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The Study of Higher Education in the Regions of Kazakhstan: Analysis of Tools and Indicators

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Abstract

This study aimed to analyse the state of higher education in the regions of Kazakhstan based on an integrated approach according to use of statistical methods and aggregation of empirical data. In this study, the focus is on assessing the level of development of higher education institutions in Kazakhstan based on the selected three groups of variables: enrollment in higher education institutions; subjects and objects of higher professional education (number of teaching staff, number of students, number of universities); provision of services (budget, population, enterprises). The research design was divided into three stages: data collection, analysis and recommendations. The data sample from 2010 to 2021 was taken from the annual statistical yearbooks of the Republic of Kazakhstan. In this study based on a comprehensive review of the above variables, it is proposed to conduct an analysis at the following three stages: data collection, definitions of the initial data and evaluation of the time period; sampling of initial data, analysis of collected data and interpretation; description of the results obtained; conclusions and recommendations. The practical results of the study and conclusions can be used by government agencies in the analysis and forecasting of the development of the education system in the region. The data obtained showed that there are differences in the availability of higher education in different regions of Kazakhstan. High rates in the cities of Astana and Almaty may be associated with their status as the capital and the largest city, respectively.

Keywords: Economic Growth, Economic Development, Region, Regional Differences, Higher Education, University

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1. INTRODUCTION

Today, special importance is attached to the role of education as one of the most important elements of the economic system. In addition, there is a fundamental tightening of the requirements for the activities of educational institutions, cultural and economic attitudes of members of society. An adequate response to new challenges is possible provided that scientific research tools are developed to provide solutions to the tasks of organizing and managing the educational industry. Since higher education contributes to the development of innovation, scientific research, technological progress and the manufacturing sector, highly qualified specialists educated in the regions can create and implement new ideas, stimulating economic growth and attracting investment.

A modern university, representing the unity of education, science, business, industry and innovation, plays the role of a centre in developing an innovative ecosystem of the regional economy. Universities play a role in regional development by contributing to the economy, society, and culture. However, there needs to be more understanding of the relationship between policy institutions and universities' contributions to regional development. Some studies are focused on the influence of national and regional policies on university contributions to regional development (Miller, 2013; Trippl et al., 2015). There are a relatively large number of approaches to assessing the effectiveness of the interaction of universities with the real sector of the economy. Some consider it an essential indicator of teaching staff and students since teaching staff of higher educational institutions in the regions play a crucial role in teaching and preparing students. They pass on their knowledge, experience and professional skills, developing students' academic knowledge and the practical skills necessary for a successful career. In addition, those engaged in scientific activities play an essential role in developing scientific research in the regions (Woo et al., 2017).

Universities stand out as catalysts for innovation and information technology and electronics research. Some studies have focused on assessing the development of entrepreneurial skills, the creation of a community to promote and develop the commercialization process, as well as the importance of business and university cooperation (Fitjar & Gjelsvik, 2018; Kitagawa et al., 2019; Castro et al., 2019). They attract talented students and scientists worldwide, creating their start-ups and companies in the region. In this context, the need to study educational processes in foreign countries is becoming most relevant (Thune, 2011; Fonseca, 2019; Kenzhaliyev et al., 2021). This creates a favourable ecosystem for developing new technology companies and attracting talent (Bölling & Eriksson, 2016; Etzkowitz, 2019; Šereš et al., 2019). There are a relatively large number of approaches to assessing the effectiveness of the interaction of universities with the real sector of the economy.

The territorial development tools used in Kazakhstan's practice recently do not take into account the duration of depressive trends and are also based on an analysis of the current situation. Already today, high-status national institutions and organizations should be integrated into the regions, and a higher level of connectivity between regional and republican development programs should be achieved. This will ensure the full implementation of strategic initiatives related to intensifying the development of border areas and regions with a high index of problems. Based on the results obtained, a strategy will be developed to improve the effectiveness of regional institutions to overcome regional disparities in the cultural and economic development of territories. Therefore, this study will focus on assessing the level of development of national education systems, analysing the level of regional differences and identifying a set of problems to reduce regional differentiation. In this context, the need to study educational processes in Kazakhstan acquires the most significant relevance and improves the processes of higher education development.

Therefore, it is essential to consider and analyse the state of higher education in the regions of

Kazakhstan based on an integrated approach based on the use of statistical methods and aggregation of empirical data. So, this paper consists of the following essential parts. The first part of the study contains a detailed analytical review of the literature on scientific views, theories and concepts. The second section describes the data sampling, the description of the research methodology and the data. The third part consists of three main parts of the study. Section 4 presents the findings and policy recommendations.

2. LITERATURE REVIEW

Today, the region's economic growth largely depends on the level of development of the education system and, in particular, higher education, based on which the intellectual potential of the region is formed. The most valuable asset among developed and developing countries is higher education institutions (hereinafter referred to as HEI), which are recognized as a critical factor in the development of sustainable societies. There are increasing numbers of studies devoted to research on the role of higher educational institutions in the regional development of a country. Various studies consider the part of universities from different angles. In their research, Etzkowitz et al. (2000) emphasized the tripartite cooperation between the business environment, higher education and government structures, which is achieved through the process of university transformation. They noted that such trilateral partnership pursues a common main goal - the country's economic development. However, this cooperation is preceded by two crucial modifications in the activities of universities. They first introduce academic research as an obligatory part of the university's activities when research becomes its culture. Secondly, it is the expansion of education. Thus it includes expanding the scope and focus of education and expanding the research focus of the university. The University of Berkeley in the USA was one of the pioneers in introducing a self-financing system for developing scientific research, using the profits from patents. Thus, they highlight the patent system as one of the successful ways to commercialize HEIs (Etzkowitz et al., 2000).

Nevertheless, there is still the case of informal cooperation between higher education institutions and the private sector. These are usually verbal agreements which reflect in the organization of training courses and professional education. Usually, such partnership is kept through the academic staff, who establish informal agreements for students, for instance, to pass internship or training. It must be mentioned that the nature of businesses collaboration with higher educational institutions varies depending on the nature of industry development (Thune, 2011; Al-Rahmi et al., 2019). Moreover, they expect that the role of higher educational institutions is to improve regional development. However, the role of the higher education sector is much more complex. Higher educational institutions affect the migration rate in the region as it provides professionals and therefore is dependent on the employment rate. Next, private and public sectors involvement play a crucial role in the process of universities' participation in the process of regional development. Therefore, the stakeholders' willingness and the region's industrial context to cooperate with universities in the regional development affects the utility rate of higher educational institution's products (Fonseca, 2019).

However, successful cooperation is not observed in all universities. Studies differ in factors affecting productive collaboration. Lambert (2003) stated that the effectiveness of collaboration depends on two main elements: relationships and people. Relationships depend on people, so everything, in fact, depends on the quality, skills, experience and character of the people involved (Lambert, 2003). Gulbranson and Audretsch (2008) consider the cooperation of universities with expert organizations not subject to state structures. Moreover, publicly funded R&D projects must be known for successful implementation or follow-up. At the same time, expert organizations are interested in full consultation and securing funding for selected projects. An essential condition is that they should be located and operate at universities that excel in research, with robust

research staff. Such organizations aim to innovate in research delivery and fruitful collaboration with the private sector (Gulbranson & Audretsch, 2008). Peer and Penker (2015) relate the impact of higher educational institutions on regional development to political expectations by the government. Precisely, the form of government predicts the institution's distribution and the profile of universities. They mainly rely on the main contribution or product of private and higher education institution's collaboration results which is qualified graduates (Peer & Penker, 2015).

Galushko and Sagynbekov (2014) noted that government-funded projects are primarily not implemented. One of the reasons is that universities are becoming more interested in cooperation with the private sector, which is characterized by the implementation of short-term projects, which is not particularly beneficial for the long-term development of the state's economy. Moreover, universities are forced to cooperate with the private sector, as the state funds less fundamental research or is less interested in implementing projects (Galushko & Sagynbekov, 2014). There are a relatively large number of approaches to assessing the effectiveness of the interaction of universities with the real sector of the economy. For example, Bölling and Eriksson (2016) developed a model for assessing universities' cooperation with the Swedish Federal Agency for the Development of Innovation Systems society. Šereš et al. (2019) identified indicators to assess the interaction between universities and enterprises.

According to the research of some authors, higher education has a better impact on economic growth, and colleges and universities are the most important components of national and regional strategies of innovation systems (Miller, 2013). Another study examines the level of contribution of universities to regional economic and social development in various national contexts and the political institutions that support them (Trippl et al., 2015). In addition, Korean scientists who investigated the impact of investment in education and R&D on regional economic growth in South Korea (Woo et al., 2017).

Fitjar and Gjelsvik (2018) found that (Norwegian) firms sometimes prefer to partner with local universities rather than better universities at a distance. The choice of firms is based not only on the fact that knowledge transfer at a distance is expensive but also on the fact that local cooperation reduces the risk of information loss during knowledge transfer and costs. Other reasons could explain the observed patterns of cooperation. For example, if a local university can make a valuable contribution, this could be considered "good enough" by local firms. Firms may also view partnerships as a long-term investment, thereby helping to improve the quality of research at a local university with the hope of future benefits. Firms may also want to contribute to the local community by supporting local/regional universities.

According to a study by Kitagawa et al. (2019), the development of entrepreneurial skills among students can also be considered positive, which has a positive impact on the growth of satraps among graduates. The study discussed the contribution and impact of the level and quality of teaching in universities (Kitagawa et al., 2019). Moreover, Castro et al. (2019) emphasized the importance of developing entrepreneurial skills among students. They also note the importance of cooperation between teachers and students, which has a beneficial effect on creating a community to promote and develop the commercialization process. Using the example of Latin American countries, they note that the development of innovative capacity plays a significant role in the development of the economy (Castro et al., 2019).

University staff involved in research and in the commercialization process notes the importance of ensuring the continuity of research income and the fact that this function should be considered more critical than income derived from any other source, such as commercialization. Of course, commercialization should protect the university's sources of income from research. This view is understandable due to the importance of university-led research and its significant size compared to commercialization revenues. Two functions should not be mutually exclusive, i.e. funding research and commercializing new ideas. Thus, separating

the functions of generating income from research and commercialization is unnecessary for success in either area (Kenzhaliyev et al., 2021). Namely, universities must adhere to market conditions, and the state does not manage internal processes (Turmaganbet, 2021). In recent years, to improve the quality of training of specialists, the state has focused on reducing the number of universities and strengthening qualification requirements for licensing higher education institutions (Kudaibergenova et al., 2022).

The interaction of universities with the private sector, with professionals and specialists, requires business knowledge in the sectors under consideration. As mentioned earlier, only sometimes the commercialization process can have a positive impact. Namely, not always an expert opinion on the implementation of scientific projects. The research development can be competent enough to successfully implement the intellectual potential (Heng et al., 2012). The commercialization of universities is also seen as an active development of entrepreneurship, which is beneficial for the development of the economy. Thus, Herrera et al. (2018) note that the commercialization of higher educational institutions stimulates innovation, increased academic entrepreneurship, the provision of human capital and collaboration in creating new knowledge transfer products, etc. (Herrera et al., 2018).

When studying the state of the level of development of higher education, regional differences related to the level of economic and social factors should be considered. The above discussion suggests that knowledge interaction with universities depends on whether the collaborating firms are embedded in the globalized knowledge economy, have developed strategies and practices for their learning, and have the quality and ability to create and improve their teaching and research. In general, based on the review, it can be concluded that there is a need for a comprehensive statistical study of the state and development of higher education in Kazakhstan based on the selected indicators. Knowledge of the objective laws of the development of the regional higher education system will increase the efficiency of its functioning, taking into account the demographic and economic situation in the region, taking into account changes in the education system. Moreover, there have been no similar studies before.

3. METHODOLOGY

The methodological basis of the study was the work of domestic and foreign scientists on the development of higher education, statistics, regional economy, and demographic data. Statistical methods of classification of dependency studies, as well as tabular and graphical methods of data representation, were used as analysis research tools. In this paper, an important emphasis is placed on the analysis of the state of higher education in the regions of Kazakhstan based on an integrated approach based on the selected three groups of variables: enrollment in higher education; subjects and objects of higher education (number of teaching staff, number of students, number of universities); provision of services (budget, population, enterprises). A set of indicators for analyzing the performance of universities was determined based on a literature review.

The following statistical methods were used as analysis tools:

(a) Classification and dependency studies: the process of ordering or distributing objects (observations) into groups in order to identify the relationships between them. This set is called a sample of data for observation. This method is used for the analysis and demonstration of processed information for its subsequent interpretation.

(b) The method of analyzing time periods: this method of analyzing economic phenomena and processes is crucial to the principle of their mutual connection. This method is widely used in many fields of knowledge at the macro and micro levels to study the processes of economic development and assess their effectiveness. The time period helps to determine the sequence of observations of a certain parameter at different points in time, as well as to understand the change in indicators over time.

(c) Tabular and graphical data representation methods: this method allows you to visualize data and conditional images of statistical data using geometric shapes, lines, dots and various symbolic images. These data presentation methods demonstrate selected indicators based on data aggregation at the stage of primary descriptive analysis and are also described using conventional images or signs.

Based on a comprehensive review of the above variables, it is proposed to conduct an analysis at the following three stages (Figure 1).

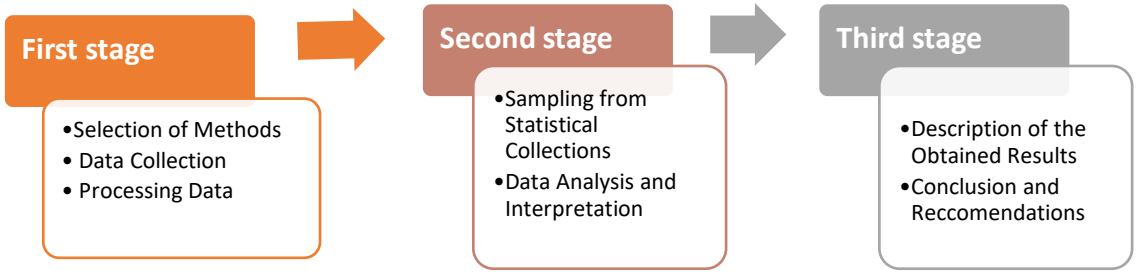

FIGURE 1. Algorithm for assessing the level of development of HEIs

Note: compiled by authors

In the first stage, data is collected from open sources, definitions of the initial data and evaluation of the time period. The second stage begins with defining a system of indicators for each region from statistical yearbooks. Then these data will be analysed using the abovementioned comparative and descriptive analysis methods. The growth rates of indicators in the regions will be revealed. Recommendations will be made in the third stage based on the findings.

The data sample was made based on the transformation and analysis of information from the annual statistical collections of the Bureau of National Statistics of the Republic of Kazakhstan, as well as periodical press data and various open resources on the research topic. Data from 2010 to 2021 were used for the analysis. A comparative analysis of the data obtained is used to identify specific characteristics in the regions regarding educational indicators and compare them with each other in different periods. Descriptive statistics were used for data processing, their systematization, visual presentation in tables and graphs, and a quantitative description of data using a system of statistical indicators.

In order to analyse and eliminate these shortcomings, indicators were selected based on an integrated approach. A full description of the variables we use is presented in Table 1.

TABLE 1. Variables used to estimate this research

No.	A variable of group estimation	Indicator	Measurement
1	Enrollment in higher education	The gross enrollment rate in tertiary education	In percentage
2	Subjects and objects of higher education	Number of teaching staff	count
		Number of students	count
		Number of universities	count

3	Provision of services	Budget	thousands KZT
		Population	thousands KZT
		Enterprises	thousands KZT
Note: compiled by authors			

The quantitative indicators described in the table will be used for statistical analysis. Fourteen regions and three cities of republican significance will be considered. The significance of the study is to develop a methodology for a comprehensive statistical study of the state and development of higher education at the regional level, which allows for assessing the prospects for its development, taking into account the demographic and economic situation in the region. The practical significance of the research results lies in the fact that the obtained research results and conclusions can be used by government agencies when analyzing and predicting the development of the education system in the region.

4. RESULTS

Enrollment in higher education

The gross enrollment ratio in higher education by regions of Kazakhstan is defined as the ratio of the number of students, regardless of age, studying in organizations of technical and vocational education and universities to the total population aged 18-22 years. The data are described in Table 2.

TABLE 2. Gross enrollment ratio in higher education, in percentage

Region	2010	2015	2016	2017	2018	2019	2020	2021	Growth
Akmola	36,42	27,71	28,21	30,95	33,67	39,41	39,53	38,38	1,96
Aktobe	40,51	47,16	51,22	54,87	62,97	70,96	70,47	64,09	23,58
Almaty	10,51	12,59	11,70	12,30	13,63	14,29	13,27	13,49	2,98
Artyrau	38,32	34,12	35,39	39,67	42,61	42,09	39,60	37,87	-0,45
West-Kazakhstan	59,06	66,98	78,11	87,45	90,48	96,51	85,28	83,20	24,14
Zhambyl	41,83	32,31	34,95	38,31	41,57	44,17	43,25	38,20	-3,63
Karaganda	61,74	55,35	56,51	61,14	67,95	68,93	66,03	64,88	3,14
Kostanay	45,32	40,45	45,59	48,53	52,01	53,47	49,80	46,46	1,14
Kyzylorda	38,45	25,31	26,03	25,90	28,70	29,43	27,98	31,40	-7,05
Mangystau	34,70	23,07	25,02	24,84	27,31	33,64	26,52	23,20	-11,5
Pavlodar	46,81	39,76	46,26	47,35	52,80	56,19	58,39	56,07	9,26
North-Kazakhstan	34,88	21,84	24,78	25,22	30,99	31,97	32,22	29,78	-5,1
Turkestan	37,80	40,05	41,14	45,34	12,28	13,33	12,76	12,88	-24,92
East-Kazakhstan	49,70	45,31	49,97	50,49	57,26	57,10	58,68	59,27	9,57
Astana c.	63,34	123,31	102,93	99,81	106,89	114,32	116,30	118,84	55,5
Almaty c.	121,44	121,27	129,47	138,05	163,57	194,27	199,90	204,64	83,2
Shymkent c.	-	-	-	-	120,69	152,57	133,29	124,41	3,72
Note: compiled by authors based on the data from the Bureau of National Statistics (2022)									

The presented data reflect the gross enrollment ratio in higher education by regions of Kazakhstan. The gross enrollment ratio is defined as the ratio of enrollment in technical and vocational education (ICED-5) and universities (ICED 6-8) to the total population aged 18-22. From 2010 to 2021, the gross enrollment ratio in higher education in the Republic of Kazakhstan ranged from 48.37% to 66.98%. In 2021, the ratio was 62.64%. Approximately 62.64% of young people aged 18-22 study in technical and vocational education organizations or universities.

In different regions of Kazakhstan, the gross enrollment ratio in higher education also had different values. For example, in 2021, in the West Kazakhstan region, the coefficient was 83.20%, one of the highest rates among the regions. On the other hand, in the Mangistau region, the ratio was 23.20%, which is one of the lowest rates. The cities of Astana and Almaty show higher gross enrollment rates in tertiary education compared to other regions of Kazakhstan. For example, in 2021, in Astana, the coefficient was 118.84%, and in Almaty - 204.64%. Compared to 2010, the growth was 55.5% and 83.2%, respectively.

Some regions, such as Akmola, Aktobe, Karaganda and East Kazakhstan, also show relatively high gross enrollment rates in higher education. In addition, there are regions where the growth turned out to be in the red for ten years. These include the Turkestan region (-24.92), the North Kazakhstan region (-5.1), Mangistau (-11.5) and others.

Subjects and objects of higher education

Universities are one of the main objects of higher education; at the beginning of the 2021-2022 academic year in the Republic of Kazakhstan, the number of operating higher educational institutions was 122 organizations. The data is shown in Figure 2.

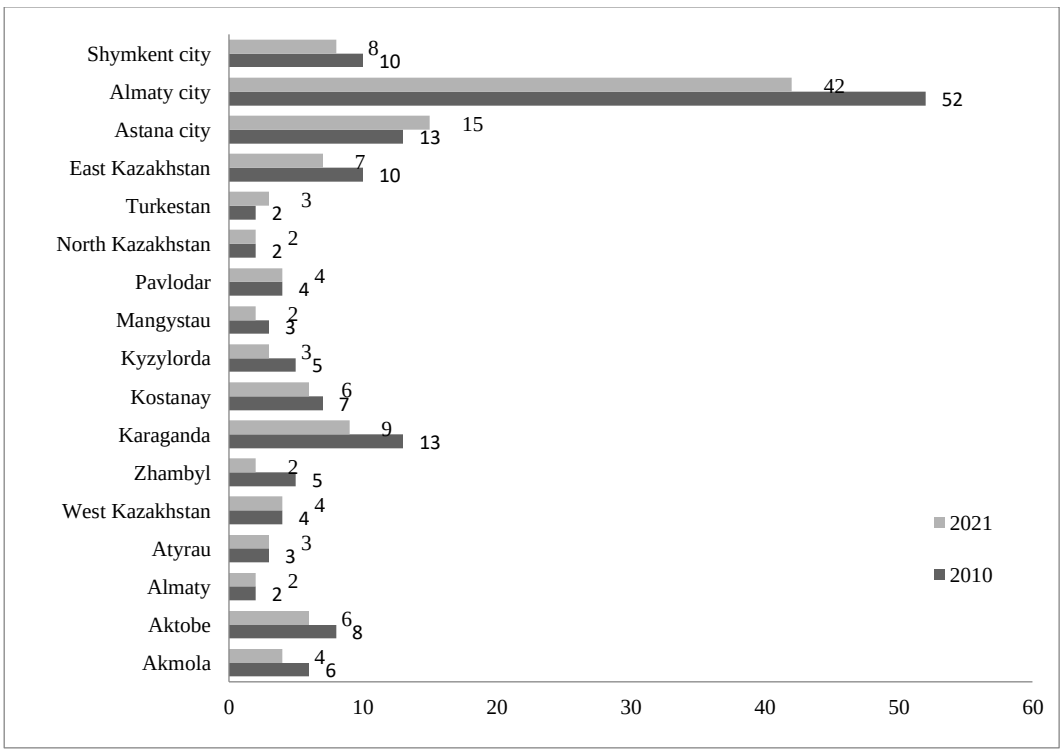

FIGURE 2. Number of universities in the regions of Kazakhstan

Note: compiled by authors

The data provided reflects changes in the number of higher education institutions in Kazakhstan from 2010 to 2021. In general, at the level of the Republic of Kazakhstan, a decrease in the number of higher education organizations was observed from 149 in 2010 to 122 in 2021, which is a difference of -27 (67%) organizations.

Changes are also observed among individual regions. Some regions, for example, Akmola, Aktobe, West Kazakhstan, Pavlodar and North Kazakhstan, maintain relative stability in the number of higher education institutions without significant changes over the specified period. At the same time, some regions, including Zhambyl, Karaganda, Kyzylorda and East Kazakhstan, are experiencing a decrease in the number of higher education organizations, with a decrease from -1 to -4 organizations.

Cities such as Astana and Almaty generally show an increase in higher education institutions over time, although there has been a slight fluctuation in some years. The city of Shymkent also shows a negative trend, with a decrease in the number of higher education institutions by two from 2010 to 2021. It should be noted that the data are presented at a general level and do not consider other factors such as the size and scale of organizations, their profiles, accreditation and quality of education.

The subjects of universities are students and teaching staff. They are the basis of any university. The total number of the contingent for 2021 was 575,511 people (see Table 3).

TABLE 3. Number of students and teaching staff by regions of Kazakhstan, people

Region	Number of students			Number of academic staff		
	2010	2021	Growth, %	2010	2021	Growth, %
Akmola	16 736	12 044	-28%	1 077	750	-30%
Aktobe	25 336	24 909	-2%	1 667	1 627	-2%
Almaty	10 057	11 572	15%	377	541	44%
Artyrau	15 481	11 775	-24%	356	612	72%
West-Kazakhstan	28 260	26 889	-5%	1 099	1 163	6%
Zhambyl	29 426	22 443	-24%	1 272	1 107	-13%
Karaganda	61 105	41 163	-33%	3 289	2 942	-11%
Kostanay	28 079	18 352	-35%	1 357	1 089	-20%
Kyzylorda	17 244	12 524	-27%	877	728	-17%
Mangystau	8 436	6 553	-22%	456	342	-25%
Pavlodar	21 755	16 713	-23%	1 296	999	-23%
North-Kazakhstan	9 405	7 338	-22%	744	528	-29%
Turkestan	14 044	13 173	-6%	1 796	1 147	-36%
East-Kazakhstan	48 381	32 211	-33%	2 769	1 926	-30%
Astana c.	40 817	62 788	54%	3 787	4 909	30%
Almaty c.	186 499	172 224	-8%	13 777	12 779	-7%
Shymkent c.	59 381	82 840	40%	3 604	3 189	-12%

Note: compiled by authors based on the data from the Bureau of National Statistics (2022)

Overall, there is negative growth in two indicators across the country over the period under study. The total number of students in the Republic of Kazakhstan decreased from 620,442 in 2010 to 575,511 in 2021, representing a decrease of 7%. Regarding the number of students, the increase was in Astana and Shymkent by 54% and 40%, respectively. Moreover, the most significant decrease was in the Kostanay region (35%).

The number of teaching staff in Kazakhstan also decreased from 39,600 to 36,378, which is an 8% decrease. Nevertheless, there are regions where there is growth. These include Atyrau region (72%), Almaty region (44%) and the city of Astana (30%). The most significant decrease is observed in the Turkestan region (36%), as well as in the East Kazakhstan region and Akmola region, where the decrease is 30%.

Higher education services are rendered at the expense of the budget, population and enterprises

In the fourth quarter of 2021, services in the field of higher education were provided in the Republic of Kazakhstan for 119.7 billion tenge, which is 603% more than in the fourth quarter of 2010. Including 1.035 billion tenge, services were provided at the expense of the budget (87% of the Republic of Kazakhstan), 133.3 million tenge - at the expense of the population (11%), 287 million tenge - at the expense of enterprises (2%). The share of providing services at the expense of the population has decreased by 10% since 2010, while the budget has increased by 11%, and at the expense of the enterprise, it has decreased by 1%.

The indicators for rendered services of higher education by regions are given in Table 4.

TABLE4. Rendered services of higher education at the expense of the budget, population and enterprises by region, in thousand tenge

Region	Budget		Population		Enterprises	
	2010	2021	2010	2021	2010	2021
Akmola	8071059	69663428	1162212	12361554	93140	303998
Aktobe	8565658	40642885	1760140	3834456	127871	687164
Almaty	10729516	103331990	1384310	4912450	141437	547233
Artyrau	4761868	29590876	1301548	2903100	1066850	3880890
West-Kazakhstan	7150336	30659573	1222731	3555216	187283	1094477
Zhambyl	9193224	51013471	1473533	3717590	17750	163658
Karaganda	13044140	140894012	3416437	7225670	469068	2343362
Kostanay	7104458	37001071	1689986	2621635	53153	229968
Kyzylorda	7251703	46588689	1051149	2383154	95110	308148
Mangystau	5550171	34818745	1674816	2698896	195920	1412298
Pavlodar	7053283	33995634	1651144	2349682	69304	396464
North-Kazakhstan	6592285	28995731	754605	1107107	33461	75168
Turkestan	20363744	97963258	3559191	3727178	54355	157417
East-Kazakhstan	11418336	55562088	2636439	4959039	95855	326643
Astana c.	8263660	89667618	3097302	21386894	1030079	7571167
Almaty c.	16568330	95705111	12756970	44955686	2435549	8220031

Shymkent c.	-	49372613		8639141		996472
Note: compiled by authors based on the data from the Bureau of National Statistics (2022)						

Overall, there is positive growth in all three areas. For example, in the regional context, the largest increase in the volume of services in the field of higher education at the expense of the budget fell on Astana and the Karaganda region, and the smallest on the West Kazakhstan region. According to the financing of the population in the Akmola region, then in Astana city. And the smallest in Turkestan, Pavlodar and North Kazakhstan regions. In the regional context, the largest increase in the volume of services in the field of higher education at the expense of the enterprise was in the Zhambyl region and Astana city.

Let's consider this indicator by forms of ownership and by the dimension of enterprises (see Figure 3).

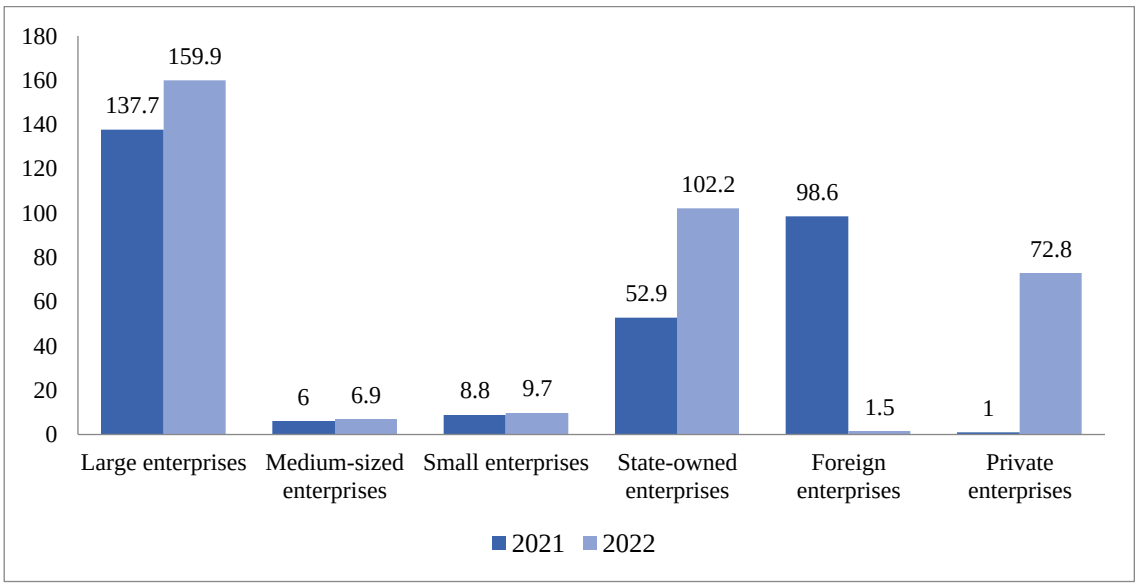

FIGURE 2. Services in the field of higher education in the context of the form of ownership and the size of enterprises, in billion tenge

Note: compiled by authors

Most of the services (90.6%) in the field of higher education in the fourth quarter of last year were provided by large businesses: 159.9 billion tenge, an increase of 16.2% over the year. Medium—sized enterprises accounted for 6.9 billion tenge (plus 15.3% for the year), small - 9.7 billion tenge (plus 10.1%).

In terms of ownership forms, state-owned companies provided the most services: 102.2 billion tenge - immediately 1.9 times more than a year earlier. The volume of services provided by foreign enterprises increased 1.6 times, to 1.5 billion tenge; the volume of services provided by private companies, on the contrary, decreased by 26.2% over the year, to 72.8 billion tenge.

5. DISCUSSION

Enrollment in higher education

From 2010 to 2021, the total tertiary coverage ratio in the Republic of Kazakhstan ranged from 48.37% to 66.98%. In 2021, this figure was 62.64%. Approximately 62.64% of young people aged 18 to 22 are enrolled in technical and vocational schools or universities. In different regions of Kazakhstan, the coefficient of total coverage with higher education also has different values. For example, in 2021, in the West Kazakhstan region, this figure was 83.20%, one of the highest values among the regions. On the other hand, in the Mangistau region, this ratio was 23.20%, which is one of the lowest rates.

The cities of Astana and Almaty show higher rates of total tertiary education coverage compared to other regions of Kazakhstan. For example, in 2021, in Astana, the coefficient was 118.84%, and in Almaty - 204.64%. This means that in these cities, the percentage of young people studying in higher education significantly exceeds the general population between 18 and 22. Compared with 2010, the growth was 55.5% and 83.2%, respectively.

Some regions, such as Akmola, Aktobe, Karaganda and East Kazakhstan oblasts, also show relatively high overall tertiary coverage rates. There are regions where the overall coverage rate has declined over ten years. These regions include the Turkestan region (-24.92), North Kazakhstan region (-5.1), Mangistau region (-11.5) and others.

These data reflect differences in the availability of higher education in different regions of Kazakhstan. The high performance in the cities of Astana and Almaty may be related to their status as the capital and largest city, respectively, as well as to the developed education infrastructure in these regions. However, there are challenges in underperforming regions, and more efforts are likely needed to improve the accessibility of higher education in these areas.

Subjects and objects of higher education

In general, at the level of the Republic of Kazakhstan, there was a decrease in the number of higher education institutions from 149 in 2010 to 122 in 2021. This indicates a general downward trend in the number of educational institutions in the country over the specified period. Some regions, such as Akmola, Aktobe, West Kazakhstan, Pavlodar and North Kazakhstan show relative stability in the number of higher education institutions with no significant changes over the period indicated. At the same time, some regions, including Zhambyl, Karaganda, Kyzylorda and East Kazakhstan, are experiencing a reduction in educational institutions.

The total number of students in the Republic of Kazakhstan decreased from 620,442 in 2010 to 575,511 in 2021, representing a decrease of 7%. At the same time, there is an increase in the number of students in Astana and Shymkent and a significant reduction in the Kostanay region. The number of teaching staff in Kazakhstan also fell from 39,600 to 36,378, a decrease of 8%. However, there are regions where growth is observed, such as the Atyrau region, the Almaty region and the city of Astana. At the same time, the most significant decline is observed in the Turkestan region, as well as in the East Kazakhstan region and Akmola region.

It is important to note that the data presented reflects the overall picture and does not consider other factors, such as the size and scale of educational institutions, their profiles, accreditation and quality of education.

The volume of services

The volume of services in the field of higher education in the fourth quarter of last year was the most significant in the region of Karaganda (12.6%) and Almaty (12.4%). Approximately a quarter of the volume of sector services falls on Astana - 118 million tenge. The smallest volume of services was provided in the North Kazakhstan region (2.5%) and the West Kazakhstan region (2.9%).

Most of the services (90.6%) in higher education in the fourth quarter of last year were provided by large enterprises for 159.9 billion tenge, an increase of 16.2% compared to the

previous year. Medium enterprises amounted to 6.9 billion tenge (an increase of 15.3% per year), and small enterprises - 9.7 billion tenge (an increase of 10.1%).

State-owned companies provided the most significant volume of services - 102.2 billion tenge, 1.9 times more than a year earlier. The volume of services provided by foreign enterprises increased by 1.6 times and amounted to 1.5 billion tenge. On the other hand, the volume of services provided by private companies decreased by 26.2% over the year and amounted to 72.8 billion tenge.

The analysis of the current state of higher education in Kazakhstan and the identification of directions for further development of the sector indicate a number of trends in higher education in Kazakhstan. For example, the growth in the volume of services in the Karaganda and Almaty regions may indicate a greater popularity of higher education in these regions. The increase in the volume of services provided by public companies may indicate the growing role of the state in the higher education sector. A decrease in the volume of services provided by private companies may indicate a worsening economic situation in the sector and possible problems faced by private educational institutions.

6. CONCLUSION

This study aimed to analyse the state of higher education in the regions of Kazakhstan based on an integrated approach based on the use of statistical methods and aggregation of empirical data. The significance of the study is to develop a methodology for a comprehensive statistical study of the state and development of higher education at the regional level, which allows for assessing the prospects for its development, taking into account the demographic and economic situation in the region. The practical significance of the research results lies in the fact that the obtained research results and conclusions can be used by government agencies when analyzing and predicting the development of the education system in the region.

The results can be used for further development of the country's regions in the field of higher education. In addition, the following points can be highlighted and recommendations made.The level of higher education in Kazakhstan can be assessed based on several factors, such as the number of higher education institutions, the availability of education, the number of graduates and the population's level of education. In Akmola region, there is an increase in budget funds for higher education and an increase in the number of enterprises. This may indicate active support for the development of higher education and an increase in the availability of educational opportunities for the population. In Aktobe region, a significant increase in budgetary funds and the number of enterprises indicates an increase in interest and investment in higher education in the region. This can help increase the accessibility of education and improve the quality of educational services.

Strong growth in budget funds, population and enterprises indicate significant support for higher education in the Almaty region. Almaty region, including the city of Almaty, is one of Kazakhstan's key centers of education and science. Atyrau region is also experiencing significant growth in budgetary funds and enterprises, which may indicate increased attention to the development of higher education. However, the population level for 2021 alone is not reported, so it is difficult to estimate the level of tertiary education in this region.

In general, based on the data provided, it can be said that higher education in Kazakhstan is developing and receiving significant support from the state and enterprises. However, a more accurate assessment of the higher education level in each region requires more detailed analysis, including data on the quality of education and the percentage of people with higher education in the population.

References

1. Al-Rahmi, W. M., Yahaya, N., Aldraiweesh, A. A., Alturki, U., Alamri, M. M., Saud, M. S. B., Kamin, Y.B., Aljeraiwi, A.A. & Alhamed, O. A. (2019). Big data adoption and knowledge management sharing: An empirical investigation on their adoption and sustainability as a purpose of education. *Ieee Access*, *7*, 47245-47258. https://doi.org/10.1109/ACCESS.2019.2906668
2. Arislanovna, Y. S., & Bakhtiyorvich, G. B. (2021). Using The Experience of Developed Countries In Developing A Consortium Between Higher Education Institutions And Production. *European Journal of Molecular & Clinical Medicine*, *8*(1), 819-825.
3. Bölling, M., & Eriksson, Y. (2016). Collaboration with society: The future role of universities? Identifying challenges for evaluation. *Research evaluation*, *25*(2), 209-218. https://doi.org/10.1093/reseval/rvv043
4. Castro, P.M, Scheede, C.R., & Gómez Zemeno, M. G. (2019). The impact of higher education on entrepreneurship and the innovation ecosystem: A case study in Mexico. *Sustainability*, *11*(20), 5597. https://doi.org/10.3390/su11205597
5. Etzkowitz, H., Webster, A., Gebhardt, C., & Terra, B. R. C. (2000). The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research policy*, *29*(2), 313-330. https://doi.org/10.1016/S0048-7333(99)00069-4
6. Fitjar, R. D., & Gjelsvik, M. (2018). Why do firms collaborate with local universities? *Regional Studies*, *52*(11), 1525-1536. https://doi.org/10.1080/00343404.2017.1413237
7. Fonseca, L. (2019). Designing regional development? Exploring the University of Aveiro's role in the innovation policy process. *Regional Studies, Regional Science*, *6*(1), 186-202. https://doi.org/10.1080/21681376.2019.1584050
8. Galushko, V., & Sagynbekov, K. (2014). Commercialization of University Research in Canada: What Can We Do Better? *International journal of business administration*, *5*(5), 1. http://dx.doi.org/10.5430/ijba.v5n5p1
9. Gulbranson, C. A., & Audretsch, D. B. (2008). Proof of concept centers: accelerating the commercialization of university innovation. *The Journal of technology transfer*, *33*, 249-258. https://doi.org/10.1007/s10961-008-9086-y
10. Heng, L. H., Rasli, A. M., & Senin, A. A. (2012). Knowledge determinant in university commercialization: A case study of Malaysia Public University. *Procedia-Social and Behavioral Sciences*, *40*, 251-257. https://doi.org/10.1016/j.sbspro.2012.03.187
11. Herrera, F., Guerrero, M., & Urbano, D. (2018). Entrepreneurship and innovation ecosystem's drivers: The role of higher education organizations. *Entrepreneurial, innovative and sustainable ecosystems: Best practices and implications for quality of life*, 109-128. https://doi.org/10.1007/978-3-319-71014-3_6
12. Kenzhaliyev, O. B., Ilmaliyev, Z. B., Tsekhovoy, A. F., Triyono, M. B., Kassymova, G. K., Alibekova, G. Z., & Tayauova, G. Z. (2021). Conditions to facilitate commercialization of R & D in case of Kazakhstan. *Technology in Society*, *67*, 101792. https://doi.org/10.1016/j.techsoc.2021.101792
13. Kitagawa, F., Marzocchi, C., Sánchez-Barrioluengo, M., & Uyarra, E. (2022). Anchoring talent to regions: the role of universities in graduate retention through employment and entrepreneurship. *Regional Studies*, *56* (6), 1001-1014. https://doi.org/10.1080/00343404.2021.1904136
14. Kudaibergenova, R., Uzakbay, S., Makanova, A., Ramadinkyzy, K., Kistaubayev, E., Dussekeev, R., & Smagulov, K. (2022). Managing publication change at Al-Farabi Kazakh National University: a case study. *Scientometrics*, *127*, 453–479. https://doi.org/10.1007/s11192-021-04139-y
15. Lambert, L. (2003). Leadership redefined: An evocative context for teacher leadership. *School leadership & management*, *23*(4), 421-430. https://doi.org/10.1080/1363243032000150953
16. Miller, D.L. (2013). Universities and Colleges as Economic Drivers: Measuring Higher Education's Role in Economic Development. *Planning for higher education*, *41*, 135.
17. Peer, V., & Penker, M. (2016). Higher education institutions and regional development: A meta-analysis. *International Regional Science Review*, *39*(2), 228-253. https://doi.org/10.1177/0160017614531145

18. Piqué, J. M., Berbegal-Mirabent, J., & Etzkowitz, H. (2020). The role of universities in shaping the evolution of Silicon Valley's ecosystem of innovation. *Triple Helix*, *7*(2-3), 277-321.
19. Rasiah, R. (2019). Building networks to harness innovation synergies: Towards an open systems approach to sustainable development. *Journal of Open Innovation: Technology, Market, and Complexity*, *5*(3), 70. https://doi.org/10.3390/joitmc5030070
20. Šereš, L., Pavlicevic, V., Tumbas, P., Matkovic, P., & Maric, M. (2019). A performance indicators of university-industry collaboration. In *EDULEARN19 Proceedings*, 9664-9672. https://doi.org/10.21125/edulearn.2019.2413
21. Thune, T. (2011) Success Factors in Higher Education–Industry Collaboration: A case study of collaboration in the engineering field. *Tertiary Education and Management*, *17*, 31-50. https://doi.org/10.1080/13583883.2011.552627
22. Trippl, M., Sinozic, T., & Lawton Smith, H. (2015). The Role of Universities in Regional Development: Conceptual Models and Policy Institutions in the UK, Sweden and Austria. *European Planning Studies*, *23*(9), 1722–1740. https://doi.org/10.1080/09654313.2015.1052782
23. Turmaganbet, T. (2021). Analysis of the Management System of the Social Health Insurance Fund of the Republic of Kazakhstan. *Journal of Health Development*, *3*(43), 41-47. https://doi.org/10.32921/2225-9929-2021-3-43-41-47
24. Woo, Y., Kim, E., & Lim, J. (2017). The Impact of Education and R&D Investment on Regional Economic Growth. *Sustainability*, *9*(5), 676. https://doi.org/10.3390/SU9050676

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