

Sagiyeva R.K.¹, Zhuparova A.S.²¹Doctor of Economic sciences, Professor, e-mail: rimmasagiyeva@gmail.com,ORCID <https://orcid.org/0000-0002-7447-268X>²PhD, Acting Associate Professor, e-mail: aziza_z@mail.ru,ORCID <https://orcid.org/0000-0002-5787-760X>

Al-Farabi Kazakh National University, Kazakhstan, Almaty

**INVESTING IN THE INTELLECTUAL POTENTIAL OF SOCIETY:
THE EXAMPLE OF KAZAKHSTAN**

Intellectual capital is the most important component of the production assets of the organization operating in the post-industrial information society. The intellectual potential of the society is determined by the following main factors: the quality of the state socio-economic policy; the genetic fund of the population; the quality of the living environment (the level and quality of life of the population, ecology, political climate, etc.) of the population in general and its individual groups in particular; the level of health of the population; the level of development of the system of education and training of the younger generation; the quality of the mechanism of motivation of the population to creative work; the structure of society and the employed population; the level of culture and national consciousness of the population. Investments in intellectual potential play a major role in its development. This article analyzes the main factors affecting the development of the intellectual potential of society since the collapse of the Soviet Union. The main purpose of the study is to analyze and study the main factors affecting the growth of investment in the intellectual capital of the society. Research methodology includes such methods of study of economic phenomena and processes: economic and statistical analysis. The results of the study will allow to study the successful experience, as well as to identify problem areas in the financing of the intellectual potential of society. The scientific and practical significance of the work lies in the fact that its main conclusions and recommendations can be used to develop effective strategies and tactical instruments of innovation policy.

Key words: intellectual (human) potential of the society, the index of human potential development, living level of population, the performance of scientific and scientific-technical activity, economic growth.

JEL Classification: O380

Сагиева Р.К.¹, Жупарова А.С.²¹э.ғ.д., доцент, e-mail: rimmasagiyeva@gmail.com, ORCID <https://orcid.org/0000-0002-7447-268X>²PhD, доцент м.а., e-mail: aziza_z@mail.ru, ORCID <https://orcid.org/0000-0002-5787-760X>

әл-Фараби атындағы Қазақ ұлттық университеті, Қазақстан, Алматы қ.

**Қоғамның зияткерлік әлеуетін инвестициялау:
Қазақстанның мысалы**

Зияткерлік капитал – постиндустриалды ақпараттық қоғамда жұмыс істейтін ұйымның өндірістік активтерінің маңызды құрамдас бөлігі. Қоғамның зияткерлік әлеуеті келесі негізгі факторлармен анықталады: мемлекеттік әлеуметтік-экономикалық саясаттың сапасы; халықтың генетикалық қоры; тұтастай алғанда халықтың және оның жеке топтарының өмір сүру ортасының сапасы (халықтың өмір сүру деңгейі мен сапасы, экология, саяси климат және т.б.); денсаулық сақтау деңгейі; жас ұрпақты оқыту және тәрбиелеу жүйесінің даму деңгейі; тұрғындарды шығармашылық жұмысқа ынталандыру тетіктерінің сапасы; қоғамның және жұмыспен қамтылған халықтың құрылымы; мәдениеттің деңгейі және халықтың ұлттық ерекшелігі. Зияткерлік әлеуеттің дамуында инвестициялар үлкен рөл атқарады. Бұл мақалада Кеңес Одағы ыдырағаннан бері қоғамның зияткерлік әлеуетінің дамуына әсер ететін негізгі факторлар талданады. Зерттеудің негізгі мақсаты – қоғамның зияткерлік капиталына инвестициялардың өсуіне әсер ететін негізгі факторларды талдау және зерттеу. Зерттеу әдіснамасына экономикалық құбылыстар мен процестерді талдаудың осындай әдістері кіреді: экономикалық және статистикалық талдау. Зерттеу нәтижелері сәтті тәжірибені зерттеуге, сонымен қатар қоғамның зияткерлік әлеуетін қаржыландырудағы проблемалық бағыттарды анықтауға мүмкіндік береді. Зерттеудің ғылыми және практикалық маңыздылығы оның негізгі тұжырымдары мен ұсыныстарын инновациялық

саясаттың тиімді стратегиялары мен тактикалық құралдарын жасау үшін пайдалануға болатындығында.

Түйін сөздер: қоғамның зияткерлік (адами) әлеуеті, адами әлеуетінің даму индексі, халықтың өмір сүру деңгейі, ғылыми және ғылыми-техникалық қызметтің тиімділігі, экономикалық өсу.

Сагиева Р.К.¹, Жупарова А.С.²

¹д.э.н., доцент, e-mail: rimmasagiyeva@gmail.com, ORCID <https://orcid.org/0000-0002-7447-268X>

²PhD, и.о. доцента, e-mail: aziza_z@mail.ru, ORCID <https://orcid.org/0000-0002-5787-760X>

Казахский национальный университет имени аль-Фараби, Казахстан, г. Алматы

Инвестирование в интеллектуальный потенциал общества: пример Казахстана

Интеллектуальный капитал – важнейшая составляющая производственных активов организации, функционирующей в условиях постиндустриального информационного общества. Интеллектуальный потенциал общества определяется следующими основными факторами: качеством государственной социально-экономической политики; генетическим фондом населения; качеством среды жизнедеятельности (уровень и качество жизни населения, экология, политический климат и др.) населения в целом и его отдельных групп в частности; уровнем здоровья населения; уровнем развития системы воспитания и обучения подрастающего поколения; качеством механизма мотивации населения к творческому труду; структурой общества и занятого населения; уровнем культуры и национального самосознания населения. Инвестиции в интеллектуальный потенциал играют основную роль в его развитии. В данной статье проводится анализ основных факторов, влияющих на развитие интеллектуального потенциала общества со времен распада Советского Союза. Основная цель исследования заключается в проведении анализа и исследования основных факторов, влияющих на рост инвестиций в интеллектуальный капитал общества. Методология исследования включает в себя такие методы познания экономических явлений и процессов: экономико-статистический анализ. Результаты исследования позволяют изучить успешный опыт, а также выявить проблемные места в финансировании интеллектуального потенциала общества. Научная и практическая значимость работы заключается в том, что его основные выводы и рекомендации могут использоваться для разработки эффективных стратегий и тактических инструментов инновационной политики.

Ключевые слова: интеллектуальный (человеческий) потенциал общества, индекс развития человеческого потенциала, уровень жизни населения, результативность научной и научно-технической деятельности, экономический рост.

Introduction

Critical from a long-term perspective are the structure of external debt, the availability of natural resources, the raw material export burden, population growth, the use of intellectual potential and the capacity of the political system to promote the necessary consensus and decisions legitimized by the Constitution realize. Specific bottlenecks arise from decreasing population potential, damage to infrastructure and the environment, neglect of real economic renewal in industry, agriculture and transport systems (indicated by missing or misguided investments) and a conceptual deficit in promoting research and development (Duff, 2010).

Looking back on the first years of Kazakhstan's transformation, it becomes clear that the factor of governance in particular has become the decisive limit to the country's development. Competence and integrity of the actors were and are not guaranteed, above all in the public sector and in politics (Bogomolova & Slepchenko, 2012). The general and

therefore also difficult to refute suspicion of corruption has paralyzing effects on all sectors of the Kazakhstan economy and society. In this context, the principles and behavior patterns of Soviet and pre-Soviet times are also relevant:

The collectivity of the “Municipality”, sanctioned even after the liberation of the peasants from 1861, with its redistribution of land, facilitated collectivization for Stalin, but also explains the unsolved problems in the reform of land law.

A traditional paternalism explains the widespread rent seeking, i.e the desire of managers in Kazakhstan today to do everything in their power to avoid the closure of unprofitable businesses through subsidies in conjunction with the leaders of regional politics and administration. The equally traditional idea of the inexhaustible wealth of Kazakhstan is only partially covered by the actual economic usability of natural resources. In any case, it can be interpreted as a motive for, on the one hand, unprecendented exploitation in dealing with nature and, on the other hand, a systematic underestimation of the

importance of technology-intensive industrial exports (Aboites & Cimoli, 2002).

Literature review

Over the past decade, intellectual potential and intangible assets have been widely viewed as an essential tool for successful business under conditions of intensive knowledge (YiYong *et al.*, 2019). Accordingly, the main purpose of this document is to develop and prioritize the most important indicators of intellectual capital in knowledge-based industries (Bessy & Brousseau, 1997). The fuzzy results of review of scientific papers showed that participants noted high concerns, especially with regard to the knowledge and skills of managers and employees regarding human capital, high concerns, especially about the positive climate, the ratio of R & D investment and the number of R & D projects in accordance with structural capital when considering relational capital, more attention was paid to customers and strategic cooperation, such as alliances and licensing (Bhattacharjee, 2012).

Intellectual potential is generally recognized as an intangible asset of a company, which is difficult to assess using ordinary financial statements. Although it usually cannot be identified from traditional financial statements, relevant parties typically accept such expanding investments. To date, researchers have proposed a wide range of definitions and perspectives of intellectual capital. Dasgupta and David (1994) argue that intellectual potential is the value of intangible assets accumulated by the company. This value was equal to the difference between the corporate market and book value (Davenport & Bibby, 1999.). David (1993) explained the intellectual potential as intellectual material consisting of knowledge, information, intellectual property and experience, which could be used to create wealth. In addition, researchers have decomposed and conceptualized IP to get a better description of this. Helpman (1993) reviewed the four components of IP, including market-related, mind-related, organization-related and human-related capital. Other researchers describe intellectual potential in terms of human capital and structural capital (Jaffe, 2000; Ling, 2011). Penrose (1951) defined intellectual potential as the sum of the knowledge and capabilities of employees in a company. Finally, intellectual potential is considered to be part of a firm's competitiveness derived from its components, consisting of human capital, structural capital, and client capital (Porter *et al.*, 2005).

An analysis of the concept of intellectual capital allows us to conclude that this category in its development has gone from the level of a person through the level of organization to the level of society (Łataś & Walasek, 2016; Yusoff *et al.*, 2019). It should be borne in mind that at each hierarchically higher level, this concept is enriched, acquiring a new content (Kianto *et al.*, 2018). Based on the analysis of McDowell *et al.* (2018) we offer a simplified three-level structure of intellectual capital, which is key in understanding the modern theory of intellectual capital:

- individual level: human intellectual resources, human capital – accumulated scientific and educational potential and experience of the individual, personality (stock of knowledge, experience and abilities);

- level of organization – the intellectual resources of the organization, the intellectual capital of organizations, which includes the human capital of workers, client capital, organizational capital (according to the classification of Tejedo-Romero *et al.* (2017);

- the level of society – the intellectual resources of society, the intellectual capital of society.

Summing up, according to Kianto *et al.* (2017) it should be emphasized that research on the topic of intellectual capital of society is only gaining momentum. Intellectual capital, as one of the basic categories of development in the post-industrial world, requires close attention on the part of researchers dealing with both the problems of human capital and the intellectual resources of an organization. The concepts associated with the category of intellectual capital still need a more precise and adequate definition. To do this, focus on the following key points. First, intellectual resources cannot be described using economic axiomatics, since they are not subject to market axioms: they are unlimited, and ownership of these resources is very difficult to specify. Secondly, intellectual capital and resources should be considered as endogenous factors in relation to the economic system. Thirdly, human capital is a private good, but the condition for its existence is public goods (Patthirasinsiri & Wiboonrat, 2017). And, fourthly, intellectual capital manifests itself in different ways at the levels of private, public and mixed good.

Methodology

As a basis for the study of the scientific problem, the tools of knowledge of economic theory were taken, namely, an analysis of the research conducted

in the works of foreign and domestic scientists was carried out. The analysis of the main factors affecting the investment in the intellectual potential of society. In addition, the method of knowledge of economic phenomena and processes was applied, which made it possible to reveal the peculiarities of investing in the intellectual potential of society.

Results and discussion

Macroeconomic growth

The overall economic development of Kazakhstan in the period from 2000 to 2017 will depend to a great extent on the existing reform policy framework conditions. However, taking into account the starting position of the real economy in 1999 and the factors described above, a limited margin for

future growth must be assumed. Realistically, the maximum for the ten-year period up to 2017 cannot be expected to be more than an average four percent increase in gross domestic product (GDP). Close stagnation with average annual growth of one per cent is likely to mark the lower limit of development (Figure 1).

In addition to domestic consolidation, debt regulation and potential foreign exchange earnings on the international energy markets are of crucial importance for long-term growth. In view of the long-term growing importance of alternative energies and energy-saving technologies, the (financially urgently needed) increase in energy prices can by no means be taken for granted. For the foreseeable future, foreign trade will remain vulnerable to global turbulence.

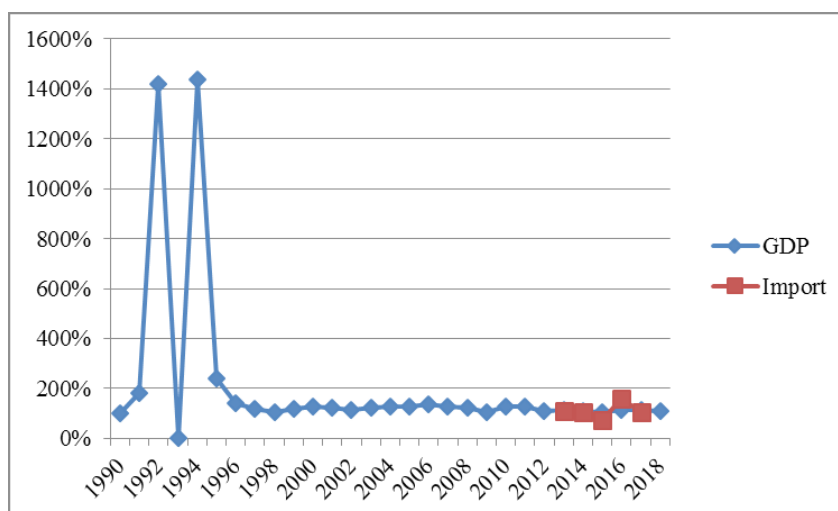


Figure 1 – Development of Kazakhstan GDP on alternative assumptions about economic growth

Note – compiled by authors on the basis of Statistics Committee (2017)

A model calculation can also clarify the long-term prospects in the area of public finances: in 2018 external debt of Kazakhstan was USD 161 million, the balance of payments requires around USD 17 million for smooth debt servicing (excluding another amortization). In order to secure funding, net capital imports must stabilize at a level of approximately \$ 17 million between 2012 and 2017, with a continuing positive current account balance of approximately \$ 3-4 million. Assuming continued capital flight (including the widespread dollar horde in cash) and constant foreign exchange reserves, steady foreign

direct investment and portfolio investment is solely for financing debt service required.

In the most successful year of transformation efforts to date (2015), direct and portfolio investment reached around \$ 37.9 million. Capital inflows are below this volume due to political uncertainty, which means that a financing gap of about \$ 5.2 million must be expected – an enormous amount for Kazakhstan. Western creditors, given their experience after the ruble crash, are not likely to find it easy to reduce their funding passivity in the coming years.

Natural resources

In Kazakhstan's wealth of resources, there are still opportunities for the country's catching up overall economic development, especially in terms of self-sufficiency and export. However, since the dissolution of the Soviet Union, this potential has been underutilized. Since 1992, a considerable export surplus has been generated, as in the Soviet Union, two-thirds of the revenues came from exports of raw materials. Much of the estimated \$ 250 billion in illegal capital transfers comes from this sector. At the same time, the maintenance and modernization of the facilities and the development of new deposits (also via foreign investments) were neglected.

Kazakhstan has the greatest potential of natural resources in the world. Minerals are represented by almost all elements of the periodic table. The Republic ranks first in the world in explored reserves of zinc, tungsten and barite, second in silver, lead and chromite, third in copper and fluorite, fourth in molybdenum, and sixth in gold. Among the CIS countries, Kazakhstan accounts for 90% of the total reserves of chromite, 60% of tungsten, 50% of lead, 40% of zinc and copper, 30% of bauxite, 25% of phosphate, 15% of iron ore, more than 10% of coal. The Western region has significant oil and gas reserves, which make it possible to classify Kazakhstan among the ten largest oil-producing states in the world, which have a significant impact on the formation of the global energy market.

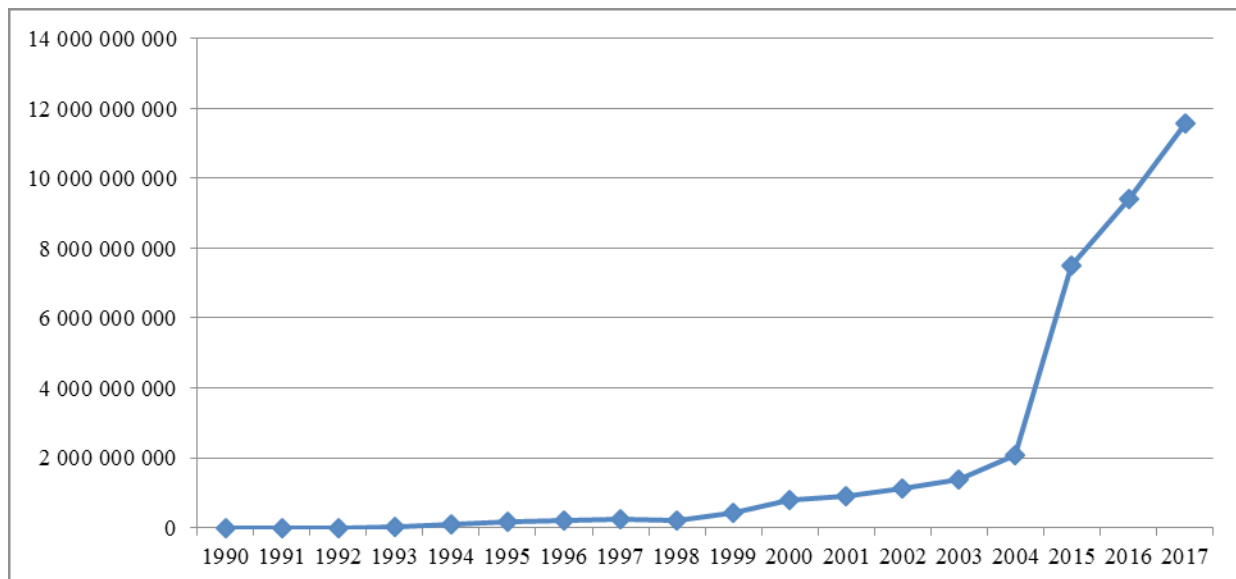


Figure 2 – Mining and quarrying in Kazakhstan 1990 – 2017

Note – compiled by authors on the basis of Statistics Committee (2017)

Currently, the country is competitive in the international market in the production and export of fuel, energy (oil, gas, coal) and metals (iron, chrome, ferroalloys, steel, copper, aluminum, zinc and lead). The country's potential in agricultural resources is also very significant, especially in animal husbandry and grain production. The global importance of the economic complex of the country is given today by rich hydrocarbon reserves. According to the latest estimates, the total reserves of oil and gas in Kazakhstan amount to 23 billion tons, of which about 13 billion tons are concentrated in the Caspian shelf. The vast reserves of oil and gas, along with the relatively low risk of political instability, have already made Kazakhstan the largest recipient

of foreign investment per capita among the CIS countries. The investment climate in the oil and gas sectors is characterized by a number of favorable factors. First, the laws on foreign investment, oil, licensing and privatization created the legal basis for the normal functioning of foreign investors in the field of environmental management. Secondly, the existing tax and tariff systems and the structure of state administration of the oil production sector have been simplified. Finally, the geographical position of Kazakhstan in the center of the continent gives it access to the large export markets of Europe. In terms of oil production, Kazakhstan ranks 26th in the world, producing about 27 million tons of oil in 1999. The largest importers of Kazakh oil, gas

and oil refined products are Kazakhstan, the United Kingdom, Ukraine, Switzerland and Italy. However, only a limited amount of Kazakhstan oil is exported to the world market. Kazakhstan and the countries of the Persian Basin, rich in hydrocarbon raw materials, is a strong competitor to Kazakhstan in the global oil and gas market.

Nearly all raw materials saw a decline in production in the 1990s. The decline in investment since the beginning of the decade has been significantly higher than that of Kazakhstan's economy as a whole. In the energy sector, the aim is to reverse the decline in production in line with the "Mining and quarrying in Kazakhstan by 2017" (Figure 2), but in high-investment sectors such as raw materials development, a return to high growth rates is unlikely for a long time to come.

Oil production in Kazakhstan is about 6 million tons per month. In 2018, it is planned to extract 87 million tons of oil. And this is not the limit, since the country intends to increase production in the near future. Kashagan is one of the largest oil fields in Kazakhstan. The volume of Kashagan minerals is 2 billion tons. The deposit is located on the 9th place in the world.

Unlike the natural gas sector and oil transport, oil production has been further privatized and important steps have been taken towards demonopolisation. The unbundling of the state monopoly was carried out predominantly from a regional point of view. Although this leads to the continued predominance of regional production monopolies, renewed tenders are increasingly fostering competition between these companies, which were originally focused on regions.

Agriculture and environment

Agriculture is one of the key sectors of the economy of Kazakhstan. In the north of the country, climatic conditions are conducive to the cultivation of spring wheat, oats, barley and other grain crops, and also allow developing vegetable growing, melon growing and cultivating a number of industrial crops – sunflower, flaxen, etc. River valleys, where there is a lot of heat, with artificial irrigation, high yields are yielded by cotton, sugar beet, yellow tobacco, rice; fruit gardens and vineyards. The natural conditions of Kazakhstan, their diversity determine significant potential opportunities for the development of animal husbandry. In the Republic, sheep, horse, camel and cattle breeding are traditionally practiced. Desert and semi-desert areas in the central and south-western parts of Kazakhstan are widely used as seasonal pastures for livestock. Mountain meadows in the east and southeast of the republic

are used as summer pastures. Being one of the priority directions of development of the republic's economy, agriculture has a huge potential and large reserves.

During the period of independence, nine policy documents were developed, on the basis of which the state policy in the field of agriculture was implemented: the socio-economic development of subregions for 1991-1995 and for the period up to 2000, the development of agriculture for 1993-1995 and 2000 development of agricultural production for 2000-2002, the state agri-food program for 2003-2005, rural development for 2004-2010, sustainable development of the agro-industrial complex for 2006-2010, priority measures for the implementation of the Concept of sustainable development of the agro-industrial complex of the Republic of Kazakhstan 2006-2010, development of the agro-industrial complex for 2010-2014, on the development of the agro-industrial complex "Agrobusiness-2017". Currently, about 5% of the gross domestic product (GDP) of the country is being created in agriculture.

In the structure of the gross output of the industry, there is a high proportion of production of personal subsidiary farms. About 80% of agricultural products produced in Kazakhstan are sold as raw materials, without processing, and finished products have weak competitiveness. While large-scale production declined substantially in the 1990s, Soviet private sector subsistence farms increased their share of production to half of total agricultural production, with specialization in higher-value products. The production shares of the newly established farms, however, remained at two percent. Although the former state-owned large agricultural enterprises (collective farms, state farms) were predominantly re-registered under private law, 90 per cent retained the usual forms of work organization. Land (62 per cent in private disposal) and other fixed assets formally belong to the shareholders of the companies, but are practically in the hands of the management. Profits are not distributed, the payment is made after the work.

The balance of industrial environmental pollution in the 1990s seems positive only at first glance: Total water withdrawal in 2010 was estimated to be equal to 21.12 km³, out of which 14 km³ was used for agriculture, 6.263 km³ for industrial usage and 0.878 km³ for municipal purposes. Water withdrawal per capita in Kazakhstan is the lowest in the Central Asian region, but comparing to other countries like Israel, consumption of water is still relatively high. However, the amount of pollutants per unit of

production increased, and the number of companies with annual pollutant emissions of more than 100 tons did not decrease. The fact that the management hardly cares about the environmental issues reflects the general financial constraints, but is also due to the fact that it is usually more favorable from the point of view of management to pay fines for non-compliance with environmental regulations than to make environmentally friendly investments be taxed.

Extremely problematic for certain areas of Kazakhstan (and often for neighboring countries) are environmental pressures resulting from the use and disposal of facilities for the production of nuclear, bacteriological and chemical weapons. Kazakhstan will also be presented as a future major buyer for the treatment, storage and disposal of nuclear waste from other countries. In the foreigners' argumentation of the proponents of this conception, reference is made to the possible contribution of Kazakhstan to preventing the misuse of nuclear material by third States.

Population development and health

It is significant for the country's human potential that the life expectancy of Kazakhstan men is about 10 years lower than that of male Central Europeans. At the same time, Kazakhstani men, on average, live 9 years less than women. At 72, it is at the level of Brazil and India. For the last time since 1991, natural population growth had increased for Kazakhstan. The life expectancy was primarily due to men of working age who experienced a large increase in "external causes" (murder, suicide, poisoning, accident). The decline in birth rates is mainly due to the lower number of women of childbearing potential Age and the increasing age of the first-time mothers.

Specifically, Kazakhstan problems are the continuing high number of legal and illegal abortions as well as high maternal mortality. Maternal mortality is five to ten times higher than in industrialized countries and continues to increase. These constellations are due to traditional attitudes in the population and a completely underdeveloped family planning.

As a result of recent births, Kazakhstan experts are predicting an increase in the number of preschool children, conscripts and working age groups, while the number of students will decrease. From the Kazakhstan side and from international organizations there are numerous – strongly divergent – forecasts of the expected population development in the next decades. It is striking that these have been more modest from year to year:

Education System of Kazakhstan

The future of modern civilization depends not only on the level of technological progress and economic growth, but also on the quality of human capital. According to the Global Competitiveness Index, in 2017, in terms of primary education, Kazakhstan ranked 4th among 137 countries of the world, increasing its position from 118th place.

In the "Human Development Index" ranking, Kazakhstan ranks 56th out of 188 countries, placed in the list of countries with a high level of human development.

In terms of economic competitiveness, according to the Institute of Management IMD-2017, the position of Kazakhstan in terms of the Education sub-factor improved by 9th position, occupying the 35th place in the world. Also, Kazakhstan joined the OECD Innovation Policy and Education Policy Committees.

The relevance of the modernization of the education system of Kazakhstan is due to the importance of the social function – the development and transmission of knowledge, which in a modern society play a key role in the division of labor.

The maximum success in the modernization of the education system in Kazakhstan can only be achieved under the condition that all the software installations put into education policy will be able to absorb the maximum possible from the positive potential accumulated by world experience. And therefore, in front of many states, especially in Central Asia, the issue of modernization of the educational system remains relevant.

In Kazakhstan, the organizational basis for the national educational policy is the State Program for the Development of Education of the Republic of Kazakhstan for 2011–2020. The program is aimed at creating a modern system for assessing the quality of education, improving education standards, training requirements for graduates of educational institutions, the emergence of various types of educational institutions of various forms of ownership, informatization of education and the introduction of new educational technologies, the active involvement of non-state sources of education financing.

In accordance with the GPRO for 2011–2020, the main directions of modernization and development of the education system were defined: the development of pre-school education, teacher training, the introduction of electronic education, the E-learning project, the modernization of higher education institutions, the modernization of vocational education, and innovation. in secondary education.

Personnel for a knowledge-based economy

Scientific personnel are specialists of the highest degree, directly involved in the process of reproduction of scientific knowledge and the preparation of scientific results for practical use (commercialization). The differentiation of the personnel structure is due to the peculiarities of the tasks of the knowledge economy, as well as the specifics of scientific and technological work. It includes cadres of scientific and engineering workers, managerial personnel, workers in pilot production, support and maintenance personnel.

They are designed to form the “quality” and “prospects” of the further development of the economy and the state. According to Academician S.Yu. Glazyev, without a staffing of high-tech sectors that are the locomotives of economic growth in the quantitative and qualitative aspects, the transition to the knowledge-based economy and the new VI technological order is unrealistic.

In recent years, the staffing of science in Kazakhstan has been developing contrary to the main world trends. The main indicators of human capacity are presented in Table 1.

Table 1 – The main indicators of the personnel potential of the science of Kazakhstan in 2012-2016

	2012	2013	2014	2015	2016
Number of employees performing R & D, people	20 404	23 712	25 793	24 735	22 985
of them:					
Researchers	13 494	17 195	18 930	18 454	17 421
of them:					
doctors of science	1 065	1 688	2 006	1 821	1 828
doctor profile	719	605	596	549	493
PhD	131	218	330	431	456
candidates of science	3 629	4 915	5 254	5 119	4 726
Average monthly nominal wages of employees by types of economic activity, tenge					
Research and development	148 530	153 567	171 626	184 940	208 752
Higher education	102 016	110 017	117 985	125 944	136 403
Number of employees performing research and development by sector of activity					
Government sector	4 921	5 516	7 608	7 157	7 643
Higher professional education sector	9 405	11 828	10 961	10 623	9791
Business sector	4 718	5 036	5 786	5 258	4222
Non-profit sector	1 360	1 332	1 438	1 697	1329
Note – compiled by authors on the basis of Statistics Committee (2017)					

So, despite the fact that, in general, in the period from 2012 to 2016, there is an increase in the total number of personnel engaged in research and development by 2,581 people, or 12%. In 2016, there is a decrease in the number of researchers in comparison with previous years.

Tracing the change in the number of personnel engaged in research and development by sector of activity, we can note a certain increment of their number in the public sector – by 2.7 thousand people, or 35%; in the MPS sector – by 0.4 thousand people,

or 0.3%; In the sector of NPOs, a negative trend is observed, that is, a slight decrease of 0.2%. At the same time, the reduction in the number of personnel engaged in research and development in the business sector by 0.5 thousand people, or 11%, is of particular concern. Indeed, in the modern market economy, the entrepreneurial sector accumulates in itself a large part of the scientific potential. This happens in traditionally developed countries – the USA, Japan, Korea, Sweden, where about 2/3 of the total number of researchers are engaged in the business

sector. These data reflect a low investment interest on the part of domestic entrepreneurs in innovations and developments, thereby further aggravating the prevailing general negative situation.

In the post-reform period there is a devaluation of the prestige of the scholarly profession. Thus, on the scale of prestige, the profession of a scientist in Kazakhstan is not even in the top 10 prestigious professions, while in America – the 1st, and in Europe – the 2nd. The low prestige of the scholarly profession is not dangerous in itself. However, it gives rise to a more dangerous trend – the lack of an influx of young scientists and researchers, as well as the loss of continuity of generations.

Thus, speaking about the tendencies of formation of a knowledge-based economy in Kazakhstan, one should focus on two main points: is this development aimed at the sustainability of the economy and the well-being of people and to what extent have internal factors matured in the country contributing to this development. Of course, the

country's scientific potential, as well as its ability to generate new knowledge, has been and remains a significant driving force for the development of the knowledge economy. Therefore, we believe that it is advisable to start the study with the presence of the number of workers engaged in research activities (Table 2). As you can see, the dynamics of this indicator in the whole country developed unevenly over the years and in 2016 decreased by 1,750 people. A significant reduction is observed in Akmola and North Kazakhstan regions, which can be explained, among other things, by migration to the nearby large cities of Kazakhstan, which are better provided with scientific infrastructure. Some reduction in the number of workers in the scientific sector occurred in Pavlodar, South Kazakhstan, East Kazakhstan regions and in the city of Astana. A slight increase in research workers is observed in the West Kazakhstan and Mangystau regions, while in both capitals there is a decrease in their number.

Table 2 – The number of employees engaged in research and development work, people

Region	2012	2013	2014	2015	2016
The Republic of Kazakhstan	20 404	23 712	25 793	24 735	22 985
Akmola region	936	992	1 054	802	652
Aktobe region	172	282	356	335	323
Alma-Ata's region	415	826	901	1 049	983
Atyrau region	605	400	398	462	400
West-Kazakhstan region	516	600	425	540	756
Jambyl Region	350	278	368	318	327
Karaganda region	1 189	1 387	1 631	1 708	1 458
Kostanay region	268	518	565	574	556
Kyzylorda Region	192	205	253	236	228
Mangistau region	569	590	583	648	700
South Kazakhstan region	994	1 466	1 359	1 356	1 088
Pavlodar region	292	774	809	716	693
North-Kazakhstan region	325	312	229	182	135
East Kazakhstan region	1 913	2 269	2 377	2 303	2 205
Astana	3 024	3 159	3 391	3 001	2 939
Almaty city	8 644	9 654	11 094	10 505	9 542
Note – compiled by authors on the basis of Statistics Committee (2017)					

In general, the downward trend in the number of workers in the scientific sector exacerbates the existing deficit, especially noticeable in comparison with the leading global economies. For example, the

highest density of scientific workers in the world in 2012 was in Israel, where per a million inhabitants, 8,337 people were engaged in scientific research. This is more than twice as high as in the United States

(3.984 people in 2013) and in the United Kingdom (4.108 people in 2013). The density of scientific workers in 2013 was also high in the Republic of Korea (6.533 people) and Japan (5.195 people). In Kazakhstan, this figure is equal to 1284 people. In fact, the scientific sector not only has a shortage of scientific personnel, but also is experiencing its aggravation. There are several reasons:

- natural aging of the country's scientific personnel;
- the unattractiveness of the scientific sector for scientists;
- outflow of young scientists in the field of business and abroad;

Despite the measures taken by the state to increase the state order for the preparation of masters and PhD students, as well as the continuation of the Bolashak international program, the field of scientific activity continues to be unattractive for youngest people due to weak material and social incentives.

A significant problem for the country remains the “brain drain” abroad, where there are more attractive material conditions for practicing science. The regions of Kazakhstan are experiencing an even greater shortage, since qualified personnel are also leaving for the capital cities. Obviously, a complex of institutional measures will be required, not only stimulating scientific activities, but encouraging the involvement of scientific personnel from abroad.

Investment in the intellectual potential of society

The demand for research and intellectual knowledge in the knowledge economy is constantly increasing. In highly developed countries, this is reflected in the constant increase in the financing of science and the wages of scientists compared with the average for the economy. However, in Kazakhstan, the general trend of investment in science is somewhat different from the global one. In general, the dynamics of financing science in Kazakhstan are presented in Table 3.

Table 3 – Dynamics of indicators of financing science in the Republic of Kazakhstan in 2012-2016, mln.

Indicator	2012	2013	2014	2015	2016
Total	325 639,3	431 993,8	434 602,5	655 361,0	1 528 645,9
including:					
state ownership	9 194,5	39 420,8	25 368,8	18 200,4	25 781,8
private property	282 167,7	345 562,8	353 918,4	606 141,4	934 296,7
property of other states, their legal entities and citizens	34 276,9	47 010,2	55 315,2	31 019,3	568 567,4
Note – compiled by authors on the basis of Statistics Committee (2017)					

In the period from 2012 to 2016, there is a fairly significant increase in domestic spending on research and development – by 120,306.6.6 million tenge. in actual prices, or 78%.

The intellectual potential of society is steadily declining as human resources are depleted. Therefore, it is necessary to increase investment in the intellectual potential of society.

The social and economic development of society at the end of the 20th century and the beginning of the 21st is characterized by a rather strong increase in the role of the human factor. To achieve competitive advantages and ensure the qualitative parameters of economic development and economic growth in the modern world economy, human resources occupy one of the most important positions. As for the prospects of this development, in the 21st century they are associated mainly with human resources as

carriers of knowledge. A person acts in scientific and technical progress not only as a carrier, but also as a creator of new knowledge, which confirms a change in the approach to building models for the functioning of macroeconomic systems. This is connected with the fact that only with the help of investments in intellectual capital, Kazakhstan can grow out of a state that trades, for the most part, natural resources, into a country whose economic growth will be based on innovative scientific and technical achievements. In the Kazakhstan context, an innovative project can be insured under one of the state support programs or at the expense of its organization on the principles of a public-private partnership.

The investment element plays a big role in creating intellectual capital, because any significant innovation appears on the basis of investments in this sphere, and not at the expense of current costs. The

essence of the theory of human capital is an investment interpretation of the costs of quality improvement and human development.

Conclusion

Undoubtedly, one of the most important factors influencing the improvement of living conditions and work of citizens of the country is the quality of the mechanism of economic management at the macro level, since it has a direct impact on the formation of the living environment of the population. The main indicators characterizing the level of perfection of this mechanism are: the volume and structure of investments in the socio-cultural sector, determining the power and quality of human capital (education, science, culture, health), the level and quality of life of the population; the validity of the choice of priorities for socio-economic and scientific and technological development; volume and structure of investments in the knowledge-intensive sector of the economy; level of innovation activity of enterprises (organizations); quality and consistency of management decisions in the field of fiscal, tax, tariff, monetary and customs policies.

The formation and implementation of an effective state socio-economic policy aimed at increasing the intellectual potential of society will ensure the achievement of the following main results: obtaining new knowledge about the laws of nature, man, society and the development of Kazakhstan's scientific and technological potential, strengthening the links between science and education, creates a base and implementation of large-scale priority technological and innovative projects and the training of human resources for innovation economy; increasing the contribution of science and innovation to GDP growth based on technological re-equipment of enterprises, faster growth of production and sales of innovative products, diversification of the economy towards expanding production of products with a high share of value added; increasing the share of high-tech products of Kazakhstan on the world market, improving the structure of exports of domestic products and services, etc.

Статья публикуется в рамках проекта грантового финансирования №AP05131314 "Формирование эффективных моделей финансирования наукоемких производств в Республике Казахстан".

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