

RESEARCH ARTICLE

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Mechanisms for Overcoming Intellectual Inequality of Regions of Kazakhstan

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Abstract

In recent years, much attention has been paid in economic research to human capital, human resources, a new technological era, a new socio-economic structure, rapid development, the main driving force of which is a man and his knowledge. Many invest in the development of the nation's mind from an economic point of view, the intellectual potential of human capital itself, and the resources spent are returned by discoveries in science, new technologies in industry and the growth of the country's GDP. Unlike other developed countries, Kazakhstan does not use its full potential for the development of the country's economy. Therefore, in recent years, attention has been paid to the intellectual potential of the nation and the intellectual potential in the regions, the intellectual potential among young people. There is no consistency and scientific validity in the effective use of intellectual resources of the state and regions and their management. That is why the study of the raised issue is relevant. The purpose of the study is to discuss the level of intellectual potential and propose mechanisms to eliminate inequality in the regions. In the course of the study, methods of deduction, induction, synthesis, analysis, complex index evaluation and ranking were used. The practical significance of the research results is explained by the fact that public authorities can use the mechanisms of intellectual potential, and the scientific significance can be a continuation of the subject of intellectual potential research.

Keywords: Economics, Intellectual Potential, Knowledge, Region, Ranking, Inequality

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1. INTRODUCTION

The modern technological era is characterized by an increasing role and importance of human intelligence in the progressive development of society. It causes a real shift from an economy based on the production of goods and services of a material nature and having tangible resources in its assets to a "new economy". The most important asset is intangible resources - intelligence, information, and knowledge, to the economy, producing and materializing this knowledge.

Scientific understanding of the factors and features of the development of intellectual potential in the regions shows the advantages and weaknesses of each of them. In general, with an effective approach, it can accelerate the processes of building and technological modernization of industries and the economy as a whole. In developed countries, much attention is paid to the issues of intellectual potential. They invest huge funds in the development of the nation's intelligence, which will be returned by discoveries in science, new technologies in industry and an increase in the country's GDP.

The Message of the President of the Republic of Kazakhstan to the people of the country dated September 1, 2021 notes the importance of education and science and support for talented, intellectually developed children and youth of the country (Message of the President of the Republic of Kazakhstan, 2021). Kazakhstan needs to increase the intellectual potential of the population because the modern digitalized society is characterized by an increasing role and importance of the intellectually developed population. In developed countries, much attention is paid to the development of the intellectual potential of the population, and developing human individuality. The development of the individual and the population leads to the development of innovations and an increase in the country's GDP.

Today, intellectual potential has a weak trend of development in the country. In the context of regions, only cities of republican significance and industrial areas have the opportunity to develop intellectual potential, and there are also areas where intellectual potential has a low level (Kireyeva et al., 2022). Based on the socio-economic development of the economy, it can be noted that there is inequality in intellectual potential development throughout Kazakhstan's territories. This study raises the issue of reducing the imbalance between regions in developing intellectual potential. Therefore, the purpose of the study is to discuss the level of intellectual potential and propose mechanisms for eliminating inequality in the regions.

The following research algorithm will be used in the research: a review of the literature on the problem of inequality among regions, and countries about intellectual potential (section 2), justification of the optimal methodology for analyzing and assessing the level of intellectual potential of the regions of the Republic of Kazakhstan (section 3), analysis, collection and processing of statistical data on the level of intellectual potential (Section 4) with the presentation of relevant conclusions (section 5).

2. LITERATURE REVIEW

An important impetus to the development of the category of intellectual potential was the development of the theory of human capital, which was considered in the early works of Becker (1962), Schultz (1971), Mintzer (1996). A significant influence on the

formation of the category of intellectual potential, was exerted by the works of the Austrian economist Schumpeter (1982), whose ideas became the basis for the evolutionary theories of economics that emerged in the early 80s. He noted that economic development is based on innovative processes, the essence of which is the implementation of new combinations of factors and conditions of economic activity.

Stewart (2007) and Karginova (2015) investigated the influence of the quality of intellectual resources and the degree of their involvement in social production on the level of national wealth in individual countries. At the same time, wealth, in their opinion, consists of human resources, production assets and natural resources. Research in this area is being actively carried out at present (Garafiyeva, 2014; Plis, 2014; Wilbowo, 2016).

In recent studies, the possibilities of intellectual potential in different areas are studied (Murodova, 2020). The importance of developing intellectual potential in the field of education, Zuntova (2021). Studies the need to increase intellectual potential in universities and improve the quality of Education. There is also some research regarding the importance of managing intellectual potential. If some relate to the use of intellectual potential in the implementation of communication in the application of innovation in enterprises (Ostrovskaya, 2019; Trusova et al. 2021) some reveal the importance of intellectual potential in improving the relationship between business, education and science (Shkoda et al., 2020). Other scientists are investigating whether there is a positive relationship between culture and intellectual potential (Shipunova et al., 2018).

Summing up, we can say that the influence of intellectual potential on the country's economy is important. Intellectual potential can increase not only economic growth, but also contribute to the development of any industry, even an enterprise. Similar studies to assess the level of intellectual potential and mechanisms to overcome the inequality of intellectual potential of Kazakhstan have not been conducted before.

3. METHODOLOGY

The research work consists of two levels. At the first level, a comparative analysis of the levels of intellectual potential in the regions of Kazakhstan is carried out. Methods of Integral indexing and ranking were used in the assessment. The composition of the indices is shown in Table 1.

TABLE 1. Indices of intellectual potential

Summary indexes	Individual indexes/ regions
Science Index	* index of regional coverage of researchers
	* science financing index in regions
	* index of training of scientific personnel of Regions
Education index	* university training index
	* college training index
	* index of secondary education coverage of students
Innovation Index	* index of innovation activity of enterprises
	* innovative performance index
	* computer literacy in the region
Culture Index	* theater coverage index

	* index of library coverage
	* index of museum coverage
Note: Compiled by authors	

According to the proposed methodological approach there were calculated intermediate Science, Education, Innovation, Culture indicators using the arithmetic mean method. It is calculated for each value according to the formula (1):

$$A = \frac{a_i - \mu}{p} \quad (1)$$

Where A - standardized assessment,

a – indicator initial value,

μ - arithmetic mean,

p - standard deviation.

Further, to derive the indicator of each block, the average value of the normalized data by region is calculated.

These values were found for all groups of indicators: scientific, educational, innovative, and cultural pastime.

The vulnerability of the regions was found according to the formula (2):

$$I_{IntelPot} = \frac{Scie_{mi} + Edu_{mi} + I_{mi} + Cul_{mi}}{4} \quad (2)$$

Where $I_{IntelPot}$ – integral index of intellectual potential;

$Scie_{mi}$ – scientific potential index;

Edu_{mi} – educational potential index;

IN_{mi} – innovation potential index;

Cul_{mi} – cultural pastime index.

At the second level, proposals are given to overcome inequality in the regions of Kazakhstan using general scientific methods. Proposals are carried out within general scientific methods using the methods of deduction, induction, comparative analysis, conceptual formulation and logical discussion.

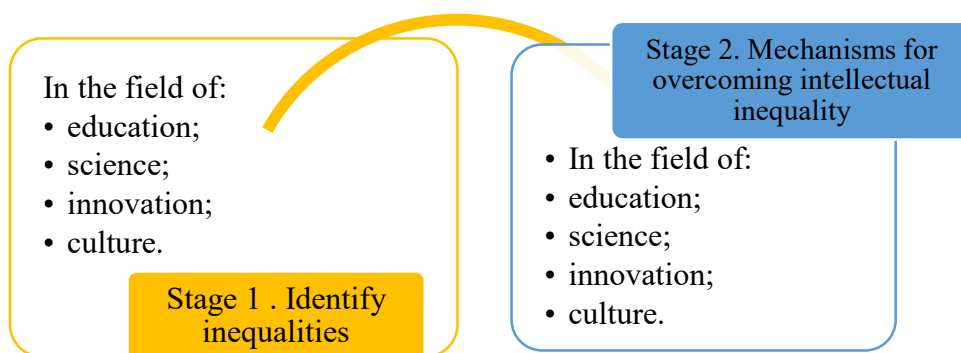


FIGURE 1. Stages of proposals

Note: Compiled by the authors

The research methodology will provide an opportunity to assess the level of intellectual potential in the regions of Kazakhstan, identify inequalities and provide mechanisms for balanced development of intellectual potential.

4. FINDINGS AND DISCUSSION

According to the diversity of socio-economic development of the regions of Kazakhstan, the development of intellectual potential is also diverse. However, in some regions, all conditions for high intellectual potential are created, and in some regions, these conditions are poorly covered. For the same reason, the level of intellectual potential reflects polarization by region. Polarization in the regions in the development of intellectual potential can be observed in accordance with the assessment for 2020 (Table 2).

TABLE 2. Level of development of intellectual potential, index method (2011 and 2020)

Region	SUMMARY INDEX	Rank	SUMMARY INDEX	Rank
Akmola	0,514	13	0,946	15
Aktobe	0,440	16	1,025	14
Almaty region	0,998	4	1,240	10
Atyrau	0,551	12	1,090	12
West Kazakhstan	0,666	9	1,361	6
Zhambyl	0,656	10	1,355	7
Karaganda	0,399	17	0,740	17
Kostanay	0,753	7	0,942	16
Kyzylorda	0,483	15	1,150	11
Mangystau	0,792	6	1,435	5
Pavlodar	1,126	3	1,310	9
North Kazakhstan	0,592	11	1,080	13
Turkestan	0,848	5	2,110	2
East Kazakhstan	0,495	14	1,345	8
Nur-Sultan	1,154	2	1,450	4
Almaty	1,730	1	2,480	1
Shymkent	0,704	8	1,970	3

Note: Compiled by authors

The highest indicator of the intellectual potential development index is calculated in Almaty with a value of 2.4, the lowest index is 0.7 in Karaganda region and 0.9 in Kostanay region. If the arithmetic mean of the index of intellectual potential is 1.5 values - Astana and Mangystau region should be in the index value, according to the rank, the regions occupy 4 and 5 positions. The average value of the intellectual potential index in the regions should be regions with ratings of 8 and 9, i.e. East Kazakhstan region and Pavlodar region.

During the competition, it was proved that the polarization of the lowest and highest intellectual potential development index is high, and the arithmetic mean of the intellectual potential development index is not equal to the factual mean. From this

observation, the industrial regions of Kazakhstan, Karaganda and Kostanay regions show a weak level of intellectual potential. Indeed, in terms of indicators that affect intellectual potential, some factors indicate weak indicators. For example, in Karaganda region, there is a need for more scientists engaged in science. Entrepreneurs' innovative activity is low because all production is in the framework of raw materials production. However, if the level of intellectual potential is of a low nature, then the socio-economic level indicates an above-average level. Therefore, it is indicated above that Kostanay and Karaganda regions need targeted programs aimed at developing high-quality education, science and innovation.

In general, the establishment of the polarization of the development of intellectual potential is not due to the inefficient use of resources in the state, but to the following reasons. Due to the need for special social institutions – the social situation in the regions is different. The worse the social situation of a person, the worse his intellectual development. "I don't know," he said. Develop new tools and technologies for managing regions. The management system in each region is different, and it all depends on the professionalism of the manager. The assistance of "elites" in the regions in the development of the intellectual potential of the region, etc.

If to consider the components of the development of intellectual potential in private. It can be said that the inequality in the field of education lies in the differences in the location of schools and universities in the regions (Table 3). Universities are especially concentrated in large cities, because the quality of education in large megalopolis is high, and qualified teachers and professors/academics share their experience. Although there is a teaching staff in universities in the regions, it is different from the size in a large city and is of low quality. If we consider schools, then in some regions, there is a shortage of schools (Kyzylorda, Zhambyl, cities of Republican significance), and there are up to 30-40 children in one class, and in some regions (North Kazakhstan region) the number of children in schools is small. In addition, it can be seen that schools in one region are equipped with all the necessary equipment, and schools in some regions are old, completely devoid of learning. Table 3 shows types of inequality in the development of intellectual potential.

TABLE 3. Types of inequality in the development of intellectual potential

Parts of the inequality	Explanation
INEQUALITY IN EDUCATION	Differences between regions in the field of Education: - Diversity of the number of schools, universities; (793 schools in Almaty region, 211 schools in Atyrau region; 65 universities in cities of Republican significance in universities, 57 universities in other regions; - Variety of technical and material base coverage; - The diversity of the level of qualification of teachers, etc.reasons. (In the North Kazakhstan region, the number of professors and teachers at universities is 330 people, in Almaty-8 188 people).

INEQUALITY IN THE FIELD OF SCIENCE	Differences between regions in the field of science: - Diversity of state financing (in terms of the amount of R&D expenditures in Kazakhstan in 2021, 109,332. 7 million tenge, of which 42,738. 7 million will be spent on the city of Almaty, 411.1 million will be spent on the N.Kazakhstan region). - Diversity in the transmission of scientific heritage; - Diversity of research infrastructure, etc. (in terms of the number of research institutions in Kazakhstan, there are 438 units, of which 139 in Almaty, West Kazakhstan region, Zhambyl region, Pavlodar, Turkestan regions, 9 units in Mangistau region).
INEQUALITY IN INNOVATION	Difference between regions in the field of innovation: - Diversity of the level of activity of innovation processes (innovation activity in Astana is 13.5%, in Pavlodar region-5.2%); - Diversity of the level of access to innovative technologies; - Diversity of coverage levels of computer literacy and digitalization; - Diversity of concentrations of innovative enterprises, etc. (28 thousand innovative business entities in Kazakhstan, of which 10 thousand are concentrated in Almaty and Astana, 635 enterprises are concentrated in Kyzylorda region, 732 in Zhambyl region).
INEQUALITY IN THE CULTURAL SPHERE	Difference between regions in the cultural sphere: - Diversity of cultural levels; - Few talented young people in the cultural sphere, poor level of talent support; - Variety in demand for cultural events (teart/Museum); - Low level of advertising of performance / concert events, etc.
<i>Note:</i> Based on official statistics compiled by the authors	

Inequality in the field of science is primarily due to the source of funding allocated by the state. While highly economically and socially developed regions receive high funding, weak regions need more funding. If all regions are financed equally, there is a probability that weak regions will not be able to master the allocated funds. In addition, the diversity of areas of scientific interest in the regions, for example, agronomic, soil composition of the land, quality of livestock fields, and production of finished products from raw materials in industrial regions are relevant. In addition, in the underdeveloped regions of production and agricultural sector, questions related to trade and construction are interested, and in the developed regions-the development of innovative technologies. Here, in the field of Science, the most important issue is the diversity of the distribution of scientific infrastructure in the regions. For the development of science at the world level, it is necessary to have the same equipment of scientific laboratories as at the world level. However, it can be concluded that the state of scientific infrastructure in Kazakhstan is poor since the latest updates were made from the time of Soviet power, which remains in the current state.

The inequality between regions in the innovation sphere is evidenced by the level of activity of innovation processes by region. Accordingly, inequality in the implementation of innovation processes leads to inequality in the development of intellectual potential between regions. The difference in the distribution of innovative technologies in the regions indicates inequality in the field of innovation. In addition, the development of computer literacy and digitalization is high in cities of Republican significance and industrial regions and low in Kyzylorda, West Kazakhstan region, etc.

That is, differences in the different development and development of the development component of intellectual potential in the regions lead to polarization. To eliminate polarization, we recommend the following mechanism:

Resource coverage. Providing regions with missing resources in the field of education

in order to develop intellectual potential. That is, full-fledged equipment of schools in the regions on demand (up to 35-40 students in one class in cities of Republican significance); replenishment of scientific laboratories with modern means (creation of a laboratory for the study of pharmaceutical preparations in Aktobe region, creation of a laboratory for agriculture in Kostanay region, etc.); coverage of innovative technologies according to the potential of the regions (Organization of stimulating tax measures for the introduction of technologies in Pavlodar, Karaganda and East Kazakhstan regions and identification and stimulation of talented young people in the field of culture.

Institutionalization. Development of Education, Science, Innovation and cultural spheres within the framework of sustainable economic development and technological modernization.

Informatization. Bringing the current state of the regions to the true center. To promote the development of intellectual potential among the population with the help of informatization, to introduce young people to education, to call for science. Organization of competitions to identify talented young people in drawing, acting and singing. Encourage talented young people.

Implementation of program-targeted projects. Organization of targeted projects in four components that stimulate the development of intellectual potential.

It is necessary to have standards for indicators in the regions regarding the development of intellectual potential. For example, in Kazakhstan in the 2021/2022 academic year, there are 7,481 general education schools where 1,762,161 students will study. On average, 283 students should study in 1 school in the Republic.

In order to develop and strengthen intellectual potential, we propose the following standards based on the national average:

- one school for 283 children by region;
- one university for 2649 students by region;
- financing of R & D in the regions of at least 6,431.3 million tenge, etc.

Of course, the standards in question are relatively affected since the probability is high. However, there is a need for standards in planning the intensive development of intellectual potential.

5. CONCLUSIONS

Developing intellectual potential implies strengthening, building up, and stimulating the intellectual potential previously formed in Kazakhstan. The development of intellectual potential forms the quality of human potential, which in the future will provide competitive advantages in modern society. The main resource of the global informatization society is a person who can acquire knowledge, use it creatively, and also participate in generating new knowledge. Training a highly intelligent person can give an impetus to accelerated economic growth.

Further, in the domestic and foreign literature, the concept of intellectual potential is new and pioneering, by 2020 there was little information about the development of intellectual potential. However, the importance of this process has become popular in recent years. Scientists began to emphasize the importance of developing the intellectual potential not only of the country but also to use it in the development of industry and

enterprises.

Based on our analysis and discussion, polarization is observed in the development of intellectual potential. It is reflected, first of all, in the result of the index assessment. That is, according to the integrated, comprehensive index of intellectual development, the first place is occupied by Almaty city with 2,480, the last places are occupied by Karaganda and Kostanay regions with 0.9 and 0.7. The assessment was based on the mutual standardization of factors related to the development of intellectual potential. Here, the dispute may be related to the Karaganda region. Here the difference between a large number of people in the region and the distribution of indicators is high. For this reason, the indices in the fields of education and science show a low result. Secondly, polarization in terms of the components of intellectual potential. For example, in the field of education, the differences between the regions are: 793 schools in Almaty region, 211 schools in Atyrau region; 65 universities in cities of Republican significance, 57 universities in other regions; in the North Kazakhstan region, the number of professors and teachers in universities is 330 people, in Almaty-8 188 people, etc.

The first is to provide the regions with the missing resources in the field of education in order to develop intellectual potential. The second is the development of Education, Science, Innovation and cultural spheres within the framework of sustainable economic development and technological modernization. The third is to promote the development of intellectual potential with the help of informatization among the population, to introduce young people to education, and to call for science. The fourth is the implementation of program-targeted projects. Fifth-it is necessary to have standards for indicators in the regions related to the development of intellectual potential.

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