внешних покрытии. Защитные покрытия для стенок и кровли вертикальных стальных резервуаров будут обладать огнестойкими свойствами. Они позволяют понижать температуру стенок вертикальных стальных резервуаров. Предлагаемые защитные покрытия для стенок и кровли вертикальных стальных резервуаров из гранулированных плавких негорючих веществ будут способствовать ограничению распространения пламени и их успешной локализации, а также предотвращают возникновение пожаров от разрядов статического электричества.

Ключевые слова: противопожарная защита, технология огнезащиты, нефтепродукты, резервуар, горючая смесь, гранулированные материалы, тепловой поток, толщина пленки, разрушение пены, легковоспламеняющаяся жидкость.

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REFERENCES

[1] Aubakirov G.A. Peculiarities of the environmental situation when extinguishing fires of oil and oil products with foams // Fire safety: the collection of scientific and practical conference materials – Kokshetau: Kokshetau Technical Institute of the Ministry of Emergency Situations of the Republic of Kazakhstan the 12th of May 2005. P. 54-57 (in Rus.).

[2] Conducting research on risk assessment and risk management of fire-hazardous technological processes in the oil and gas industry of the Republic of Kazakhstan: research report / JS «Research Institute of Fire Safety and Civil Defense» Ministry of Emergency Situations of the Republic of Kazakhstan: research advisor Dzhumagaliyev R.M. Astana, 2012 (in Rus.).

[3] Dzhansayev B.B., Aubakirov G.A., Alimbetova A.Zh., Amrayev Zh.A., Redkin B.M. The current state of fire protection tanks with oil products // New in life safety: the collection of materials of the 9th International scientific and technical conference. Almaty: KNTU, 2007. Vol. 1. P. 45-57 (in Rus.).

[4] Dyusebayev M.K., Sharipova S.A., Aubakirov G.A. Polygon testing of a foaming agent with high fire extinguishing efficiency in relation to combustible liquids of various classes // Scientific and technical, spiritual values in the heritage of philosophers of the East and A. Mashani: the 3rd International scientific and practical conference. Almaty: KNTU, 2007. P. 2. P. 101-104.27 (in Rus.).

[5] Dudnikov Yu.V., Azmetov Kh.A., Dudnikov I.Yu., Aubakirov G.A. The method of testing the tightness of the linear shut-off valves of the main operated pipeline // STJ «Problems of collection, preparation and transportation of oil and oil products». Institute for the Transport of Energy Resources. Ufa, 2013. N 4(94). P. 88-94 (in Rus.).

[6] Dyusebayev M.K., Sharipova S.A., Aubakirov G.A. Study of the patterns of extinguishing the flames of organic flammable liquids and oil products // Scientific and technical, spiritual values in the heritage of philosophers of the East and A. Mashani: the International scientific and practical conference. Almaty: KNTU, 2007. P. 2. P. 25-28 (in Rus.).

[7] Dyusebayev M.K., Sharipova S.A., Aubakirov G.A. Polygon testing of a foaming agent with high fire extinguishing efficiency in relation to combustible liquids of various classes // Scientific and technical, spiritual values in the heritage of philosophers of the East and A. Mashani: the International scientific and practical conference. Almaty: KNTU, 2007. P. 2. P. 101-104 (in Rus.).

[8] Plotnikov V.M., Aubakirov G.A. Fire protection of flammable liquids tanks // The official gazette of SE Kokshetau Technical Institute of the Ministry of Emergency Situations of the Republic of Kazakhstan. 2012. N 4(8). P. 51-55 (in Rus.).

[9] Narbayev K.A., Kussainov A.B. About the Operating Techniques of Assessment of Social and Economic Consequences of Emergency Situations // Bulletin of the Academy of sciences of the Republic of Kazakhstan. 2017. Vol. 2. P. 256-265. https://doi.org/10.32014/2018.2518-1467 (in Eng.).

[10] Esenbekova A.B., Alan Robert. Economic mechanisms of providing of sustainable development of the Republic of Kazakhstan in the conditions of global warming // Bulletin of the Academy of sciences of the Republic of Kazakhstan. 2018. Vol. 2. P. 197-202. https://doi.org/10.32014/2018.2518-1467 (in Eng.).

[11] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[12] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[13] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[14] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[15] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

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ABSORPTION POTENTIAL IN INCREASING INNOVATIVE PERCEPTION OF KAZAKHSTAN ENTERPRISES

Abstract. Currently, for the development of society and economic growth, new technologies built on new ideas and new knowledge play an important role. It should be noted that the potential of existing industries, despite the task of transferring the economy to an innovative development path, currently requires substantial growth in all areas: strategic, managerial, organizational, technical and technological, personnel. Analysis of the current situation by various indicators showed the inertia of the innovative development of enterprises in Kazakhstan. The purpose of the study is to conduct a review of the scientific literature and the development of approaches to increase the innovative activity of enterprises. The results of the study show that one of the factors for increasing the innovation susceptibility and absorption capacity of enterprises, leading to the growth of innovative activity, is the network interaction of enterprises. Channels of network interaction were analyzed and were proposed the expansion of network interaction of enterprises through the development of an informal information channel and human resources channel to increase the absorption capacity of low and medium technological enterprises, and expansion of interaction with universities and scientific organizations through the development of a channel of research projects and consulting to support the development of high-tech enterprises. It is assumed that the development of network interaction will enhance the absorption potential of enterprises, and, accordingly, their susceptibility to innovative solutions and technologies.

Keywords: absorption capacity, innovative susceptibility, innovative activity.

Introduction. Innovative development is proclaimed an important priority of economic policy in all countries of the world. In turn, new knowledge is the basis of breakthrough innovations and serves to the benefit of the development of not only the economy of a single country, but also the entire civilization. First of all, innovative technologies in the production of goods and services for the population have a positive effect on the quality of life of people, allowing them to consume high-quality goods and services, to live in environmentally healthy conditions, to raise the level of education and skills in the most appropriate and comfortable ways.

The beginning of the course on the development of an innovative economy was laid in the Strategy for the Industrial-Innovative Development of the Republic of Kazakhstan for 2003-2015, one of the tasks of which was "to stimulate the creation of knowledge-intensive and high-tech export-oriented industries" As a result of the programs adopted during this period, the main elements of the innovation infrastructure and technology commercialization were created, measures for financial support for innovations were developed and implemented, and the science management system was reformed. Implementation of the State Program of Forced Industrial-Innovative Development of the Republic of Kazakhstan for 2010-2014. together with the measures taken to create a national innovation system, it allowed doubling the share of innovatively active enterprises from 4 to 8.1%. According to the Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan for 2017, this figure was 9.6%. However, this level is still critically low. In the cost structure of technological innovations, 42% are expenses for the purchase of modern machines, equipment, software and other capital goods, while R & D accounts for

only 5% of all costs [1]. This indicates a weak susceptibility of enterprises to innovations. For comparison, in the USA the share of innovatively active enterprises is 70%, Germany - 67%, Great Britain - 50.3% [2]. In 2014-2016. the innovation activity of Turkish enterprises was 61.5% [3], and in some manufacturing industries the level of this indicator reaches 80% [4].

In this regard, the purpose of the study is to give suggestions on how to increase the susceptibility of Kazakhstan enterprises to new knowledge.

Research methodology. Universal research methods such as observation, synthesis, analysis, analogy, induction, deduction, abstraction, comparison and analogy. A statistical analysis of the sphere of science and innovations was carried out on the basis of the data: the Committee on Statistics 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. The research results confirm the weak susceptibility of the economy to new knowledge and solutions, which leads to low innovation activity of enterprises in the country.

Thus, the level of innovation activity in Kazakhstan in 2017 amounted to 9.6% or 2974 innovative companies. A significant positive trend in the electricity and water supply sector (7.6% and 1.9%, respectively, in 2013) can be noted. The innovative activity of manufacturing enterprises has decreased by 1.2% compared to 2013 (figure 1).

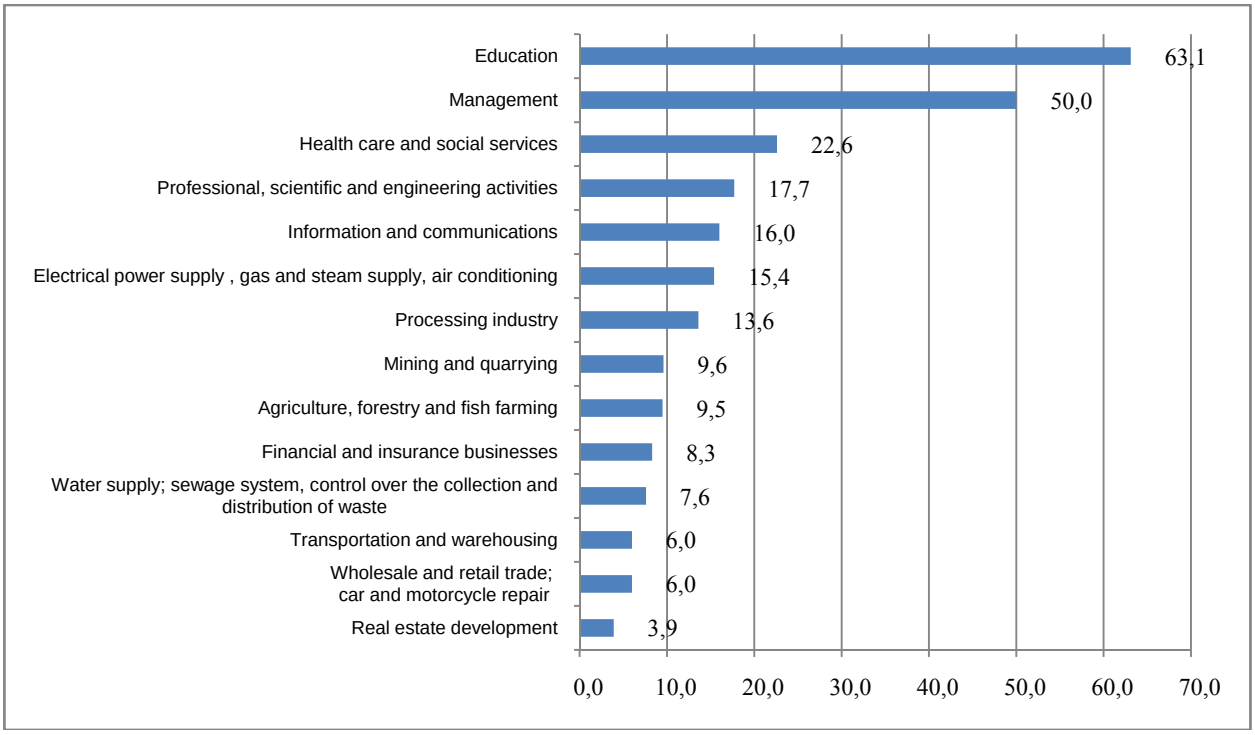

Figure 1 – The level of activity of sectors of the economy in the field of innovation for 2017, in %

In the regional context, the highest innovative activity is observed in the East Kazakhstan region (15.1%) and the city of Nur-Sultan (14.4%). The lowest - in the Mangystau region and West Kazakhstan region (3.5 and 5.3%, respectively).

According to the level of activity in the field of technological (product and process) innovations, the leaders are North Kazakhstan - 9.2% and East Kazakhstan regions - 8.3%. The lowest level of technological innovation is observed in West Kazakhstan (1.5%) and Mangistau (2.5%) regions.

In terms of ownership, state-owned enterprises are leading in technological innovation - 19.7% in 2017. It is noteworthy that the gap between enterprises of public and private forms of ownership is increasing: in 2013-2014 the gap was 2 times bigger, in 2015-2016. - 3 times, and from 2017 - 4 times.

Among private enterprises, the level of activity in the field of technological innovation is increasing at insignificant rates: 2013. - 4.5%, 2017 - 5.6%.

The volume of innovative products produced in 2017 amounted to 1.59% of GDP or 3.18% of industrial production. At the same time, only in 2017 the level of the volume of innovative products in 2006 (1.53%) will be reached. The peak level (1.64% in 2014) has not yet been reached.

In particular, the manufacturing industry produced in the same period 87% of all innovative products of industrial enterprises (figure 2). Other types of innovative products include the production of chemical products, food products, other non-metallic mineral products, etc.

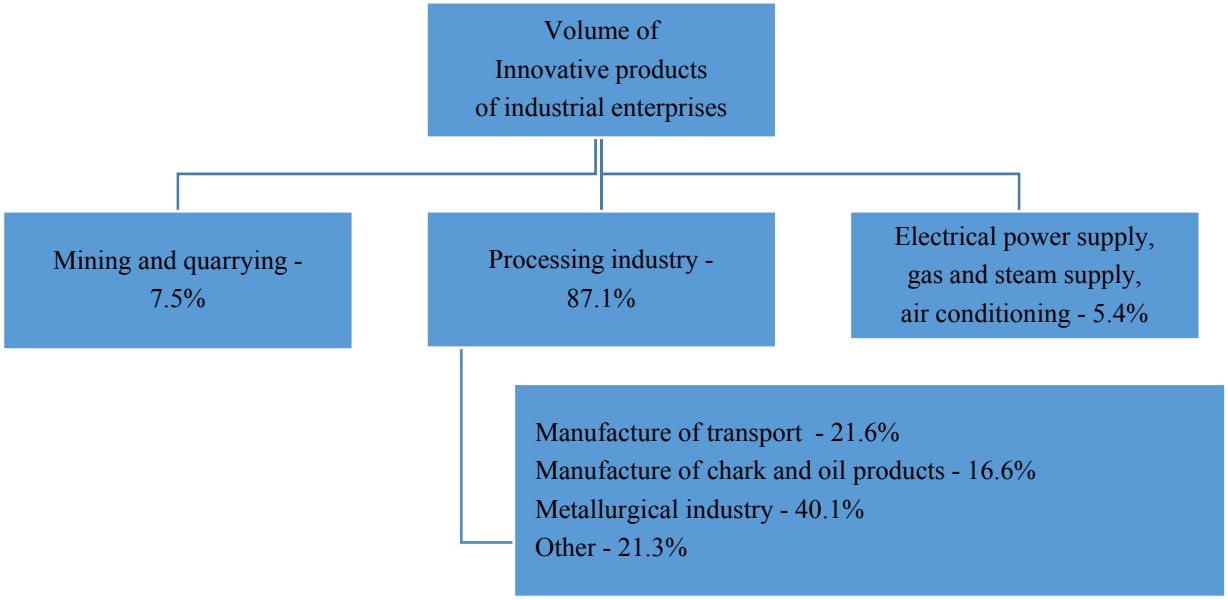

Figure 2 – Distribution of the volume of innovative products (goods, services) by types of economic activity of industrial enterprises for 2017

Of the total volume of sold innovative products in 2017, the volume exported was 10%.

Knowledge intensity is traditionally defined as the ratio of R & D costs to gross value added (GVA) or gross output (VP). Unfortunately, the general knowledge-intensiveness of a country's economy tends to decrease: if in 2002 it was 0.26%, then in 2017 - 0.13%. At the same time, it is noteworthy that almost 70% of R & D is carried out by private enterprises (this figure has not changed much over the past 5 years).

In the industry, the most knowledge-intensive industries remain the mining and metallurgical industry: mining of metal ores - 5.6%, metallurgy - 4.0% (table 1).

Table 1 – Knowledge intensity of the sectors of the economy of Kazakhstan in 2017,%

Economic sector	Research intensity
Activities in the field of architecture, engineering research, technical testing and analysis	6.5
Metal ore mining	5.6
Metallurgical industry	4.0
Crude oil and natural gas production	2.7
Other professional, scientific and engineering activities	1.3
Fabrication of products for chemical industry	0.9
Health care activities	0.7
Coal and lignite mining	0.2
Crop and livestock production, hunting and the provision of services in these areas	0.2
Manufacture of electrical equipment	0.2
Advertising and market research	0.2
Engineering services in the field of mining industry	0.1
Other branches of mining industries	0.1

According to the sub-indicators of the Global Competitiveness Index, a decrease in the availability of venture capital, the availability of scientists and engineers, as well as the volume of foreign direct investment and technology transfer is evident (figure 3).

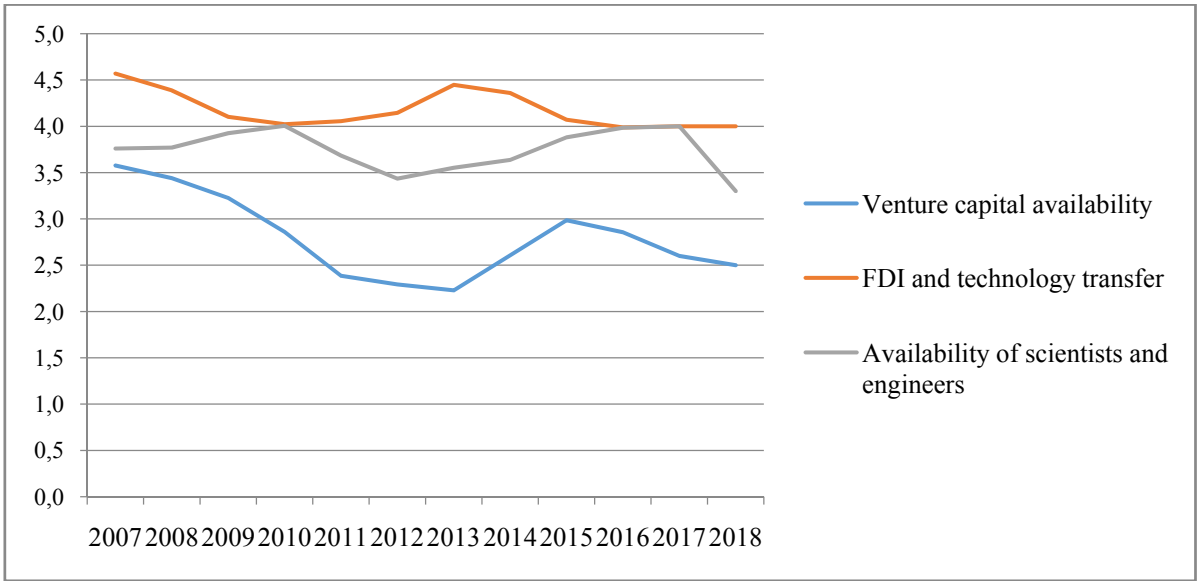

Figure 3 – Dynamics of sub-indicators of the Global Competitiveness Index for the Republic of Kazakhstan, 2007-2018

Facts prove that the field of venture investment in Kazakhstan is very much stalled. Thus, since 2003, 10 domestic venture funds have been created in Kazakhstan in cooperation with local investors. However, an audit of the performance of Kazakhstan's national funds conducted on behalf of the Head of State in 2010 showed that out of 85 projects funded by venture funds of JSC "NATD", only 3 were implemented [5]. As a result, the result was the recognition of project and venture financing as ineffective and the Resolution of JSC NUH Baiterek of September 4, 2013. financing of new innovative projects and new venture funds was suspended. As noted in the Annual Report of JSC NATD for 2013, "a significant part of the income of the Agency's group of companies is net interest income" [6]. This testifies to the high risks of the development of funds allocated by the state to finance innovative projects. Obviously, there is no venture investment ecosystem.

Another negative trend is the decline in the indicator "Accessibility of scientists and engineers" (2010 - 4.0 and 2018 - 3.3). Scientists explain the departure to foreign universities because of weak scientific schools and the lack of creative freedom [7]. Reduced availability of engineers is a consequence of the negative migration balance of skilled labor.

If in the first years of independence, due to the huge "brain drain" abroad, Kazakhstan lost a significant part of the country's intellectual component, then from 2007 to 2011 the picture changed - more people came to Kazakhstan, less actively left, and the external migration balance was positive. However, in 2012 (January-September) the number of arrivals and departures became equal, and in subsequent years the rate of outflow of the population only increased [8]. So, from 2013-2017. there was a huge outflow of personnel to the CIS countries, 35% of the qualified emigrants were technical specialists (figure 4).

The level of emigration mobility of persons with higher education in 2017 was 29.9% (11.290 people) of the total number left Kazakhstan, that is, almost every third emigrant. Of the total number who entered the country, 2.736 people had a higher education, or only 17.5% (every sixth) [9]. As a result, many industries are faced with the difficult problem of a lack of qualified personnel.

The situation is aggravated by the fact that manufacturing enterprises are now in a lower technological structure, whereas for an innovative economy a transition to higher structures is necessary. In the economy of Kazakhstan, the share of the V technological order is less than 1%, the IV technological order is about 35%, and the III technological way is about 65%. In this case, the main line of development is the buildup of the fourth technological order [10, 11].

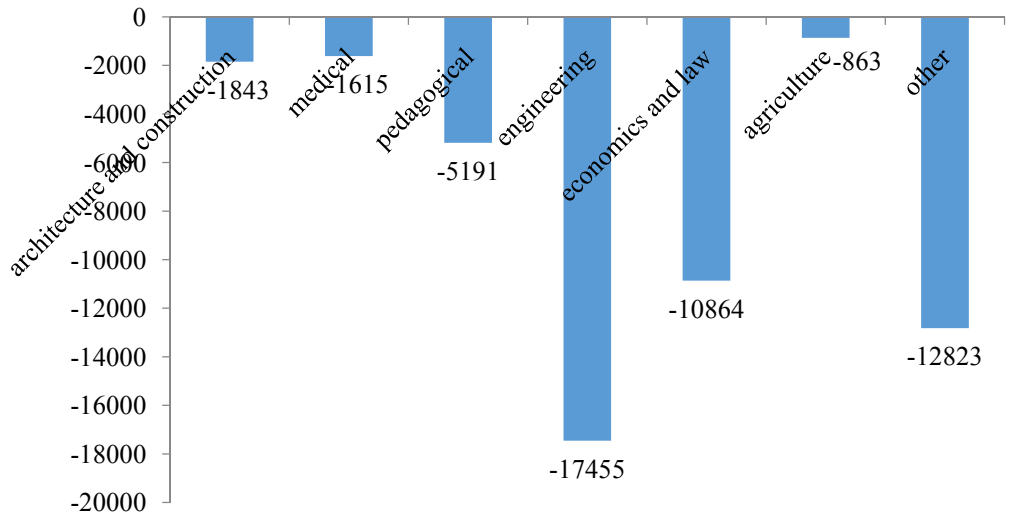

Figure 4 – The balance of migration of the population over 15 years old by specialties (CIS countries), 2013-2017

The analysis of the development of innovative activity of economic entities confirms the assumption of the weak susceptibility of the economy and industry to new knowledge and solutions.

To increase the susceptibility of a country's enterprises to innovations, it is necessary to increase their ability to determine, assimilate, transform and use external knowledge or the absorptive capacity of an enterprise [12]. Absorbing or absorbing ability of an enterprise is a complex of organizational rules and processes by which a firm acquires, assimilates, transforms and exploits knowledge to create flexible organizational capabilities [13].

The absorptive capacity of a company depends on the availability of various network connections, which give access to new knowledge, social capital and social assets in the form of participation in various meetings, associations and networks, personal acquaintance with technological development agents [14]. The strength of a firm's network interaction is revealed when its networks provide access to new knowledge, while the absorption potential of a firm is determined by the absorption and use of this knowledge [15].

Network interaction encourages firms to make decisions about the introduction of innovations and the degree of their radicalism. Radical innovation - the degree of change made in the development and improvement of products and production processes. In particular, it was revealed that one of the factors of radical innovation is cooperation with universities [16].

Thus, network interaction affects the innovative activity of an enterprise by increasing access to new knowledge, making decisions about introducing innovative changes and the degree of radical change.

Innovative environments of a mature medium and low-tech industry and a developing high-tech industry differ significantly in the characteristics of the necessary knowledge (table 2).

The data in table 2 show that different sources of knowledge are prioritized for mature and developing industries. For developing high-tech industries, proximity of universities and suppliers as sources of hidden and non-material knowledge for developing new technologies and products is important, while information from consumers and competitors in the form of codified knowledge for developing non-core competencies is important for mature middle-technology industries.

The share of formally high-tech enterprises in Kazakhstan is low. To ensure their real compliance with the criterion of high manufacturability, it is necessary to feed these industries in the form of more intensive use of scientific knowledge generated in scientific organizations and universities in the country, or by developing their own units implementing R&D.

Scientists confirm that the most important innovations, which are key to economic growth, arise when universities, industry and government research institutes interact [18, 19] to find solutions to common problems. The positive effect of the interaction of universities and industry on the innovation activity of firms has been revealed [20, 21]. And this is justified by the fact that links between industry and universities accelerate the transfer of knowledge between scientists and industrial researchers, which allows firms to benefit from savings in specialization without investment [22].

Table 2 – Characteristics of the necessary knowledge
for a mature medium and low-tech industry and a developing high-tech industry

Indicators	Medium-tech industry/low-tech industry	Hi-tech industry
Role of interaction and collaboration	External sources of knowledge are important for developing secondary competencies	Interaction and collaboration are important for accessing resources and seeking knowledge in order to develop specific new technologies and products
Characteristic of necessary knowledge	Embodied and codified knowledge	Hidden and non-embodied knowledge
Territorial proximity	Not important	Important
Source of knowledge	Consumers, competitors	Universities, suppliers
Goals of cooperation with universities	Expanding general knowledge and promoting a higher level of integration of technologies with embodied knowledge	Activation of the development of new knowledge and the acquisition of scientific support for the development of new products
Note: based on [17].		

Scientists identify the following channels of interaction between universities and industry - the information channel (Info Channel), the human resources channel (HR Channel), the research project channel (Project Channel), the intellectual property rights channel (IPR Channel) [23].

Their analysis shows that more developed countries use integrated channels, combining primarily channels of human resources and research projects and consulting. Scientists have long found that in the early stages of a developing industry, new knowledge and university research can enhance the agglomeration of innovation, while new knowledge embodied in qualified employees contributes to clustering at all stages of industry development [24].

The factor of weak channels of cooperation between science and industry is the reason for the weak effectiveness of technology transfer grant programs in Kazakhstan. So, in particular, the grant for industrial research, which was implemented by JSC NIF (later renamed as JSC NATD) earlier, as a channel of research projects cannot be widely demanded in conditions of low technological effectiveness of industries. In this case, the development of an information channel and a human resource channel – informal knowledge transfer channels – is recommended. The situation is aggravated by the distrust of enterprises in the university sector, which has developed as a result of the gap between the mutual expectations of employers and university graduates [25].

Even on the example of the highly developed Stanford environment, where both the industrial and scientific communities are quite developed and closely interact, it is revealed that the transfer of technology from universities occurs through informal networks of scientists and industrial companies, and not through the formal channels of the technology transfer department. Scientists and industrial corporations are part of the same scientific knowledge sharing networks in a non-codified form, and the formal transfer of explicit, codified knowledge is the result of informal relationships [17]. Moreover, scientists argue that low absorptive capacity makes firms dependent on personal contacts for the absorption of external codified knowledge that is not their core competency [17]. Consequently, informal relationships and staff mobility may be more important to influence the environment than formal technology transfer [26].

Thus, since “formal transfer of explicit, codified knowledge” means the transfer of technologies in the form of transfer / assignment of a patent and (or) making it into the authorized capital of an innovative enterprise being created (channel of intellectual property rights), the commercialization of the results of scientific developments is a consequence of the development of informal relationships that can be developed through channels such as the information channel and the human resource channel. Consequently, networks make a significant contribution to the innovative abilities of firms, tuning them to new sources of ideas, quick access to resources and enhancing knowledge transfer [27, 28].

In 2010-2014 in terms of science-intensiveness, Korea ranked first in the world, in terms of research infrastructure and quantitative indicators, such as the total number of research personnel, scientific articles, patent applications and patents received - 5-9th places. However, in 2014, in terms of overall competitiveness, Korea dropped to 26th place. The researchers explain this by saying that government policies to improve the relationship between the actors of the "triple helix" (science-business government) failed in

terms of creating synergies from the cooperation of the participants of this model in research networks [29]. Research in the field of science, technology and innovation has widely recognized that the "innovation potential" of a nation depends not only on the power of individual players (firms, universities, state scientific laboratories), but, more importantly, on the connections between these "players" [30].

Conclusion. Based on the analysis carried out to increase the innovation activity of companies, the policy of innovation and technological development of the economy should be focused on the development of the absorption potential of enterprises by:

– expanding the network interaction of enterprises through the development of an informal information channel, which implies the development of relations through the organization of meetings, seminars, exhibitions, conferences, and a human resource channel (hiring graduates and mobility of researchers) to increase the absorption capacity of low and medium technological enterprises;

– expansion of interaction with universities and scientific organizations through the development of a formal channel - a channel of research projects and consulting to support the development of high-tech enterprises.

The programs for promoting the commercialization of scientific research, specified in the Law of the Republic of Kazakhstan "On the commercialization of the result of scientific and technical activities" as a commercialization mechanism, should serve the regional authorities at the initial stage as a tool to increase the absorption potential of enterprises in the region. At the mark level, these programs can be managed by the Kazakhstan Industry Development Institute, which since 2019 has been assigned to operate with grants for the technological development of industries and enterprises.

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ҚАЗАҚСТАННЫҢ КӘСІПОРЫНДАРЫНЫҢ ИННОВАЦИАЛЫҚ СЕЗІМТАЛДЫҒЫН АРТТЫРУЫНДАҒЫ СІҢІРУ ҚАБІЛЕТІ

Аннотация. Қазіргі уақытта қоғамды дамыту және экономикалық өсу үшін жаңа идеялар мен жаңа білімге негізделген жаңа технологиялар маңызды рөл атқарады. Экономиканы инновациялық даму жолына ауыстыру міндетіне қарамастан қолданыстағы салалардың әлеуеті қазіргі уақытта барлық салалардағы: стратегиялық, басқарушылық, ұйымдастырушылық, техникалық және технологиялық персоналдың айтарлықтай өсуін талап ететінін атап өту керек. Ағымдағы ахуалды әртүрлі көрсеткіштері бойынша талдау Қазақстандағы кәсіпорындардың инновациялық дамуының инерттілігін көрсетті.

Зерттеудің мақсаты – ғылыми әдебиеттерге шолу жасау және кәсіпорындардың инновациялық белсенділігін арттыру тәсілдерін дамыту.

Зерттеу нәтижелері, кәсіпорындардың өзара желілік әрекеттестігі, кәсіпорындардың инновациялық сезімталдығы мен қабылдау қабілетін арттыру және кәсіпорындардың сіңіру қабілеттері, инновациялық өсу белсенділігін арттыру факторларының бірі болып табылатынын көрсетті.

Желілік өзара әрекеттесу арналары талданып және бейресми ақпараттық арнаны дамыту арқылы кәсіпорындардың желілік өзара әрекеттесуін кеңейту және өнімділігі төмен және орта кәсіпорындардың сіңіру қабілеттілігін арттыру үшін адам ресурстарының арнасын, және университеттермен және ғылыми ұйымдармен өзара әрекеттесуді ғылыми- зерттеу жобаларын дамыту арқылы және өнімділігі жоғары кәсіпорындардың өзара әрекеттестігін күшейту.

Желілік өзара әрекеттестікті дамыту кәсіпорындардың сіңіру әлеуетін арттырады, және, тиісінше, олардың инновациялық шешімдер мен технологияларға бейімділігін арттыратыны болжанған.

Түйін сөздер: сіңіру қабілет, инновациялық сезімталдық, инновациялық белсендік.

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АБСОРБЦИОННЫЙ ПОТЕНЦИАЛ В ПОВЫШЕНИИ ИННОВАЦИОННОЙ ВОСПРИИМЧИВОСТИ ПРЕДПРИЯТИЙ КАЗАХСТАНА

Аннотация. В настоящее время для развития общества и экономического роста новые технологии, построенные на новых идеях и новых знаниях, играют важную роль. Следует отметить, что потенциал существующих производств, несмотря на задачи перевода экономики на инновационный путь развития, в настоящее время требует существенного роста во всех направлениях: стратегическом, управленческом, организационном, технико-технологическом, кадровом. Анализ текущей ситуации по различным показателям показал инертность инновационного развития предприятий Казахстана. Целью исследования является проведение обзора научной литературы и выработка подходов к повышению инновационной активности предприятий. Результаты исследования показывают, что одним из факторов повышения инновационной восприимчивости и абсорбционной способности предприятий, ведущей к росту инновационной активности, является сетевое взаимодействие предприятий. Проанализированы каналы сетевого взаимодействия и предложено расширение сетевого взаимодействия предприятий путем развития неформального информационного канала и канала человеческих ресурсов для повышения абсорбционной способности предприятий низкой и средней технологичности, и расширение взаимодействия с университетами и научными организациями через развитие канала научно-исследовательских проектов и консалтинга для поддержки развития высокотехнологичных предприятий. Предполагается, что развитие сетевого взаимодействия усилит абсорбционный потенциал предприятий, и, соответственно, их восприимчивость к инновационным решениям и технологиям.

Ключевые слова: абсорбционная способность, инновационная восприимчивость, инновационная активность.

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REFERENCES

[1] Ob innovazionnoi deiatelnosti predpriatii v Respublike Kazakhstan, 2017, Komitet po statistike MNE RK.

[2] Innovation statistics// http://ec.europa.eu/eurostat.

[3] Percentage of innovative enterprises in Turkey rises // https://www.aa.com.tr/en/economy/percentage-of-innovative-enterprises-in-turkey-rises/990164.

[4] Uzun A. Technological innovation activities in Turkey: The case of manufacturing industry, 1995-1997 // Technovation. 2001. N 3(21). P. 189-196.

[5] Kazakhstanskie senatory trebuiut povysit’ effektivnost’ vlozhenii v innovazii http://innovbusiness.ru/NewsAM/NewsAMShow.asp?ID=15010

[6] Godovoi otchet AO NATR za 2013 god // http://old.natd.gov.kz/ru/report/43/

[7] Issledovateli iz RK uezzhaiut v Rossiu iz-za silnykh nauchnykh shkol. Istochnik: https://24.kz/ru/news/obrazovanie-i-nauka/item/274546-issledovateli-iz-rk-uezzhayut-v-rossiyu-iz-za-silnykh-nauchnykh-shkol

[8] V Kazakhstane rastet “utechka mozgov” https://kursiv.kz/news/obschestvo/2017-11/v-kazakhstane-rastet-utechka-mozgov

[9] Iz Kazakhstana uezhaut luchshie. Uezzhaut I budut uezhat’// https://forbes.kz/process/expertise/iz_kazahstana_uezjayut_luchshie_uezjayut_i_budut_uezjat

[10] Daurenbekova A.N., Kunanbayeva D.A. Povyshenie innovazionnoi aktivnosti predpriatii Kazakhstana v usloviah globalisazii // Vestnik KazNU. 2013. http://articlekz.com/article/8730

[11] Dnishev F., Alzhanova F. Razvitie innovazii i progressivnyh tekhnologicheskih ukladov v ekonomike Kazakhstana v usloviakh industrial’noi modernizazii: instituty, mekhanismy I prioritety. Vena, Avstria: Assoziazia perspektivnyh issledovanii I vysshego obrasovania “Vostok-Zapad”, 2015. 532 p.

[12] https://www.oxford-review.com/oxford-review-encyclopaedia-terms/encyclopaedia-absorptive-capacity/

[13] Zahra S., George G.. Absorptive capacity: A review, reconceptualization and extension // Academy of Management Review. 2002. N 2(27). P. 185-203.

[14] Mowery D.C., Oxley J.E., Silverman B.S. Strategic alliances and interfirm knowledge transfer // Strateg. Manag. J. 1996. N 17. P. 77-91.

[15] Sui-Hua Yu. Social capital, absorptive capability, and firm innovation // Technological Forecasting and Social Change. 2013. N 7(80). P. 1261-1270.

[16] Réjean Landry, Nabil Amara, Moktar Lamari. Does social capital determine innovation? To what extent? // Technological Forecasting and Social Change. 2002. N 7(69). P. 681-701.

[17] Bodas Freitas I.M., Marques R.A., Silva E.M. de P. e. University–industry collaboration and innovation in emergent and mature industries in new industrialized countries // Research Policy. 2013. N 2(42). P. 443-453.

[18] Phillips F., Alarakhia S. The Triple Helix: international cases and critical summary. Technopolis. Springer, London, 2014. P. 67-90.

[19] Álvarez I., Marin R., Fonfría A. The role of networking in the competitiveness of firms // Technological Forecasting and Social Change. 2009. N 3(76). P. 410-421.

[20] Laursen K., Salter A., Searching high and low: what types of firms use universities as a source of innovation? // Research Policy. 2004. N 8(33). P. 1201-1215.

[21] George G., Zahra S.A., Wood D.R. The effects of business-university alliances on innovative performance: a study of publicly traded biotechnology companies // Journal of Business Venturing. 2002. N 6(17). P. 577-609.

[22] Schwartz M., Hornych C. Cooperation patterns of incubator firms and the impact of incubator specialization: empirical evidence from Germany // Technovation. 2010. N 9(30). P. 485-495.

[23] Best channels of academia-industry interaction for long-term benefit// https://pdfs.semanticscholar.org/aa3c/845b8521c738f4cef02ba5c3c31c400ed9ec.pdf

[24] Audretsch, D.B. Agglomeration and the location of innovative activity // Oxford Review of Economic Policy. 1998. N 2(14). P.1 8-29.

[25] Abdullina G.A., Zholdasbekova G.Zh., Meshkov V.R. Graduates of higher educational institutions and business: mutual expectations // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2018. Vol. 5, N 375. P. 93-100. ISSN 2518-1467 (Online). ISSN 1991-3494 (Print). https://doi.org/10.32014/2018.2518-1467.12

[26] Colyvas J., Crow M., Gelijns A., Mazzoleni R., Nelson R.R., Rosenberg N., Sampat B.N. How do university inventions get into practice? // Management Science. 2002. N 1(48). P. 61-72.

[27] Bruce S. Tether, Abdelouahid Tajar. Beyond industry–university links: Sourcing knowledge for innovation from consultants, private research organisations and the public science-base // Research Policy. 2008. N 6-7(37). P. 1079-1095.

[28] Sirazitdinova Yu.Sh. Setevoi podhod k innovaziam: perspektivy vzaimodeistvia kompanii s bizness partnerami // Sovremennye problem nauki i obrazovania. 2015. N 3. P. 399-407.

[29] Young Hoon Lee, Young Jun Kim, Analyzing interaction in R&D networks using the Triple Helix method: Evidence from industrial R&D programs in Korean government // Technological Forecasting and Social Change. 2016. N 110. P. 93-105.

[30] Morlacchi B.R. Martin. Emerging challenges for science, technology and innovation policy research: a reflexive overview // Research Policy. 2009. N 4(38). P. 571-582.

[31] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state regulation industrial and innovative development of Kazakhstan economy // Life Sci J 2014; 11(10s): 369-378. (ISSN:1097-8135). http://www.lifesciencesite.com.70

[32] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J 2014; 11(4s):354-35]. (ISSN:1097-8135). http://www.lifesciencesite.com.63

[33] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. (1). P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[34] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[35] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[36] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[37] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[38] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[39] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[40] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state regulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[41] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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TRANSFORMATION OF FINANCIAL INTERMEDIATION IN THE CONTEXT OF SPREAD OF DIGITAL TRENDS

Abstract. The article defines the essence, principles, transformation of functions and elements of financial intermediation management as the central institution of economic growth in the context of spread of digital trends. While considering the evolution of the concept of the business model of banks as financial intermediaries, the authors have revealed the principles of functioning of their adaptive business model in the conditions of proliferation of digitalization processes, wherein a customer-oriented sales approach, effective innovation development, and organizational flexibility became the main principles. To implement the adaptation business model, a system of transformation measures aiming at creating the main banking product, customer service technology, non-banking services has been substantiated. It has been proved that the evolutionary progress and the processes of digitalization led to the need of banks, based on the adaptive business model, to create an ecosystem as an effective integration market strategy that provides functional openness through any interface, the ability to create innovative products, interaction at the level of clients and institutions to increase cost, strengthening financial sustainability and increasing competitiveness. Modern tendencies concerning the transformation of the essence of an insurer as a subject of financial intermediation, principles and approaches of insurance of new types of assets and risks have been systematized; reactions to the spread of digital technologies and support of digital trends in the insurance market have been revealed; the need to change the insurers business model has been justified.

Keywords: innovation, financial innovation, financial intermediation, digital economy, FinTech, InsurTech.

Introduction. The globalization of economic relations, the limited resource base, and competition lead to the search for new principles for the effective management of financial intermediation development. The features of the latter are determined by the factors of the macroeconomic environment, namely, political, economic and institutional conditions, legislative regulation, financial infrastructure and level of its innovativeness.

Innovative development of financial intermediation has recently been influenced by the spread of digital trends, the main among which is FinTech. In particular, in 2018, FinTech received a record-high $ 41 billion for development, 78% up from the previous year, and over the period 2013-2018, funding increased by 61% on average. A significant segment of FinTech is consumer lending – almost $ 4 billion, which is 2.5 times the financing of the business lending segment ($ 1.5 billion). In the consumer lending segment, FinTech-companies offer consumers new ways to obtain personal loans and assess credit risks (P2P lending, microfinance, big data analytics, and consumer credit services) [1]. Other actively developing areas of financial intermediation digitalization are payment systems, investment management [3], financial trading, digital banking, and insurance [2].

At the same time, the innovative activity of financial intermediaries is depended on the concept of modern informatization [4] and digitalization as strategic priorities, implementation of the digital technologies in economy allowing the state, business, and society to interact effectively [5]. It is also related to the ability of financial intermediaries to introduce innovative financial services and the consumer demand for them, their level of financial literacy, awareness and experience with financial market instruments and their use.

This implies an increase in the target complexity of financial intermediation, where customer orientation, personalization and maximization of financial services customer satisfaction are added to traditional functions.

Methods of research. The issue of financial intermediation research is quite broad. In this aspect, the methodological basis for the development of the financial intermediation industry is formed by works of F. Allen, B. Bernanke, A. Berger, S. Freeman, G. Gorton, E. White, T.S. Campbell, R. Levine et al. Understanding the essence and current problems of financial intermediation is based not only on the theoretical and methodological basis, but also on solid empirical research, which is dedicated to determining the role of financial intermediaries in economic growth, violations of financial stability, the emergence of crisis phenomena, and the complexity of state regulation. But today the direction of financial innovations and financial technologies (FinTech) is unambiguously distinguished. They have attracted attention as drivers of innovative changes in traditional financial services and opened up a wide debate among regulators, financial market participants, consumers and scientists. The FinTech financing transformation processes are discussed with respect to the changes in internal business processes, the management of product and service promotion channels, financial analytics, the impact on the financial sector, competition, financial stability, regulatory organization (Alt and Puschmann [6], Davies et al. [7], Marjanovic and Murthy [8], S. Bunea, B. Kogan, A.-G. Kund [9]); T. Philippon [10], Gomber et al. [11], Pousttchi and Dehnert [12].

In the study of the problem aspects of financial intermediation, most researchers use two main approaches – a historical and evolutionary one, and a process one – in identifying the essence and role of FinTech in developing financial infrastructure, providing financial resources of the real sector of the economy, revealing various aspects of financial intermediation, financial sustainability of the intermediaries, their competition and interaction. The authors use the dialectic method, scientific generalization, as well as the institutional, systemic and analytical approaches for studying the functional features of modern digital technologies and assessing their potential, generalizing the practice of developing and introducing financial intermediaries of developed countries in order to determine the possibility of its further implementation.

The objective of the work is to study the principles of modern financial intermediation, identify strategic challenges and threats, and analyze the impact of digital technologies on the operational and functional activities of financial intermediaries, to substantiate the institutional, functional and social transformations of financial intermediation in a context of digital trends strengthening, and deepening of financial integration and convergence.

Results.

1. Basic principles of modern financial intermediation. Financial intermediation is the main institution of economic growth of the world national economies. Financial intermediation in the broadest sense is understood as a type of production activity in which an institutional unit assumes an obligation to acquire financial assets through participation in financial transactions in the market, and in the narrow sense, it means performing intermediary functions in the distribution of financial products or services. Today, we can state the disruption of stability of the structure of financial intermediation, the basis of which has long been formed by insurance companies, commercial banks, investment and pension funds, as financial conglomerates are forming, and high-tech companies of FinTech are entering the financial market, and their market activity has increased by 41% over the past five years.

Stability and success of financial intermediaries in the market can only be ensured by the efficient management of the flow of financial resources. Its main goals are to improve the quality of financial assets and perform intermediary functions, to ensure the optimal allocation of resources in the economy, and to generate profits. Achieving this is not possible without creating an integral and effective management system based on innovation, requiring a rethinking of organizational, procedural and other aspects of the activities of financial intermediaries. Herewith, the management process should be considered at the level of interdependence of objectives, division of responsibilities and powers with cost and performance management (table 1).

Practice shows that each stage of economic development corresponds to the forms of financial intermediation, which allow to understand its main motives. Thus, there is now a new stage in the expansion of financial intermediation, due to the dynamic development of modern digital technologies and the

Table 1 –The basic elements of financial intermediary activities management

Management	Elements of management	Directions in realization
Cost management	Attracting resources	Identifying customer needs
	Use of resources	Improving the quality of products and services
	Degree of profitability	Interest rate policy, liquidity management, risk management (forming reserves on financial instruments according to IFRS 9), financial security
Performance management	Technical capabilities	Stimulating the development of advanced technologies and products
	Accounting and control	Use of the accounting and reporting methodology according to IFRS for control purposes
	Analysis of results	Analysis of performance of planned results, management of deviations
	Personnel	Education, qualifications, competencies

emergence of such a phenomenon as FinTech, namely a new financial intermediary in the face of high-tech companies in the financial services market.

Taking into account the speed of change in the format of financial intermediation and the functioning of the financial services market with the involvement of FinTech, traditional financial intermediaries are trying to transform their business models for future development. The following principles are driving for them: 1) innovative modernization as a method of overcoming negative effects of crisis phenomena, increasing competition and disintermediation in the financial market; 2) the strategic priority which means the relevance of digital technologies introduction to the strategic priorities of financial intermediaries as development institutions; 3) strategic partnership – digitalization in the financial sector provides for deepening of financial integration on the basis of public-private partnership; 4) transparency of policy in the transparency and reliability of digital technologies; 5) personalization – the study of values and individual demand, the provision of personalized needs to take into account behavioral aspects of consumers in financial intermediation; 6) fair, reliable regulation – a moderate approach to regulatory controls, taking into account situational uncertainty, and self-regulation; 7) optimal balance of interests and risks – the will and capacity at the permissible risks of potentially negative effects to obtain the maximum positive effect of financial intermediation through the use of digital technologies.

2. The evolution of the concept of the business model of banks as financial intermediaries in the context of digitalization. Bank-centered financial systems in most countries determine the priorities, significance, universality, specialization and responsibility of banks as financial intermediaries. A business model reflects the business logic of the activities of a bank as a financial intermediary and evidence of its institutional positioning, creation of added value, generation of profit, own development and social value. However, the constancy of business models does not allow to respond promptly to changing market conditions, to fully use its own advantages of the existing customer base, established and diversified traditional channels of marketing of the banking product, access to funding sources and experience in organizing activities within regulatory constraints.

In recent years, the situation has changed fundamentally due to the emergence of FinTech, its high level of innovation and the use of the opportunity to enter the market of financial intermediation, guided by and using imbalances on the characteristics of the product offer of traditional participants and real needs and expectations of customers. The threat of losing market positions pushed banks to transform the business model and set up strategically mutually beneficial cooperation with FinTech-companies, that is, the construction of a business model adapted to the requirements and conditions of digitization. In such a business model, two subsystems can be distinguished: 1) work with clients, focused on the formation of the most qualitative client experience and its new value; 2) internal model of bank operation. This division defines the obligation of digital optimization of the mechanism of interaction with customers, creation of personalized banking products; provision of internal business processes of a bank; identification and understanding of customer needs (table 2).

The implementation of the principles laid down in the adaptation business model of a bank for further transformation into an ecosystem is carried out through the introduction of digital solutions (table 3).

Table 2 – Principles of functioning of the adaptation business model of a bank

Principle	Characteristics of properties
Client-oriented approach in implementing the product	greater personalization; instant interaction with the client in real time; accessible, transparent, reliable information about the bank; active actions of the bank, based on a deep understanding of client demands
Effective innovation development	reliable and effective IT support of the bank; continuous introduction of innovations; use of cloud technologies
Organizational flexibility	implementation of end-to-end internal processes; perception of the database as a separate asset; a deep understanding of the client and providing suggestions and prompts in real time; introduction of digital culture; organization of internal communication aimed at innovations in product development

Table 3 – Transformation directions of the adaptation business model of a bank

Direction	Transformation measures
The main banking product	developing end-to-end principles for digital products and services; implementing cross-products; advising clients on financial issues; providing product comparisons
Customer service technology	developing digital channels of interaction between the bank and the client; ensuring the highest level of privacy and customer data protection; monitoring client's impressions; Internet of Things; integration with social networks
Non-banking services	deep integration with non-banking services; partnership with non-banking institutions by opening an API and implementing joint projects

At the same time, non-traditional financial intermediaries seize the market and strengthen their own positions. They build business based on platforms and ecosystems, the fundamental difference of which is that the former are the online gateway or the integration layer between the back office systems of the bank and all its front-offices of interaction with customers, and the latter form an environment of effective interaction between banks, non-bank financial institutions and consumers around financial innovation to ensure the synergistic effect of their use and spread, as well as evolutionary development [13].

For example, for a product-oriented ecosystem, the goal is the value, that is offered through the product integrated with another, where the latter is used as the basic user interface. That is, the integration concept of the ecosystem is an effective market strategy, functional openness through any interface, the ability to create innovative products, and provide interoperability at the level of clients and institutions. If we consider the ecosystem at the bank level, then it can be noted that it is formed taking into account the existing business model and objective adaptation aspects, at the same time conceptually changing their logic, functional and technological paradigm (table 4).

Table 4 – The evolution of the concept of the business model of a bank

The traditional business model of a bank	The adaptation business model of the bank	Ecosystem
Satisfactory level of process automation	Digital end-to-end processes	Effective use of the API
Product implementation in service centers	Digital sales channels	The only digital channel for selling a multi-component product
Satisfactory level of service flexibility	Flexible and adaptive service	Deep integration with related services
Implementation of the product under generally defined conditions	Sales personalization	Extended personalization of multi-component product sales

The business model of Sberbank is illustrative as a client-centric ecosystem, when the bank becomes a platform for interaction in the "bank-client" relationship not only in the range of financial intermediary products and services, but also in the "society-client" and "bank-client-public-private partnership" relations. Digital technologies such as Open API (Open Application Programming Interface), Machine Learning, Big Data, Virtual reality technology, Artificial Intelligence, etc. are a unique gateway for this

kind of interaction and integration of financial and non-financial services. In this aspect, the adoption by the EU of the updating of the Payment Services Directive (PSD2) is essential to ensure an open architecture of financial services. It promotes consumer protection, regulates and clearly defines the interactions of financial intermediaries with regard to financial data and their accessibility for both banks and FinTech through the API.

In contrast, Ukrainian PrivatBank became the first bank in the world to open a public API that is currently used by almost 5,000 partners, including those outside Ukraine. The API allows transfers between bank cards, payments to cards of any bank of Ukraine and an international bank, purchase of Skype vouchers, selected face value, replenishment of mobile communication, sale of tickets for sports and leisure activities, etc.

Consequently, an ecosystem is the respond to the challenges of digitalization, which integrates business factors to increase value, strengthen financial sustainability and enhance competitiveness.

3. InsureTech is a new vector of insurance activity transformation. Digitalization processes are accompanied by the emergence of new types of risks, the complexity of which is due to the impossibility of quantification, the lack of relevant information on sources and causes of their occurrence, the effects of the impact and the size of potential losses for economic agents and financial intermediaries. This marked the emergence of InsurTech as an innovation of market players using information technology to provide solutions specific to the insurance industry [14].

The current trends in InsurTech should be considered from the point of view of transforming the insurer's essence as a subject of financial intermediation, the principles and approaches of insurance of new types of assets, the response to the proliferation of digital technologies in the insurance market and the need to change the business model.

In the context of the proliferation of digitalization processes, we are witnessing the transformation of the essence of an insurance company, namely: 1) a business entity – an insurance company that provides services connected with the protection of property interests of legal entities and citizens in case of an insurance event; 2) an institutional investor that attracts insurers' funds for further placement in income-earning assets, including digital ones; 3) an issuer developing share or debt securities, may be involved in the ICO mechanism, also when creating InsurTech; 4) a participant in information exchange – a miner; 5) a depositary user, namely, keeping his own funds in Bitcoin Wallets; 6) a participant in the sale and purchase of digital assets on special exchanges. Traditional functions of insurance intermediation acquire new features, and their implementation requires a balanced approach to achieving a compromise between income generation, redistribution of risks and compensation for losses.

Insurance companies act as active institutional investors, operate in the regulatory field and take into account legislative constraints. In investing activities, they must take into account investment risks and risks of investing in certain types of assets. Cryptographic assets and a growing demand for their insurance became something new in the practice of insurers. However, to date, digital assets do not refer to assets determined by the authorized body, which may be represented by insurance reserves. However, there is no direct prohibition on investing in free reserves in cryptographic assets. Therefore, the insurer decides on the expediency of placing funds in these assets, taking on the risk of possible losses from reducing their value and not receiving investment income. However, we note that the subjective nature of such a risk prevails over its objective nature, because it is speculative in content and not subject to insurance.

Thus, the emergence of cryptoassets as a new type of financial asset, and the development of the huge cryptocurrency market, on the one hand, lead to the need to insure cryptographic assets on deposit accounts, transactions and hedging risks of changing market conditions for the participant, and on the other hand, to the emergence of threats and new manifestations of financial risks for the insurer.

In particular, the latter are as follows: 1) credit – failure to fulfill contractual obligations by the counterparty of the insurer (issuer of cryptographic assets); 2) market – fluctuations in the value of assets; informational asymmetry, etc .; 3) operational – weaknesses in management, imperfection of the processes of information collection and processing, low level of control and reliability of technologies, errors and unauthorized personnel actions (internal fraud), etc.; 4) underwriting – lack of information for actuarial calculations; 5) investment – changes in market conditions. Among the needed mechanisms and means of reducing risk, there are schemes of insurance and service for insurance bonds through smart contracts, ratings of issuers, the model of scoring evaluation of ISO projects, the escrow mechanism, adapted risk management and reinsurance practices, etc.

Foreign practice demonstrates the integration of cryptocurrency exchange, digital investment platforms and international insurance brokers for risk insurance and insurance coverage, subject to legislative resolution. The spread of a new type of insurance, namely cyber insurance [15], is due to the need to provide institutional investors with reliable protection and safe storage of cryptographic assets on digital investment platforms, taking into account the growth and consequences of cyber attacks and cyber fraud. In particular, the participation of the insurance giants Lloyd's of London (Great Britain), Allianz (Germany), Hanwha Insurance (South Korea) indicates the promise of direct insurance of cryptographic asset safety services and guarantee of compensation for losses caused by cracking cryptocurrency exchanges.

At the same time, insurance companies are directly exposed to cyber-risk (internal and external), since they have significant amounts of information [16]. Violations of cyber resistance can lead to serious waste and losses, including the reputation and trust of society. In this connection, such actions are gaining importance in the insurance sector: by the regulator – the strengthening of control and supervision of common standards, and by insurers – the implementation of policies, procedures and technologies for ensuring cyber-stability on the basis of public-private partnership [17].

Digital technologies are objectively spread on the insurance market (table 5).

When solving the issue of integrating radical innovations, insurance companies make decisions about changing traditional business models, the development of which is extremely difficult to predict. Now, there is obviously a process of financial and technological integration of large international insurance companies and independent FinTech companies (Axel Springer, Plug and Play, Allianz, Startupbootcamp), that is, the desire to become the leaders in digital insurance. Other market participants may gradually be crowed out or become a small part of the market as a result of retaining the right to own customer data. The competition, which is currently gaining momentum, can gradually decrease as traditional insurers lose domination, and an integrated market is being formed. The information asymmetry will decrease, but will not be completely leveled.

Table 5 – Financial intermediary support for digital trends in the insurance market

Trend	Characteristic	Insurance companies which implemented the trend
Omni-channel	integration of various online and offline customer-centric communications channels into a single environment, self-service applications	Progressive Insurance (USA) Allianz Italy Intact Financial Corporation (Canada)
Virtual Digital Assistant, Chatbot	consulting financial assistance, purchase of insurance policy, preparation of an insurance offer	Lemonade (USA) PolicyPal (Singapore)
Big Data	financial analytics based on large amounts of information for market segmentation and personalization, fraud reduction, new driver discovery and improvement of claims settlement processes	John Hancock Financial, American Family Insurance, Nationwide Insurance (USA)
Digital signature, remote identification	transition to a digital form of insurance policy, ensuring mobility and efficiency, increase in productivity, cost reductions; behavioral biometrics	DAS Spain, Donegal Insurance Group, Gainsco Auto Insurance, American National (USA)
Blockchain	distributed data access, cost reductions, increased trust in online products, digital policies, smart contracts and claims administration	Ping An Insurance Group (China), American International Group (USA), AXA Group (France), Allianz (Germany)
Artificial Intelligence Technologies, AI	automation of insurance processes, portfolio management, credit analysis, machine learning for fraud prevention, underwriting and settlement of losses, risk assessment	Allianz (Germany) Mitsui Sumitomo (Japan) Lemonade (USA)
Internet of Things, IoT	new sources of information through the means of biometric monitoring, sensors of object control and geolocation systems, new opportunities in medical, personal and auto insurance	Munich Re (Germany) Progressive Insurance, Liberty Mutual Insurance, John Hancock Financial (USA)
Source: compiled on the basis of [18-22].		

Ukrainian insurance companies have an interesting attitude regarding the support of digital trends. Today, InsurTech technology capabilities on the Ukrainian insurance market are represented by the following startups: CIVILKIN – a web service and mobile application for the selection, purchase and management of insurance policies, EWA – SaaS insurance platform, Alfa Protection – a service for protection in the field of e-commerce, INSART – an insurance broker, which provides customer advisory services on risk and financial management [23].

Thus, with almost 300 insurance companies, a significant IT potential, more than 100 thousand specialists, the attraction of direct investments in InsurTech startups, for example, $ 3.8 billion in 2016, Ukrainian insurance companies have a unique opportunity to use digital technologies for overcoming the technological lag behind banks and raise the market of insurance services, coping with increasing competitive challenges, improving the efficiency of key insurance processes, enhancing customer loyalty and interest.

Discussion of results and conclusion. The further development of financial intermediation determines further study of modern practice of its transformation under the influence of digital trends in order to resolve such urgent issues:

1. Strategic management of financial intermediaries' innovative activity at macro and macro levels in the following priority directions:

- improvement of legal support and regulation of financial market participants' activities in order to ensure financial stability;
- improvement of legislation in the field of financial services consumers' rights protection;
- expansion of financial infrastructure due to financial integration of financial intermediaries (banking and non-banking institutions) with the aim to expand the spectrum and to increase the level of accessibility and quality of financial services;
- transformation of philosophy, principles, structure of organizational and economic mechanism and business models of financial intermediation for the formation of effective high-tech institutions with innovative strategies and customer-oriented ecosystems domination.

2. Deepening of client-oriented approach by using modern digital technologies (Big Data, AI, IOT, blockchain, machine learning and etc.) for the formation of new financial services based on a personalized approach and segmentation of target consumer categories.

3. Monitoring and assessing the economic and social influence of digitalization on financial intermediation, welfare and quality of life in society.

The real economy and dynamic changes in the financial market require a highly effective financial integration of traditional financial intermediaries and FinTech-companies, which should receive institutional and regulatory support, thus forming powerful financial intermediation and maintaining financial stability. This will be facilitated by innovative openness and activity, informational transparency of financial intermediaries due to modern digital technologies, taking additional measures to protect consumers of financial services and standardizing the latter, forming consortia in the "science-education-financial intermediation-state-public" system of relations.

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САНДЫҚ ТРЕНДТЕРДІ ТАРАТУ БАРЫСЫНДА ҚАРЖЫЛЫҚ ДЕЛДАЛДЫЛЫҚТЫ ТРАНСФОРМАЦИЯЛАУ

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ТРАНСФОРМАЦИЯ ФИНАНСОВОГО ПОСРЕДНИЧЕСТВА В УСЛОВИЯХ РАСПРОСТРАНЕНИЯ ЦИФРОВЫХ ТРЕНДОВ

Аннотация. В статье определены сущность, принципы, трансформация функций и элементы управления финансовым посредничеством как центральным институтом экономического роста в условиях распространения цифровых трендов. Рассматривая эволюцию концепции бизнес-модели банков как финансовых посредников, выявлены принципы функционирования их адаптационной бизнес-модели в условиях распространения процессов цифровизации, где главными принципами стали клиенто-ориентированный подход при реализации продукта, эффективное инновационное развитие, организационная гибкость. Для реализации адаптационной бизнес-модели обоснована система трансформационных мероприятий в направлениях создания основного банковского продукта, технологии обслуживания клиентов, небанковских услуг. Доказано, что эволюционный прогресс и процессы цифровизации обусловили потребность банков на основе адаптационной бизнес-модели создавать экосистему как эффективную интеграционную рыночную стратегию, которая обеспечивает функциональную открытость через любой интерфейс, возможность создания инновационных продуктов, взаимодействие на уровне клиентов и учреждений для роста стоимости, укрепления финансовой устойчивости и повышения конкурентоспособности. Систематизированы современные тенденции относительно трансформации сущности страховщика как субъекта финансового посредничества, принципов и подходов страхования новых видов активов и рисков; выявлены реакции на распространение цифровых технологий и поддержки цифровых трендов на страховом рынке; обоснована необходимость изменения бизнес-модели страховщиков.

Ключевые слова: инновации, финансовые инновации, финансовое посредничество, цифровая экономика, FinTech, InsureTech.

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REFERENCES

[1] Fintech Exit Activity Reached Record Year in 2018. [Online]. Available: https://www.venturescanner.com/blog/tags/top%20fintech%20companies (in Eng.).

[2] Pantielieieva N., Krynytsia S., Zhezherun Y., Rebryk M., Potapenko L. (2018) Digitization of the Economy of Ukraine: Strategic Challenges and Implementation Technologies // IEEE 9th International Conference on Dependable Systems, Services and Technologies (DESSERT). P. 508-515. doi:10.1109/DESSERT.2018.8409186 (in Eng.).

[3] Mergenbaeva T., Nurasheva K.K., Kulanova D.A., Abdikerimova G.I., Abishova A.U., Alibek A. (2019) IPO Market: transformation of savings into investments // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1, N 377. P. 119-125. ISSN 2518-1467 (Online), ISSN 1991-3494 (Print) https://doi.org/10.32014/2019.2518-1467.14 (in Eng.).

[4] Kenzhebayeva Zh.E., Yeskendirova D.M., Abdurakhmanova A.A., Bainazarova R.M., Sarieva A.M., Pestvenidze T.K. (2018) System analysis, management and processing of information // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2018. Vol. 5, N 375. P. 124-128. ISSN 2518-1467 (Online), ISSN 1991-3494 (Print) https://doi.org/10.32014/2018.2518-1467.16 (in Eng.).

[5] Kushzhanov N.V., Balginova K.M., Maydangalieva Z.A., Satygalieva G.B., Dashqin Mahammadli. (2018) The digital Kazakhstan. The developmemt of human resourses in education // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2018. Vol. 6, N 376. P. 82-94. ISSN 2518-1467 (Online), ISSN 1991-3494 (Print). https://doi.org/10.32014/2018.2518-1467.31 (in Eng.).

[6] Alt R., Puschmann T. (2012) The rise of customer-oriented banking – electronic markets are paving the way for change in the financial industry // Electronic Markets. 22(4): 203-215. doi:10.1007/s12525-012-0106-2 (in Eng.).

[7] Davies S., Jackett D., Kashyap M., Nicolacakis D. et al. Customers in the spotlight: How FinTech is reshaping banking // Global FinTech Survey. 2016. [Online]. Available: PricewaterhouseCoopers. https://www.pwc.com/il/he/bankim/assets/fintech-banking.pdf (in Eng.).

[8] Marjanovic O., Murthy V. (2016) From product-centric to customer-centric services in a financial institution – Exploring the organizational challenges of the transition process // Information Systems Frontiers. 18(3): 479-497. doi:10.1007/s10796-015-9606-x (in Eng.).

[9] Bunea S., Kogan B., Kund A.-G., Stolin D. Fintech and the banking bandwagon // Journal of Financial Transformation. 2018. 47:25-33. (in Eng.).

[10] Philippon T. The FinTech Opportunity // The National Bureau of Economic Research. 2016. doi:10.3386/w22476 (in Eng.).

[11] Gomber P., Koch J.-A., Siering M. Digital finance and FinTech: Current research and future research directions // Journal of Business Economics. 2017. 87(5):537-580. doi:10.1007/s11573-017-0852-x (in Eng.).

[12] Pousttchi K., Dehnert M. Exploring the digitalization impact on consumer decision making in retail banking // Electronic Markets. 2018. 28(3):265-286. doi:10.1007/s12525-017-0283-0 (in Eng.).

[13] Dapp Th.F. Fintech reloaded – Traditional banks as digital ecosystems. 2015. ISSN 1612-314X [Online]. Available: https://www.deutschebank.nl/nl/docs/Fintech_reloaded_Traditional_banks_as_digital_ecosystems.pdf (in Eng.).

[14] Stöckli E., Dremel C., Uebernickel F. Exploring characteristics and transformational capabilities of InsurTech innovations to understand insurance value creation in a digital world // Electronic Markets. 2018. 28(3):287-305. doi:10.1007/s12525-018-0304-7 (in Eng.).

[15] CRO Forum. The Cyber Risk Challenge and the Role of Insurance (2014) [Online]. Available: https://www.thecroforum.org/wp-content/uploads/2015/01/Cyber-Risk-Paper-version-24-1.pdf (in Eng.).

[16] Safarov R., Kushzhanov N. Methods for improving the socio-economic efficiency of state regulation of insurance activities in the digital economy // Bulletin of National academy of sciences of the Republic of Kazakhstan. 2018. 3(373):130-136. ISSN 1991-3494 (in Eng.).

[17] Issues Paper on Cyber Risk to the Insurance Sector (2016) [Online]. Available: https://www.iaisweb.org/page/supervisory-material/issues-papers//file/61857/issues-paper-on-cyber-risk-to-the-insurance-sector (in Eng.).

[18] Global State of FinTech Report (2018) [Online]. Available: https://gomedici.com/state-of-fintech-2018/ (in Eng.).

[19] The Internet of Things in insurance: shaping the right strategy, managing the right risks (2016) [Online]. Available: https://www.ey.com/Publication/vwLUAssets/EY_-_The_internet_of_things_in_insurance/$FILE/EY-the-internet-of-things-in-insurance.pdf (in Eng.).

[20] The Impact of Big Data on the Future of Insurance (2016) [Online]. Available: https://actuaries.asn.au/library/opinion/2016/bigdatagpweb.pdf (in Eng.)

[21] Big Data and Insurance: Implications for Innovation, Competition and Privacy (2018) [Online]. Available: https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/big_data_and_insurance_-_implications_for_innovation_competition_and_privacy.pdf (in Eng.).

[22] Insurance 2030 – The impact of AI on the future of insurance [Online]. Available: https://www.mckinsey.com/industries/financial-services/our-insights/insurance-2030-the-impact-of-ai-on-the-future-of-insurance (in Eng.).

[23] The FinTech in Ukraine report (2018) USAID Financial Sector Transformation Project [Online]. Available: http://data.unit.city/fintech/fgt34ko67mok/fintech_in_Ukraine_2018_en.pdf. (in Eng.).

[24] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[25] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[26] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[27] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[28] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[29] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[30] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state regulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[31] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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INTERNATIONAL ELECTORAL STANDARDS AND ELECTORAL LAW OF SUBJECTS OF THE RUSSIAN FEDERATION

Abstract. Research objective is the legal research of the international electoral standards applied at legal regulation of elections to public authorities of subjects of the Russian Federation.

The analysis, synthesis and legal method are applied. Contents of the Constitution of the Russian Federation, regarding use of rules of international law, international legal acts, including selective (Universal Declaration of Human Rights, International Covenant on Civil and Political Rights, Document of the Copenhagen meeting of the Conference on human measurement of CSCE, Convention on protection of Human Rights and Fundamental Freedoms and Convention on standards of democratic elections, electoral rights and freedoms in the State Parties of the CIS), decisions of the Constitutional Court of the Russian Federation and the Russian common courts in which these bodies applied electoral laws, decisions on electoral disputes of European Court of Human Rights and works of scientists are studied.

The author analyzes the ideas that in electoral law of subjects of the Russian Federation it is difficult to find consequences of application of the international electoral standards and comes to a conclusion that as this standards are the principles, the provided statement is exaggerated.

Keywords: international electoral standards, electoral law, subjects of the Russian Federation, Universal Declaration of Human Rights, International Covenant on Civil and Political Rights, Document of the Copenhagen Meeting of the Conference on the Human Dimension of the Conference for Security and Co-operation in Europe, Convention on protection of Human Rights and Fundamental Freedoms, Convention on standards of democratic elections.

Introduction. In the Constitution of the Russian Federation 1993 there are no basic provisions concerning elections and the electoral principles. Authors of the Constitution made an exception only for the election of the President of the Russian Federation, that he is elected for four years by citizens of the Russian Federation on the basis of general equal and direct suffrage by secret ballot (Paragraph 1 of Art. 81 of the Constitution of the Russian Federation). The researcher I. Zhuravleva notes that these principles are equally obligatory for all elections in the Russian Federation. It follows from Art. 15 of the Constitution of the Russian Federation according to which universally recognized principles and norms of international law are a component of a legal system of the Russian Federation [17]. The constitutional obligation of the electoral principles (general equal suffrage at free will, obligation of periodic elections) extend to all elections in Russia by interpretation of the Constitution of the Russian Federation with reference to universally recognized principles and norms of international law [1].

Methods. The analysis, synthesis and legal methods were used in the study of the international electoral standards applied at legal regulation of elections to public authorities of subjects of the Russian Federation.

Discussion and results. As observed by the Kazakh researchers Z.K. Ayupova and D.U. Kussainov and the American scientist W. Nagan all the legal systems of the world enter into cooperation especially in relation to those objects, and in those areas of public relations. This cooperation on specific issues directly and most significant influence on the intensity of the universalization of legal systems, the convergence of

legal families and the overall intensity of legal integration [2]. The primary sources for the international standards set forth in these guidelines are various international, regional and un declarations and conventions on human rights and other relevant legal documents. the more important of these instruments include the following: the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, the European Convention (together with its Protocols) for the Protection of Human Rights and Fundamental Freedoms, the Document of the Copenhagen Meeting of the Conference on the Human Dimension of the Conference for Security and Co-operation in Europe (CSCE), the American Declaration of the Rights and Duties of Man, the American Convention on Human Rights and the African Charter on Human and People's Rights [12]. Also, these sources of law are the most important international electoral acts. These standards have been endorsed in a series of authoritative conventions, treaties, protocols, and guidelines by agencies of the international community, notably by the decisions of the United Nations (UN) General Assembly, by regional bodies such as the OSCE, the Organization of American States, and the African Union, and by member states in the UN [5]. If electoral laws fail to meet the international standards, the electoral process will likely be marred by malpractice and irregularities [15].

The Constitutional Court of the Russian Federation extends the principle of equality on the right to elect and be elected to all public authorities and local governments irrespective of sex, races, nationalities, language and also other circumstances. In several decisions the Constitutional Court of the Russian Federation pleaded to the International Covenant on Civil and Political Rights and the Convention on Protection of Human Rights and Fundamental Freedoms [16].

At trial of electoral affairs Russian common courts appeal to international legal acts, Novosibirsk regional court established that extension of powers of the Novosibirsk regional council of deputies violates the electoral rights of citizens (provided by Art. 32 of the Constitution of the Russian Federation and also Art. 25 of the International Covenant on Civil and Political Rights of December 16, 1966 and Art. 21 of the Universal Declaration of Human Rights of 1948): the right to vote and be elected on true periodic elections. This decision of the Novosibirsk regional court is left without change by Judicial Board on Civil Cases of the Supreme Court of the Russian Federation [15].

According to Paragraph 4 of Art. 15 of the Constitution of the Russian Federation the universally-recognised norms of international law and international treaties and agreements of the Russian Federation shall be a component part of its legal system. If an international treaty or agreement of the Russian Federation establishes other rules than those envisaged by law, the rules of the international agreement shall be applied because the Russian federal and regional legislators are obliged to consider the following international obligations of the Russian Federation in the electoral lawmaking:

in the Universal Declaration of Human Rights it is said that everyone has the right to take part in the government of his country, directly or through freely chosen representatives. The will of the people shall be the basis of the authority of government; this will shall be expressed in periodic and genuine elections which shall be by universal and equal suffrage and shall be held by secret vote or by equivalent free voting procedures. (Parts 1 and 3 of Art. 21);

The International Covenant on Civil and Political Rights reproduces that every citizen shall have the right and the opportunity to take part in the conduct of public affairs, directly or through freely chosen representatives and to vote and to be elected at genuine periodic elections which shall be by universal and equal suffrage and shall be held by secret ballot, guaranteeing the free expression of the will of the electors (the paragraphs "a" and "b" of Article 25);

in Paragraphs 5, 5.1 Document of the Copenhagen Meeting of the Conference on the Human Dimension of the Conference for Security and Co-operation in Europe (CSCE) of June 29, 1990 the State Parties solemnly stated that among those elements of justice which are essential to the full expression of the inherent dignity and of the equal and inalienable rights of all human beings are free elections that will be held at reasonable intervals by secret ballot or by equivalent free voting procedure, under conditions which ensure in practice the free expression of the opinion of the electors in the choice of their representatives;

in Protocol to the European Convention on Protection of Human Rights and Fundamental Freedoms of March 20, 1952 is established that the High Contracting Parties undertake to hold free elections at

reasonable intervals by secret ballot, under conditions which will ensure the free expression of the opinion of the people in the choice of the legislature;

in the European Charter of Local Self-Government is said that local self-government denotes the right and the ability of local authorities, within the limits of the law, to regulate and manage a substantial share of public affairs under their own responsibility and in the interests of the local population. This right shall be exercised by councils or assemblies composed of members freely elected by secret ballot on the basis of direct, equal, universal suffrage, and which may possess executive organs responsible to them. This provision shall in no way affect recourse to assemblies of citizens, referendums or any other form of direct citizen participation where it is permitted by statute (Art. 3).

Universal international sources of electoral standards is also the Convention on the Political Rights of Women of December 20, 1952, the Convention on the Elimination of All Forms of Discrimination against Women of December 18, 1979, the International Convention on the Elimination of All Forms of Racial Discrimination of December 25, 1965.

One of the most volume international legal acts establishing electoral standards is the Convention on Standards of Democratic Elections, Electoral Rights and freedoms in the State Parties of the Commonwealth of the Independent States. This regional act fixes and opens the maintenance of next concepts: general, equal and direct suffrage; secret ballot; periodic, obligatory, open, public, free, genuine and fair elections; main beginnings of elections by electoral bodies and financings of elections; general order of the state information support of elections and propaganda activity; appeal and responsibility for violation of electoral rights and freedoms of citizens; status and powers of national and international observers; requirements to selective documentation; measures which should not be considered as discriminatory on elections.

Interesting sources of electoral international law is the Convention on Protection of Human Rights and Fundamental Freedoms as this act is applied and interpreted by the European Court of Human Rights. These law-enforcement acts as a matter of fact are obligatory for Russian federal and regional legislators. So, the European Court of Human Rights did not find violation of the European Convention in practice of creation of national electoral districts [8]. Though the Russian judicial practice recognizes creation of national electoral districts as illegal, however at corresponding change of the federal legislation creation of such constituencies will not contradict the international obligations of the Russian Federation.

In the Judgment of February 19, 1998 in the matter of Bowman against the United Kingdom the European Court of Human Rights recognized that, for all practical purposes, as a total barrier to Mrs Bowman's publishing information with a view to influencing the voters of Halifax in favour of an anti-abortion candidate. It is not satisfied that it was necessary thus to limit her expenditure to GBP 5 in order to achieve the legitimate aim of securing equality between candidates, particularly in view of the fact that there were no restrictions placed upon the freedom of the press to support or oppose the election of any particular candidate or upon political parties and their supporters to advertise at national or regional level, provided that such advertisements were not intended to promote or prejudice the electoral prospects of any particular candidate in any particular constituency. It accordingly concludes that the restriction in question was disproportionate to the aim pursued. It follows that there has been a violation of Article 10 of the Convention according to which everyone has the right to freedom of expression [6].

The European Court of Human Rights established by other decision that it is not any or disproportionate, and free will of the people is not interfered when choosing legislature by application of Art. 56 of Paragraph 3 of the Constitution of Greece establishing the prohibition to certain categories of public servants to the military personnel, serving legal entities of public law, state and municipal enterprises and institutions to propose the candidates in parliamentary elections and to be elected in any constituency of the country where they carried out the official duties more than three months for three years preceding elections. Moreover, these persons lose such rights even in case of their resignation before elections that it is not provided in relation to some other categories of the public servants falling under operation of Art. 56 of Paragraph 1 of the Constitution of Greece [7].

The legal position of the European Court of Human Rights that the order of pronouncement of decisions on compliance of candidates to the established requirements has to provide pronouncement of fair and objective decisions, prevention of abuses of authority from the corresponding officials, stated in the resolution of April 9, 2002 in the matter of Podkolzina against Latvia has to be a peculiar reference

point for legislators. The court considered the procedure of additional check of knowledge of a state language by candidates in Latvia which is not corresponding to this criterion and recognized that when the declarant was excluded from lists of candidates in parliamentary elections on the basis of insufficient knowledge of a state language, the provision of Protocol of the European Convention on protection of human rights was violated [9].

During the last 25 years, international human rights law has evolved considerably over the question of the best way to achieve the goal of democratic elections, and a set of criteria for democratic elections has gradually emerged based on international law, and the practice of States and inter-governmental organizations [12].

Conclusion. In jurisprudence the opinion was spoken that in in electoral law of subjects of the Russian Federation it is difficult to find consequences of application of the international electoral standards and comes to a conclusion that as this standards are the principles, the provided statement is exaggerated.

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ХАЛЫҚАРАЛЫҚ-ҚҰҚЫҚТЫҚ САЙЛАУ СТАНДАРТТАРЫ ЖӘНЕ РЕСЕЙ ФЕДЕРАЦИЯСЫ СУБЪЕКТТЕРІНІҢ САЙЛАУ ҚҰҚЫҒЫ

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МЕЖДУНАРОДНО-ПРАВОВЫЕ ИЗБИРАТЕЛЬНЫЕ СТАНДАРТЫ И ИЗБИРАТЕЛЬНОЕ ПРАВО СУБЪЕКТОВ РОССИЙСКОЙ ФЕДЕРАЦИИ

Аннотация. Целью исследования является юридический анализ международно-правовых избирательных стандартов, применяемых при правовом регулировании выборов в органы государственной власти субъектов РФ.

С применением анализа, синтеза и юридического метода изучены содержание Конституции РФ, в части применения норм международного права, международно-правовые акты, включая избирательные (Всеобщая декларация прав человека, Международный пакт о гражданских и политических правах, Документ Копенгагенского совещания Конференции по человеческому измерению СБСЕ, Конвенция о защите прав человека и основных свобод и Конвенция о стандартах демократических выборов, избирательных прав и свобод в государствах-участниках СНГ), решения Конституционного Суда РФ и российских судов общей юрисдикции, в которых названные суды ссылались на данные акты, а также решения по избирательным спорам Европейского Суда по правам человека и труды ученых-юристов.

В статье приводится мнение отдельных учёных-правоведов, что в избирательном праве субъектов Российской Федерации трудно обнаружить какие-либо отзвуки международных обязательств Российской Федерации в области избирательного процесса, однако, учитывая, что международные избирательные стандарты являются нормами-принципами, то можно прийти к выводу о преувеличенности данного утверждения.

Ключевые слова: международно-правовые избирательные стандарты, избирательное право, субъекты Российской Федерации, Всеобщая декларация прав человека, Международный пакт о гражданских и политических правах, Документ Копенгагенского совещания Конференции по человеческому измерению СБСЕ, Конвенция о защите прав человека и основных свобод, Конвенция о стандартах демократических выборов, избирательных прав и свобод в государствах-участниках СНГ.

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REFERENCES

[1] Alenicheva L.G. (1999) Constitutional basis of the ratio of federal and regional electoral law // Russian law journal [Zhurnal rossiyskogo prava]. 9: 9-15 (in Rus.).

[2] Ayupova Z.K., Kussainov D.U., Nagan W. (2019) Novelties in the Legal System as Motive Force of Legal Integration // News of the National academy of sciences of the Republic of Kazakhstan. Series of Social and Human Sciences. 1: 102-106. ISSN 2224-5294. https://doi.org/10.32014/2019.2224-5294.15 (in Eng.).

[3] Baimakhanova D.M., Ospanova D.A. (2018) Constitutional and Legal Consciousness as an Important Component of Constitutionalism and Its Role in the Solution of Human Rights Problems // News of the National academy of sciences of the Republic of Kazakhstan. Series of Social and Human Sciences. 5: 126-136. ISSN 2224-5294. https://doi.org/10.32014/2018.2224-5294.22 (in Eng.).

[4] Borisov I.B. (2000) International and domestic law in matters of elections. http://www.roiip.ru/public/law-in-el.htm (in Rus.).

[5] Carroll D.J., Davis-Roberts A. (2013) The Carter Center and Election Observation: An Obligations-Based Approach for Assessing Elections // Election Law Journal: Rules, Politics, and Policy. 12(1): 87-93. doi:10.1089/elj.2013.1215 (In Eng.).

[6] Case of Bowman v. the United Kingdom. Judgment of the European Court of Human Rights. https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-58134%22]} (in Eng.).

[7] Case of Gitonas and others v. Greece. Judgment of the European Court of Human Rights. https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-58038%22]} (in Eng.).

[8] Case of Mathieu-Mohin and Clerfayt v. Belgium. Judgment of the European Court of Human Rights. https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-57536%22]} (in Eng.).

[9] Case of Podkolzina v. Latvia. Judgment of the European Court of Human Rights. https://hudoc.echr.coe.int/eng#{%22fulltext%22:[%22Podkolzina%22],%22documentcollectionid2%22:[%22GRANDCHAMBER%22,%22CHAMBER%22],%22itemid%22:[%22001-60417%22]} (in Eng.).

[10] Foos V. Electoral law – the key to democracy. Evening Astana. 08/29/2013 (in Rus.).

[11] Hassan N.M. (2019) Flawed Laws, Flawed Elections: Local Elections in Pakistan // Election Law Journal: Rules, Politics, and Policy. 18(1): 1-15. doi:10.1089/elj.2017.0479 (in Eng.).

[12] International Electoral Standards. Guidelines for reviewing the legal framework of elections (2002) / Printed and bound by B. Tryckeri. Halmstad. ISBN 91-89098-88-9 (in Eng.).

[13] Mukashev R. (2002) Electoral law and democratization processes in the Republic of Kazakhstan // Policy [Sayasat]. 2: 10-17 (in Rus.).

[14] Mukhamedzhanov E.B. (2001) Electoral law of the Republic of Kazakhstan: theoretical and legal issues. Almaty: Zheti Zhargy. ISBN 5-7667-5067-6 (in Rus.).

[15] On some issues of the application by courts of the electoral law in the resolution of disputes related to the election of deputies of the State Duma of the Federal Assembly of the Russian Federation, the President of the Russian Federation, as well as to legislative (representative) and executive bodies of the subjects of the Russian Federation (1998) Bulletin of the Supreme Court of the Russian Federation. 1: 18-24; 2: 13-18 (in Rus.).

[16] The ordinance of the Constitutional Court of the Russian Federation "On the Case of Revision the Constitutionality of a part of the second Article 3 of the Law of the Orenburg Region of September 18, 1997 "About Elections of Deputies of Legislative Assembly of the Orenburg Region" of March 23, 2000 in Connection with the Complaint of Citizens G.S. Borisov, A.P. Buchnev, V.I. Loshmanov and L.G. Makhova". Russian newspaper. 04/26/2000 (in Rus.).

[17] Zhuravleva I.A. (1999) Problems of legal regulation of elections of deputies to representative (legislative) bodies of state power of subjects of the Russian Federation: Cand. Jurid. Sci. diss, Moscow Law Institute of the Ministry of Internal Affairs of Russia (in Rus.).

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ENVIRONMENTAL EDUCATION IN THE SYSTEM OF GLOBAL AND ADDITIONAL EDUCATION

Abstract. The purpose of the study is to analyze the significance of the role of global and additional education in the formation of common cultural, common human competencies of future generations. A comparative analysis of the characteristics of the content and forms of global and additional education in Russia and in the world makes it possible to assess the prospects of these types of education from the point of view of environmental education (edu-cation and upbringing) as an important component of human competences. Environmental education plays a strategic role in the system of global and additional education. Environmental education - the leading competence of students and trainees in relation to the world around them and themselves: the ability to live in harmony with nature and culture, with themselves and with society - leading orienteer global education. These benchmarks are also guidelines for students' self-development. The article deals with the pedagogical support of person's self-development in the context of solving the problem of self-development of the individual, acting as one of the leaders in the context of the globalization of modern education. The possibilities (pedagogical resources) of the additional education of the person in the self-development of the individual and the realization of pedagogical ideas of Russian space scientists are shown, the appeal to which acquires particular relevance in the light of the globalization of education.

Keywords: the globalization of education, self-development, subjectivity, pedagogical support of self-development of the person, additional education of the person, after-hour activity, cosmism, alternativism.

Introduction. Environmental education plays a strategic role in the system of global and additional education. Environmental education - the leading competence of students and trainees in relation to the world around them and themselves: the ability to live in harmony with nature and culture, with themselves and with society - leading orienteer global education. These benchmarks are also guidelines for students' self-development. In the world community, a system-holistic view of man and the world, science and education, arose at the turn of the XX and XXI centuries. This view presupposes the solution of the global problems of humankind, including the problems of education as a practice of development of the indi-vidual and society. Global education is a complex idea that is taught to enhance ones our understanding of the world. Students learning to be global citizens through global education will be able to learn more about the most significant issues of human life. This is the issues about international communities and migra-tions, problems of the corruption and social justice issues, problems of poverty and poverty, bioethical and biotechnological problems of mankind, problems of ecology and culture, science and arts, professional life and education, other global events, and international ideas in their typical classroom setting. Global Education will shape the way people understand themselves and the world to help better shape the world. It will foster service learning initiatives and activism within the different community, organizations, and families, and around the world (Friesen, 1995; Gaudiani, 1995). Global education that opens people's consciousness to the realities of the transnational and multi-religion interaction, multiregional and globa-lized world and awakens them to bring about a world of greater moral and spiritual, justice and equity, human duties and rights for all.

Global education is understood to encompass development education, human rights, and duties education, education for sustainable development, education for peace and conflict prevention and intercultural education; being the global dimension of education for citizenship and ecological harmony (Arpentieva, 2018; Arshinova, Tokar, Kuznetsova, Arpentieva, Kirichkova, Novakov, 2018; Kassymova, Stepanova, Stepanova, Menshikov, Gridneva, Arpentieva, and Merezhnikov, 2018; Lo, 1991; Milone, 1995; Ostheimer, 1995).

Literature Review. Global education promotes constructive humankind values and assists students and teachers (educators) to take responsibility for their actions and to see themselves as global citizens who can contribute to a more peaceful, just, harmonical and sustainable world. Global Education is a dimension that runs through the total schools curriculums, an extra filter to help person and educators make sense of all the information about themselves and the world and opinion. The world is throwing at them (Sinha, & Sinha, 1977; Banks, 2015). On methodology level, it combines some experiential and experimental (scientific) discussion-based activities, a caring, co-operative and open outlook on the classroom and other types of human experience, and core concerns. It combines some experiential and experimental (scientific) discussion about culture and nature of the world, about all countries, regions and groups, about the causes of poverty and inequality (here as well as in other countries), criminality and corruption, about the technical and social environment and about life meaning problems and dimensions. Global Education is an active learning process based on the universal values of love and tolerance, solidarity and co-operation, equality and non-violence, justice and moral, inclusion and participation, nobility and dignity. Global Education begins with raising awareness of global challenges such as poverty, unfair distribution of opportunities and resources, environmental degradation and climate change, violent conflict and non-respect of human rights. It then creates a deeper understanding of the complex underlying issues (Banks, 2015; Harris, and Morrison, 2012). Thereby it aims at changing people‘s attitudes and encourages them to reflect on their own role in the world. Global education motivates and empowers people to become active as responsible and active "global citizens" (Bajaj, Hantzopoulos, 2016). Global Education is a way of approaching and integrating different knowledge and skills. It integrates everything we teach about life and the world. It broadens understanding of the world and personal life horizons and encourages exploration of all subjects from a global perspective. It also contributes to the whole curriculum and enhances our understanding of the world. This education provides a comprehensive approach to educating for a just and sustainable future. It includes religious and historical trends that have molded our understanding of "peace" and then presents a variety of ways to practice peace education in schools and communities and explains how it can motivate students. The teaching and practice of peace, multicultural and other components of the global education provide a basis of valuable knowledge about resolving conflicts and transforming violence without the use of force, about living in harmony with nature and culture, social and personal essences.

Thus, one of the central ideas of global education is the idea of cosmism and alternativism. At different times and in different countries, the ideas of cosmism were developed by various investigators (I. Goethe, A. Einstein, P. Teilhard de Chardin, É.L. Le Roy, K. Jaspers, J. Nehru, D. Rumi, Chen Yu, Ali Nuri M.Kh. and other).Unfortunately, in Russia global education is a topic not disclosed. A number of similar approaches are devoted to its comprehension, including the research of scientists and practitioners in the field of studies of the evolution of humankind. Among them, we can especially highlight the works of philosophers, scientists, artists, ecclesiastics, who comprehend the co-evolution of man and nature, the role of space in this evolution,cosmism and alternativism (Hollstein, Penth, 1980; Le Roy, 1930;Maralov V, 2004; Perekusikina, 2013; Pushkareva, Pushkarev, Latukha O, 2007; Pushkin, 2012; Rogulin,1998). We can also single out the work of economists who consider the relationship and role of social, human and cultural capital in the development of production technologies on different turns and within the framework of different models of socio-political and economic development (Tarasenko, 2011a; Tarasenko, 2011). The solution of global problems of the present, ensuring the sustainable development of humankind as a planetary phenomenon, a prosperous future of society assumes the globalization of human consciousness and the concerted actions of the world's population to harmonize relations in the system "man-society-nature" (Tarasenko, 2011a: 335). Globalization today is one of the main factors of civilizational development (U. Beck, Kh. A. Barlybaev, A.S. Panarin, M.A. Muntean, A.D. Ursul, A.I. Utkin, etc.), while the process of globalization is interpreted as the formation of a single interconnected world,

the process of the unification of mankind on a worldwide scale (Kassymova, Stepanova, Stepanova, Menshikov, Gridneva, Arpentieva, and Merezhnikov, 2018; Tarasenko, 2011: 116). According to N.M. Mamedov, "the processes of globalization, unfolding in our time, fundamentally differ from their historical precedents. They embrace the person, society and nature in their multifaceted interrelations, manifest not only in vast territories but on the whole of our planet, in all countries of the world and touch upon vital interests, the future of every inhabitant of the Earth "(Mamedov, 2004: 34). In turn, the modern paradigm of education should reflect the cardinal changes in the character of human development at the beginning of the XXI century. The modern paradigm of education should be aimed at the formation of a personality capable of meeting the challenges of time. According to the researchers: V.V. Kazyutinskiy, A.S. Pushkareva, Yu. V. Pushkarev, O.A. Latukh and others, education is in the epicenter of globalization. The scientists note that it is here that a new generation is being formed, on which the real implementation will depend, both the positive aspects of globalization and the elimination of its negative consequences. Therefore, it is in the sphere of education that one must carefully study the phenomenon of globalization, its driving forces, its consequences, and influence these processes. Education in the modern world becomes an integrating factor and a condition for the development of the individual and the entire world community (there is the satisfaction of both individual and social needs) " (Pushkareva, Pushkarev, Latukha, 2007: 405-406).

At the level of UNESCO and the Council of Europe at the beginning of the XXI century, the concept of global education was formulated: "The Earth is our common home", the main tasks of which are: the formation of an understanding of the world on the basis of holistic (perception of the world as a whole) and humanistic views; education of the person responsible for all forms of life on Earth and in the cosmos; education of a person who is able to combine freedom of choice with personal responsibility for the decisions made, universal human interests with national ones, security in the world with tolerance, friendship among nations, etc. (Bajaj, 2016: 108). Proceeding from UNESCO documents, the main goal of the XXI century education is a full-fledged, qualitative development of the Person, one of the main tasks is the formation of a global understanding of the world. The modern development of the world community requires an innovative education that would form a person's ability to forestall the future and responsibility for it. One of the main objectives of the XXI century education should be to disclose the global interdependence, the integrity of all existing on the Earth and in the Universe, the discovery of the logic of the development of this relationship, the definition of a special role and responsibility of man for preserving this integrity and himself in it (Kassymova, Stepanova, Stepanova, Menshikov, Gridneva, Arpentieva, and Merezhnikov, 2018).

The idea of the formation of global responsibility makes it necessary to orient the modern educational process on preparing students for solving global problems, for spiritual and scientific development of the surrounding world, for the upbringing of moral qualities that meet the imperative of survival and sustainable development of human civilization (Pushkin, 2012: 141). In turn, the formation of global responsibility is an integral component of the process of self-development of the individual, assuming, on the one hand, freedom of choice. On the other hand, responsibility for its implementation. Turning to the definition of freedom, K. Rogers emphasizes that it is not limited to the choice of external alternatives, on the contrary, personal freedom is an existential quality of the individual, the ability to internal choice. Another important aspect of determining freedom is the responsibility for your choice. When a person chooses himself, he learns to take responsibility and keep an answer not only to others (such responsibility is of a formal nature) but also to himself, to his conscience (Rogers, 1994). Existential responsibility is the management of freedom as exits beyond the limits of social existence, which should be directed to the benefit of the person himself and surrounding people, of humanity as a whole. It should be noted that the idea of educating global responsibility was anticipated by Russian and other cosmists and alternativists (N.A. Berdyaev, V.I. Vernadskiy, K.N. Ventzel, V.S. Soloviev, N.K. Rerich and E.I. Rerich, E. I. Blavatskaya, E.T. Faddeev, A. D. Ursul, L. V. Leskov , N.F. Fedorov, N.G. Kholodniy, M. Montessory, K.E. Tsiolkovskiy, A.A. Bogdanov, A.L. Chizhevskiy, P. Teilhard de Chardin, E. Le Roy, K. Jaspers), whose ideas received special relevance in the context of the globalization of education.

In the context of the globalization of education, the following ideas of the philosophy of space education are of particular relevance: comprehension of the infinity of the Universe embodied in the infinity of cognition of the Cosmos and man as its particles; comprehension of the , personal freedom and existential

responsibility for one's choice; comprehension of the interdependence and continuity of man and the Cosmos; comprehension of the integrity of consciousness and a holistic view of oneself and the world around us; the proclamation of the idea of moral Unity of mankind and the Universe; comprehension of the priority of moral values and aims in the development and self-development of the individual and the search for ways of their development in education; comprehension of the leading task of education the creation of conditions for making a person highly competence, reflexive and moral, and therefore more perfect and happy; comprehension of the task of education as the creation of conditions for self-development, which can be embodied in the content of education and the educational methods used, techniques, technologies (Arpentieva, 2018; Arshinova, Tokar, Kuznetsova, Arpentieva, Kirichkova, Novakov, 2018; Kassymova, Stepanova, Stepanova, Menshikov, Gridneva, Arpentieva, and Merezhnikov, 2018).

The main feature of cosmism and alternativism is not in the contemplative attitude of man to the Earth and the Universe, but in the formation of his active position, since man is called upon to creatively and responsibly transform this World. It was within the framework of cosmism and alternativism at the beginning of the XX century that an understanding of the responsibility of the mind for resolving the contradictions between man and mankind, man and nature was born. Man is a creator, not a destroyer, Therefore cosmicists have always affirmed the priority of moral education. Perfection and self-development of man, in the opinion of space scientists, is the main task of pedagogy (V.I. Alekseeva, A.G. Gacheva, N.K. Gavryushin, V.E. Ermolaeva, V.V. Lytkin, V.M. Mapelman, I.I. Mochalov, S.G. Semenova, L. V. Fesenkova, K. Kh. Khairullin, L. V. Shaposhnikova, V. N. Yagodinskiy). The objectives of education, reflecting the axiological ideas of cosmism and alternativism, can be formulated as follows: child education as a citizen of the universe; The result should be a person's awareness of the community of his life with the life of the cosmic; child education as a free creative person (development of individuality, personal self-awareness); the result should be an individual's awareness of the meaning of his life in connection with the meaning of the existence of mankind and the world; child education as a member of society (development of social consciousness) and as part of the natural community; the result is a person's realization of his unity with humanity as a collection of individuals rising to higher forms of harmonic existence, and unity with the life of the Planet (Perekusikina, 2013; Rogulin,1998). The main "point of growth" of the modern educational system should be the formation of a new cosmic outlook for persons and teachers, the emergence of new meaningful landmarks as a result of comprehension by each person of the grandeur of its existence and purpose. The content of the educational process can be presented in the form of knowledge of the scientific and philosophical nature of the laws of the cosmos, the harmonious unity of man, mankind and the universe, the need to maintain and develop the original unity. Today, the pedagogy of the ideas of cosmism and alternativism, which found their actualization in the context of the globalization of education, can be presented in the context of educational practice for the implementation of pedagogical support for the self-development of persons in the conditions of education. The definition of the category of pedagogical support for self-development is based on the theoretical constructions proposed by V.G. Maralov, V.I. Slobodchikov and E.I. Isaev; V.E. Rogulin, other scientists. So, according to V.G. Maralov, the process of pedagogical support of personal self-development is an educational practice, involving the inclusion of an adult in the educational process with the goal of creating conditions for self-development, self-movement in the activities of all subjects of interaction (Maralov, 2004). According to V.I. Slobodchikov and E.I. Isaev, self-development is understood as the process of becoming “subjectness” in a given period. Self-development presupposes, on the one hand, personal freedom, on the other hand, responsibility before itself (Slobodchikov and Isaev, 2000). V.E. Rogulin gave a description of the ideas of cosmism and alternativism in the context of social and pedagogical problems (Rogulin,1998).

We believe that the greatest efficiency and effectiveness of psychological and pedagogical support for self-development of the person of different age groups is achieved in conditions of additional education. This is because the environment (conditions) of additional education for person have a number of important educational resources (opportunities) (Kassymova, Stepanova, Stepanova, Menshikov, Gridneva, Arpentieva, and Merezhnikov, 2018): the priority in personal development belongs to "self-processes" (self-knowledge, self-development, self-actualization, self-improvement, self-forecasting). This priority is expressed in providing the child with freedom of choice, taking into account the individual needs of the child and his family due to the variability and integrative character of complementary education. It manifests itself in the expansion and deepening of the educational space; the educational environment of

the person's association is favorable for the person to manifest their "I", self-expression in the circle of peers; person's association is a favorable environment for the formation of the subjectivity of the child, in the equal dialogue between the teacher and the child, the co-existence of children and adults is born; the absence of universal, uniform for all standards of the content of education and strict regulation of the educational process creates favorable conditions for creativity, initiative, success, self-knowledge, and self-development; in additional education there are conditions for the development of independence and individuality, responsibility and initiative of the child. These conditions arise, among other things, thanks to the person's self-government, which presupposes the responsible execution of various social roles; in additional education, there is a consideration of the pedagogical principle of the adoption and protection of the individual interests of the child. On the contrary, accounting for his academic merits is not the most important. The main thing - the creation of a teacher situation of success. Psychological and pedagogical support of the personal self-development in supplementary education is the creation of conditions conducive to the development of the subjectivity of person in the environment of a child-adult community. Psychological and pedagogical support of the personal self-development is organized in the form of a system of interaction accompanied and accompanying. As a result of the interaction, the child learns ways of independent and optimal (subjectively) realization of personal choice on the basis of the system of value orientations formed, as well as resolving emerging problems that impede self-development. The implementation of pedagogical support for the self-development of the person in supplementary education should take into account the peculiarities of the situation of personal choice. The choice is based on personal self-development. He creates conditions for self-determination.

Psychological and pedagogical support takes into account the following features of personal elections:

- the formation of the personal ideas about the plurality of options (alternatives) for education and life and formation of qualitative characteristics of the choice (the importance of choice, the assumption of responsibility for the choice, the experience of independent choice). Additional education develops a system of personal representations by offering him a system of educational areas of self-realization. Additional education develops the ability to choose by offering the student a system of educational areas of self-fulfillment, and also by creating conditions for the selection of person at different stages of development subjectivity (taking into account their age and other characteristics);

- the procedural aspect of the choice (assessment of the consequences of decision making and choice, the retention of the consequences of the choice, their correlation with the value system in the situation of "crossroads" in the moral choice, trying on probabilistic consequences). The procedural aspect of the choice is supported by an additional education through the development of the value-semantic sphere of the child, motivation for self-development through immersion in the content of additional education. Such education must be saturated with anthropo-cosmic ideas and existential values;

- the determinants of choice (the existence of independence, freedom of choice, the realization of one's vital, moral position at the time of the choice);and availability of readiness for selection (achievement of emotional satisfaction when making a choice, recognition of the decision as the best possible as a basis for self-acceptance, ability and willingness to accomplish independent elections and bear responsibility for them).The determinants of choice are supported by additional education through the search and correction of technologies of psychological and pedagogical support for person's self-development in education. Readiness for choice is supported by a teacher, a psychologist, a social worker by offering the child a system of educational areas of self-realization in supplementary education. They create conditions for making a choice and responsibility for the choice for a person who is at different stages of development of subjectivity (taking into account their age and other characteristics).

Results. The embodiment of the pedagogical ideas of Russian space scientists in the context of psychological and pedagogical support for the self-development of person is seen by scientists today in a number of aspects of the additional education: a)the use of forms of organization of classes that promote the development of personal freedom and the existential responsibility of person (open group discussion, discussion in the form of a television talk show, mini-conferences, trainings, design classes on the declared educational interests of person, research, viewing and discussion of videos with identification actual problems, social design); b)substantive emphasis of educational activities on the study of global and everyday problems; the priority of implementing integrated educational programs of different focus as a

condition for ensuring the formation of a holistic view of themselves and the world around them; c) the orientation of education on the formation and development of the student's awareness of the cause and effect relationships of his and others' actions, the world as a whole. Such awareness creates a basis for the accomplishment of an independent choice, taking into account the study of possible scenarios for the development of events, the investigation of the consequences of certain elections and the activity to implement them. Awareness of the choice contributes to the formation of responsibility for the decisions made; d)development of the person by additional educational programs of aerospace orientation. The development of these programs contributes to the development of the child's motivation for learning about himself and the Cosmos. The realization of its inseparable, involvement in the world around us, the Universe is combined with the formation and development of a truly scientific worldview.

The scientific worldview is based, in this context, on the tradition of cosmism and alternativism, the achievements of the aerospace industry, environmental science and global education. In addition, there is a development of a sense of patriotism and love for the Motherland, for the Earth. Development of cognitive abilities of a person, expansion of their outlook, formation of not only visual-figurative (empirical), but also theoretical thinking develops. In the process of further education, students acquire competencies in the field of research (the ability to put forward hypotheses and find the means of their adequate study). In parallel, the experience of self-knowledge and self-forecasting accumulates. An important part of this experience - personal and creative achievements as the results of student self-realization in additional education.

The content component of education can include the following aspects: providing extensive material for studying biographies of great people; help in understanding the concept of the Highest (the principle of having an ideal); Formation of the idea of Man as the Microcosm, who came to Earth to fulfill his personal mission to free the planet and people from the captivity of death and ignorance; creating conditions for the child to explore his personal potential and the capabilities of the "higher self", as well as studying ways of self-improvement; education of positive creative attitude to any kind of work, including educational, family, professional, understanding of the importance of meaningfulness and value fullness of labor; help in understanding the value of spiritual relationships and training in the norms of highly moral human relations; providing knowledge about Nature, about the laws of development and co-evolution of man and nature; the formation of an integral picture of the world, and, consequently, of the rich inner world of man, of love for the external world, its beauty and harmony.

As a result of the implementation of pedagogical support for the self-development of the person in supplementary education, the educational resources of the educational environment of basic and additional education are updated. Many important moments of human life are being formed and are developing: person is motivated to develop their subjectivity, their desire to know themselves and the world, to find their unique place in the world; there is a formation of a subjective position, one's own point of view, the ability to express one's opinion and defend one's position, to follow the principles of one's own; the idea of plurality of elections and freedom in decision-making is formed; the perception of the world as an integrity (as a unified system) is formed, the level of awareness of the world and life, their cause-and-effect relations, increases. Psychological and pedagogical support helps to understand the relationship between the choice of a person and its consequences. Thanks to him, the person's awareness of their involvement in the surrounding world, the country, the planet is actively formed; the person form and develop responsibility for their own destiny, life of their relatives, the country, the planet; increased awareness of their actions, the results of their choice, predicting the consequences of their decisions and actions from the point of view of their influence on man, nature, the planet; there is a statement in the minds of person of the priority of universal human, general cultural values; orientation is formed on humanistic principles in the exercise of independent choice; the ability to see alternative ways to solve the problem is formed and come to an independent choice; the motivation and willingness to accomplish independent elections based on value orientations are formed; criticality of thinking, overcoming of stereotypes, ability to display the individuality in different kinds of activity develops. These results of additional education directly correlate with the tasks of global education. Global education is the development of global thinking, the upbringing of a sense of the involvement of a person in the life of the planet Earth, our common home, the establishment of harmonious human relations with nature, with ourselves.

Global competency is defined in various ways, for example (Mestenhauser, 2011: 198; Hamza, 2010; Russo, & Sans, 2009; Reimers , 2009), global competency is the ability to define as Investigate the World, that is, to be aware of and interested in the world and its workings. This ability involves investigate and exploring globally significant questions and creating a coherent and complex response that considers multiple levels and perspectives and draws useful, defensible and creative conclusions. Global competency is the ability to weigh perspectives (of the understanding and activity). Students recognize that they have a particular perspective of the understanding and activity and those others may or may not share it. They can then articulate and explain the perspectives of the understanding and activity of other people and can compare their perspective with others and construct a new understanding and ways of action and life. Global competence entails effective and productive interaction and communication—both verbal and non-verbal with diverse audiences, opponents and proponents. Globally competent students are a proficient different language. They are also skilled users of digital media and other modern technology. Global competency is the ability to take action and participation. Globally competent students are able to weigh options based on evidence and insight, assess the potential for impact, consider possible consequences, and act and reflect on those actions. Globally competent students are able to cooperate and serve to other individuals and organizations. "Global competency [is] the knowledge and skills that help people understand the flat world in which they live and the skills to integrate across disciplinary domains to comprehend global affairs and events and to create possibilities to address them. Global competencies are also the attitudinal and ethical dispositions that make it possible to interact peacefully, respectfully and productively with fellow human beings from diverse geographies." (Reimers, 2010: 283). In education, the harmony of interests of a person, society, state, and business is necessary. Global education is education aimed at the formation and development of a person as an individual, as an individual and a professional, as a partner and member of the community. It is aimed at actualization and realization of the essence of man, his abilities and purpose in a certain cultural, historical and socio-political environment (Gunesch, 2004; Arpentieva, Duvalina, Gorelova, 2017; Arpentieva, 2016a; Kassymova, Stepanova, Stepanova, Menshikov, Gridneva, Arpentieva, and Merezhnikov, 2018).

"The time will come, and we will realize our kinship with Cosmos, our sonship in full and perfect degree, and we will gain Cosmic consciousness and reveal it in life. None of us can be excluded. We will deepen and expand our consciousness, and it will lead us to the most complete and perfect knowledge of our "I", our close connection and kinship with the Cosmos and Humanity, and from the depths of our spiritual life, we will shine like Cosmic Stars and Creative Humanity. They will illuminate all things before us, we will find them in ourselves, and our life will become one and the Holistic Creative life of the Cosmos and of all Humanity " (Ventzel, 1925: 15). Due to more or less directed space education in the form of a global or additional education for adults and children, a rapid expansion of cosmic consciousness is characteristic of the consciousness of a person of confusion; scientifically grounded and practically confirmed awareness of its inseparable relationship with the Cosmos; the need to understand their place and role in the universe, the universe as a whole; a holistic approach to understanding the world and understanding oneself in the world, dialogue with the world; ecological and ethical approaches in the study of life and the universe (L. Gindilis, G. Svyatokhina, I. Feodulova, N. Tarasenko, K. Sumnitelniy N. Dmitrieva, et al.). Philosophical-anthropological and pedagogical views and works of K. Ventzel, M. Montessori, K.E. Tsiolkovskiy, N. Fedorov, K.S. Lewis, and other researchers lead scientists and specialists to the conclusion about the relevance of space education for the modern educational process. At the same time, cosmic pedagogy of K. Ventzel, M. Montessori's idea of "cosmic education" and other theories of Russian and world cosmism are universal theories of the educational process, denoting the goal of upbringing and education, as well as human activity - becoming a cosmic creature and the fulfillment of its purpose - as part of the universe. K. Sumnitelniy and other researchers note the importance of cosmic education (Sumnitelniy, 2002): the acquisition of landmarks in the world of objects and the ability to arrange chaos, which for an ordinary, devoid of cosmic understanding, is the world around; creating on the basis of a holistic and "normalized" psyche a realistic picture of the world based on human experience (scientific knowledge) and independently determined paths of personal development; working out a position of life based on cosmic morality and expressing the subject's readiness for a creative transformation of the surrounding reality. Both in global and in additional education, the teacher needs to focus the attention of schoolchildren, students and another person on the following aspects of the process of forming a scientific worldview (Arpentieva, 2016b; Bazaluk, 2013; Matusevich, 2013): a) disclosure of the ideological nature of the process of knowledge of the Universe, for which it is necessary to acquaint students with the history of the development of ideas about the Universe, as well as with constantly

improving methods of astronomical research; b) attracting students' attention to the philosophical and ideological aspects of the basics of astronomy and astronautics; the formation of students a generalized view of the astronomical picture of the world; c) the formation and development of students' philosophical style of thinking based on the analysis of the most important discoveries in the field of astronomy. Astronomy, cosmology, and cosmonautics pose and strive to solve many fundamental issues of the universe, inextricably linked with the worldview of man, with the problems of human existence and humanity, with life and mind in the Universe, with an awareness of the role of the mind in the Universe.

Conclusion. It can be concluded that the educational process, which in its goals, principles, content, and technology relies on the global ideas of the philosophy of c cosmism and alternativism as a methodological basis, can provide an effective solution to the problem of the formation of the existential responsibility of the individual in the conditions of a globalizing world. Approaches to the organization of pedagogical support for the self-development of a person can find wide application in the educational practice of additional education and extracurricular activities in conditions of development Federal state educational standards. Pedagogical support for person's self-development in the conditions of education globalization is aimed at the global competency of the person.

Following the analyzed researchers, we can formulate a number of main groups of tasks of global and additional space education:

- to ensure, on an individual and universal scale, the formation and development of the self-identification of man as a planetary-cosmic being, including people's awareness of their purpose and the significance of their actions and choices for the development of civilization; to stimulate and guide the realization of the spiritual and creative intentions of each person in the interests of the qualitative development of the noosphere on the scale of earth and space;
- to improve ideas about the person of the future, the characteristics of which allow the noosphere to develop, prepare (train and educate) new generations in the direction of this presentation, develop and implement a system to stimulate the development of each person and humanity as a whole, provide people with equal and developmental conditions for self-realization and mutual implementation in the conditions of cooperation and competition;
- to ensure the transition from the realization of humanity in predominantly material forms (material products of labor) to material-virtual and spiritual-virtual forms, the attainment by mankind and each individual person of a state in which the values and goals of spiritual and moral development will lead;
- the consistent development of studies of planetary and cosmic evolution, the structure and mechanisms of the life of the Universe, in order to ensure the resettlement and reproduction of the Earth's noosphere on the scale of the Solar System and beyond (into galactic and intergalactic spaces);
- explore and create conditions for the successful formation and development of a perfect wandering psyche that has all the traditional and new virtues necessary for life in space: for the psyche born and formed under the conditions of an artificial material object (spacecraft, etc.) traveling in outer space;
- to develop the idea of humanity about itself as a single, synergistic, systemic education, including people as beings, guided by the goals and values of comprehending oneself and the world.

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ЭКОЛОГИЯЛЫҚ ІЛІМДЕ ҒАЛАМДЫҚ ЖӘНЕ ҚОСЫМША БІЛІМ БЕРУ

Аннотация. Зерттеудің мақсаты – болашақ ұрпақтың ортақ мәдени, ортақ адами құзыреттілігін қалыптастыруда жаһандық және қосымша білім беру рөлінің маңыздылығын талдау. Ресейде және әлемде жаһандық және қосымша білім берудің мазмұны мен формаларының салыстырмалы талдауы білім берудің осы түрлерін болашақта экологиялық білім беру (білім беру және тәрбиелеу) тұрғысынан маңызды деп бағалауға мүмкіндік береді. Бұл адамның құзыреттілігінің компоненті. Экологиялық ілім жаһандық және қосымша білім беру жүйесінде стратегиялық рөл атқарады. Экологиялық

ілім – студенттер мен тәрбиеленушілердің қоршаған ортаға және өздеріне қатысты: табиғатпен және мәдениетпен үйлесімді өмір сүру қабілеті, өздері және қоғаммен бірге жетекші бағдарлы әлемдік білім беру. Бұл бағдарлар студенттердің өзін-өзі дамытуға арналған әдістемелік нұсқаулар болып табылады. Мақалада қазіргі заманғы білім беру жаһандану жағдайында көшбасшылардың бірі ретінде әрекет ететін адамның өзін-өзі дамыту проблемасын шешу контекстінде адамның өзін-өзі дамытуын педагогикалық қолдау. Жеке тұлғаның өзін-өзі дамытуына және орыс ғарыш ғалымдарының педагогикалық идеяларын жүзеге асыруға адамның қосымша білім беру мүмкіндіктері (педагогикалық қорлар) көрсетіледі, олардың сұранысы білім берудің жаһандану жағдайында ерекше өзектілікке ие болады.

Түйін сөздер: білімнің жаһандануы, өзін-өзі дамыту, субъективтілік, тұлғаның өзін-өзі дамытудың педагогикалық сүйемелдеуі, адамның қосымша білім беруі, кейінгі қызмет, космизм, альтернативизм.

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ЭКОЛОГИЧЕСКОЕ ОБРАЗОВАНИЕ В СИСТЕМЕ ГЛОБАЛЬНОГО И ДОПОЛНИТЕЛЬНОГО ОБРАЗОВАНИЯ

Аннотация. Цель исследования – проанализировать значение глобального и дополнительного образования в формировании общекультурных, общечеловеческих компетенций будущих поколений. Сравнительный анализ характеристик содержания и форм глобального и дополнительного образования в России и в мире позволяет оценить перспективы этих видов образования с точки зрения экологического образования (образования и воспитания) как важного компонента человеческих компетенций, включая компетенции здоровьесбережения и развития. Экологическое образование играет центральную, стратегическую роль в системе глобального и дополнительного образования. Экологическое образование - ведущая компетенция студентов и школьников по отношению к окружающему их миру и себе: способность жить в гармонии с природой и культурой, с собой и с обществом, развиваться - ведущие ориентиры глобального образования. Эти ориентиры также являются руководством для самовоспитания и самообучения в контексте саморазвития студентов. В статье рассматривается педагогическая поддержка саморазвития личности в рамках проблемы саморазвития личности, данная проблема – одна из центральных в условиях глобализации современного образования. Авторами показаны возможности (педагогические ресурсы) дополнительного и глобального образования в (само)развитии личности, в том числе в контексте реализации педагогических идей российских и мировых ученых-космистов. Обращение к этим идеям и практикам развития человека и человечества приобретает все большую значимость и актуальность в свете глобализации образования.

Ключевые слова: глобализация образования, саморазвитие, субъективность, педагогическая поддержка саморазви-тия личности, дополнительное образование личности, внеурочная деятельность, космизм, альтернативность.

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REFERENCES

[1] Arpentieva M.R. (2016a) Innovative and traditional approaches to students' preparation for final attestation: the problem of learning styles // Testing and language progress assessment: traditions and innovations. Collection of scientific articles and materials of the international conference. March 21-22, 2016, Surgut. Southampton, Surgut: Southampton Solent University, Surgut State University: 5-11.

[2] Arpentieva M.R. (2016b). Xenopsychotherapy: space travel and transformations in science fiction. Philosophy and Cosmology. 1 (15): 163-181.

[3] Arpentieva M.R. (ed.) (2018) Psychodiagnostics, counselling and mediation in professional and unprofessional relationships. Canada, Toronto: Altaspera Publishing & Literary Agency Inc., 1-664.

[4] Arshinova V.V., Tokar A.V., Kuznetsova N.V., Arpentieva M.R., Kirichkova M.E., Novakov A.V. (2018) Travel therapy or psychotherapeutic tourism // Service in Russia and abroad. 12(3): 6-24. https://doi.org/10.1051/matecconf/201710201002

[5] Arpentieva M.R., Duvalina O.N., Gorelova I.V. (2017) Intersubjective management in aerospace engineering // In: Borikov V., Uchaikin S., Baranov P., Ivanova V., Dolgih A. and Ignatovskaya A. (Eds.) 5th International Forum for Young Scientists "Space Engineering" MATEC Web of Conferences. 12–14 April 2017. Tomsk: National Instruments Russia Corporation: 01002. doi.org/10.1051/matecconf/201710201002

[6] Almurzayeva B., Kussanova B., Summers D., Maydangalieva Z. (2019). Bilingual education in former soviet country: perspective and problems // The bulletin, of the National academy of sciences of the Republic of Kazakhstan. 2019. 2 (378), 43-54. https://doi.org/10.32014/2019.2518-1467.39

[7] Bajaj M., Hantzopoulos M. (Ed.) (2016) Peace education: international perspectives. Bloomsbur. 1-304.

[8] Banks J.A. (2015) Cultural Diversity and Education. London, New York: Routledge: 1-366.

[9] Banks J.A. (2015) Multicultural Education: Issues and Perspectives. New York: Wiley: 1-360.

[10] Bazaluk O.A. (2013) Cosmic education: New Realities // In: O. A. Bazaluk (ed.) Image of a human being of the future. Kiev: MFKO, 3: 13-26.

[11] Burganova R.I., Abdugalina S.E., Tuyakova A.E.. Improving the quality of education through student-centered education // News of the national academy of sciences of the Republic of Kazakhstan. Series of social and human sciences. 2018. Vol. 6, N 322. P. 102-104. ISSN 2224-5294. https://doi.org/10.32014/2018.2224-5294.40

[12] Friesen D., Kang H., McDougall B. (1995). Toward Global Horizons: Student Stories from an International Teacher Education Project // Action in Teacher Education. 17(2). 40-46. https://doi.org/10.1080/01626620.1995.10463242

[13] Gaudiani Cl.L. (1995). Global social development: Higher education's next moral commitment // Educatiopal Record, 76(1): 6-13.

[14] Gunesch K. (2004). Education for cosmopolitanism // Journal of Research in International Education. 3(3), 251-275. https://doi.org/10.1177/1475240904047355

[15] Hamza A. (2010). International experience: An opportunity for professional development in higher education // Journal of Studies in International Education. 14(1): 50-69. https://doi.org/10.1177/1028315308329793

[16] Harris I., Morrison M. (2012). Peace education. London: Jefferson, New York: McFarland: 1-292.

[17] Hollstein W., Penth B. (1980). Alternativprojekte: Beispiele gegen Resignation // Reinbeck bei Hamburg: Rowohlt: 1-459.

[18] Kassymova G.K., Stepanova G.A., Stepanova O.P., Menshikov P.V., Gridneva S.V., Arpentieva M.R., Merezhnikov A.P. (2018) Self-development management in educational globalization // International Journal of Education and Information. 12: 171-176.

[19] Kassymova G.K., Kosherbayeva A.N., Sangilbayev O.S., Schachl H., Cox N. (2018). Stress management techniques for students. Proceedings of the International Conference on the Theory and Practice of Personality Formation in Modern Society (ICTPPFMS 2018). https://doi.org/10.2991/ictppfms-18.2018.10

[20] Kenzhaliev O., Salykova L., Ilmaliyev Z., Sadykova (2018). Overview of problems in the management of commercialisation of capital-intensive scientific developments // Kompleksnoe Ispol′zovanie Mineral′nogo syr′â. 306 (3), 101-108. https://doi.org/10.31643/2018/6445.23

[21] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. (1). P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[22] Le Roy E. (1930) Les Origines Humaines et l'Evolution de l'Intelligence // Journal of Philosophy. 27(18): 497-500. https://doi.org/10.2307/2017010

[23] Lo D.E. (1991). Implementing a global curriculum // Gifted Education International. 7, 146-148.

[24] Mamedov N.M. (2004) Globalization as a modern state of social development // The era of global change. Moscow: 34-36.

[25] Maralov V.G. (2004) Fundamentals of self-knowledge and self-development: training. allowance. Moscow: Academy: 1-256.

[26] Matusevich T.V. (2013). Space education: modern philosophical and pedagogical discourse // Philosophy and Cosmology. 1 (11): 183-189.

[27] Mestenhauser J.A. (2011). Reflections on the past, present, and future of internationalizing higher education: Discovering opportunities to meet challenges. Minneapolis: GPSA, University of Minnesota: 1-198.

[28] Milone M.N. (1995). Global education begins at home // Technology & Learning. 16(3): 48-50 52.

[29] Ostheimer S. (1995). Internationalize yourself and your classes, school, and community // Business Education Forum. 76(1): 44-47

[30] Perekusikina N.A. (2013) Value-goal priorities of Russian cosmism as the world outlook basis of the educational process // Bulletin of the Buryat State University. 1:64-68.

[31] Pushkareva E.A., Pushkarev Yu.V., Latukha O.A. (2007) Russian education in the context of the innovative formation of the global organization of the socio-cultural space. Problems of the logic of sociocultural evolution and the philosophy of Western Siberia. Biysk: BSPU them. V.M. Shukshin: 404-405.

[32] Pushkin I.M. (2012) Formation of the global human responsibility in the light of the reforms of the national education // Bulletin of the Northern (Arctic) Federal University. Series: Humanities and Social Sciences. 1: 141-145.

[33] Reimers F. (2009). Global Competency' Is Imperative for Global Success // Chronicle of Higher Education. 55(21): A29.

[34] Reimers F. (2010) Educating for Global Competency. In: Cohen J. & Malin M. (Eds.), International perspectives on the goals of universal basic and secondary education. New York: Routledge Press: 183-202.

[35] Rogers K. R. (1994) A look at psychotherapy. The formation of man. Moscow: Progress: 1-480.

[36] Rogulin V.E. (1998) Russian cosmism and the modern alternative movement in the search for a new civilizational model. Ryazan: ROIRO Publ.: 1-188.

[37] Russo A., Sans A. (2009). Student communities and landscapes of creativity: How Venice "The World's most touristed city' is changing // European Urban and Regional Studies. 16(2): 161-175.https://doi.org/10.1177/0969776409102189

[38] Sinha A.K., Sinha U.P. (1977). Some socialization correlates of worldmindedness // Asian Journal of Psychology and Education. 2(3), 27-30.

[39] Slobodchikov V.I., Isaev E.I. (2000) Psychology of human development. Development of subjective reality in ontogenesis. Moscow: School-Press: 1-324.

[40] Sumnitelniy K.E. (2002) Pedagogicheskaya sistema M. Pedagogical system of M. Montessori in the field of Russian education // Bulletin of Moscow State Pedagogical University. 1: 96-100.

[41] Sheriyev M.N., Atymtayeva L.B., Beissembetov I.K., Kenzhaliyev B.K. Intelligence system for supporting human-computer interaction engineering processes // Applied Mathematics and Information Sciences. 2016. 10(3). P. 927-935. https://doi.org/10.18576/aims/100310

[42] Tarasenko N.G. (2011a) The problem of the formation of an integral worldview of the individual in the context of ideas of the philosophy of cosmism // Scientific Bulletin of Belarus State University. The humanities. 6 (101): 335-342.

[43] Tarasenko N.G. (2011b) The value of K.N. Ventzel's cosmic pedagogy and M. Montessori's ideas about "Cosmic education" in resolving the problem of the formation of a person's world outlook // Historical and Socio-Educational Thought. 5: 116-121.

[44] Ventzel K.N. (1925) Notes on cosmic education // Scientific archive of the Russian Academy of Education. Foundation. 23, 1: 1-16.

[45] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[46] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[47] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[48] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[49] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[50] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[51] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state re-gulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[52] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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INTEGRATIVE MODEL OF STUDENT AND TEACHER STRESS COPING: THE CORRECTION OF RELATIONS IN EDUCATIONAL, PROFESSIONAL AND PERSONAL INTERACTION

Abstract. This paper deals with stress, which is a major problem for students and teachers throughout the mo-dern world. Stress is a significant problem in our times and affects both the physical and mental health of people. The main objectives are to ascertain the extent to which stress affects students' academic success and health and to suggest some techniques and practices cope with stress for students. Stress coping methods are the physiological, behavioral, social and psychological methods to deal with stress (to its prevention and coping). Authors outline and suggest stress management techniques, which are easy to practice for students and teachers even during the lesson and in special activities. In addition to educational and professional stress, it is important to take into account the stresses of personal development and interpersonal relations, which are associated with the "private" or "intimate-personal" as well as social aspects and layers of relationships.

Keywords: stress, health, stress coping, students, teachers, creative abilities, network, values, crisis manage-ment, psychological assistance.

Introduction. Stress is a major problem for students throughout the modern world. Stress is a signi-ficant problem of our times, affects both the physical and mental, and spiritual health of people. Stress management techniques are easy to practice for students and teachers even during the lesson and in special activities (Kassymova, 2018c; Kassymova, Kosherbayeva, Sangilbayev, Schachl, Cox, 2018).

In developing an integrative coping model for students and teachers, it is important to consider the prevention and correction of stress in the context of correcting the development of the subjects of education in different contexts: in the context of educational or professional and personal interaction. Prevention and correction of stress in education is associated with the prevention and correction of pedio-genias (harm caused by incorrect, destructive, and pathologizing attitudes of teachers towards students), as well as correction and prevention of "mathetogenias" (harm caused by incorrect, devastating, and patho-logizing attitudes of students towards teachers). Although the share of the latter is supposed to be relatively small, it has been growing lately, as the tension between pupils and teachers is growing. Modern educational institutions often mark not only the "usual" forms of confrontation between teachers and students (in the form of lower grades, pickiness, situational conflicts, etc.) but also forms that are close to directional, group bullying and other forms of harassment.

Also typical are psychosomatic and mental disorders. In general, a psychosomatic type disorder refers to a clinically defined group of symptoms or behavioral signs that, in most cases, cause suffering and interfere with personal functioning. The severity and nature of the disorder are determined by the degree of deviation in the field of basic criteria of human health as a whole. For health, self-understanding is im-portant as awareness and a sense of continuity, constancy, and identity of different parts of yourself: physical, mental, spiritual. For health, the understanding of the world is also important as an experience

and an idea of the constancy and variability of the world, identity, and difference of experiences in situations of the same type. Self-reflection is very necessary as acceptance and criticality to oneself and to one's own mental production (activity) and its results. The most important point is the confirmation and "self-affirmation" as the correspondence (adequacy) of mental reactions to the strength and frequency of environmental influences, social circumstances, and situations. A healthy person needs self-government as the ability to control oneself in accordance with one's own, internal with them, and with external, social norms, rules and laws. A healthy person implements self-design as the ability to plan one's own livelihoods and implement plans. A person needs flexibility as the ability to change the way of behavior, depending on the change of life situations and circumstances. Mental disorders appear when a person persists in his mistakes, not wanting to "suffer" bodily and socially, does not admit that he did wrong, that his behavior violated moral values and was life-denying. At the same time, from the point of view of medical psychological and spiritual aspects of violations are secondary or background, however, from the point of view of a psychologist, as well as a healer and a priest, they are primary. As for infectious diseases, the psychological aspects of this type of health disorders of a small person are practically not studied: purely "medical" status is attributed to diseases, the causes of diseases are seen in foreign infections affecting a weakened or injured body, the consequences of diseases are considered solely negative: the purpose and value diseases as a uniquely destructive and undesirable phenomenon is denied.

However, every disease has a goal - the improvement of man and his relationship. Therefore, it is not surprising that an optimistic attitude and an active lifestyle are important predictors of somatic health and/or full recovery. The results of many studies "allow us to assert the existence of close relations with the state of the organism with such characteristics as: a system of attitudes towards one's health, an awareness of its value, an active attitude towards the disease, a level of self-understanding, attitude to life, a focus on a healthy future, ways of coping with stress. As D. Likken, for example, notes many other studies that the development of diseases "comes faster if the patient uses denial as a typical coping strategy, suppresses the manifestation of anger, demonstrates guilt or has recently experienced stressful events" (Likken, 2003, p. 696). Scientists describe such psychological characteristics of the sick as the feeling of dependence on the social environment and the lack of ability to act independently in life (they tend to shift the responsibility to other people and circumstances); the tendency of reproduction is the reproduction of strategies and stereotypes previously learned, the lack of desire to change them, even if they are ineffective, the desire to act "like everyone else", "as it should be", "as they are used to". In the process of psychological support for children with infectious diseases, support aimed at transforming the personality to oneself and the world is necessary, the leading modus of which is self-acceptance and peace, selfless service and mutual assistance, developmental orientation, and also complex aid to the child's body: pharmacological, physiotherapeutic and etc., as well as psychological assistance to his parents, family. In addition to educational and professional stress, therefore, in the work of preventing and correcting stress, developing the knowledge and skills of students and teachers in coping with stress, correction, and support of personal development and interpersonal relations are important. In general, the ability to cope with stress is a function of the harmony of intrapersonal and interpersonal relations. Asymmetries, disharmony, mistakes, and incompleteness of educational and professional relations often mark the problems of interpersonal and intrapersonal relations.These asymmetries manifest themselves in pedagogical and administrative conflicts, in psychological burnout, overwork, and depression, in deviant behavior and deformations (personal and professional type), in diseases and injuries, accidents, deaths, including murder and suicide. Very often, a person cannot cope with stress, if he is deprived of faith in himself and life, support of his family, friends, comrades, and colleagues, if weakened by illness and other injuries, if he does not have the knowledge and skills of co-development, he is not familiar with mechanisms of productive and effective transformation of stress and distress.

The main objectives of our investigation are to ascertain the ways, which stress affects teacher's and students' professional and academic success, satisfaction and health and to suggest some techniques and practices prevent and cope with stress for students. Stress coping methods are the physiological, cognitive, behavioral and psychological methods to deal with stress.

The main method of our investigation used has been to gather and analyses the relevant theoretical and empirical data. For this purpose, questionnaires about stress were randomly distributed to different student and teachers groups mostly at three Kazakhstani universities. The results obtained show that

students and teachers need to be given effective techniques and integrative anti-stress assistance to cope with stress while they are studying and work. In addition to educational and professional stress, it is important to take into account the stresses of personal development and interpersonal relations, which are associated with the "private" or "intimate-personal" as well as social aspects and layers of relationships. These are, for example, such characteristics as the social distance of relations between groups, the social status of a person and a group, the presence, and absence of stigmatization and isolation (ghettoization), readiness for close, trusting relationships, friendship, love, parenthood and mentoring, etc.

Results and its discussion. After a thorough literature review in major databases stress management techniques were identified. Stress can be managed through the introduction of a stress management course and engaging in extracurricular physical and mental activities. These techniques are easy to learn and practice, with excellent results in individuals with sound health or even those with health issues. They are beneficial and very helpful for both groups' school stakeholders, teachers, and students (Kassymova, 2018a; Kassymova, Kosherbayeva, Sangilbayev, Schachl, Cox, 2018). Distress and its consequences are especially dangerous, including widely known post-traumatic stress, which, in fact, is an accumulation of injuries and stresses. Such injuries are becoming more common in the relations of subjects of education: pediogeny and mathetogeny, psychological burnout, and professional and personal information are typical results of the relationship of bullying between students, between teachers, and between teachers and students.

Stress is a survival program and has some negative effects on teaching and learning and openness of the man to the world in whole. The focus idea in this context is based on different stress management techniques. To cope with stress there are recommended some types of yoga exercises, meditation, and other relax-technologies. An intensive focus should be put on physical exercise: it contains positive impacts not only on health but also on cognitive learning (Kassymova, 2018b). In addition, a very important point is psychological regulation and the observance of the moral principles of attitudes towards themselves and the world. Interactive and group practices of educational work are also very useful (Kassymova, Stepanova, Stepanova, MenshikovArpentievaMerezhnikov, Kunakovskaya, 2018). In an atmosphere of psychological security, full-time and part-time (including network) forms of work contribute to the formation and strengthening of knowledge and skills in the field of coping with stress (Stepanova, Tashcheva, Stepanova, Menshikov, Kassymova, Arpentieva, Tokar, 2018). The need to build management, cooperation and network interaction of educational organizations of all levels is explained by the high demand for the efforts of leading specialists, scientists, methodologists, and practitioners in order to improve the quality and accessibility of General and special education. The model of network interaction in education contributes to activation of participation of educational organizations in solving specific educational problems of teaching children and adult. It is increasing the efficiency of the use of methodological resources. The model of network interaction in education expanding opportunities for training, pedagogical skills and psychological and pedagogical competence of teaching staff. It is improving the management of educational processes and organizations, raising the level of social and human capital (Stepanova, Tashcheva, Stepanova, Menshikov, Kassymova, Arpentieva, Tokar, 2018).

It is also important to note that although internet-based education has many unsolved problems and issues, in general, going out into the wide world of human knowledge and skills is useful and enhances a person's ability to resist negative influences and productively cope with stress. The leading changes in education associated with digital learning are that digital learning develops the cognitive competence of schoolchildren and students. The use of e-learning stimulates the development of metacognitive components of cognitive competence, and also activates the declarative and procedural components of cognitive activity (Kassymova, Arpentieva, Kosherbayeva, Triyono, Sangilbayev, Kenzhaliyev, 2019). The management of children's and adult's self-development in additional and other levels and types of an ecological education is very impotent in the context of the educational globalization. The possibilities (managerial and pedagogical resources) of the additional education of children and adults in the self-development of the individual and the realization of pedagogical ideas of Russian and world space scientists are shown, the appeal to which acquires particular relevance in the light of the globalization of education (Kassymova, Stepanova, Stepanova, MenshikovArpentievaMerezhnikov, Kunakovskaya, 2018). In the correction and strengthening of the value system, the formation of an ecological or holistic ("global") understanding of oneself and the world by a person plays an important role. "Cosmic Consciousness" includes the

reflection of a huge number of connections of the Universe, life, which attempts to focus and hyperbolize situational stress, destroys self-centeredness and stimulates the desire to learn from life, rather than escape from it. We carried out a theoretical and empirical study of the influence of socio-psychological correction of behaviors deviations, health and other problems on changing behavior. This influence on the value system of persons carried out in the form of a program of value-motivational development. As a result of such an investigation, the positive impact of disclosing the internal motivation, revealing the true meanings of one's own activity, was revealed, which, in turn, positively affects the orientation of behavior towards the normative orientation and positively affects to the health and stress (to its coping and prevention) (Stepanova, Gridneva, Menshikov, Kassimova, Tokar, Merezhnikov, Arpentieva, 2019).

The important source of resistance to stress is a person's creative abilities. Stress and creative abilities of a person interact ambiguously. On the one hand, stress suppresses creative abilities, as well as all other intellectual abilities of a person. On the other hand, stress encourages people to search for new forms of response, that is, to creativity. The nature of creativity in a stressful situation is largely related to the type of stress. The more extensive stress a person experiences, than higher and larger his creative achievements. On the third hand, the creative abilities of the individual help her to undergo stress easily, sometimes not noticing them. On the fourth hand, the creative abilities of a person "lead" him to specific stressful situations associated with the need for its realization, as well as with the opposition of creative and reproductive (stereotypical) social patterns of life activity. There are some interesting problem-solving methods, they can integrate into the crisis management system in psychological counseling and training in the academic service of psychological assistance (support for students and teachers), etc. Our investigation clear demonstrate what consulting and seminars on stress management and other technologies and practices there is very necessary (Kassymova, Tokar, Tashcheva, Slepukhina, Gridneva, Bazhenova, Shpakovskaya, Arpentieva, 2019).

The important point of violations and reduce the ability to cope with stress is alienation, and, especially, self-alienation. If a person is in conflict with himself and his life, for example, he gets an unwanted profession, learns among unpleasant people that learn from those he does not respect, etc. It is especially difficult for him to adapt and develop. Unfortunately, collisions of this level are usually investigated only in the context of spiritual and religious assistance. In classical psychiatry, medicine, and psychology, these conditions are described and studied far less than "post-traumatic stress disorder." (Herlofsen, 1996; Lebigot, 2001). It is more or less described in the similar phenomena of "sociopathy" and "psychopathy." Working with such people is difficult, and the essence of the violation (inability and unwillingness, inability and refusal to be a man and disagreement with the world) usually remains outside the attention of specialists. At the same time, the consumer society, which has become the label of the modern "civilization", which extols anomie and tolerance, physical and social well-being, is the basis for the formation of what can be called "social cannibalism". Starting as a desire and pleasure to destroy one's own peers in the competitive struggle for survival and reproduction, social cannibalism develops into a refusal to recognize them as human beings, and the final stage of the violation is a refusal to consider oneself a man. Educators and even students of this type are more and more common in schools and universities. From the point of view of the organic "substrate", this violation, strictly speaking, is not a mental disorder. It refers to violations occurring in the sphere of spiritual and moral, sometimes for a long time does not manifest in any way at all, even in states of depression of apathy (psychological burnout, etc.). However, at the final stages, moral self-destruction is accompanied by destruction at the level of functional and organic systems. Physical and facial asymmetries and deformations, deviant and delicate behavior, etc., are striking external manifestations, violations of cardiovascular activity, heart attacks). At the level of the psyche, manifestations are injuries and manifestations similar to post-traumatic stress disorder in other situations with numerous injuries and heartiness, for example, with the state of victims of terrorist acts and wars, but with some modifications. Thus, disorders of identification and a combination of "delusions of grandeur" with self-abasement are typical. The need for self-justification is transformed into bragging, the exaltation of violence and its capacity for violence. Fear of death, violence, and betrayal, transforming into love for death, violence, and betrayal, including sexual perversions (coprophagy, etc.), "trump-upness", complaints and denunciations and similar violations. This deformation, which M. R. Arpentieva denoted the concept of "pre-traumatic stress disorder," is also, by its nature, distress. However, it is not always possible to call him post-traumatic: in this case, the stress and trans-ordinary events

associated with it are the choice of the person himself. In this sense, pre-traumatic stress is similar to the symptoms of self-damaging behavior observed in a number of forms of schizophrenia. Pro-traumatic stress disorder due to the fact that a person deliberately creates a situation that somehow injures himself and others. It can be assumed that it is a form of compensation for the states of helplessness and powerlessness experienced and experienced by a person throughout his life: from early childhood to adulthood. Without knowing how to get away from violence, a person creates his endless "circles" and "spiral". The spiral of violence, unwinding, involves all new participants, including those who perform the functions of the "final situation" for the one who activated it. In fact, pro-traumatic stress is aimed at the self-destruction of a person and those around him. Post-traumatic stress, in contrast, is the survival of the person and those around him.

Post-traumatic stress, on the contrary, is the survival of a person and those around him. In pro-traumatic stress, the goal itself and the accompanying value-semantic aspects of the experiences and actions of the individual are distorted. In the post-traumatic - the "psycho-technical" aspects of human experiences and actions are not so much violated as the target, value-sense ones. Post-traumatic stress is overcome, therefore, through the awareness of the person and the support of others around his awareness of the goal of experiences and actions in the trans-ordinary and post-trans-ordinary situation – "survival". Pro-traumatic stress - through the total transformation of the basic meanings of human life. Unfortunately, such a transformation is often impossible: in helping such a person, neither the state, nor specialists, nor the person himself, who is easier to die than change, can be unprepared and unmotivated. In addition, a number of survivors of pre-traumatic stressful events continue to live quite calmly after them: a consumer society with its anomie and pseudo-tolerance represents an optimal living environment that does not induce a person to repent and does not set himself any tasks other than those he is used to setting: survival at the expense of other people. Perhaps this is the secret to the low level of knowledge of such violations and their carriers: the beginning studies of bullying (harassment) and "stalking" (harassment) are too fragmented to comprehend the full extent of the violence that is occurring, even by the example of an individual or group (Arpentieva, Gorelova, 2017). In one way or another, the whole "civilization" suffers from this "disease": failure to understand what violence is, inability to work with it, "break" the circles of violence and the consequences of violence on a social, psychological and somatic level are not peculiar to patients and clients. but also to specialists. Until the question of the ubiquity of violence and a culture of violence is raised, as long as violence is relied upon by the "legitimate attribute" of power and the "illegal attribute" in relations between people not included, different forms of mass and individual violence under various pretexts and in different forms will develop.

There are exaggerated ideas that these subjects are incurable, although very attractive as a challenge to society and the state, for others who are "silent", unlike "lambs". Therefore, in communities, periodically or constantly there is a fashion for massacres, carried out by some "peaceful citizens" against other civilians, as well as "cleansing" and "lustration" of the state level. In civilized countries, ideas are actively spreading that a person needs to emit negative energy and the right to violence and even murder and the behavior of neighbors: at least sometimes, at least symbolically. In addition, while ordinary (everyday) gets used to the idea of everyday violence, in trans-ordinary situations where violence reaches its peak, this "habit" reveals its complete inconsistency: a person faces death no longer by someone else's, but by their own experience. Moreover, this leads him to the idea of correction and transformation, the need for the rehabilitation and prevention of violence and its consequences.

The central point of the rehabilitation of a person and society as a whole is the awareness of the essence of violence in a person's life, its role in the development or destruction of a person's self-consciousness. "Self-consciousness is the main goal of a person, manifested in the aspirations of all things." However, he is confronted with violence living in the world and in the soul of a person: "... violence opposes to him a closed sphere ... awareness of this sphere is inaccessible to those who lack violence (it is inaccessible, in particular, when violence distorts consciousness and leads to disorder). In other words, since man is the product of two opposing principles, an awareness of what he is impossible for him. "He certainly loses in one area what he gains in another," notes G. Bataille, analyzing sadism as one of the expressed, clinical forms of violence (Bataille, 1992, p. 92). M. Blancheau writes about this: "... between a normal person, driving a sadist to a dead end, and a sadist who turns this deadlock into a way out is the one who knows more than others about his true situation. He has a deeper understanding of it, therefore,

he is able to help a normal person to realize himself, helping him to change the conditions of any understanding ” (Blanchot, 1992, p. 52). These two fragments reveal the problem of violence in transnormal and ordinary, ordinary relationships and situations. Violence, in its essence, is a partial “antonym” of awareness. At V.V. Nalimov aggression is regarded as a function (an indicator) of incomprehension (Nalimov, 1993). Then what is awareness (understanding)? Relatively speaking, “violence” differs from “non-violence” by a measure of the awareness and use of violence: the degree of intervention in the inner world and the actions of another person, as well as the degree of violence towards himself. As a practice and rehabilitation studies in the field of victimology show, understanding situations of violence often allows you to understand two things (Bush and Folger, 1994; Fattah, 1997; Gold, 1993; Zehr, 2005; Flier, 2012). Firstly, any situation can be interpreted as violence, secondly, violence, even the most obvious, often reflects only a person’s powerlessness to understand and change what is happening. In addition, in this capacity - the inept attempt to be human, to survive where survival, according to psychiatrists and psychotherapists who survived concentration camps, wars, and other trans-ordinary events, they can be, if not transformed, then at least understood and prevented in the future.

It should also be noted that pro-traumatic stress disorder, although associated with sadism, the realization of sadistic aspirations, as well as the general desire for destruction and self-destruction, is not reduced to them. It includes the whole complex of consequences and causes of violence towards oneself and the world: the subject of the pro-traumatic disorder is at the same time both the victim and the persecutor. The pain that a person causes to others is also his pain, brought to the point of absurdity and hatred for himself and the world. He tries to guarantee his immortality, sowing death: “death is not mine” for him becomes life, a subjective guarantee of his immortality. As a natural continuation of the ideas of social competition and consumption, social cannibalism, which has actively progressed in the last century, leads to a total inversion of the relationship between life and death. The more suffering, death, and problems a person creates around himself, the more he realizes himself to be prosperous, immortal and perfect. Man, therefore, is rapidly emerging from the "human": subjectively - into the divine and immortal, destroying the "inferior" others, objectively - into the animal, into death and self-destruction.

In contrast to pro-rheumatic stress, “post-traumatic stress disorder” has been described and studied quite extensively. It was recorded as a diagnostic category as a condition that develops in a person experiencing a stressful event of a threatening or catastrophic nature, capable of causing general distress as early as the 80s of the 20th century. The beginning of research in this area was laid by the experiences of the world wars of the twentieth century. Psychiatrists described the symptoms of a military neurosis and proposed the concept of "shock from a contusion" (shell-shock), which explained its symptoms as a result of mental traumas received during explosions and shelling. They described the symptoms and long-term consequences of the mental trauma received during the fighting - military psychosis (“combat exhaustion”). When studying the state of political prisoners and prisoners of war, E. Minkovskiy’s syndrome was revealed [2; 3] (concentration camp syndrome) - apathy and depression, irritability, sleep disturbances, accompanied by difficulties in work and family life. It has long been described by scientists and the general for intense and prolonged injuries and significant losses of the syndrome of "emotional anesthesia" ("l'anesthésie affective"). It combines the phenomena of a peculiar insensitivity due to the long-term moral and physical suffering of many prisoners of Nazi concentration camps and modern prisons (destruction of the personality, narrowing of the range of interests, predominance of primitive, instinctive reactions). The duration, type, and a number of symptoms depend on the time spent in extreme conditions, the type of stress and the help provided. If a person is “sick” with post-traumatic stress, this means that he has experienced a traumatic event or a series of events, i.e. experienced something terrible that does not often happen to people. The horrors of war have an impact not only by their intensity but also by their frequent occurrence: injuries follow one after another. So that a person does not have time to "come to his senses." The other side of post-traumatic stress relates to the inner world of the individual and is associated with the person's reaction to the events experienced. All people respond to violence and other traumatic events in different ways. The tragic accident can cause serious injury to one person and almost does not affect the psyche of another. It is also very important at what point the event occurs. The same person may react differently at different times. Speaking about post-traumatic stress, they usually mean that a person has experienced one or several traumatic events. They are many-sided and deeply affected his psyche. These events were so different from all previous experiences or caused so much suffering that the person

responded with a violently negative reaction. A normal psyche in such a situation naturally seeks to alleviate the discomfort: a person who has experienced a similar reaction radically changes his attitude towards the world around him in order to make life even a little easier.

So, the integrative coping stress model draws attention to the comprehensive support of teachers and students in schools and universities. Its components are:

1) prevention, correction of violations and the development of knowledge and skills of subjects of education in the field of self-regulation at the physiological, psychological, social and moral levels,

2) the development of a person's creative abilities, his striving for self-realization, and, at the same time, the harmonization of attitudes towards other people, the development of knowledge and skills in the field of building harmonious educational, professional and personal relationships;

3) optimization of contact and distance learning and learning interaction, work teams, including in the framework of mediation of processes by means of the Internet and digital devices;

4) prevention and correction of pre-traumatic and post-traumatic disorders, bullying and other forms of violence and its consequences (mathetogeny, pediogeny, psychological burnout, occupational and personal deformities, diseases, accidents, injuries and deaths), the formation of a culture of violence - an understanding of its role and functions in people's relationships and inhuman activities;

5) the assertion of life and the refusal of discontent and accusations against other people, against one's own address and against life in general, the willingness and desire to efficiently and effectively process traumatic experiences;

6) the development of preventive and correctional stress management programs, the introduction of techniques and programs to cope with stress in education, including in the context of specialized occupations and practices, as well as psychotherapeutic-oriented pedagogical communication.

Conclusion. The ability to cope with stress is a function of the harmony of intrapersonal and interpersonal relations. In developing an integrative coping model for students and teachers, it is important to consider the prevention and correction of stress in the context of correcting the development of the subjects of education in different contexts: in the context of educational or professional and personal interaction. Prevention and correction of stress in education is associated with the prevention and correction of pediogenias (harm caused by incorrect, destructive, and pathologizing attitudes of teachers towards students), as well as correction and prevention of "mathetogenias" (harm caused by incorrect, devastating, and pathologizing attitudes of students towards teachers). Although the share of the latter is supposed to be relatively small, it has been growing lately, as the tension between pupils and teachers is growing. Modern educational institutions often mark not only the "usual" forms of confrontation between teachers and students (in the form of lower grades, pickiness, situational conflicts, etc.), but also forms that are close to directional, group bullying and other forms of harassment. In addition to educational and professional stress, therefore, in the work of preventing and correcting stress, developing the knowledge and skills of students and teachers in coping with stress, correction, and support of personal development and interpersonal relations are important. Students and teachers need to be given effective techniques and integrative anti-stress assistance to cope with stress while they are studying and work. In addition to educational and professional stress, it is important to take into account the stresses of personal development and interpersonal relations, which are associated with the "private" or "intimate-personal" as well as social aspects and layers of relationships. These are, for example, such characteristics as the social distance of relations between groups, the social status of a person and a group, the presence, and absence of stigmatization and isolation (ghettoization), readiness for close, trusting relationships, friendship, love, parenthood and mentoring, etc.

Compared to this definition, the essence of pre-traumatic stress disorder can be formulated as a condition that develops in a person who purposefully or "unknowingly" creates a stressful event that threatens others or catastrophic in nature, which can cause general distress in these people. For both disorders, "walking in a circle" is typical: the more stress, the more attempts to get out of it, and, thus, the more additional stress accumulating on the initial stress - in post-traumatic disorder; the more stress, the more attempts to increase and prolong stress. Therefore, the resolution of the situation in both cases requires consideration of the circular nature of the trauma. To overcome post-traumatic stress, you need - at the tactical level - to learn not to fight with experience and with yourself, but to "let go", allow events to be, "explain yourself" and, at the strategic level, just reconcile with something that causes the greatest

suffering. To overcome pro-traumatic stress, it is necessary, in fact, also, but somewhat differently: at a strategic, in-depth level - accepting the suffering of victims of violence, their awareness of themselves as subjects of violence against them, at the tactical level - dialogue with the subject of violence, recognition of his being Situations of violence. In both cases, victims and persecutors, gaining spontaneity and subjectivity, have access to the search for healing solutions and entering a new, healed reality.

The motivation for self-preservation (the need for security) is the fundamental motivational education of the individual, the implementation of which in every day and in transboundary situations is the main and necessary condition for existence. Associated with it are the motives (intentions) of understanding - of themselves and the world, the motives of relations – with people and the motives of transformation - of themselves and the world. The "paradigm of invulnerability", which characterizes everyday life, existence in an ordinary situation implies the fulfillment of the security condition as a matter of course. A person believes that he understands the world, has a satisfying relationship with people and is able to influence the world, to change. However, in a transnormal situation, the fulfillment of this condition is problematic, the understanding of oneself and the world is lost, the illusions of control and many of the illusions of relationships are lost. One of the leading problems is the problem of death as a problem of human choice: to live, trying to find a new meaning and a new life strategy, correct the "mistakes" of the past life, or die, refusing to return to the already familiar pain, suffering, habitual way of life and old meanings. Society and victims need a sincere, realistic understanding of what happened and accepting the experience of violence and its consequences – in themselves and others. Thus, the circle of violence can be broken: not only victims but also "persecutors" need help, as well as research and the practice of debriefing – "rescuers". Restorative work, in this way, includes the procedures for forming and reforming the culture of violence of a person and group (community). The most important thing is to teach a person not to become a victim of their own will and initiative: life teaches a person to cope with obstacles and problems, not to succumb to difficulties and pain. Therefore, complex work is needed, but not fragmentary. Different techniques and practices of coping with stress will be productive and effective only in the context of a comprehensive work with students and teachers.

Asymmetries, disharmony, mistakes, and incompleteness of educational and professional relations often mark the problems of interpersonal and intrapersonal relations. These asymmetries manifest themselves in pedagogical and administrative conflicts, in psychological burnout, overwork, and depression, in deviant behavior and deformations (personal and professional type), in diseases and injuries, accidents, deaths, including murder and suicide. Very often, a person cannot cope with stress, if he is deprived of faith in himself and life, support of his family, friends, comrades, and colleagues, if weakened by illness and other injuries, if he does not have the knowledge and skills of co-development, he is not familiar with mechanisms of productive and effective transformation of stress and distress.

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СТУДЕНТ ПЕН ОҚЫТУШЫЛАРДЫҢ СТРЕСС КОФИНГ ИНТЕГРАЦИЯЛЫҚ ҮЛГІСІ: БІЛІМДЕГІ, ПРОФЕССИОНАЛДЫ ЖӘНЕ ЖЕКЕ ТҰЛҒАЛЫҚ ҚАТЫНАСТАРДЫҢ НОРМАЛАРЫ

Аннотация. Мақалада қазіргі заманғы студенттер мен оқытушылар үшін басты проблема болып табылатын стресс қарастырылады. Стресс – біздің заманымыздағы маңызды мәселе және адамдардың физикалық және психикалық денсаулығына әсер етеді. Негізгі міндет – стрестің оқушылардың академиялық жетістіктері мен денсаулығына әсерін анықтау және кейбір әдістемелер мен дағдыларды студенттер үшінстреспен күресу

жолдарын зерттеу. Стресті жеңу әдісі – бұл стреске қарсы күресудің физиологиялық, мінез-құлық, әлеуметтік және психологиялық әдістер (оның алдын алу және күресу). Авторлар сабақ кезінде және арнайы іс-шараларда студенттер мен мұғалімдерге оңай тәжірибе беретін стресс басқару әдістерін анықтайды және ұсынады. Оқу және кәсіптік стрестен басқа, «жеке» немесе «жеке-дара», сондай-ақ әлеуметтік аспектілер мен қарым-қатынастар топтарымен байланысты жеке даму мен тұлғааралық қарым-қатынастың стрестері ескеріледі.

Түйін сөздер: стресс, денсаулық, стреспен күресу, студенттер, оқытушылар, шығармашылық қабілеттер, желі, құндылықтар, дағдарысты басқару, психологиялық көмек.

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ИНТЕГРАЦИОННАЯ МОДЕЛЬ СТУДЕНЧЕСКОГО И ПЕДАГОГИЧЕСКОГО СТРЕССА-КОПИНГА: КОРРЕКЦИЯ ОТНОШЕНИЙ В ОБРАЗОВАТЕЛЬНОМ, ПРОФЕССИОНАЛЬНОМ И ЛИЧНОМ ВЗАИМОДЕЙСТВИИ

Аннотация. Статья посвящена проблемам стрессов и совладания со стрессами. Стресс является серьезной проблемой для студентов и преподавателей в современном мире. Стресс также выступает как серьезная проблема в современном мире в целом. Он влияет как на физическое, так и на психическое, социальное и нравственное здоровье людей. Основными целями исследования являются выяснение того, в какой степени стресс влияет на успеваемость и здоровье учащихся, а также и трудовую активность и продуктивность педагогов (преподавателей и учителей), гармоничность и дисгармоничность отношений между ними. В работе предложены некоторые направления профилактики и совладания со стрессами, применения методов и приемов для преодоления стресса у учащихся и обучающихся, а также у педагогов, направленные на коррекцию и развитие гармоничных отношений между участниками образовательного процесса, а также на формирование и развитие ценностных ориентаций учеников и педагогов в отношении к себе и окружающему миру. Методы предотвращения и преодоления стресса включают физиологические, социальные и психологические методы борьбы со стрессом. Авторы в общих чертах обрисовывают направления и методы управления стрессом, предлагают те, которые легко и важно практиковать студентам и преподавателям, в том числе в рамках учебных занятий и во внеучебной деятельности. Авторы подчеркивают, что помимо образовательного и профессионального стресса, важно учитывать стрессы личностного развития и межличностных отношений, которые связаны с интимно-личностными (межличностными) и социальными (межгрупповыми)аспектами и уровнями отношений.

Ключевые слова: стресс, здоровье, преодоление стресса, студенты, учителя, творческие способности, сеть, ценности, антикризисное управление, психологическая помощь.

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REFERENCES

[1] Arpentieva M.R., Gorelova I.V. Management bulling: phenomenology, research, correction and prevention. Hg. Vl. Grinev Entwicklungsverläufe. Materialien der ersten internationalen wissenschaftlichen und praktischen Konferenz. Moskau, den 18. Oktober 2017 [Online-Ressource]. Berlin: West-Ost-Verlag Berlin, 2017. P. 274-286.

[2] Bataille G. Sad i ɵychnyy chelovek. Suverennyy chelovek Sada // In: Markiz de Sad i XX vek . M.: RIU «Kul'tura», 1992. P. 89-132.

[3] Blanchot M. Sad. In: V.V.Ryklin (comp.). Markiz de Sad i XX vek. M.: RIU «Kul'tura», 1992. P. 47-88 (in Rus.).

[4] Braithwaite J. Crime, Shame and Reintegration. Cambridge. UK: Cambridge University Press, 1998.

[5] Bush R.A.B., Folger J.P. The Promise of Mediation Responding to Conflict Through. San Francisco: Jossey-Bass, 1994.

[6] Dontsov A.I., Perelygina E.B. Security Problems of Communicative Strategies // Psychology in Russia: State of the Art. 2011. Vol. 1. P. 316-323. https://doi.org/10.11621/pir.2011.0020 (in Rus.).

[7] Fattah Ez. Towards a victim policy aimed at healing, not suffering / A. J Lurigio (ed.) Victims of crime. Thousand Oaks, CA: Sage, 1997.

[8] Flier A.Ya. Kul'turnye osnovaniya nasiliya // Znanie. Ponimanie. Umenie. 2012. Vol. 1. P. 19-25 (in Rus.).

[9] Gold L. Influencing Unconscious Influences. The Healing Dimension of Mediation // Mediation Quarterly. 1993. Vol. 11(1). P. 55-66. https://doi.org/10.1002/crq.3900110107

[10] Gizdatov G.G. Psycholinguistic study of the concepts of kazakhstani discourse // News of the National academy of sciences of the Republic of Kazakhstan. Series of social and human sciences. 2018. Vol. 5, N 321. P. 57-63. ISSN 2224-5294. https://doi.org/10.32014/2018. 2224-5294.10

[11] Herlofsen P. Group treatment in the aftermath of trauma // Balliere's Clinical Psychiatry. 1996. Vol. 2. P. 315-328.

[12] Kassymova G. (2018). Competence and its implications. Challenges of Science. https://doi.org/10.31643/2018.063

[13] Kassymova G. (2018). Stress management techniques recommended for students. Challenges of Science. https://doi.org/10.31643/2018.008

[14] Kassymova G.K., Stepanova G.A., Stepanova O.P., Menshikov P.V., Arpentieva M.R., Merezhnikov A.P., Kunakovskaya L.A. Self-development management in educational globalization // International journal of education and information technologies. 2018. Vol. 12(12). P. 171-176.

[15] Kassymova G.K., Tokar O.V., Tashcheva A.I., Slepukhina G.V., Gridneva S.V., Bazhenova N.G., Shpakovskaya E.Yu., Arpentieva M.R. Impact of stress on creative human resources and psychological counseling in crises // International journal of education and information technologies. 2019. Vol. 13(1). P. 26-32.

[16] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan/ 2019. (1). P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[17] Kassymova G.K., Kosherbayeva A.N., Sangilbayev O.S., Schachl H., Cox N. (2018). Stress management techniques for students // Advances in Social Science Education and Humanities Research или European Proceedings of Social and Behavioural Sciences (ASSEHR). Paris, France, Amsterdam, Netherlands: AtlantisPress, 2018. Vol. 198. Proceedings of the International Conference on the Theory and Practice of Personality Formation in Modern Society (ICTPPFMS 2018). https://doi.org/10.2991/ictppfms-18.2018.10

[18] Lebigot M. Psychological debriefing // Stress et Trauma. 2001. Vol. 1(3). P. 137-141.

[19] Likken D. Psychoneuroimmunology / R. Korsani, A. Auerbach (Eds.). Psychological Encyclopedia. SPb.: Peter, 2003. P. 695-699.

[20] Nalimov V.V. V poiskakh inykh smyslov. M.: Izdatel'skaya gruppa «Progress», 1993. 261 p. (in Rus.).

[21] Summers D., Balpeisova S., Maydangalieva Z., Utemissova G. (2019). The role in professional development of psychologist // The Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. 377(1). P. 54-62. https://doi.org/10.32014/2019.2518-1467.6

[22] Sheriyev M.N., Atymtayeva L.B., Beissembetov I.K., Kenzhaliyev B.K. Intelligence system for supporting human-computer interaction engineering processes // Applied Mathematics and Information Sciences. 2016. 10(3). P. 927-935. https://doi.org/10.18576/aims/100310

[23] Stepanova G.A., Tashcheva A.I., Stepanova O.P., Menshikov P.V., Kassymova G.K., Arpentieva M.R., Tokar O.V. The problem of management and implementation of innovative models of network interaction in inclusive education of persons with disabilities // International journal of education and information technologies. 2018. Vol. 12. P. 156-162.

[24] Stepanova O.P., Gridneva S.V., Menshikov P.V., Kassymova G.K., Tokar O.V., Merezhnikov A.P., Arpentieva M.R. Value-motivational sphere and prospects of the deviant behavior // International journal of education and information technologies. 2018. Vol. 12, P. 142-148.

[25] Zehr H. Changing Lenses. Scottdale, PA: Herald Press, 2005.

[26] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[27] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[28] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia – Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[29] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[30] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[31] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[32] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state re-gulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[33] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

[34] Nailya K. Nurlanova, Anel A. Kireyeva, Rashid M. Ruzanov // Journal of Asian Finance, Economics and Business. 2017. Vol. 4, N 2. P. 37-44 37. Print ISSN 2288-4637. Online ISSN 2288-4645. Evaluation of Economic Potential and Level of Concentration of the Regions of Kazakhstan Received: March 8, 2017. Revised: April 25, 2017. Accepted: May 2, 2017. https://doi:10.13106/jafeb.2017.vol4.no2.37

[35] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. 2018. Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability. Issues 6(2). P. 711-728. https://doi:org/10.9770/jesi.2018.6.2(17)

[36] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy // Procedia - Social and Behavioral Sciences. 2013. 89. P. 886-889. https://doi:org/10.1016/j.sbspro.2013.08.950

[37] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning // Bulletin of the National academy of sciences of the Republic of Kazakhstan. 2019. Vol. 1. P. 269-278. https://doi.org/10.32014/2019.2518-1467.31

[38] Alibekova G., Panzabekova A., Satpayeva Z., Abilkayir N. // IOP Conference Series: Earth and Environmental Science IOP Conf. Series: Earth and Environmental Science. 2018. 177. 012010 (Web of Science Conference Proceedings Index и Scopus). https://doi:10.1088/1755-1315/177/1/012010

[39] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation // Economic Annals - XXI. 2017. 166(7-8). P. 31-36 (Scopus). https://doi.org/10.21003/ea.V166-06

[40] Khalitova M.M., Praliev G.S., Panzabekova A.Z., Andreeva Z.M., Dzhubaliyeva Z.A. Financial instruments of state re-gulation industrial and innovative development of Kazakhstan economy // Life Sci J. 2014. 11(10s). P. 369-378. ISSN 1097-8135. http://www.lifesciencesite.com.70

[41] Khalitova M.M., Panzabekova A.Z., Berstembaeva R.K. Government debt of Kazakhstan under conditions ofthe global financial system`s instability // Life Sci J. 2014. 11(4s). P. 354-35. ISSN 1097-8135. http://www.lifesciencesite.com.63

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TO THE ISSUE OF INNOVATIVE DEVELOPMENT OF RAILWAY TRANSPORT IN KAZAKHSTAN

Abstract. The article discusses the issues of innovative development of railway transport, based on the targets of the "State program of infrastructure development "Nurly Zhol" for 2015 - 2019" and "Development strategy of JSC "NC "KTZ" until 2025". Innovative development of railway transport is determined through the current state of the company, which provide their innovative services in the industry. At the same time, it is known that in Kazakhstan its operator provides access to the main railway network, which is a natural monopolist of this industry in the person of National Company Kazakhstan Temirjoly JSC "NC "KTZ".

Railway transport is functionally divided into two parts: the main activity is the transportation of passengers and baggage transportation, which is carried out through several leading specialized companies belonging to JSC "NC "KTZ" as: Passenger transportation JSC, Zholaushylartrans Company, JSC Suburban Transportation, JSC Passenger Leasing Carriage Company, JSC Passenger Leasing Carriage Company. Based on the activities of the companies noted, there was considered the innovative orientation of the strategy and tactics of railway transport development within the framework of a mixed natural-monopoly and market mechanism. The factors constraining innovation development are also described, and the conditions for improving innovation activity in railway transport are proposed.

Key words: innovations, innovative activity, innovative development, railway transport, state policy in the field of railway transport, national economy, railways, passenger transportation.

Introduction. Under the conditions of technological revolution and innovation development of Kazakhstan, companies of all sectors of the economy are striving to introduce and increase the volume of innovations in goods and services sold, which allows them to expand the market and increase the level of monopolism in their field and dictate their policies to customers and competitors. The orientation of the national economy to the innovative type of development required a clarification of priorities and a strategy for the development of the entire economic infrastructure, including the country's transport system. Due to the fact that in modern conditions of economic globalization, the role of transport in the world and national economies is significantly increasing, which is reflected in an increase in the degree of mutual influence of transport development and macroeconomic development, the development of other industries, transport must develop ahead of the industries it serves.

The effectiveness of the national economy, economic growth, the sustainability of the development of vertically integrated systems, territorial complexes and foreign economic activity is largely determined by the operation of railway transport. On the one hand, it reflects the level of development of the national economy and its competitiveness, and on the other hand, the level of economic security of the country.

Main body. In Kazakhstan rail transport is a backbone sector of the national economy with a developed infrastructure covering the entire territory of the state. The value of rail transport in Kazakhstan is very high. Kazakhstan railways provide 68% of the total freight turnover and over 57% of the country's passenger traffic. The length of railways in Kazakhstan exceeds 13.7 thousand km., 16 butt points (11 with Russia, 2 with Uzbekistan, 1 with Kyrgyzstan, 2 with China) connect the railway system of Kazakhstan with neighboring states. The railway of Kazakhstan directly borders and interacts with the railways of

Russia, Uzbekistan, Kyrgyzstan, Azerbaijan and China, which is one of its main advantages in the transport services market. The railway systems of Russia and Kazakhstan are extremely interdependent. Railways connecting Russia, European countries, countries of Central Asia and the Middle East run across the country [1].

Innovative development of railway transport is determined through the current state of the company, which provide their services in the industry. In Kazakhstan, access to the main railway network is provided by its operator, represented by National Company Kazakhstan Temirzholy JSC "NC "KTZ", which is a natural monopolist, whose tariffs are regulated by the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies.

In the passenger sector, competition and increased participation of the private sector are ensured through franchising and access to passenger rolling stock of state and independent carriers. For these purposes a significant amount of financial resources is allocated annually to the state. The main objectives of the reform in this sector of the railway industry are: financial and organizational separation of passenger and freight traffic, achieving transparency of financial flows, reducing losses, strengthening the role of the private sector and introducing competition in the process of organizing passenger traffic.

On a functional basis, passenger transportation is divided into two blocks: the main activity is the transportation of passengers and baggage transportation, which provides activities such as repair and maintenance of railcars, passenger service at railway stations, restaurant cars, laundry services and others. The farm has created several specialized companies.

The national passenger carrier JSC Passenger Transportation is a subholding company of JSC "NC "KTZ" and, together with its subsidiaries and affiliates, ensures the process of transporting passengers. It was originally planned that JSC Passenger Transportation will operate as a carrier in international and interregional communications, retaining only those routes that were not received by private carriers in interregional communications. However, practice has shown that such a mass transfer of routes from the state carrier to the private ones did not occur. Therefore, as the main activity of JSC Passenger Transportation was restructured, the following activities were carried out with the formation of legal entities engaged in relevant activities: a second carrier, Zholaushylirtrans LLP, was established to encourage competition, which participates in tenders for the right to provide passenger transportation services between and intraregional routes. In the future, as originally planned, this company was to be transferred to the private sector.

JSC Suburban Transportation was organized for the transport of passengers, mainly for medium-distance distances in a suburban or intercity zone within the same area. This company participates in tenders held by Akimats and cases when private carriers have not expressed a desire to carry out transportation; Responsibility for organizing long-distance and domestic traffic within one region is transferred to local executive bodies, which also transfer this right on the basis of franchising to regional private companies; To reduce entry barriers to the passenger transportation market, a company called Passenger Leasing Wagon Company was established, which provides maintenance, maintenance and repair of passenger cars transferred from Passenger Transportation, as well as leasing them to private carriers wishing to enter the market through franchise system. The restructuring of the auxiliary activity of the passenger economy was also carried out. In particular, work on the overhaul and maintenance of cars transferred to the private sector to serve carriers on a contractual basis. Works on current maintenance and uncoupling repairs en route, which for technological reasons cannot be transferred to the competitive sector, as they are carried out on main routes, are transferred to Vagon Service JSC; on the basis of buildings of railway stations for the provision of service to passengers organized by JSC "Station Service", etc. [2].

Targets and forms of innovative development of the companies described above are determined by the “Transport Strategy of the Republic of Kazakhstan up to 2020”, “The State Infrastructure Development Program “Nurly Zhol” for 2015–2019” and the “Development Strategy of JSC "NC "KTZ" until 2025”, where the following [3-5]:

- formation of a single economic market through the integration of the country's macroregions on the basis of building an effective infrastructure - ensuring security at railway transport facilities;

- implementation of anti-crisis measures to support individual sectors of the economy in the context of deteriorating conditions on foreign markets;

- development of scientific research in the field of railway transport, including those financed at the expense of JSC "NC "KTZ";

- modernization and development of infrastructure for the elimination of restrictions and “bottle-necks” in the capacity of the railway network, the expansion of the railway network, the reconstruction and construction of new artificial structures (tunnels and bridges);

- development of high-speed and high-speed rail traffic, as well as heavy traffic;

- the renewal of railway rolling stock, the development of an industrial complex supplying products for railway transport, the creation of high-tech and high-tech samples of railway equipment;

- integration of the transport system of Kazakhstan into the world transport system by increasing the level of development of transport infrastructure, the competitiveness of domestic carriers in the foreign market of transport services, as well as the efficiency of using the transit potential;

- strengthening the single economic space and the development of interregional relations, as well as ensuring transport accessibility at a level that guarantees social stability through the development and improvement of the efficiency of use of transport infrastructure;

- ensuring environmental safety and rational use of energy resources through the implementation of a targeted state policy in establishing environmental standards that meet international standards, and monitoring their implementation.

The marked directions are based on the innovative orientation of the strategy and tactics of railway transport development within the framework of a mixed natural-monopoly and market mechanism. The implementation of such large-scale tasks requires the solution of a number of large scientific and technical problems that provide the technological foundation of the industry, respectively, the issues of innovative development of railway transport are actualized at all levels of public-private partnership in transport.

In the current situation, the above-mentioned areas of innovation development are implemented mainly in the framework of JSC "NC "KTZ". In this case, it is necessary for the company to form an innovation management system that ensures the full cycle of innovation projects implementation - from defining strategic directions and target development parameters to obtaining new products and evaluating their performance, as well as introducing a corporate innovation management system, defining innovation development indicators, which will be used as key performance indicators.

However, it should be noted the factors constraining the innovative development of JSC "NC "KTZ". First, the high depreciation of the company's fixed assets and a significant amount of obsolete equipment cause a lag in technical development compared to the railways of the Russian Federation and China. Secondly, territorial disproportions in the development of railway transport infrastructure, regional transport capacity and capacity development of railway lines, the underdevelopment of the system of providing additional services in demand in many types of business have a negative impact on maintaining and increasing the share of the transport market both in the national market and in development and expanding its presence abroad. In this regard, such phenomena as a discrepancy between the structure of the car fleet and changes in the structure of cargo traffic under conditions of growing share of high-tech goods and container traffic, while reducing the share of raw materials transport, as well as discrepancy between the level of development of railway infrastructure, international transport corridors and changes in direction and traffic intensity, noted by domestic researchers significantly exacerbate the risk of reducing the competitiveness of railway transport due to the technical and technological lag behind other types of transport and the world level of development of transport systems.

Third, the system of innovative development of railway transport in an integrated company with a single legal entity required the development of a mechanism to combine the vertically integrated budgeting of railway costs and a motivated system for managing innovative development of enterprises taking into account regional features of branches - structural divisions of JSC "NC "KTZ". As a result, the innovation management system of railway transport became complicated due to the lack of innovative developments and “breakthrough” scientific and technical solutions. At the same time, the innovative activity of the industry is provided not only and not so much by science, as by the state of its engineering system, which develops innovations, ensures rapid updating and high-quality improvement of the material and technical base, increasing its scientific and technical potential.

Fourth, the state policy in the field of railway transport has not achieved the set results on improving the quality of services provided to the population, updating the main assets of the industry and effective interaction between the public and private sectors: carriers are discouraged by the principle of state subsidies, covering only their losses of minimum profitability; subsidies cover only half of all losses, the practice of cross-subsidization of passenger traffic at the expense of freight remains; according to experts, the unmet demand for transportation by the population is about 4 million people per year, which requires first of all the solution of the issue of carriage deficit, which carriers are not able to solve at their own expense; there are no incentives - in the form of long-term contracts, the necessary profitability of activities or benefits for lending to financial institutions.

Fifth, contracts for the organization of passenger transportation are concluded for a rather short period - 1 year with the possibility of extension to 3 years, which in such a capital-intensive industry as railway transport is clearly not enough to implement the minimum plans for carriers to achieve a profitable level of service and implement long-term programs; Passengers 'interests are not a priority in contracts with carriers, since their monitoring is ensured according to aggregated indicators of carriers' activity - the frequency of trains running and the average number of cars in trains, there are no important indicators for users, such as safety, accuracy of timetable, reliability and comfort shipments; the level of competition for the right to provide passenger transportation in Kazakhstan can be significantly reduced with stricter requirements for the presence of its own fleet of cars, and subsequently locomotives.

An important problem requiring its actual solution is the creation of institutional conditions for the development of innovative activities of companies, the formation of a culture of innovative thinking and competencies of specialists capable of ensuring dynamic growth and innovative development of enterprises in the industry.

These circumstances determine the search for such mechanisms and structures that, on the one hand, would enhance the investment attractiveness of railway transport, and on the other hand, create conditions for the continuous generation and diffusion of innovations in the industry, involving a significant number of participants in the innovation development processes. Given the strategic nature of the development of rail transport for the national economy, the country's defense and security, such a mechanism should be implemented in the public-private partnership system in the field of innovative development of rail transport.

Further ambitious business development plans based on public-private sector cooperation may become unfulfilled, unless there are fundamental changes in the resolution of these problematic issues. Taking into account that the significant role of the railway industry in the socio-economic development of the country will continue in the medium and long term, the scientific substantiation of decisions taken in the industry is particularly necessary, both in current activities and in research on the subject of innovation, the introduction of advanced foreign and domestic experience.

Thus, according to the authors, an important area of innovation development is the formation of a system of innovation activity, within the framework of which the integration of the innovation sphere with the railway transport infrastructure is ensured on the principles of self-organization. Such intrasystem integration is based on innovative, horizontal-vertical, network infrastructure integration, network electronic integration, integration of various fields and activities of railway transport enterprises.

According to the authors, the following conditions are necessary to improve innovation development in rail transport:

- the presence of a developed methodology for managing innovative development, including the general and particular methodological principles of innovation management that take into account the interests of all stakeholders (the state, JSC "NC "KTZ" and other railway enterprises, consumers), as well as developed and updated methodological tools of innovation management in railway transport, taking into account the priority directions of innovative development of the country's economy and tional transport system;

- formation of the mechanism of interrelation and interaction of the management system of railway transport enterprises with the innovation market, the investment and financial markets, the transport services market;

- formation of the innovation management system for the integrated development and implementation of the innovation potential. Such a control system should include a set of interrelated and interacting incoming subsystems: an innovation system; system of formation of investment attractiveness of innovative investment objects; portfolio management system of innovative projects and programs; network infrastructure innovation; public-private partnership in the field of innovation regulation. The interaction of the marked subsystems is the basis of the organizational and institutional mechanism for activating and developing the innovation potential, the innovation and market infrastructure, and the market instruments that enable the commercialization of innovations. The formation of such a system is designed to ensure the creation of conditions for the continuous generation and diffusion of innovations, the formation of a synergistic mechanism of the multiplicative process of innovation development.

Conclusion. Summing up, it should be noted that the transition of the national economy to the innovative path of development, the ongoing processes of corporate transformation in the railway transport are actualizing the problem of innovative development. The most important direction of the innovation development of railway transport enterprises is the formation of a system of innovation activity, within which the synergetic development mechanism can be realized in the logic of "demand for innovation - investment in intellectual capital - increase in profitability of transport due to the application of innovative technologies - accumulation of intellectual capital - development of competition in the innovation market due to the additional demand for innovation". The necessary conditions for the implementation of such a mechanism are the existence of a developed methodology for managing innovative development, the formation of a mechanism of interconnection and interaction of the management system of railway transport enterprises with the innovation market, the investment and financial markets, the transport services market, and the formation of an innovation management system for railway enterprises.

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ҚАЗАҚСТАНДАҒЫ ТЕМІРЖОЛ КӨЛІГІНІҢ ИННОВАЦИЯЛЫҚ ДАМУЫ ТУРАЛЫ СҰРАҚҚА

Аннотация. Мақалада «Нұрлы жол» инфрақұрылымдық дамытудың 2015-2019 жылдарға арналған мемлекеттік бағдарламасы» және «ҚТЖ» ҰК АҚ-ның 2025 жылға дейінгі даму Стратегиясындағы мақсатты бағыттарына негізделген темір жол көлігін инновациялық дамыту мәселелері қарастырылған. Темір жол көлігінің инновациялық дамуы осы салада өзінің инновациялық қызметтерін көрсететін компаниялардың ағымдағы жағдайы арқылы айқындалады. Сонымен қатар, Қазақстанда магистральдық темір жол желісін қамтамасыз ететін және оның тек жалғыз ғана операторы болып табылатын осы саланың табиғи монополисті «Қазақстан темір жолы» Ұлттық компаниясы» АҚ - «Қазақстан темір жолы» ҰҚ» АҚ екені белгілі.

Темір жол көлігі функционалдық белгісі бойынша жолаушылар тасымалы белгісі бойынша екі блоктан тұрады: негізгі қызметі - жолаушылар тасымалдау және жүк тасымалы және оларды жүзеге асыратын «ҚТЖ» ҰҚ АҚ құрамына кіретін бірнеше жетекші мамандanған келесі компаниялар жүргізеді «Жолаушылар тасымалы» АҚ, «Жолаушылартранс» Компаниясы» АҚ, «Қала маңы тасымалы» АҚ, «Жолаушылар лизингтік вагон компаниясы» АҚ. Аталған компаниялардың қызметтері негізінде темiржол көлігі инновациялық бағыты стратегиясы мен тактикасын дамыту аясында аралас табиғи монополиялық және нарықтық механизм қарастырылған. Сондай-ақ, инновациялық дамуды тежейтін факторлармен темір жол көлігінің инновациялық қызметін жетілдіру бойынша шарттар ұсынылған.

Түйін сөздер: инновациялар, инновациялық қызмет, инновациялық даму, теміржол көлігі, теміржол көлігі аясындағы мемлекеттік саясат, ұлттық экономика, теміржол жолдары, жолаушылар тасымалы.

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К ВОПРОСУ ОБ ИННОВАЦИОННОМ РАЗВИТИИ ЖЕЛЕЗНОДОРОЖНОГО ТРАНСПОРТА КАЗАХСТАНА

Аннотация. В статье рассмотрены вопросы инновационного развития железнодорожного транспорта, основанные на целевых ориентирах «Государственной программы инфраструктурного развития «Нұрлы жол» на 2015-2019 годы» и «Стратегии развития АО «НК КТЖ» до 2025 года». Инновационное развитие железнодорожного транспорта определяется через текущее состояние компании, которые оказывают свои инновационные услуги в данной отрасли. При этом известно, что в Казахстане доступ к магистральной железнодорожной сети обеспечивается ее оператором, являющееся естественным монополистом данной отрасли в лице АО «Национальная компания «Қазақстан темiржолы» - «НК «ҚТЖ»

Железнодорожный транспорта по функциональному признаку пассажирские перевозки разделен на два блока: основная деятельность – перевозка пассажиров и багажные перевозки, которое осуществляется через несколько ведущих профильных компаний, входящих АО «НК «ҚТЖ» как: АО «Пассажирские перевозки», ТОО «Компания «Жолаушылартранс», АО «Пригородные перевозки», АО «Пассажирская лизинговая вагонная компания», АО «Пассажирская лизинговая вагонная компания». На основе деятельности отмеченных компании рассмотрена инновационная направленность стратегии и тактики развития железнодорожного транспорта в рамках смешанного естественно-монопольного и рыночного механизма. Также описаны факторы, сдерживающие инновационное развитие и предложены условия для совершенствования инновационной деятельности в железнодорожном транспорте.

Ключевые слова: инновации, инновационная деятельность, инновационное развитие, железнодорожный транспорт, государственная политика в области железнодорожного транспорта, национальная экономика, железные дороги, пассажирские перевозки.

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REFERENCES

[1] The state program of infrastructure development "Nurly Zhol" for 2015-2019 of April 6, 2015 No. 1030.

[2] Prospects for the development of railway passenger transport in Kazakhstan //http://www.webeconomy.ru/index.php?newsid=2198&page=cat&type=news

[3] The development strategy of JSC "NC KTZh" until 2025".

[4] Decree of the Government of the Republic of Kazakhstan dated January 31, 2005 No. 75 “Transport Strategy of the Republic of Kazakhstan until 2020”.

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ON THE THEORY OF PERSONAL IDENTIFICATION IN THE SYSTEM OF CONTINUOUS PEDAGOGICAL EDUCATION (ANALYSIS OF FOREIGN EXPERIENCE)

Abstract. The article discusses the international experience of research on age identity in the framework of the system of continuous pedagogical education. The authors believe that the existing concepts "identity theory" and "social identification theory" need to add a "differentiated identification theory", when the individual is a subject of social life and implements a plurality of social roles adopted in society. The article was prepared in the framework of the project "Formation of public consciousness and spiritual and moral culture of students in the system of continuous pedagogical education on the basis of the patriotic idea "Mangilik El".

Key words: the theory of identity, the theory of social identification, the theory of differentiated identification, age identity, learning and communicative environment, continuous pedagogical education.

Problem statement in general. Since the beginning of the reforms of the Russian education (since 1983) and similar reforms in Kazakhstan, only in the last 12 years have they begun to pay attention to the study of the identification properties of students. This is due to the problems of a broad social transformation of society and the need to restore the integrity of the civil and national-cultural worldview.

Russia and Kazakhstan are complex state entities that unite ethnic groups with different cultural and religious beliefs. In this regard, the education system should contain both macrosocial (universal and nationwide) ideological characteristics, and socio-communicative (unique and national-ethnic) properties. For "identification" is the relationship of people in the form of ideas about the world and about normative interactions with it.

At present, a large amount of scientific literature and dissertation research in the field of philosophy, political science, sociology, psychology and anthropology are devoted to the analysis of the nature of both Russian and Kazakh identity, in which its individual and social structures are revealed. If in philosophy they are interpreted as indivisible processes of individual identity of a person and his social identity with the environment, then psychology analyzes the balance of the normative behavior of an individual with his social-public roles.

In modern Russian and Kazakh studies the Western understanding of social realities isoften used. Of course, we can use the theoretical concepts of leading scientists of the world, but in the context of taking into account the socio-cultural specifics of a particular country.

Purpose of the article. The purpose of the article is to analyze the western practice-oriented experience in the study of individual identity and social identification in the education system.

Method of theoretical analysis.

Distinction of methodological installations of Russia and the West. Social construction of a person's identity is formed in the process of its development. Therefore, the education system is one of the important research components of the theory of identification in world practice.

However, in the twentieth century, both in Russia and in Kazakhstan, a unique ideological system of upbringing and education for professional activity developed. This is a materialistic perception of reality, which allowed to form multifunctional properties of identity, revealing the objective variability of a person's relations to the world around.

The formation of the professional Soviet identity took place on the basis of Todor Pavlov's reflection theory, which analyzed the mental unity of matter and consciousness, object and mental image [4, 5]. He argued that human life proceeds in an integral system of social relations, therefore the mental phenomenon of the reflection of reality is associated with collective identity.

The consciousness of an individual could be deceptive, dull and inadequate, and the evolutionary (collective) consciousness has a multifaceted reflection of reality. The social form of life projects the expedient unity of perception and activity on the unconscious and subconscious levels.

The Soviet education system shaped both the active perception of the world around us and the active identification position of the future specialist. In this regard, the consciousness of people from the very beginning became a public (universal) form of life organization. Therefore, in the materialist theory of reflection, it was not consciousness in general that was analyzed, but the forms of a person's conscious attitude to objects of social interaction and to himself [2].

The Western education system initially functioned in market conditions. Quality education was provided by the state itself or businessmen who needed qualified specialists. Therefore, in the first half of the 20th century, the Western education system was solving utilitarian-market goals for specific tasks of the customers (the state and capitalists-entrepreneurs). But in general, in this system there was no need for mass quality education.

In the USSR, all children received high-quality education, and in a historically short time the state was able to receive a galaxy of brilliant scientists and tens of thousands of highly qualified engineers. In the country classical secondary and higher education was versatile and fundamental, so it was designed, researched and analyzed in the framework of the materialist philosophy of the theory of reflection.

The American education research association (AERA) identifies the following types of research:

- fundamental research;
- applied research;
- research in the field of education quality;
- study of educational activity or activity approach in the education system;
- social orientation (stratification) studies.

Fundamental and applied research in the American version is not opposed, but "mixed". They are conducted by universities, think tanks, corporations, foundations, and government agencies. Moreover, their results are published in scientific and professional research journals [7].

Fundamental research is aimed at studying the basic processes of education (social, psychological and personal). They are conducted using scientifically based and experimental research methods, taking into account all the conditions affecting the educational process.

Applied research analyzes the situational aspects of education, which are provided by a quick decision making and overcoming problems. They are conducted in the natural conditions of the educational environment and form more realistic conclusions from scientific analysis.

Analysis of *the quality of education* allows to analyze the willingness of trained specialists to work in real (rapidly changing) social conditions. The product of this study may be a textbook or a new educational equipment that changes the learning behavior of students and the educational program itself [21, 41, 57].

These studies are divided into two types, depending on the goal. Studies aimed at improving the educational program. They create formative evaluation information and are called "*formative evaluation*." If the study analyzes the effectiveness of the curriculum, then it creates a "*summative assessment*." These studies allow to decide on further funding of the educational program.

The study of educational activity (activity approach) is the most popular. Its field research is aimed at solving specific problems faced by local educational institutions and teachers, and they reveal new problems in strategies and social actions [25, 45].

The relevance of field research is related to the fact that they also allow integrating the theory of education with the practice of its implementation. Therefore, this area of research needs highly qualified scientific experts, which AERA is trying to "educate" in market conditions.

Social-orientational research allows to solve social problems of public development: social discrimination, unfair social stratification of society and the distribution of wealth. These studies are consistent with the social interests of society (ideological and political) and are aimed at improving it [39, 43].

All the researchers in this area are to some extent ideological from the very beginning, but in the process of analyzing social processes they form new ideologies and political plans or correct existing ones. Therefore, these studies are called "*critical scientific theories*" [8].

Among the areas we have presented, the most common and at the same time latent studies are identificational, as they are formed as a philosophical concept analyzing the nature of the relationship between body and consciousness, man and the natural-social environment, in which he acquires the psychic ability to "*multiple realization*" [11].

The social concept of identification theory has emerged as a way of explaining intergroup behavior based on the sense of identity and differences in the status of the social "I". In contrast to philosophy, this direction does not develop the theory of social categorization, but characterizes the processes of self-categorization [55].

A lot of interdisciplinary research is devoted to identification topics in the education system [56]. Most of them begin with an analysis of the system of interaction between schoolchildren and school administrators in various social situations unfolding in an educational environment. Special attention is paid to the problem of making decisions about the curriculum, since digital technologies can seriously change the educational system towards fundamentalization, but this is a matter of the future. And now we are analyzing informational and communicative educational processes:

1. What sources of information (parents, books, friends, social networks, etc.) form the students' specific beliefs?

2. Do students' political attitudes correlate with parents' identification preferences?

3. Are their social interactions with peers connected with the identity of the student or his parents?

Any system of education in the world is interconnected with the social identity of students, as a system of overt and covert phenomena. The educational process itself is explicit, the system of interpersonal relations and the socio-information environment of the learning environment are hidden [20]. In other words, the education system is not only a substantial part of knowledge, but also an introduction to social interaction and an idea of oneself and of the world within the walls of an educational institution. Identification studies address the relationship and interaction of academic knowledge, social interactions and the interior of the classroom or class in which the educational process takes place. For most of the successes and failures of students are associated not with obvious learning processes, but with self-assessment acquired in the learning process. How he "sees" himself in the learning process; how he actualizes the importance and interest in academic disciplines; how his system of interaction with teachers and classmates (groupmates) is built. Of course, these structures affect the ability or inability of the learner to identify himself with respect to the material studied, as well as with other people involved in the learning process. Therefore, the local administration of a school or university participates in educational policy, regulating not external learning indicators, but internal communication relations and in-depth understanding of other people [38].

Each identification study clarifies ideas about the unique characteristics of students and their active learning experience in educational organization. The training audience becomes a complex ("matrix") of functional interaction around the knowledge system, and each lesson becomes a joint collective project. In the system of group interaction students not only learn, but also communicate with each other during the school day, forming a communication of interest.

The study of the student's socially constructed identity in the education system can enrich not only pedagogy and age psychology, but also other humanitarian sciences. In the last decade, the problem of age identity has attracted many psychologists. They differentiate not only age features (pupils, teenagers, students of early adolescence), but also ethnic, socio-territorial, gender, professional and socioeconomic features. However, there are few works in the world devoted to the analysis of age-related changes in the identity of children, although psychodiagnostic material is sufficient for such studies.

Dewey argued that in real life, each student forms a personal identity not in isolation, but by interacting with the content of school subjects, i.e. curriculum affects the extracurricular (social) behavior of students [16].

With the cognitive processes of categorizing and analyzing human prejudice, the theory of the social identity of Henry Tejfel and John Turner began to acquire conceptual integrity. They drew attention to the fact that a person can feel that he belongs to several social groups at once or to one. But he will always establish mental boundaries that divide people into "his" and "alien". Group interaction allows you to become like (i.e. identical) and helps to learn to evaluate yourself positively (the feeling of similarity enhances self-esteem and self-value) [46, 47].

Identity is not only social, but also educational. In the process of learning, students learn to identify themselves within the framework of the subject being studied, and at the same time they learn about the world and about their new personal characteristics, which are formed in comparison with the acquired knowledge [35, 36, 56].

Each classroom creates a social context of the learning process in which students' personal structures, the educational process itself and the system of interaction with peers are "embedded". The student acquires the "right" to a certain form of communication and interaction in the educational process, finds his own forms of self-expression of attitude towards him, showing the success or failure of learning [23]. For the classroom, where the educational process takes place, becomes a specific study space in the identity theory of the person.

The psychological reality of man exists in the social context of his attitude to this reality. Moreover, the formation of this context begins in early childhood and is constantly compared with the living environment [29].

For the schoolchild, the initial institution constructing the context of reality becomes an educational institution in which his identity is formed. And, according to Mead, scholars should study the cultural contexts of social norms in an educational institution where the student learns to express and reflect social norms or behaviors.

The theory of identity, built by L. S. Vygotsky, characterizes not only a person's changing ability, but also allows social groups to "create new communities, new cultural worlds and realize them" [24].

This means that not only the sociocultural context influences the individual, but also the individual acts as an agent for the transformation of the cultural context that formed it. The theory of human identification activity in a socio-cultural context, formulated by L. S. Vygotsky, covers the nature of the educational process, in which certain qualities of a possible reality for students are modeled.

Physical space, the teacher and the wide context of learning knowledge exist separately before the arrival of students. The classroom becomes a community at the moment when students enter its space and begin to interact with it in the process of functional learning.

The educational process is always a certain social position and role-playing action, which is important not for the "I-present", but the potential "I-future", which is formed in the context of the implementation of the intended professional action and relationship. An adult considers the processes of direct belonging and "finds" himself in his consciousness as self-fulfilling. Therefore, the learning person expands his identification properties with established socio-historical roles and positions, and expected ones, aimed at mastering completely new forms of social interaction.

Any adult has mechanisms for implementing many social roles in the present. And the maturing teenager develops a comprehensive sense of the coherent self, which is filled with the life scenarios of the past and potentially of the future. He constructs several identities for different contexts in reality: he implements one behavior model at school, and another for home. His behavior can be modeled in different training situations and even change in different classrooms [6].

In adolescence, a person begins to identify himself from the point of view of his peers [18]; [50]. In other words, the self-awareness of adolescent students is not determined by individual uniqueness and purposefulness, but by the identification of correspondences (or inconsistencies) of their peers in a common culture. They tell everyone about who they are, and then try to behave accordingly, i.e. identical to the ideas of proper and necessary role-playing behavior. Thus, a teenager creates an external identification projection of his personality in the desired role-playing behavior. Its interaction is "open" and "arbitrary" from a certain rigidity of social discourse observed in an adult [23].

The student spends a lot of time in the learning environment. He projects his personal roles from peers, teachers and adults with whom he communicates daily. And various social and informational contexts really influence his development.

A “socially constructed I” is built through social interactions and cultural ideological constructions [22]. It can be modeled during maturation. The term “I-concept” refers to the folded mechanisms of the perception of an individual in relation to social groups [28]. At the same time, self-assessment is an integral part of this relationship and the process of self-determination of the individual [6]. Therefore, the student, being in the learning environment, models the “reality of adult life” from knowledge systems and the proposed standard forms of professional behavior. In other words, he creates “his own definition” as a form of perception and self-assessment, aimed at understanding the external world and himself. Moreover, self-esteem includes aspects such as appearance and relationships with other people [49].

In pedagogy the mechanisms of “social construction of I” or technologies of social corrections of “I-concept” in adulthood are analyzed more. For in the educational system the social construction of identity is interpreted as a “knowing self” in relation to the sociocultural context in which the individual lives.

Analysis of the development of the socio-cultural theory of the mind requires close attention to the institutional type of social interaction [30].

A look at the concept of a sociocultural context of an emerging identity in a student requires a new understanding of the term “culture”. The initial perception of culture by the younger generation is associated with ethnicity and comprehension of the inheritedsocial reality. Less commonly, a culture is perceived as a value that each student develops [31].

Culture refers to a dynamic system of social values, cognitive codes, behavioral standards, worldviews and beliefs used to organize and give them the necessary meaning in a collective and individual life [19].

In a multi-ethnic environment, a student can be in different socio-cultural environments (general education school, educational circles and sports organizations, places of general accessibility - trade, transport, home). Each environment is filled with certain patterns of behavior that are assimilated by people. A teenager must learn to navigate in these different behavioral contexts, obey them or consciously violate them.

A cultural environment is a space of specific contexts, where each person has a specific role: “built in” into the personality traits of the individual (for an adult); "embedded" in the mental structure of the student. Analysis of the educational environment makes it necessary to take into account the communicative system of interaction of students and the wide context of the culture of an educational institution. For the relation to reality is formed in a complex way and in the process of interaction with the general context of culture, the core of which is the training audience. Therefore, in the analysis of the educational system attention is paid to the social context of the educational process, which affects the formation of the student’s personality structures.

The identity of children is formed in the system of contradictions generated by various social interactions in which they participate during the whole process of learning:

- communication in the learning process and with the participation of an adult;
- communicative interaction with groupmates or classmates;
- the system of group relationships in the educational environment of the learning institution;
- electronic-communicative forms of information interchange.

The nature of the formation of a social interaction system can vary greatly in different cultures. If in the American education systemit was given a sufficiently great importance, then in the Russian and Kazakh - no. Our educational systems have formed a personality through a system of fundamental knowledge, in which the nature of interaction was a functional property of the educational process. In the American education system attention was paid not to “educating” the personal structures of the student through the system of knowledge, but to the formation of his personal qualities in the communicative environment of an educational institution.

In Soviet Russia and in Kazakhstan a different mechanism of social interaction was taking shape, which initially had to obey certain ethical standards, and which the learner joined in, undergoing socialization in such groups as “oktyabrenok”, “pioneer”, “komsomol member”. The social structure of socializing organizations reproduced the necessary value system. And the developed system of values of an adult provided the functionality of the social structure of society. Therefore, in the Soviet pedagogy there was a differentiation of the educational and behavioral processes.

Whereas in Western pedagogy, training has always been analyzed in a specific socio-informational context, which the student has mastered and implemented as an active participant in the educational process, i.e. students take part in the "realization" of the social context of the educational process, which becomes an integral part of their identity. They themselves define the "limits" (ability and will in the development of educational material) and the "importance" (interest) of the knowledge system.

The methodology of research in Western pedagogy is interpreted by simple schemes, since it should reveal the "special view of the student on the phenomena studied and on the experience of other people's professional activities" [13].

The student learns to perceive social reality in terms of history and cultural significance, highlighting its parameters such as "temporality", "sociality" and "territoriality".

Time characterizes the variability of a person's life. It shows that everyone has past, present, and future. *Sociality* gives events a socially significant code and cultural context that the student learns by conducting these or other intellectual studies. The *place* defines the spatial framework of social events, outlines the limit of human existence.

Without these parameters, the identity of the person will be narrowed to the phenomena and events of private life. The learning process expands the identification parameters of life perception, "restoring" the knowledge of the past, "conditioning" the present and potential future. To this end, the educational institution collects "reports" in the form of life stories of both students and those who graduated from high school or university and successfully grew in their profession. In other words, each person (including teachers) narrates about his life, describing and making out the direct experience of life and study as a significant (legendary) action [12]. Written small stories about experiences in the period of study allows teachers to look at their professional skills from the perspective of the students themselves, reflect on existing problems in teaching practice and on the "policy" of the educational process.

In the collective opinion developed in the process of student interaction, the "forming" and "correcting" social perception of the group and the "vesting" of them in the socio-cultural context in the form of general collective judgment are highlighted.

Thematic survey is an incentive and a means of studying the "individual experiences" of students, which "turns" their learning experience.

Learning cannot be separated not only from the content, but also from the context in which learning takes place. For any learning process does not exist in a vacuum, it is enveloped in internal and external communication processes and in a certain learning action, which is "implemented" by the training group [31].

The study of the social context should be differentiated into the "classroom" communicative environment, the "intranet" (internal network of relationships and interactions) of the educational institution and the general cultural environment beyond it, as they all influence the student's forming personality.

Differentiation of scientific approaches. For pedagogy the most important is the theory of social identification, as well as the analysis of the theory of individual identity. Both theories provide a basis for studying the student's identity in a social context.

Social identification theory (SIT). The study of the sense of belonging of students takes place with the help of a mixed method of analysis of psychosocial variables that combine ethnicity, social status and the attitude of students to an educational institution and the level of their participation in institution activities. Scientists, using observations, surveys, focus-group discussion interviewing and appealing with initial data (gender, academic assessments, attendance, length of residence in the area, etc.) reveal the level of satisfaction with the educational process, associating this indicator with a sense of belonging and participation in group and general educational activities [40].

The system of group relations is a circle of friends and peers with whom students regularly communicate. Research based on SIT reveals value judgments of personal preferences when it is necessary to make a choice of "our own" due to the alienation of "external" groups. Therefore, adolescent group relationships are rather strongly polarized, strengthening its internal cohesion due to "external" factors of perception of reality.

According to the theory of social identification, the strengthening of group properties of an individual occurs through social categorization of evaluative qualities [10], since members of "their" group are always evaluated positively, which, in turn, makes adolescents strive for a positive identity [51]. Students

associate members of "their" group with positive figurative experiences [52]. In other words, teenagers assess themselves and their peers on the basis of their social preferences and the ability of their comrades to achieve their desired goals (school, sport, hobby, etc.).

Students of this or that role activity are considered as a necessary condition for belonging to people of higher social status. In this case students endow their peers with many unique characteristics. Accordingly, adolescents often choose to participate in groups that they find more popular at school or whose activities they believe will lead to long-term social or academic benefits.

M. Tarrant [50] conducted numerous studies in the field of social identification of students. He identified a correlation between *social categorization and adolescent behavior* in the younger generation of males (14-15 years), since he believed that the nature of social identification in girls has a different nature and it is oriented towards relationships with close friends, and not with a large group.

He provided the participants with a questionnaire. In the first half of the questionnaire students described and assessed the behavior or actions of “their” social group (the system of intragroup relations), as well as another group of peers (external group). Then they formed a rating of desirable and undesirable patterns of behavior, both in their own and in their peers’opinion. And at the end of the questionnaire gave themselves self-appraisal.

According to the study M. Tarrant confirmed his hypothesis. As a result, survey participants developed a positive sense of self (self-appraisal), comparing themselves with other social groups whose activities they perceived as less desirable. They pointed out that "their" group is more fun, fashionable and creative than the outside one [50].

Identity theory (IT). Identity theory focuses on social roles and individual role actions, allowing the learner to master various models of social behavior. Theorists of individual identity seek to understand the perceived meanings (social contexts) of role actions involved in the construction of self-identification properties of a person. With the help of role actions, self-categorization (self-knowledge) of a person occurs.

Social identification theorists explore mechanisms for streamlining relationships between people with different perceptions and role-playing actions. They focus on the process of comparing oneself with other social groups, that is, on the phenomena of social categorization of the individual [44].

Individualization through role identity is self-knowledge through self-esteem and self-determination that people apply to themselves, based on the positions of structural role actions that they perform [22].

Western theorists of social identification analyze each academic role in the context of group and intergroup self-determination. Students perform various roles as if “trying on” several self-identifying properties of their personality: an athlete, a member of a choir or a dance troupe, etc. Scientists believe that active participants in social education programs have better adapted to various social roles in adult life [42].

Identity theory explores the potential array of roles that social learning programs can form, both common to the institution and the classroom. This takes into account the understanding not of specific role actions, but their logical “arbitrariness” associated with the students' expectations [22].

In other words, identity theory explores the “boundaries” of mental representations and actions that unite the “real” and “desired” learners in early school age. “Borders” are able to facilitate and encourage interaction in various social circumstances, contributing to the development of personality with a certain structural identity. At the same time, the existence of “boundaries” may hinder the interaction beyond the prescribed role actions [15].

The significance of a social role is determined by its value, which is endowed by society from the social expectations of its citizens. And the formation of individual identity occurs through a set of values acquired in the process of interpersonal relations and interactions, since cognitive processes and social actions are interdependent and interrelated phenomena [57].

Wortham, identifying the relationship of academic knowledge with identification processes, observed 50 classes (English and history) during the school year in the ninth grade. The classes were conducted by experienced teachers in a school in one of the urban areas of Philadelphia with a population with a low income level. The training took place under the program "Paideia", which provides fundamental encyclopedic knowledge. He found a connection between relationship systems and behavioral patterns, which collectively indicated a certain form of identity of a particular person [56].

In the minds of people all social events "are entextualized" into a suitable metapragmatic identification model of personality. As practice shows, a person's life trajectories often overlap with the events of the learning process. In this regard, Worth comes to the conclusion that the signs of individual identification are determined by events and logical metapragmatic models of perception of reality. Moreover, among some students, social identification was determined by logical perception schemes, which united not one, but several social and historical events [56].

These studies found a coincidence of cognitive (informative) and metapragmatic (logical-analytical) models of perception of reality, which means: specific thematic programs can become models of individual identification, and at the same time, individual social-logical identification categories become resources for additional understanding of the curriculum content.

In the studies of Wortem special attention is paid to the role of the teacher, as he was perceived by students as the "embodiment" of the content of educational material, which he interpreted through events and characters. For the central methodical thesis of "Paideia" pedagogy says: "knowledge is a certain type of social action and interaction" [56].

The problem of "merging" of identification theories or "formation" of a new concept. The West is guided by two concepts that consider the nature of social identity construction. In the classical version, they compared organic and mechanical forms of social integration [17], which are still the most discussed in theoretical sociology. Scientists argue that social identity in group relationships corresponds to organic solidarity, and role-based - mechanical. A complete analysis of the social structures of society should include both organic (group) and mechanical (role) forms of relationships, since an individual-role identity cannot function without a social one [44].

The scientific differentiation of theories was due to different scientific approaches to the analysis of the nature of social relations. Identity in role activity was considered in the "mechanics" of the sociocultural context of the perception of reality, depending on the needs of the people implementing it. They were interdependent from the standpoint of controlling role actions.

General differences between the concepts of personal and social identities in the educational system were considered by Olson [33]. He compared individual and group identification constructs and found that the theory of social identity differs from the theory of individual identity only in conceptual interpretation frames. In one case, a person identifies himself with a social role in a particular context, and in the other with group attitudes and expectations.

Most Western scholars have begun to characterize social identification with a differentiated set of normative roles. Staz and Burke, analyzing the difference between these types of identifications, wrote that having a certain social identity means being in unity with the group, being completely like the group members and taking things from the point of view of the collective. Whereas individual identity is determined by social and role expectations, the ability to coordinate and differentiate models of role-playing behavior, as well as the ability to manipulate them. If the basis of social identity is uniformity in group perception and interaction, then in the individual - differences in perceptions and actions in the same group relationships [44]. If it is necessary to analyze the ability of students to master educational material and develop as a person, then use the methodological analysis of individual identity. And if it is necessary to study the collective forms of education that affect the social properties of the individual, then the theory of human social identity is used.

However, at the turn of the 21st century, the systems of social relations in the world are changing. Today, modern information technologies are actively transforming the social structure of society, which causes the variability of individual-role identity of an individual, entailing the transformation of both categories, values and statuses, and the socio-psychological specification of communicative processes. An infinite number of objects and phenomena of the external world (real and virtual) began to organize the perceived reality, immensely complicating the subjective world of man. Scientists and philosophers know that the genesis of the process of perception is subject to the ontological properties of development: irreversibility, direction and regularity of the processes of change [3].

The need to integrate identity theories at the turn of the twenty-first century was expressed by Martin and Dow, arguing that the interaction of two forms of social activity (role identity and social identification) can provide the most complete picture of the dynamics of the "human-environment" interaction. Their integration will not allow theoretical constructions to reduce the phenomenon of identification to the

personal characteristics of a person or to social forms of life. And only their joint analysis allows us to look at the limiting or stimulating features of the social context, which people strategically self-manage with respect to others [15].

They presented a model of scientific integration, where (a) intragroup interactions are the real primary structure of interpersonal relationships, (b) the pursuit of the desired status causes a person to "rebuild" the existing system of relationships to more favorable for individual development, (c) the interpersonal relationship system can have several levels of social support (the more it is, higher the status of a person is, more he identifies himself with the group). It is this model of integrated identity that manifests itself in a real social group and in information and social networks. Therefore, the social aspect of cultural (collective) identification has a huge potential for maintaining an individual, and membership in a social group creates a “definite” network of cultural contexts of perception of reality, which are formatted into specific “signs”, “symbols” or “labels” [15].

However, most scientists tend to partially integrate these concepts, as they characterize the opposite states of one process: individualization and socialization. Therefore, the question of the relationship of these theories still remains open [52].

The author of the article assumes that an integrated theory of multiple identification properties of a personality should appear - *a theory of differentiating identification*. The nature of age identity should be analyzed both at the interpersonal level (IT), and at the intergroup level (SIT) and the socially differentiated level (DIT). Such a differentiation of scientific campaigns is associated with the age characteristics of a person: in the younger school age, individual identification properties dominate (the child develops role models of interaction); in adolescence - social identification properties (collective behavior patterns become dominant); in adolescence - integrated identification properties (the time of a conscious understanding of collective behavior patterns and the search for individual properties of self-expression). As he grows older, a person begins to “realize” the limits of individual identity and social identification, “understand” the contradictions of social interaction contexts, separating “his” model of role-playing actions from “generally accepted”. However, in the process of life, a person can change his group and individual preferences.

If at the younger school age the role model is only “mastered” by the “repetition” method, when the social context only begins to be “captured”, then in adolescence the student can completely “dissolve” in various social group roles without the ability to limit them to the detriment . In adolescence, multiple identities (social and individual) are formed, when the normative character of role models of behavior is comprehended, consciously limited and individually enriched. Therefore, all identity theories are defined as “socially constructed I” [22]. At the same time, the theory of social identity focuses on intergroup communication processes, the theory of individual identity - on interpersonal relationships or role-based identity, and the theory of differentiated identity - on the ability to self-improve and develop throughout life.

As the student learns about the world and develops, he begins to describe his role actions, evaluate himself from the point of view of their fulfillment and identify himself with his peers [33].

The construction of the social identity of students is related to the perception of peers, families and other people meeting with them in various social situations. Therefore, in the Western education system, special attention is paid to collective tasks, team projects and speeches that develop the student's social identity. However, role identity in the education system remains the main one, since it supports the learner's learning activity. It should be noted that such concepts as “self-assessment”, “self-control” and “self-regulation” are also associated with the social identity of students.

Findings. Thus, social identification theory (SIT) and identity theory (IT) in educational science affect different levels of social context. Social identification studies combine a wide range of social phenomena, while research in the field of individual identity focuses on immediate interpersonal relationships and interactions. These research areas have their own independent scientific traditions, while they are interrelated, since no role-playing activity exists outside of social interaction. However, in different cultures role-playing activities may find different social contexts.

The nature of student interaction depends on the general social context and on the individual role identity that they embody. Therefore, the formation of interpersonal groups is determined by personal identification settings, summarized in relationships and different in actions.

For the most complete scientific understanding of the processes of "entering" the younger generation into adulthood, there are three types of age identification features of people that should be studied with various scientific approaches (IT, SIT and DIT).

The theory of differential identification (DIT) can explore the underlying forms of materialistic and idealistic relations of the subject to the object. At the same time, an object interacting with a person carries the "imprint" of system processes that are significant for the subject of reflection and are suitable for its technological use.

In the psychological theory of reflection the identification relations to external objects are integral (emotional, rational-semantic and value). And objective reality in the human mentality has a meaningful (subjective, conscious and holistic images of the material and ideal objects of the external world) and determination (contradictory semantic attitudes of motives and needs) structure. The theory of differentiated identification also allows for a deeper analysis of the nature of ethnic identity. All of the above theories are complementary and not mutually exclusive. The merging of these concepts reinforces social, psychological and pedagogical sciences. Understanding a socially constructed identity can help understand how young adolescents see themselves in the light of their perceptions of those around them. After all, a person who knows the world is the subject and object of his own thinking. It reflects the world as a holistic object of knowledge, including himself. But in the internal mentality (in the system of reflected ideas) a person opposes himself to nature, identifying himself with an autonomous system, i.e. self-aware of himself as a spiritual and intellectual person, and not a psycho-physiological individual.

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ҮЗДІКСІЗ ПЕДАГОГИКАЛЫҚ БІЛІМ ЖҮЙЕСІНДЕ ЖЕКЕ ТҰЛҒАНЫ СӘЙКЕСТЕНДІРУ ТЕОРИЯСЫ ТУРАЛЫ (ШЕТЕЛДІК ТӘЖІРИБЕНІ ТАЛДАУ)

Аннотация. Мақалада үздіксіз педагогикалық білім беру жүйесінде жеке тұлғаны жас ерекшелігіне сай сәйкестендіруді зерттеудің халықаралық тәжірибесі талқыланған. Авторлардың пайымынша, күнделікті қолданыста жүрген«жеке сәйкестілік теориясы» мен «әлеуметтік сәйкестендіру теориясы» тұжырымдамаларына жеке адам әлеуметтік өмірдің субъектісі бола алатын және қоғамда қабылданған көптеген әлеуметтік рөлдерді іске асыруға ықпалын тигізетін «дифференциалды сәйкестендіру теориясын» қосқан оңтайлы болар еді. Мақала «Мәңгілік Ел» патриоттық идеясы негізінде үздіксіз педагогикалық білім беру жүйесінде студенттердің қоғамдық санасын қалыптастыру және рухани-адамгершілік мәдениетін қалыптастыру» жобасы аясында дайындалды.

Түйін сөздер: сәйкестендіру теориясы, әлеуметтік сәйкестендіру теориясы, дифференциалды сәйкестендіру теориясы, жас ерекшелігі, оқыту-коммуникативтік орта, үздіксіз педагогикалық білім.

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К ИДЕНТИФИКАЦИОННОЙ ТЕОРИИ ЛИЧНОСТИ В СИСТЕМЕ НЕПРЕРЫВНОГО ПЕДАГОГИЧЕСКОГО ОБРАЗОВАНИЯ (АНАЛИЗ ЗАРУБЕЖНОГО ОПЫТА)

Аннотация. В статье рассматривается зарубежный опыт исследований возрастной идентичности в рамках системы непрерывного педагогического образования. Авторы полагают, что к существующим кон-

цепциям «теория идентичности» и «теория социальной идентификации» нужно добавить «теорию дифференцированной идентификации», когда личность становится субъектом социальной жизни, реализуя множественность социальных ролей, принятых в обществе.

Ключевые слова: теория идентичности, теория социальной идентификации, теория дифференцированной идентификации, возрастная идентичность, учебно-коммуникативная среда.

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REFERENCES

[1] Lyakhova L.N. (1979). Reflection and activity of matter. Saratov. 177 p. P. 91.
[2] Marx K., Engels F. Writings, Vol. 23. P. 81-82.
[3] Medvedev D. A. Ontogenesis of verbal reflection of reality at the stage of ideology // Human Ecology. 2006. N 6. P. 41-44.
[4] Pavlov (Dosev) T. Theory of reflection. Foreign Literature Publishing House, 1949, p. 561.
[5] Pavlov T. Selected philosophical works, Vol. 3. M., ed. foreign lit., 1962, p. 104.
[6] Adler A.H.W. (2002). A case study of boys' experiences of singing in school. Unpublished doctoral dissertation, University of Toronto, Canada.
[7] Anderson J.R. (1995). Cognitive psychology and its implications. New York, NY: W. H. Freeman.
[8] Anyon J. (2009). Theory and educational research: Toward critical social explanation. New York, NY: Routledge, p. 220.
[9] Armstrong, D.M. (1968). A Materialist Theory of the Mind, London, Routledge.
[10] Bakagiannis S. Tarrant M. (2006). Can music bring people together?: Effects of shared musical preference on intergroup bias in adolescence. Scandinavian Journal of Psychology, 47(1).
[11] Borst Clive V. (ed.) (1970). The Mind/Brain Identity Theory. Macmillan, p. 261.
[12] Bruner J. (1996). The culture of education. Cambridge, MA: Harvard University Press.
[13] Connelly F.M., Clandinin D.J. (2006). Narrative inquiry // In Green J.L., Camilli G., Elmore P.B. (Eds.), Handbook of complimentary methods in education research. P. 477-488.
[14] Guba E.G., Lincoln Y.S. (1981). Effective evaluation. San Francisco, CA: Jossey-Bass.
[15] Deaux K., Martin D. (2003). Interpersonal networks and social categories: Specifying levels of context in identity processes. Social Psychology Quarterly, 66(2), 101-117.
[16] Dewey J. (1959). Progressive education and the science of education // In Dworkin, M. S. (Ed.), Dewey on education: Selections (pp. 113-126). New York: Teachers College Press. (Original work published 1928).
[17] Durkheim E. 1957 (1915). Elementary Forms of the Religious Life. Translated by Joseph Ward Swain. London: Allen & Unwin. ONLY the following sections: Introduction / Subject of Our Study: Religious Sociology and the Theory of Knowledge (13-36).
[18] Erikson E.H. (1963). Childhood and society, 2nd ed. New York: W. W. Norton & Company, p. 445.
[19] Gay G. (2000). Culturally responsive teaching: Theory, research, and practice. New York: Teachers College Press, p. 320.
[20] Goodlad J.I. (2004). A place called school, Anniversary Ed. New York: McGraw Hill, p. 448.
[21] Guba E.G., Lincoln Y.S. (1981). Effective evaluation. San Francisco, CA: Jossey-Bass.
[22] Hogg M.A., Terry D.J., White K.M. (1995). A tale of two theories: A critical comparison of identity theory with social identity theory. Social Psychology Quarterly, 58(4), 255-269.
[23] Holland D., Lachicotte Jr.W., Skinner D., Cain C. (1998). Identity and agency in cultural worlds. Cambridge, MA: Harvard University Press, p.361.
[24] Holland D., Lachicotte Jr.W. (2007). Vygotsky, Mead, and new sociocultural studies of identity // In Daniels, H., Cole, M., &Wertsch, J. V. (Eds.), The Cambridge companion to Vygotsky (pp. 101-135). New York: Cambridge University Press.
[25] Lewin K. (1946). Action research and minority problems. Journal of Social Issues, 2(4), 34–46.
[26] Lewis D. (1966). "An Argument for the Identity Theory," Journal of Philosophy, 63, 17-25.
[27] Lewis D. (1972). "Psychophysical and Theoretical Identifications," Australasian Journal of Philosophy, 50, 249-258.
[28] McCarthy M. (1999). Gendered discourse and the construction of identity: Toward a liberated pedagogy in music education. Journal of Aesthetic Education, 33(4).
[29] Mead G.H. (1956). On social psychology. Chicago: The University of Chicago Press, p.296.
[30] Minick N., Stone C.A., Forman E.A. (1993). Integration of individual, social, and institutional processes // In Forman, E. A., Minick, N., Stone, C. A. (Eds.), Contexts for learning: Sociocultural dynamics in children's development (pp. 3-16). New York: Oxford University Press.

[31] Nieto S. (1999). The light in their eyes: Creating multicultural learning communities. New York: Teachers College Press.
[32] Nieto S. (1999). The light in their eyes: Creating multicultural learning communities. New York: Teachers College Press.
[33] Olsson B. (2007). Social issues in music education // In Bresler, L. (Ed.), International handbook of research in arts education (pp. 989-1002). Dordecht, The Netherlands: Springer.
[34] Place U.T. (1988). "Thirty Years on--Is Consciousness still a Brain Process?" Australasian Journal of Philosophy 66, 208-219.
[35] Pope D.C. (1999). Doing school: Successful students' experiences of the high school curriculum. Unpublished doctoral dissertation, Stanford University, California.
[36] Pope D.C. (2001). Doing school: How we are creating a generation of stressed out, materialistic, and miseducated students. New Haven, CT: Yale University Press. students. New Haven, CT: Yale University Press, p. 240.
[37] Rorty, Richard (1965). "Mind-body identity, privacy, and categories," Review of Metaphysics 19 (September): 24-54.
[38] Sadowski M. (2006). Why identity matters at school. In Sadowski M. (Ed.) Adolescents at school: Perspectives on youth, identity, and education. (pp. 1-5). Cambridge, MA: Harvard Education Press.
[39] Sandoval C. (2000). Methodology of the oppressed. Minneapolis: University of Minnesota Press, p. 264.
[40] Schlanger D.J. (1998). An exploration of school belongingness: Ethnicity, mediating factors, and fostering activities in a multicultural, middle-class, suburban middle school. Unpublished doctoral dissertation, Columbia University Teachers College, New York.
[41] Scriven M. (1967). The methodology of evaluation. In R. E. Stake (Ed.), Perspectives of curriculum evaluation (pp. 39–83). Chicago, IL: Rand McNally.
[42] Silvey P.E. (2004). Acquaintance knowledge of musical works in the secondary choral music classroom. Arts and Learning Research Journal, 20(1), 111-134.
[43] Smith L.T. (2008). Decolonizing methodologies: Research and indigenous peoples. New York, NY: Zed Books, p.220.
[44] Stets J.E., Burke P.J. (2000). Identity theory and social identity theory. Social Psychology Quarterly, 63(3), 224-237.
[45] Stringer E.T. (2013). Action research (4th ed.). Thousand Oaks, CA: SAGE, p.328.
[46] Tajfel H. (1970) Experiments in intergroup discrimination. Scientific American, 223, 96-102.
[47] Tajfel H., Turner J.C. (1979). An Integrative Theory of Intergroup Conflict. In W. G. Austin & S. Worchel (Eds.), The Social Psychology of Intergroup Relations. Monterey, CA: Brooks-Cole, p.33-47.
[48] Tajfel H., Turner J.C. (1979). An integrative theory of intergroup conflict. In W. G. Austin, S. Worchel (Eds.), The Social Psychology of Intergroup Relations (pp. 33-47). Monterey, CA: Brooks-Cole.
[49] Tarrant M., MacKenzie, L., Hewitt, L.A. (2006). Friendship group identification, multidimensional self-concept, and experience of developmental tasks in adolescence. Journal of Adolescence, 29(4).
[50] Tarrant M., North A.C., Eldridge M.D., Kirk L.E., Smith E.A., Turner R.E. (2001). Social identity in adolescence. Journal of Adolescence, 24(5), 597 - 609.
[51] Tarrant M., North A.C., Hargreaves D.J. (2004). Adolescents' intergroup attributions: A comparison of two social identities. Journal of Youth and Adolescence, 33(3), 177-185.
[52] Tarrant M., MacKenzie L., Hewitt L.A. (2006). Friendship group identification, multidimensional self-concept, and experience of developmental tasks in adolescence. Journal of Adolescence, 29(4), 627-640.
[53] Tarrant M., North A.C., Hargreaves D.J. (2001). Social categorization, self-esteem, and the estimated musical preferences of male adolescents. The Journal of Social Psychology, 141(5), 565-581.
[54] Taylor C. (1967). "Mind-body identity, a side issue?" Philosophical Review 76 (April): 201-13.
[55] Turner J.C. (1999). Ellemers N.; Spears R.; Doosje B., eds. "Some current issues in research on social identity and self-categorization theories". Social Identity. Oxford: Blackwell: 6–34.
[56] Wortham S. (2006). Learning identity: The joint emergence of social identification and academic learning. New York, NY: Cambridge University Press, p. 316.
[57] Worthen B.R., Sanders J.R., Fitzpatrick J.L. (1997). Programevaluation. NewYork, NY: Longman, p. 568.
[58] Kassymova G.K., Arpentieva M.R., Kosherbayeva A.N., Triyono M.B., Sangilbayev S.O., Kenzhaliyev B.K. (2019). Science, education & cognitive competence based on e-learning. Bulletin of the National academy of sciences of the Republic of Kazakhstan, 2019, (1), pp. 269-278. https://doi.org/10.32014/2019.2518-1467.31
[59] Sagiyeva R., Zhuparova A., Ruzanov R., Doszhan R., Askerov A. (2018). Intellectual input of development by knowledge-based economy: problems of measuring in countries with developing markets // Entrepreneurship and Sustainability Issues 6(2): 711-728. https://doi.org/10.9770/jesi.2018.6.2(17)
[60] Kosherbayeva N.A., Abdreimova K., Kosherba G., Anuarbek A. Synthesis of achievements of world mankind in humanity pedagogy. Procedia - Social and Behavioral Sciences 89, 2013. P. 886-889. https://doi.org/10.1016/j.sbspro.2013.08.950
[61] Azatbek T., Panzabekova A., Bekenova L., Yegizbyeva Zh. The share of drug trafficking in Kazakhstan's GDP: methods for evaluation / Economic Annals-XXI (2017), 166(7-8), C. 31-36 (Scopus). doi: https://doi.org/10.21003/ea.V166-06

ИНСТИТУТ ВСЕОБЩЕЙ ИСТОРИИ РАН
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ИМ. А.М.ГОРЧАКОВА
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«РОССИЙСКИЙ ФОНД МИРА»

ПРОГРАММА
МЕЖДУНАРОДНАЯ НАУЧНАЯ КОНФЕРЕНЦИЯ
«В СЕРДЦЕ ЕВРАЗИИ:
РОССИЯ И КАЗАХСТАН НА ИСТОРИЧЕСКИХ ПЕРЕКРЕСТКАХ»
(МОСКВА, 16-17 МАЯ 2019 Г.)

КОНФЕРЕНЦИЯ ОРГАНИЗОВАНА В РАМКАХ
ПЛАНА РАБОТЫ СОВМЕСТНОЙ РАБОЧЕЙ ГРУППЫ
ИСТОРИКОВ РОССИИ И КАЗАХСТАНА

«ЛОЦМАН ПОДЗЕМНЫХ МОРЕЙ» – ДОКУМЕНТАЛЬНОЕ НАСЛЕДИЕ АКАДЕМИКА АН КАЗАХСКОЙ ССР У.М.АХМЕДСАФИНА В АРХИВЕ РОССИЙСКОЙ АКАДЕМИИ НАУК

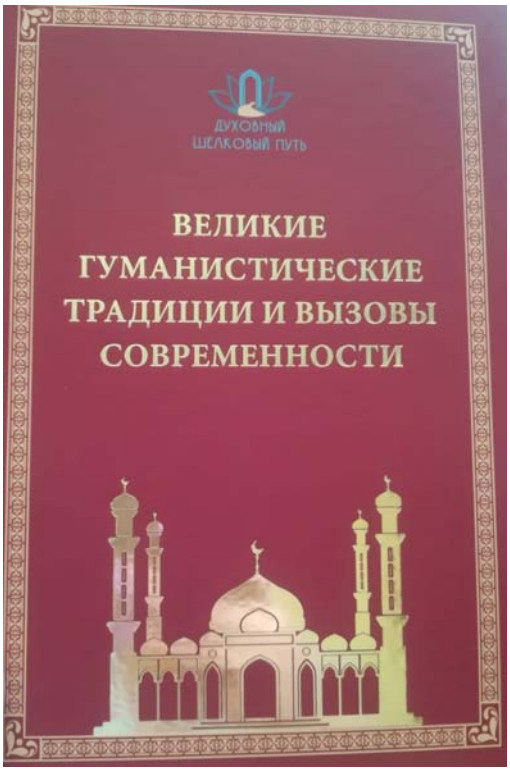
Уфа Мендбаевич Ахмедсафин – крупнейший ученый-гидрогеолог, географ, эколог; родился 15(28) июля 1912 г. в Петропавловском уезде Акмолинской губернии в бедной крестьянской семье. Не достигнув четырех лет, остался сиротой, его родители умерли от черной оспы. Бродяжничал, несколько лет жил у муллы, который научил его арабской грамоте, затем еще некоторое время работал пастухом у бая. В 1921-1923 гг. Уфа Ахмедсафин находился в детском приюте в Петропавловске. В 1923 г. по указанию Казнаркомпроса его в числе лучших семнадцати воспитанников приюта отправили в Оренбург (в то время столицу Казахской автономной республики), где была открыта школа-интернат для осиротевших детей.

После окончания восьмого класса школы-интерната У.М.Ахмедсафин в 1930 г. был направлен в Ташкент для получения высшего образования, где согласно распределению попал на планово-экономический факультет Среднеазиатского хлопково-ирригационного института. Через некоторое время он добился перевода в Среднеазиатский геологоразведочный институт (САГРИ, с 1933 г. – Среднеазиатский индустриальный институт), где изучал гидрогеологию засушливых районов не только по учебникам, но и выезжал на полевые работы в засушливые районы Узбекистана, Киргизию, Южного Казахстана. Его дипломная работа «Инженерно-геологические условия Кокандского ирригационного узла», оформленная 40 цветными блок-диаграммами, геологическими зарисовками и многочисленными расчетами размеров фильтрации под гидротехническими сооружениями, получила высокую оценку и дважды была премирована учебными и проектными институтами.

В 1936-1940 гг. У.М.Ахмедсафин учился в аспирантуре Московского геологоразведочного института им. С.Орджоникидзе. В 1940 г. защитил кандидатскую диссертацию на тему «Режим грунтовых вод аллювиальных отложений долины реки Чирчик». В 1947 г. защитил докторскую диссертацию на тему «Подземные воды песчаных массивов южной части Казахстана».

Награжден орденами и медалями, Почетными грамотами Верховного Совета Казахской ССР (1961-1962, 1972). С 1965 по 1984 гг. Директор Института гидрогеологии и гидрофизики АН КазССР. В 1969 г. присвоено звание Героя Социалистического Труда с вручением Ордена Ленина и Золотой медали «Серп и Молот» за большие заслуги в развитии советской гидрогеологической науки. В 1980 г. Лауреат государственной премии в области науки и техники КазССР. В 1982 г. награжден орденом Дружбы народов. В короткой статей трудно перечислить все заслуги великого ученого. О них подробно изложены в книгах и различных статьях.

Умер У.М.Ахмедсафин 21 октября 1984 г. в Алма-Ате.



Имя ученого присвоено Институту гидрогеологии и гидрофизики АН Казахской ССР (ныне – Институт гидрогеологии и геоэкологии Республики Казахстан), одной из улиц города Алматы, школе-интернату на его родине в селе Трудовом в Северо-Казахстанской области. 100-летие У.М.Ахмедсафина в 2012 г. отмечалось под эгидой ЮНЕСКО.

В Архив Российской академии наук документы У.М.Ахмедсафина были переданы в 2010 г. его дочерью – Диной Уфимовной Ахмедсафиной.

Из научного и творческого наследия в личном фонде У.М.Ахмедсафина (Ф.2189) сохранились: конспект по гидрологии 1936 г., диссертация на соискание ученой степени кандидата геолого-минералогических наук, экспедиционный дневник за апрель-май 1941 г., альбом чертежей к докторской диссертации, газетные статьи и интервью, наброски статей и выступлений, выписки из литературы, карты, рисунки. Биографические документы включают в себя: диплом об окончании Среднеазиатского индустриального института, автобиографии, удостоверения, трудовую книжку, рецензию и отзыв на книгу «В поисках подземных морей», статьи о жизни и деятельности У.М.Ахмедсафина, документы о праздновании 100-летия со дня рождения ученого и др.

Значительную часть в целом небольшого по объему архивного фонда составляют фотографии У.М.Ахмедсафина разных лет. Переписка в основном представлена личными письмами и открытками, адресованными дочери Дине и внучке Эллине, которые наполнены невероятной теплотой и любовью.

Архив Российской академии наук выражает Дине Уфимовне огромную благодарность за переданные документальные материалы основателя гидрогеологической школы в Казахстане, «Лоцмана подземных морей» – Уфы Мендбаевича Ахмедсафина.

ЛИТЕРАТУРА

[1] Ахмедсафина Д.У., Шапиро С.М. Уфа Мендбаевич Ахмедсафин, 1912-1984 / Д.У.Ахмедсафина, С.М.Шапиро; отв.ред. Ф.Т.Яншина. 2-е изд., доп. – М., Наука, 2005. 180 с.

[2] Ахмедсафина Д.У. Лоцман подземных морей / Отв. ред.Ф.Т.Яншина. – М.: Наука, 2009. – 270 с.

[3] Ахмедсафин Уфа Мендбаевич. Библиографический указатель / Сост. П.А.Плеханов, акад. МАНЭБ, М.А.Мухамеджанов, д-р геол.-минер. наук; Н.Т.Кожакова, канд. техн. наук; Б.К.Жуматаев, научн. сотр.; Гл.ред. Ж.С.Сыдыков, акад. НАН РК. Алматы, ЦНБ, 2012. 160 с.

Когда верстался номер. *В апреле 2019 г. в Москву был доставлен остальной архив У.М.Ахмедсафина. Объем фонда большой. В настоящее время идет обработка фонда.*

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