NON-PROFIT LIMITED COMPANY
KARAGANDA TECHNICAL UNIVERSITY

APPROVED BY
the Board of Directors of NLC
Karaganda Technical University
decision
(minutes No. 2 dated 24/02/2022)

STRATEGIC PLAN of Karaganda Technical University Development for 2021-2025

Discussed at the broad meeting of the Academic Council (minutes No. 7 dated 27/01/2020)
(with amendments and additions of 17/08/2020, minutes No.13)

Karaganda 2020

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PASSPORT
of the Strategic Plan of Karaganda Technical University Development for 2021-2025

Name	Strategic Plan of Karaganda Technical University Development for 2021-2025
Grounds for the development	– the Republic of Kazakhstan Law dated July 27, 2007 No. 319-III “On Education” (amended and supplemented on July 7, 2020); – the Republic of Kazakhstan Law dated February 18, 2011 No. 407-IV “On Science”; – the Republic of Kazakhstan Law dated December 27, 2019 No. 293-VI ZRK “On the Status of a Teacher”; – the Republic of Kazakhstan President Decree dated December 26, 2014 No. 986 “On the Anti-Corruption Strategy of the Republic of Kazakhstan for 2015-2025”; – the Republic of Kazakhstan President Decree dated February 15, 2018 No. 636 “On Approval of the Strategic Development Plan of the Republic of Kazakhstan until 2025 and invalidation of some decrees of the President of the Republic of Kazakhstan”; – the Republic of Kazakhstan President N.A. Nazarbayev Letter to the people of Kazakhstan dated December 14, 2012 "Strategy "Kazakhstan - 2050": New political course of the established state"; – the Republic of Kazakhstan President K.K. Tokayev Letter to the people of Kazakhstan dated September 2, 2019 "Constructive public dialogue is the basis of stability and prosperity of Kazakhstan"; – the Republic of Kazakhstan President K.K. Tokayev Letter to the people of Kazakhstan dated September 1, 2020 "Kazakhstan in a new reality: time for action"; – the Republic of Kazakhstan President K.K. Tokayev Latter to the people of Kazakhstan dated September 1, 2021 "The unity of the people and systemic reforms are a solid foundation for the country's prosperity"; – the Government of the Republic of Kazakhstan Decree dated December 12, 2017 No. 827 “On Approval of the State Program “Digital Kazakhstan” (as amended and supplemented as of July 29, 2019); – the Government of the Republic of Kazakhstan Decree dated November 13, 2018 No. 746 “On approval of the State Program for the Development of Productive Employment and Mass Entrepreneurship Enbek for 2017-2021; – the Republic of Kazakhstan President K.K. Tokayev Letter to the people of Kazakhstan dated September 2, 2019 "Constructive public dialogue is the basis of stability and prosperity of Kazakhstan";

	– the Republic of Kazakhstan President K.K. Tokayev Letter to the people of Kazakhstan dated September 1, 2020 "Kazakhstan in a new reality: time for action"; – the Republic of Kazakhstan Government Decree dated December 12, 2017 No. 827 “On Approval of the State Program “Digital Kazakhstan” (amended and supplemented on July 29, 2019); – the Republic of Kazakhstan Government Decree dated November 13, 2018 No. 746 “On approval of the State Program for the Development of Productive Employment and Mass Entrepreneurship Enbek for 2017-2021”; – the Republic of Kazakhstan Government Decree dated December 31, 2019 No. 1050 “On Approval of the State Program for Industrial and Innovative Development of the Republic of Kazakhstan for 2020-2025”; – the Republic of Kazakhstan Government Decree dated December 27, 2019 No. 988 “On approval of the State Program for the Development of Education and Science of the Republic of Kazakhstan for 2020–2025”; – the Republic of Kazakhstan Government Decree dated December 31, 2019 No. 1050 “On Approval of the State Program for Industrial and Innovative Development of the Republic of Kazakhstan for 2020-2025”; – the First President of the Republic of Kazakhstan N.A. Nazarbayev article "Looking into the future: modernization of public consciousness" dated April 12, 2017; the First President of the Republic of Kazakhstan N.A. Nazarbayev article "Seven Facets of the Great Steppe" dated November 21, 2018; – Strategic Plan of the Ministry of Education and Science of the Republic of Kazakhstan for 2020-2024; – the Republic of Kazakhstan Minister of Education and Science Order dated April 19, 2021 No. 171 “On Approval of the Corporate Governance Code of a Non-profit Joint-stock Company in the Field of Higher and Postgraduate Education”.
Developers	Doctor of Engineering, Professor Ibatov M.K.; Doctor of Engineering, Professor Zhetessova G.S.; Candidate of Technical Sciences, Associate Professor Kropachev P.A., Candidate of Pedagogical Sciences, Associate Professor Smirnova G.M.; Candidate of Pedagogical Sciences, Associate Professor Udartseva S.M.; Candidate of Pedagogical Sciences, Jantassova D.D.; Candidate of Chemical Sciences Sultanova L.M., Candidate of Technical Sciences Toleuova A.R., PhD Amirov A.Zh., PhD Kurmasheva B.K., PhD Rakishev A.K., PhD Suleyev B.D., PhD Shormanbayeva D.G., Kozhukhova M.M., Kozhanov M.G., Shebalina O.A.
Purpose	Development and promotion of the intellectual capital of Kazakhstan on the basis of interdisciplinary and cross-cultural collaborations for technological modernization and digitalization of the country
Tasks	1. Ensuring a high level of training for the economy of the future, taking into account the development of digital technologies with

	competences that are in demand in various sectors of the economy, creative thinking and entrepreneurial skills. 2. Ensuring the continuity of education aimed at forming equal conditions for quality education of all the categories of students, in accordance with the needs of the economy and taking into account modern achievements in science and production. 3. Forming at the University an effective holistic system for assessing the quality of education in the context of its further recognition at the global and national levels 4. Continuous and systematic developing the scientific and pedagogical staff of the University in accordance with the structure of competencies required for an innovative economy 5. Developing the intellectual potential of science, increasing the demand for scientific developments and the integration of scientific research into the world scientific space. 6. Implementing a set of measures to develop a sense of patriotism, high moral and leadership qualities among students, involving them in strengthening the spiritual and moral values of the National Patriotic Idea "Mangilik El" and the culture of a healthy lifestyle. 7. Ensuring the increased transparency and efficiency of the management and financing system of the University. 8. Improving the material and technical base of the University, providing a safe and comfortable learning environment, modernizing and digitalizing the scientific and educational infrastructure, reducing the shortage of places in hostels.
Time limits and stages of implementing	*2021-2025*
Sources of funding	• republican budget; • means of public-private partnership; • funds received from organizations, enterprises and institutions under agreements; • special funds allocated by international scientific, educational funds and organizations; • income from the results of implementing scientific clusters, commercialization of innovative projects and the results of the activities of innovative enterprises, entrepreneurship, spin-out and start-up companies; • own funds of the University; • endowment fund; • charitable contributions of sponsors, voluntary donations of legal entities and individuals, patronage; • funds from other sources.

Most developed and developing countries, as well as large companies, are currently betting on the development of human capital. The amount of investment in education around the world is growing. In the context of forming the knowledge economy, the requirements for specialists who are able to work in conditions of uncertainty and to perform complex analytical tasks are changing.

Now in the structure of employment in advanced countries, such specialists already account for at least 25 %.

Active scientific studies and implementation of their results, such as the Internet of things, robotics, nanotechnologies and others, are changing world economies, and, consequently, labor markets that form the demand for highly qualified specialists.

Intensive modernization processes in Kazakhstan require the formation and support of sustainable systemic relationships between socio-economic development programs, labor market needs for qualified personnel and the system of training specialists. In turn, technological renewal and digitalization of industries dictates the need for close cooperation with the educational and research sectors.

Global social megatrends reflected in the key requirements of the Strategic Development Plan of the Republic of Kazakhstan until 2025, the State Program of the Industrial and Innovative Development of the Republic of Kazakhstan for 2020-2025 and the State Program of the Development of Education and Science of the Republic of Kazakhstan for 2020-2025, necessitate higher and postgraduate education to be responsive to changes taking place in the socio-economic sphere, to be open to innovation and to implement a flexible policy in the field of educational and research activities based on the principles of sustainable development. It is under these conditions that the directed, continuous and systematic development of personnel becomes possible in accordance with the structure of competences required for the innovative economy.

The development of the University requires forming a strategy in accordance with the priority areas for the development of education and science of the Republic of Kazakhstan based on the goals and KPI in the field of sustainable development, the risk management system, balancing the interests of stakeholders and their own innovative potential.

The strategic plan of KTU development for 2021-2025 defines the educational, research and management activities of the University aimed at improving the quality of human capital and the competitiveness of personnel to form the knowledge-intensive economy in Kazakhstan.

The priority trends of KTU development are determined as a result of a multifactorial analysis of the external and internal environment of the University, taking into account regional characteristics, and provide for consistent and systematic improvement of the University management processes, integration of sustainable development into key processes including risk management, planning, human resource management, investment, reporting, operational activities, decision-making processes.

2. PROSPECTS FOR THE DEVELOPMENT OF NLC KTU

Based on the long-term goals and objectives of the Strategic Development Plan of NLC KTU, the prospects for the development of the University were determined within the framework of the relevant Strategic trends:

Strategic trend	Prospects for the development
1. Training for the economy of the future	Ensuring the training of highly qualified specialists with demanded competences in accordance with international standards for a scientific and technological breakthrough in the region
2. Building a sustainable research ecosystem	Improving the quality of scientific developments for implementation of research results in the real sector of the economy and the expansion of international collaborations
3. Internationalization of the University	Implementing sustainable and feasible strategies for internationalization of the educational process for training technical specialists, taking into account the national and international context
4. Social development	Sustainable development of spiritual and moral values and leadership qualities among young people in the conditions of the formed accessible educational environment
5. Infrastructure and digitalization	Achieving a high level: - development of the infrastructure on the basis of constant strengthening and improvement of the material and technical base of the university; - digitalization of scientific and educational activities; - quality of educational, research and consulting services.
6. Effective management and corporate culture	An effective system of managing the processes of the University, developing human resources and achieving a high level of corporate culture

3. ANALYSIS OF THE CURRENT STATE AND FORECAST OF THE DEMAND FOR PERSONNEL

3.1 Analysis of the state of NLC KTU activities

Currently, the Karaganda Technical University trains specialists in 83 relevant educational programs including 46 bachelor, 29 master and 8 PhD doctoral programs. In addition, 9 military specialties are implemented at the Military Department of the University.

Since September 1, 2019, taking into account the demand of the regional labor market, personnel are being trained in 7 newly developed innovative educational programs related to digital technologies in industry.

The contingent of students is 8890 persons with the share of master and doctoral students of 6 % (486 persons) and 2 % (107 persons), respectively. Within the period from 2018 to 2020, there has been a decrease in the number of students at all three levels of education (Table 1).

Table 1 – Student contingent at KTU according to the educational levels

Educational level	**Student contingent by years, prs.**		
	2018	**2019**	**2020**
Bachelor students	9980	10255	9733
Including the part-time mode of training	*2877*	*2444*	*1614*
Master student	1394	1124	388
Doctoral students	128	141	135
Total	**11402**	**11520**	**10256**

The main reason for the decreasing number of bachelor students is the closure of part-time training mode in the Republic of Kazakhstan in 2018, the master students decreasing the number of grants under the State Program for Industrial and Innovative Development of the Republic of Kazakhstan, as well as changes in the format of admission to educational programs of master's and doctoral studies and introduction of a mandatory foreign language examination with international certification.

Over the past 3 years, the University has trained more than 6,000 specialists for the region and the country. For example, the priority areas of the region economy, active work with enterprises within the framework of the innovative and educational consortium "Corporate University", provided employment for graduates of KTU in 2020 including more than 74 % at enterprises in Karaganda and the Karaganda region, taking into account those continuing master's degree programs more than 89 % (Figure 1).

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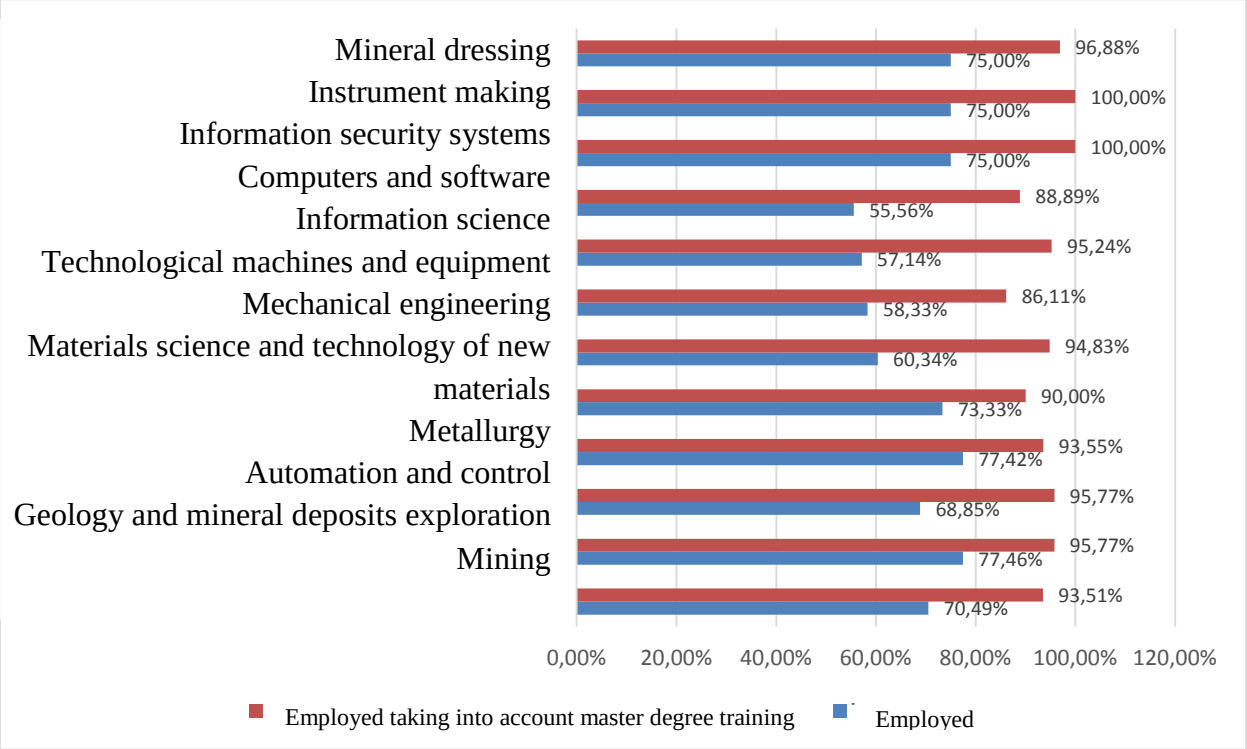

Figure 1 – Graduate employment in the priority areas of the regional economy

Graduate employment statistics for this period indicates a high demand for the University graduates (see Table 2)

Table 2 - Analysis of the University graduate employment by years and levels of education

Indicators		**2018**		**2019**		**2020**	
		Winter	***Summer***	***Winter***	***Summer***	***Winter***	***Summer***
Bachelor's programs							
1	**Number of graduates**		**1298**		**1714**		**1600**
	On a budgetary basis		*707*		*828*		*797*
	On a commercial basis		*591*		*886*		*803*
2	**Employed**		**1225**		**1398**		**1187**
			94.4%		***81.6%***		***74.2%***
	On a budgetary basis		*621*		*622*		*661*
			87.8%		*75.1%*		*82.9%*
	On a budgetary basis		*243*		*507*		*526*
	Entered the master program		***361 (27.8%)***		***269 (16.2%)***		***246 (15.4%)***
Master's programs							
Indicators		**2018**		**2019**		**2020**	
		Winter	***Summer***	***Winter***	***Summer***	***Winter***	***Summer***
1	**Number of graduates**	**319**	**85**	**521**	**100**	**17**	**683**

	On a budgetary basis	*315*	*54*	*509*	*79*	*2*	*671*
	On a commercial basis	*4*	*31*	*12*	*21*	*15*	*12*
2	**Employed**	***293***	***72***	***490***	***93***	***17***	***599***
		91.8%	***84.7%***	***94.0%***	***93.0%***	***100.0%***	***87.7%***
	On a budgetary basis	*289*	*46*	*478*	*72*	*2*	*599*
		91.7%	***85.2%***	***93.9%***	***91.1%***	***100.0%***	***89.3%***
	On a budgetary basis	*4*	*26*	*12*	*21*	*15*	*0*
3	**Not employed**	**26**	**13**	**31**	**7**	**0**	**84**
	On a budgetary basis	26	8	*31*	*7*	*0*	*84*
	On a commercial basis	*0*	*5*	*0*	*0*	*0*	*0*

Doctoral studies

Indicators		**2018**		**2019**		**2020**	
		Winter	***Summer***	***Winter***	***Summer***	***Winter***	***Summer***
1	**Number of graduates**		**12**		**14**		**45**
	On a budgetary basis		*12*		*13*		*41*
	On a commercial basis		*0*		*1*		*4*
2	**Employed**		**12**		**13**		**42**
			100.0%		***100.0%***		***93.3%***
	On a budgetary basis		*12*		*13*		*38*
			100.0%		*100.0%*		*92.6%*
	On a budgetary basis		*0*		*1*		*2*

The table shows decreasing the percentage of employment of bachelor graduates, which is associated with the following reasons:

- in connection with changing the employment procedure, which is associated with increasing the term of employment up to two years (when the state of emergency or situations of a social, natural and man-made nature are declared, the University ensures the employment of its graduates in their specialties over the next two years);

- students who graduated from the program "Mangilik el zhastary industriyaga!" - "Serpin 2050", must be employed in the region of study, i.e. in the Karaganda region. Meanwhile, many graduates were employed in other regions of Kazakhstan, which is a violation of the requirements of the Law "On Education" and the Rules for sending young specialists to work approved by the Republic of Kazakhstan Government Decree and is not reflected when uploading the information of employment from the base of the Branch of the State Corporation "Government for Citizens" JSC in the Karaganda region. To form the conditions for graduate working at the place of study, NCL KTU recommended that graduate students find vacancies at enterprises and organizations from among the Corporate University or register with the Employment Center of the Karaganda region;

– the Karaganda region is an industrial region, where enterprises of the mining and metallurgical and mineral raw materials profile are mainly located. The specifics of the existing industries do not allow employing all the graduates who have mastered educational programs in the specialties "Mangilik el zhastary industriyaga!" - Serpin 2050;

– it should be noted that due to the current epidemiological situation, some enterprises in the region are currently reducing their staff and not recruiting specialists for vacant positions, which complicates the process of finding a job for graduates.

At the same time, there is a trend of stable 100 % employment of master and doctoral graduates.

On the basis of the University, there is working the leading educational and methodological association in 4 areas of training:

– Engineering;
– Producing and processing industries;
– Standardization, certification and metrology (by industry);
– Hygiene and occupational safety.

In the educational process there participate 645 teachers and 80 leading specialists of enterprises including 270 candidates and doctors of sciences, PhDs, participate.

The analysis of changes in the staff of the University in a three-year period is presented as part of an assessment of the innovative potential of the team.

Since 2008, on the basis of KTU, the innovative and educational consortium "Corporate University" has been operating that includes 76 large industrial companies: the Kazakhmys Corporation LLP, the ArcelorMittal Temirtau JSC, the Sokolov-Sarbai Mining and Processing Production Association JSC, the Shubarkol Komir JSC and others. The enterprises of the consortium have 60 training centers in the branches of the graduating departments equipped with unique technological and laboratory equipment, training grounds, simulators and professional software systems.

Research activities of Karaganda Technical University are focused on technological innovation and engineering in industry. Fundamental scientific areas of mining, metallurgy, mechanical engineering, structural mechanics, automation of production processes, etc., have been formed and are in demand by industry.

At the enterprises of the Coal Department of ArcelorMitall Temirtau JSC and Kazakhmys Corporation LLP, innovative technologies have been introduced for underground coal mining, controlling the state of mine workings, storing run-of-mine coal and special coke, improving the mining equipment reliability, automatic control and regulation of ore dressing processes.

At the mining enterprises of SSMPPA JSC, Kazmarganets JSC, AK Altynalmas JSC, Shubarkol Komir JSC, Zhairemsky GOK JSC, the results of studies to ensure the stability of slopes, ledges and pit walls have been implemented. In the field of metallurgy, new processes and casting machines, as well as innovative technologies have been developed and put into practice:

- powder metallurgy;

- obtaining new materials by modifying the surface;

- producing and processing of wear-resistant materials of a new generation for the production of parts for metallurgical units;

- producing sand-resin molds at non-stationary pressure in order to improve the quality of finished products;

- producing refractory materials for the metallurgical industry with optimal porosity and increased thermal stability.

Innovative technologies have been developed and implemented for the metallurgical industry.

In the field of mechanical engineering, the development of the Kazakhstan system of technological preparation automation of machine-building production is being carried out.

In the field of automation of production processes at the enterprises of the Shubarkol Komir JSC, digital systems of remote monitoring the operating modes of high-voltage substations and excavators have been developed and implemented. Leakage current protection devices developed by scientists of the University, were manufactured at a small enterprise (the Elat LLP) in the amount of 650 pieces and implemented at almost all the enterprises of the Republic of Kazakhstan that carry out open-cast mining.

In the field of structural mechanics and engineering reliability of buildings and structures, scientists and specialists of the Research Institute "Kazakhstan Multidisciplinary Institute of Reconstruction and Development" (KazMIRD) provided scientific and technical support for safe construction and reconstruction based on innovative technologies for monitoring and strengthening load-bearing structures of more than 2,000 industrial and civil facilities in Kazakhstan. Among them there are almost all the unique buildings of the capital of Kazakhstan, the city of Nur-Sultan, such as the Palace of Independence, Baiterek, the Kazakh Eli complex, Khan Shatyr and others. The KazMIRD developed 31 republican regulatory and technical documents based on Eurocodes that were put into effect on January 1, 2018 in the territory of the Republic of Kazakhstan, which will expand the practice of international projects and introduction of innovations in the domestic construction industry.

There are 5 dissertation councils at KTU to defend dissertations for the PhD degree in the specialties "Mining", "Geology and exploration of mineral deposits", "Metallurgy", "Engineering", "Electric power", "Transport, transport equipment and technologies" , "Construction" and "Production of building materials, products and structures".

The University has scientific schools, 51 research groups. The share of teaching staff involved in R&D is 65 %, of students 29 %, master and doctoral students 100 %. More than 60 % of students' theses and 100 % of master graduation works are of a research nature and are executed on the orders of enterprises.

There is a positive trend of a significant increase in the total volume of R&D funding, in general, the University funding for R&D increased by 36 % (from 690.5 million tenge in 2018, 923.5 million tenge in 2019 to 941.52 million tenge in 2020).

For a series of works on the topic: “Development of heat-resistant alloys and new generation technologies for the production and processing of parts based on them”, a group of KTU scientists was awarded the Al-Farabi State Prize of the Republic of Kazakhstan for 2020.

In 2019, as a result of implementing the project "Improving corrosion resistance of metals by using halloysite nanotubes" a new production of the national product was organized with organizing seven new jobs.

According to the results of scientific research, there increased the publication activity of the teaching staff of the University (Table 3)

Table 3. Publication activity of teaching staff of the University

No.	Database name	2018	2019	2020
1	RCSCI	568	669	573
2	Scopus	87	124	132
3	Web of Science	65	95	94

The publication activity of the teaching staff was assessed using three main international databases: Scopus, Web of Science, RSCI. A sharp surge in publication activity was observed in 2019, so according to the RSCI database it was 17.7 %, according to the Scopus database 42 % and according to the Web of Science database 46 %. According to the 2020 indicator, there is a decrease in publications in the RSCI database and an increase in the Scopus database, and stability is observed in the Web of Science database.

The publication activity of the teaching staff of the University shows a positive trend, which is associated with involving in active research activities not only the teaching staff but also master and doctoral students.

Currently, there are more than 1,567 titles of protection on the balance sheet of KTU including 106 patents received since 2006, the right holder of which is the University (Table 4).

Table 4 - Dynamics of receiving titles of protection

No.	Title of protection name	2018	2019	2020
1.	Patent	31	56	79
2.	Certificate of state registration of rights to objects of copyright	152	215	276

In 2018, the University has filed a total of 62 patent applications, received 31 patents. 153 applications were submitted, 152 certificates of state registration of rights to objects of copyright were received. In 2019, there were received 56 patents and 215 certificates of state registration of rights to copyright objects. In 2020, there were received 79 patents and 276 certificates of state registration of rights to copyright objects, and 79 patent applications were filed.

The analysis shows that the number of applications filed for obtaining titles of protection has been increasing over the past three years. The sharp increase in applications for title of protection is mainly due to the simplification of the filing process itself. Since 2018, the acceptance of copyright applications has moved to

an electronic format. If earlier the process of receiving an Intellectual Property Certificate took up to one month on average, now, with electronic submission of documents this period has been reduced to two days. The same trend is observed when applying for a patent starting in 2019.

The total area of buildings and structures of KTU is more than 96 thousand square meters. The campus of the University consists of 7 educational and laboratory buildings, in which there are 185 laboratories. There is a large sports complex, 3 comfortable hostels, the Youth Palace, the Polytechnic sports and recreation camp in the resort area of Karkaralinsk.

The educational, scientific and industrial base of the University includes:

- 5 Research Institutes (Research Institute "Kazakhstan Welding Institute" is a member of the club "International Institute of Welding", Research Institute "Kazakhstan Diversified Institute for Reconstruction and Development", Research Institute "New Materials", Research Institute "Industrial Ecology", Research Institute "Patriotic Education"), 185 laboratories, 70 computer classes, 88 interactive classrooms;
- 6 Centers of working professions (“Mining”, “Engineering”, “Welding”, “Construction”, “Energy”, “Telecommunications”);
- 4 small enterprises (Elat LLP, Pnevmopodem LLP, Alternativa LLP, Temir Men Mys LLP);
– 7 Engineering Competence Centers equipped with equipment and software systems of such transnational corporations as the TOTAL, the FESTO, the Schneider Electric, the Mitsubishi Electric, the Leica Geosystems, the Epam Systems and the FLUOR;
– IT Competence Center (6 laboratories of IT companies "WTO", "ABI", "Wooppay", "X-net", "Gexabyte", "ERP-company" and CISCO Networking Academy);
– 4 scientific and educational complexes (“Industry 4.0”, “Digital Engineering”, “Nanotechnologies in Metallurgy” and “Bioengineering”);
– Business Skills Park (co-working center, business incubator offices and other infrastructure for developing entrepreneurial skills and start-ups on an area of 300 m^2).

The laboratory complex also includes the accredited Engineering Testing Laboratory "Integrated Development of Mineral Resources" and 5 world-class educational and scientific laboratories.

The University digital campus includes:

- the "Upgrade Center" for monitoring, analyzing and managing the processes of the University;
- the International Center for Materials Science;
- the automated information system "Univer";
- licensed software for educational processes and scientific research;
- the digital library;
- the “Directum” electronic document management system;
- the video surveillance system and pass on chip cards.

Within the 2018-2020 period, the park of computer equipment and the

technical and technological equipment of the classroom fund was radically modernized. So, within 3 years, the computer park and office equipment have been updated by 90 % with the installed Windows 10 and Microsoft Office. More than 3,000 modern workstations are installed in the KTU buildings.

All the workstations installed at the University use the MS Windows operating system, they are connected to local area networks and have access to the Internet.

The server hardware has been updated by 80 %, which significantly reduced the response time to KTU information systems. The hard drivers for the RAID server arrays have been upgraded and more than 20 uninterruptible power supplies have been installed.

The computer network of the University includes a significant number of servers and network equipment. All the University buildings have wireless access points that cover 100 % of the classrooms and the surrounding campus.

In 2018, a project of a wireless Internet network and video surveillance with an advanced face recognition system was implemented in all the University buildings based on the Cisco equipment. The following services are deployed on the basis of the corporate network:

- the Wi-Fi network of about 500 points in the buildings and dormitories of the university;
- television broadcasting of programs in the buildings and dormitories of the university;
- video surveillance in educational computer classes, libraries and hostels.

KTU has a corporate portal (http://www.kstu.kz/), which is intensively updated. In 2019, KTU for the first time won the National Internet Award and it occupies the leading position in the international ranking of webometrics in the Republic of Kazakhstan. In 2020, KTU moved its website to the edu domain zone.

In 2020, thanks to the computer technology used at the University for storing and processing data of the course of the educational process using remote technology, for interaction between participants in the educational process including teachers, students, during the global pandemic, the University was able to switch 100 % to remote technology as soon as possible.

At KTU, with distance learning technologies, students can study using the available information systems: IS "Univer 2.0", MOODLE, ZOOM, Cisco Webex, CER certification system.

The University has developed, certified and introduced into the educational process 12686 electronic educational publications (EUI), 8483 of which have been developed by the teaching staff of the University (Table 5).

Table 5 - E-learning resources

EER name	2018	2019	2020
Basic versions	1432	1635	-
Video lectures	118	113	164
Internet versions	88	76	244
Virtual laboratory and practical complexes	6	15	27

Multimedia presentations	198	281	285
Slide lectures	633	1326	1819
Web portfolio	-	-	2
MOOC	-	4	61
Complexes of video lessons	2	3	27
Acquired EER	983	1469	1751
DER	-	-	5897
Total	**5478**	**6941**	**10277**

Since 2019, KTU has been managing electronic documents based on the DIRECTUM electronic document management and interaction system.

Since 2006, KTU has been participating in the international scientific and educational network project on industrial automation and mechatronics "SYNERGY" that is implemented under the auspices of one of the world leaders in "Industry 4.0", the transnational corporation "FESTO" (Austria, Germany).

KTU cooperates with more than 100 universities of the world within the framework of cooperation agreements in the field of education and science.

In 2017, the University signed a cooperation agreement with the Moscow State Institute of International Relations, MSIIR (Moscow, Russia) for the preparation of top managers for the mining and metallurgical industry under the MBA and DBA programs within the framework of the interuniversity educational center.

On October 28, 2021, on the basis of KTU, the Kazakhstan branch of the International Center of Competence in Mining and Engineering Education under the auspices of UNESCO was organized to award the qualification “mining engineer” recognized by all the world companies (headquarters in St. Petersburg Mining University, St. Petersburg, Russia).

Financial sustainability of the University

The analysis of implementing the Strategic Development Plan of the Karaganda State Technical University for 2011-2020 shows that 100 % fulfillment of all the indicators of the strategic development of the University laid down in the plan was achieved. It takes into account decreasing the number of students from 2018 to 2020. At the same time, it was found that the main reason for decreasing the contingent of students in the bachelor's degree is the closure of correspondence courses in the Republic of Kazakhstan in 2018, in the master's program decreasing the number of grants under the State Program for Industrial and Innovative Development of the Republic of Kazakhstan, as well as changes in the format of admission to educational programs of master's and doctoral studies and introduction of the mandatory foreign language examination with international certification. Despite decreasing the contingent of students from 11402 people in 2018 to 10856 people in 2020, which makes 4.7 %, there is stable financial sustainability of the University presented in the form of the corresponding indicators of Table 6.

Table 6

Name of the basic indicators of financial-economic activities	**Unit**	**Basic indicators values of financial-economic activities, th. tenge**

			2018	2019	2020
Active assets		th. tenge	6 979 667,0	7 025 019,0	8 025 364,0
Passive assets	Total:	th. tenge	6 979 667,0	7 025 019,0	8 025 364,0
	Equity capital	*th. tenge*	*5 351 425,0*	*5 449 537,0*	*6 681 726,0*
	Obligations	*th. tenge*	*1 628 242,0*	*1 575 482,0*	*1 343 638,0*
Income		th. tenge	5 105 568,0	5 836 529,0	6 477 553,39
Expenses		th. tenge	5 019 855,0	5 725 495,0	5 719 894,87
Gross income (gross loss is indicated with a minus sign)		th. tenge	485 132,0	470 307,86	974 374,89
Profit (loss) before tax (loss is indicated with a minus sign)		th. tenge	85 713,0	111 034,0	757 658,52
Net profit (loss is indicated with a minus sign)		th. tenge	75 506,0	111 034,0	757 658,52
Distribution of net income remaining at the disposal of the organization	Total:	th. tenge	75 506,0	*97 029,0*	757 658,52
	For development	*th. tenge*	75 506,0	*97 029,0*	757 658,52
Profitability	Active assets	%	1.08	1.58	9,44
	Equity capital	%	1.41	2.04	11,34
	income	%	1.48	1.9	11,7
Leverage			0,3	0.29	0.2
The effect of financial leverage		%	0,13	0.35	1.9
EBITDA (Earnings before interest, taxes, depreciation and amortization)		th. tenge	771 352,0	893 299.41	1 603 658.86

In accordance with the Ministry of Finance of the Republic of Kazakhstan Order No. 372 dated April 9, 2020 “On approval of the Rules for calculating coefficients and determining the boundaries of financial stability classes” for legal entities, as well as joint-stock companies whose shares are not placed on the securities market, the financial stability of an organization (Z) is established based on the total value of the main indicators of its financial stability:

$$Z=0.717*K1+0.847*K2+3.107*K3+0.42*K4+0.998*K5,$$

where K1 is the return on assets ratio;

K2 - coefficient of financial leverage;

K3 is the coefficient of financial leverage efficiency;

K4 - return on equity ratio;

K5 - profitability ratio of income (sales).

Based on the calculations, the value of the financial sustainability of the University Z increases from 3.5 in 2018 to 29.28 in 2020, which allows classifying the University as a class I financially stable joint-stock company ($Z \geq 2.9$ and more) and confirms stable financial sustainability of KTU (Figure 2).

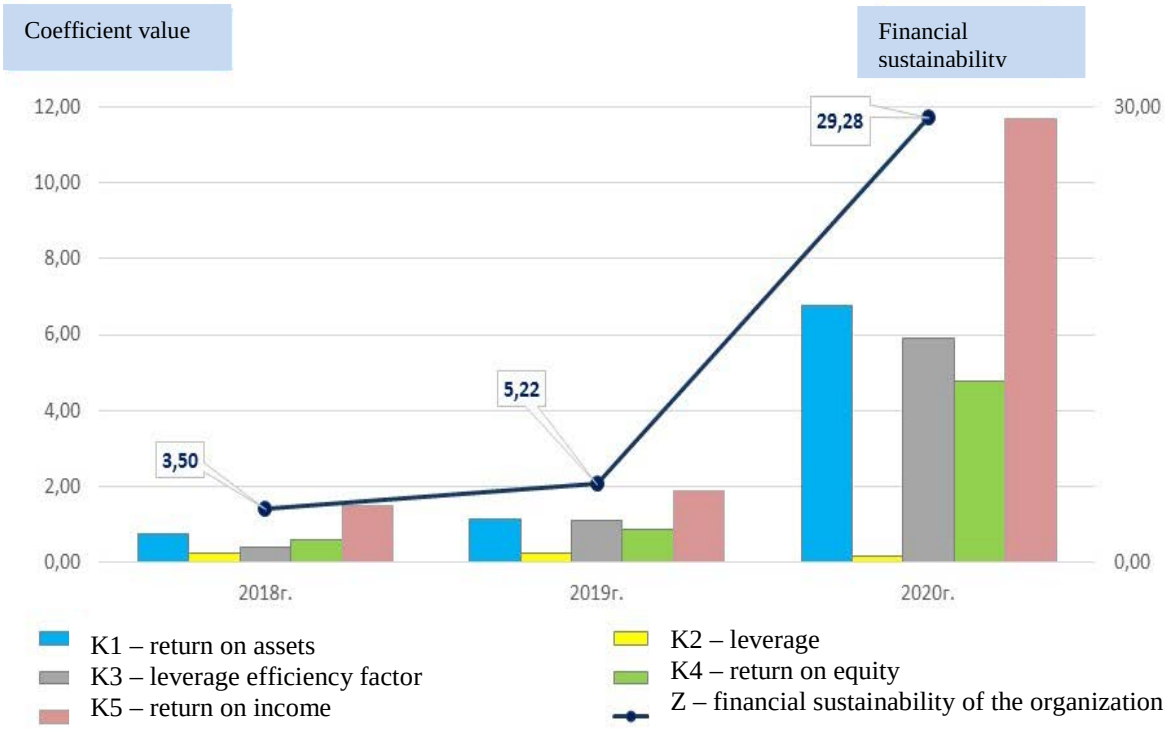

Figure 2 – KTU financial sustainability

3.2 Evaluating the innovative potential of the staff

The innovative potential of the staff of Karaganda Technical University is a combination of the abilities and capabilities of employees to carry out the sustainable development of the University. As part of the analysis of the innovative potential of the KTU staff, an assessment of innovative readiness for work is required including intellectual development, professional competence and the ability for professional self-development; in addition, motivational qualities and an innovative attitude to work are important, including an orientation towards high standards of labor quality, a creative attitude to work, and susceptibility to innovations.

Based on the above, an analysis was carried out over a three-year period in the following areas:

- analyzing the degree holders rate of the teaching staff;
- analyzing the completion of advanced training courses, trainings of the teaching staff of the university on the development of professional competence, motivational qualities and innovative attitude to work;
- analyzing the potential of young scientists;
- analyzing the potential of research activities;
- analyzing publication activity.

Within 2018-2020 the University has seen a slight increase in the degree holders rate due to increasing the number of PhDs, as well as decrease the number of full-time teachers as a result of decreasing the staffing. So, in 2018, the degree holders rate was 41 %, in 2019 42 %, in 2020 43 %. The number of doctors and candidates of sciences is gradually decreasing for a number of reasons. Most doctors and candidates of sciences are people of retirement age who, due to age,

health status, stop working at their own request or due to circumstances beyond the control of the parties, as well as in connection with changing the place of work or place of residence. At the same time, successful defenses of doctoral students with the award of the Doctor of Philosophy (PhD) lead to increasing the University degree holders rate and a natural replacement of Doctors and Candidates of Sciences with Doctors of Philosophy (PhD) (Figure 3).

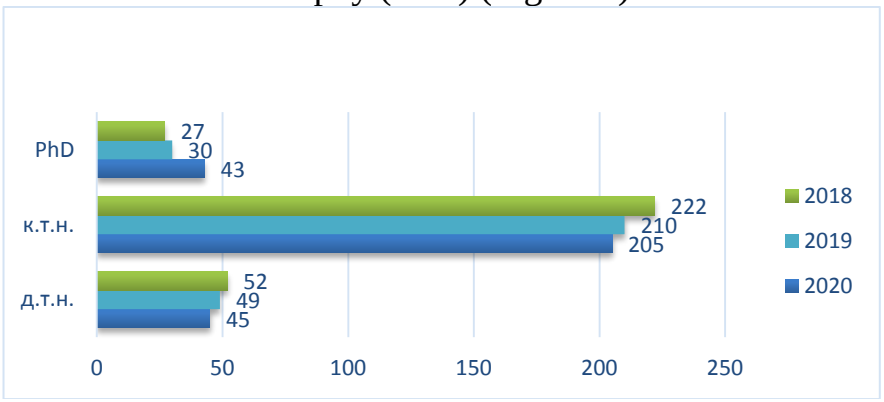

Figure 3 – Dynamics of the degree holders rate of the teaching staff

The teaching staff professional development at the University is aimed at developing the professionally important qualities of a teacher, developing flexible skills, creative thinking and entrepreneurial competence.

In 2018, 691 teachers completed advanced training courses in the following areas:

1. In order to modernize the content of higher and postgraduate education in the context of global trends, on the basis of cooperation with strategic partners, a “Training seminar on the design of competence-oriented educational programs in cooperation with employers” was held (18 hours) from 02/05/2018 to 23/02/2018 (66 persons).

2. In order to form integrated entrepreneurial culture, the teaching staff of the University conducted advanced training courses on the topic “Modern management technologies in education and entrepreneurial activity” (Time management in the management of educational systems; Developing startups in the higher education system as a success factor for entrepreneurship in the technological field) in the volume of 36 hours from 02/04/2018 to 21/04/2018 (99 persons).

3. For the purpose of improving the effectiveness of corporate governance and skills of structural divisions heads and teachers in the field of implementing the principles of collective responsibility, advanced training courses were held on the following topics:

- "Planning the strategic development of the university" (Defining the mission of the educational institution; Analysis and evaluation of the external and internal environment (SWOT-analysis); Strategic goal-setting; Formation of a strategic plan) in the amount of 36 hours from 05/02/2018 to 05/18/2018 (140 persons);

- "Implementation of the principles of collective responsibility in the university" (Effectiveness of corporate governance; Teambuilding as a way of forming collective responsibility; Effective mechanisms for making collective

decisions; Principles and rules for the development and implementation of managerial innovations) in the amount of 36 hours from 13/11/2018 to 30/11/2018 (136 persons).

4. In order to implement the Comprehensive University Development Program, to increase the level of theoretical knowledge, to improve practical skills and abilities in connection with the ever-increasing requirements for the qualifications of the teaching staff and employees, 98 people underwent advanced training and internships at the enterprises of Corporate University, as well as at various organizations and universities of the Republic of Kazakhstan (124 persons), abroad 28 persons.

In 2019, 301 teachers completed advanced training courses:

1. In order to improve the effectiveness of managing the pedagogical process through the formation of a culture of pedagogical communication, advanced training courses “Technologies of emotional leadership. Management through Influence" in the amount of 36 hours for the faculty and staff of the University from 10/07/2019 to 10/18/2019 (51 persons).

2. In order to implement the Comprehensive University Development Program, to increase the level of theoretical knowledge, to improve practical skills and abilities in connection with the ever-increasing requirements for the qualifications of teaching staff and employees, 105 people underwent advanced training and internships at the enterprises of Corporate University, as well as at various organizations and universities of the Republic of Kazakhstan (114 persons), abroad 31 persons.

In 2020, 857 teachers completed advanced training courses:

1. In order to implement the Roadmap for the phased transfer of theoretical education, practices, ongoing monitoring of progress, intermediate and final certification of students into a remote format using ICT, advanced training courses in the amount of 36 hours were held for the faculty of the university from 06/08/2020 to 20/06/2020 in the following areas:

- “Effective use of DLT based on the use of Moodle tools” (158 perons);
- "The use of distance technologies in teaching languages" (28 persons);
- “New platforms and formats for DLT. Developing virtual laboratory works” (73 persons);
- “Virtual group training using Skype-technologies. Experience in using the Cisco Webex platform in educational activities” (111 persons);
- “Google best practices in distance learning technologies. Possibilities of using streaming when conducting classroom activities using the Youtube service” (206 persons).

2. In order to improve the professional development of the teaching staff and university staff from among the youth personnel reserve in the field of modern management technologies in education, advanced training courses “Development of the managerial potential of HiPo-employees” were held in the amount of 36 hours from 11/09/2020 to 11/21/2020 based on the ZOOM platform (35 persons).

3. In order to implement the Comprehensive University Development Program, to increase the level of theoretical knowledge, to improve practical skills and abilities during the pandemic, 75 people completed online advanced training

courses and internships at various organizations and enterprises and universities of the Republic of Kazakhstan (181 persons), abroad 18 persons.

The dynamics of the teaching staff number who have completed advanced training courses in the context of three years is shown in Figure 4.

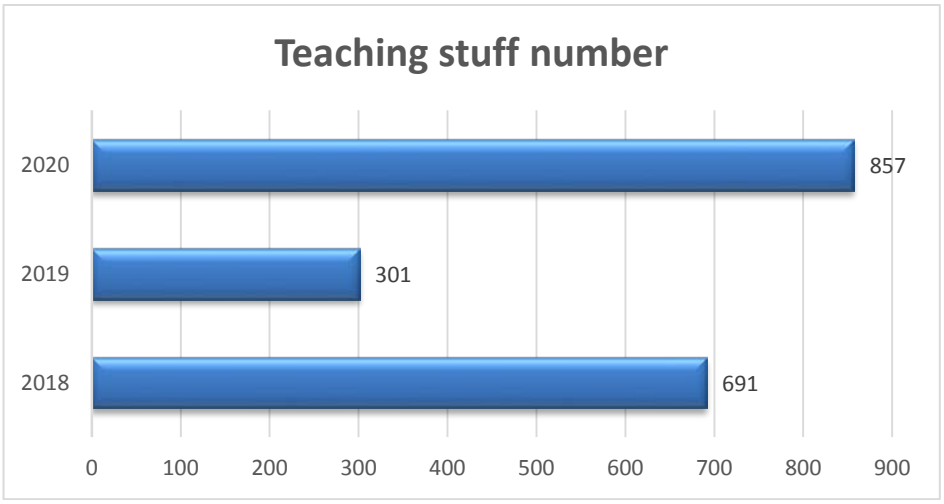

Figure 4 – Dynamics of the teaching staff number in advanced training courses within the Comprehensive program of KTU Development

Particular attention at the University is paid to strengthening the potential of the team through the development of the Institute of Young Scientists. KTU provides training in 8 educational doctoral programs, which, in addition to acquiring educational credits and passing various types of practices, attend lectures by leading professors from near and far abroad, perform research work with a mandatory scientific internship. In the period from 2018 to 2020, there were defended 38 works for the degree of Doctor of Philosophy (PhD). The information of the activities of young scientists is presented in Figure 5.

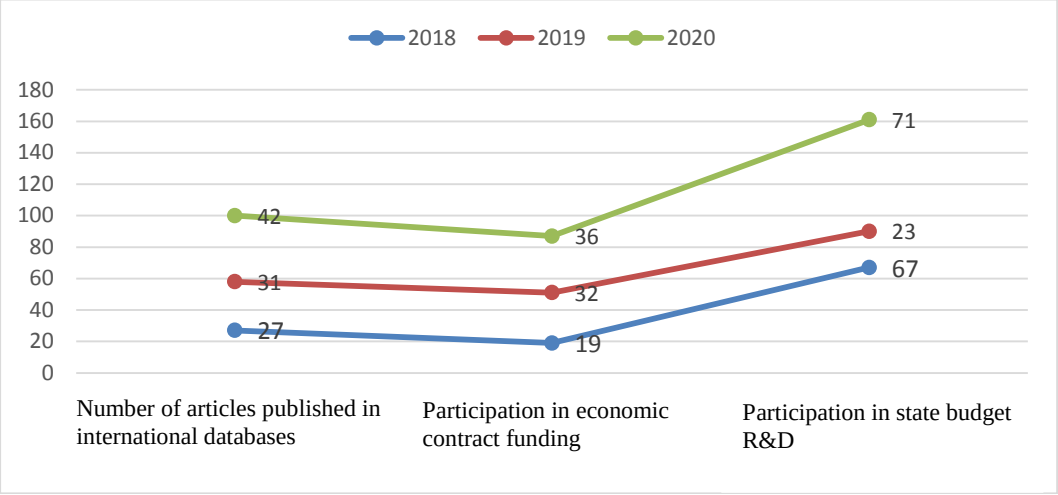

Figure 5 – Young scientists' activities

Increasing the participation of young scientists in economic contract projects amounted to 68 % in 2019 compared to 2018, and 89 % in 2020.

In terms of the "Participation in state budget research projects" indicator,

there was a decrease in activity in 2019, due to the fact that in 2018, through the Ministry of Education and Science of the Republic of Kazakhstan, a competition for young scientists was not announced. In 2020, the indicator increased showing the activity of young scientists, according to the results of the announced competition for grant funding of young scientists for scientific and (or) scientific and technical projects for 2020-2022. The potential of young scientists of the University is high and shows steady growth.

In recent years international scientific cooperation at the University has mainly been carried out at the level of cooperation with foreign scientists in joint projects (Table 7).

Table 7 - Participation of foreign scientists in projects and programs of KTU

No.	Foreign scientist's name, position, organization, country	Name of the scientific project, name of the KTU project manager
1.	Marina Sidorová, PhD, Professor at Technical University, Kosice, Slovakia	Developing, manufacturing and testing a new design of the rotary assembly of the conveyor with the rotation of the cargo flow at an angle of up to 90 degrees in the plane of the working soil for bottom hole systems and curved workings, p.m. Doctor of Engineering, Prof. Beisembayev K.M.
2.	Juraj Janočko, PhD, Professor at Technical University, Kosice, Slovakia	
3.	Azotte A., Deputy Director of the Institute of Mechanics and Microstructure, PhD, Professor of the University of Lorraine, France	Developing and implementing the technology of the manufacturing refractory materials for the metallurgical industry with optimal porosity and increased heat resistance, p.m. Doctor of Engineering, Prof. Issagulov A.Z.
		Improving the technology of manufacturing precision castings from complex alloy steels with a homogenized structure and improved properties using raw materials of Kazakhstani content, p.m. PhD, Prof. Kvon S.S.
4.	Michot J., PhD, Professor the University of Lorraine, France	Improving the technology of manufacturing precision castings from complex alloy steels with a homogenized structure and improved properties using raw materials of Kazakhstani content, p.m. PhD, Prof. Kvon S.S.
		Designing, developing and implementing the technologies of producing and processing wear-resistant materials of a new generation for producing parts for metallurgical units, p.m. Doctor of Engineering, Prof. Issagulov A.Z.
5.	Olegas Černašėjus, PhD, Prof. of Vilnius Technical University n.a.Gedeminas, Vilnius, Lithuania	Developing a resource-saving technology for the repair of long rods of hydraulic cylinders of large-sized special equipment for industrial use with the possibility of restoring local damage at the place of its operation,
6.	Jelena Škamat., Doctor of Engineering, Senior Researcher of the Laboratory of Composite	Developing a resource-saving technology for the repair of long rods of hydraulic cylinders of large-sized special equipment for industrial use with the

	Materials, Associate Professor of theMechanics and Engineering of Materials dep., Vilnius Technical University n.a.Gedeminas, Vilnius, Lithuania	possibility of restoring local damage at the place of its operation, p.m. Doctor of Engineering, Prof. Zhetessova G.S.
7.	Lyapunova M.V. Chemist of the Organic Synthesis laboratory, Tomsk State University Tomsk, Russia,	Developing methods of isolating natural triterpenoids from plants and their chemical transformation in order to search for new biologically active substances, p.m. PhD, head of the C&CT department Takibayeva A.T.
8.	Mitussov A.A. Dr. Eng., Prof. of the Engineering networks, heat engineering and hydraulics department, Altai State Technical University n.a. I.I. Polzunov, Barnaul, Russia	Developing and studying the hydraulic impact mechanism for the production of mining and construction works, p.m. PhD, Prof. of the EC department Kyzyrov K.B.
9.	Kovalev P.V. Candidate of Technical Sciences, Associate Professor, Peter the Great St. Petersburg Polytechnic University St. Petersburg, Russia	Developing and implementing the production of sand-resin molds under non-stationary pressure in order to improve the quality of the finished product, p.m. Doctor of Engineering, Prof. of the TT&LS department Ibatov M.K.
		Developing and implementing the technology of manufacturing refractory materials for the metallurgical industry with optimal porosity and increased heat resistance, p.m. Doctor of Engineering, Prof. of the TT&LS department Ibatov M.K.
		Designing, developing and implementing the technologies of producing and processing wear-resistant materials of a new generation for the production of parts for metallurgical units, p.m. Doctor of Engineering, Prof. of the TT&LS department Ibatov M.K.
10.	Melnikov A.G. Candidate of Technical Sciences, Associate Professor of National Research Tomsk Polytechnic University, Tomsk, Russia	Development and implementation of technology for the manufacture of refractory materials for the metallurgical industry with optimal porosity and increased heat resistance, p.m. Doctor of Engineering, Prof. of the TT&LS department Ibatov M.K.

Based on the assessment of the innovative potential of the team, there is also observed sustainable development of the University aimed at improving the quality of education and conditioned by a high intellectual potential and professionalism of the team, readiness to increase the intensity of work; the presence of professionals in the team; intensity of communications; readiness for mutual learning; managerial leadership; positive experience in research and project activities; information culture of the team.

3.3 Forecast of the labor market changing tendencies of the demand for personnel

In recent years, the economy of Kazakhstan has shown stable growth. In 2018, the GDP growth amounted to 4.1 % maintaining the momentum gained in 2017. Almost all the segments of the economy showed a positive trend due to high investment and consumer demand, as well as industrial activity in the basic sectors of the economy.

In the real sector of the economy, there is a synchronous growth in the mining and manufacturing industries. In general, the volume of industrial production increased by 4.4 %. The growth of industry was significantly affected by increasing the extraction of iron ore, natural gas and oil, increasing the production of machine building, petroleum products and the chemical industry. In the mining and quarrying industry, production increased by 4.6 %, in the manufacturing industry by 4.5 %.

In the structure of the gross regional product of the Karaganda region, industry dominates: 48.4 %. The share of the manufacturing industry in the total GRP of the region is 31.4 %, mining 13.1 %, electricity, gas, steam and air conditioning 3.2 %, water supply; sewerage system, control over the collection and distribution of waste 0.7 %.

The industrial base of the region is formed by more than 200 enterprises and industries of mining, manufacturing, electricity and water supply.

One of the main priorities of the economy of the Republic of Kazakhstan is developing new jobs. In 2018, there were developed 318.2 thousand jobs. The number of employees increased by 126.5 thousand people and amounted to 6.6 million people. This helped keeping unemployment low at 4.9 %. In 2008 the average monthly nominal wage rose by 8.4 % to 162.3 th. tenge. Real monetary incomes of the population increased by 5.3 %. In 2019, economic activity also showed a progressive growth trend. In general, in the republic, the need for personnel in 2020 amounted to 148,526 people, of which 79,804 people (54 %) have secondary specialized education, 20,732 people (14 %) have higher education, 47 people have professions that do not require special education 990 people (32 %).

According to the data of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, priority sectors were identified with the greatest need for personnel in the context of specialties/ educational programs of Karaganda Technical University (Table 8).

It has been established that the largest number of vacancies has developed in the following industries:

- manufacturing industry - 12,457;
- mining and quarrying - 5,345;
- supply of electricity, gas, steam, hot water and conditioned air – 6,161;
- construction - 5,132.

Table 8 – Number of vacancies and expected demand for workers by the types of economic activities

Total in RK			Akmola region		Aktobe region		Almaty region		Atyrau region		West Kazakhstan region		Zhambyl region		Karaganda region		Kostanai region		Kyzylorda region		Mangistau region		Pavlodar region		North Kazakhstan region		Turkestan region		East Kazakhstan region	
Priority OIIN industries	**Nuber of vacancies (1)**	**Expected demand for workers (2)**	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Mining and quarrying industries	1 982	786	148	-	212	-	x	-	57	501	-	-	25	-	127	56	853	-	113	140	54	1	x	-	-	-	113	68	89	20
Processing industry	5 304	2 313	461	346	135	-	313	114	117	-	155	54	13	11	520	205	536	x	17	x	72	-	841	14	277	145	17	12	434	31
Supply of electricity, gas, steam, hot water and air conditioning	3 015	295	466	-	105	-	45	1	241	94	224	-	-	-	344	-	289	-	12	-	51	-	215	-	232	-	90	-	425	17
Construction	2 129	930	x	-	63	-	109	-	1 070	345	199	x	12	12	94	41	x	-	-	x	-	x	x	13	-	-	62	x	53	x
Passenger rail transport, intercity	582	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-	-	-
Freight rail transport	697	x	28	-	144	-	x	-	24	-	x	-	1	-	10	-	1	-	4	-	-	-	183	-	-	-	-	-	153	-
Other passenger land transport	1 416	156	-	-	53	-	-	-	x	x	x	-	-	-	212	80	-	-	-	-	-	-	130	-	-	-	-	-	-	-
Freight transportation by road and transportation services	220	64	-	-	-	-	-	-	x	-	-	-	-	-	x	59	-	-	-	-	x	-	-	-	-	-	48	-	x	x
Communication	582	231	-	-	17	-	-	-	x	x	29	-	4	-	52	-	56	-	66	-	x	-	42	-	10	-	x	-	95	-
Computer programming, consulting and other related services	260	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Activities in the field of architecture, engineering surveys, technical testing and analysis	257	51	-	-	-	-	-	-	18	-	x	x	x	-	30	x	x	-	-	-	-	-	-	-	-	-	-	-	x	-
Total	**20 324**	**5 668**	**1 131**	**346**	**960**	**0**	**469**	**120**	**1 732**	**961**	**731**	**54**	**56**	**23**	**1 631**	**580**	**1 792**	**0**	**326**	**140**	**177**	**1**	**1 724**	**27**	**519**	**145**	**378**	**80**	**1 429**	**68**

Based on the analysis of vacancies in the Republic of Kazakhstan, it is possible to determine the future demand for personnel with higher and postgraduate education in the context of specialties/educational programs of KTU through the vacancies of specialists in the Karaganda region (Table 9).

Table 9 - The number of vacancies in specialists with higher education in Karaganda and Karaganda region by years, prs.

Name of vacancies	**Number of vacancies at the beginning the the three-year period**		
	2018	**2019**	**2020**
Industry		981	1229
Mining and quarrying industries		137	204
Mining, metallurgical and related technicians	21		
Mining engineers, metallurgists and related professionals	40		
Oil and gas engineers	74		
Oil and gas technicians	9		
Technicians in industry and production	42		
Manufacturing industry		399	562
Power supply, gas supply, steam supply and air conditioning		290	360
Water supply; sewerage system, control over the collection and distribution of waste		155	
Construction		36	75
Civil engineers	110		
Construction technicians	15		
Transport and warehousing		515	501
Land and pipeline transport		-	328
Passenger rail transport, intercity		164	-
Freight rail transport		60	83
Other passenger land transport		247	238
Warehousing and auxiliary transport activities		-	34
Warehousing and storage of cargo			-
Ancillary activities during transportation			34
Freight transportation by road and transportation services		-	-
Information and communication		13	
Communication		13	20
Telecommunications and broadcasting engineers	111		
Computer programming, consulting and other related services			-
Activities of information services			-
Information technology (IT) professionals	354		
Developers and analysts of software and applications	243		
Database and network professionals	111		
Technicians in Science and Technology	687		
Operations with real estate		8	
Operations with real estate		8	
Buying and selling real estate		-	
Professional, scientific and technical activities		110	
Activities in the field of law and accounting		-	-

Activities in the field of architecture, engineering surveys, technical testing and analysis		16	35
Architects, planners, surveyors and designers	187		
Architects of buildings and structures	36		
Urban planners and other designers	76		
Graphic and multimedia designers	6		
Administrative and support services activities			615
Advertising and market research		-	
Specialists-professionals in the field of science and technology	1733		
Meteorologists	59		
Chemists	-		
Geologists, geophysicists and other natural science professionals	70		
Biologists, botanists, zoologists, pharmacologists and related professionals	15		
Environmental professionals	26		
Technical professionals, excluding electrical engineers	888		
Environmental engineers	12		
Mechanical engineers	196		
Chemical engineers	20		
Technical professionals excluding electrical engineers	135		
Electrical engineers	296		
Electrical engineers	137		
Electronics engineers	48		
Surveyors, cartographers and related professionals	66		
Engineering and teaching staff of colleges and other organizations of technical and vocational education (2)	16		
Engineer assistants	111		
Technicians in the field of physical and technical sciences (1)	244		
Technicians in the field of physical and technical sciences (2)	129		
Technicians in the chemical and physical sciences	6		
Environmental technicians	11		
Mechanical technicians	138		
Chemical production technicians	2		
Electrical technicians	84		
TOTAL:	**6564**	**3152**	**4318**

Based on the simulation results, the expected total demand for personnel in the Karaganda region for the period from 2020 to 2025 will be 93,801 specialists, taking into account extrapolation to enterprises and organizations of the district/city administration as a whole, based on the total number of operating enterprises in the district/city administration, as well as the average republican share of economic entities, which, according to the results of a survey by the National Chamber of Entrepreneurs of the Republic of Kazakhstan, expressed the demand for personnel (45 %).

Depending on the districts/city administrations, these indicators vary. In the context of administrative-territorial objects, the largest total demand is noted in the city of Karaganda (29.9 thousand people), Zhezkazgan (13.8 thousand people) and Ulytau district (6.8 thousand people), and the smallest is in the cities of Karazhal (1.3 people), Priozersk (769 people) and Osakarovsky (1.3 thousand people) district.

The Karaganda region is one of the leaders in terms of the expected number of vacancies in the forecast period until 01/01/2026[1], in particular, by industry (Figure 6).

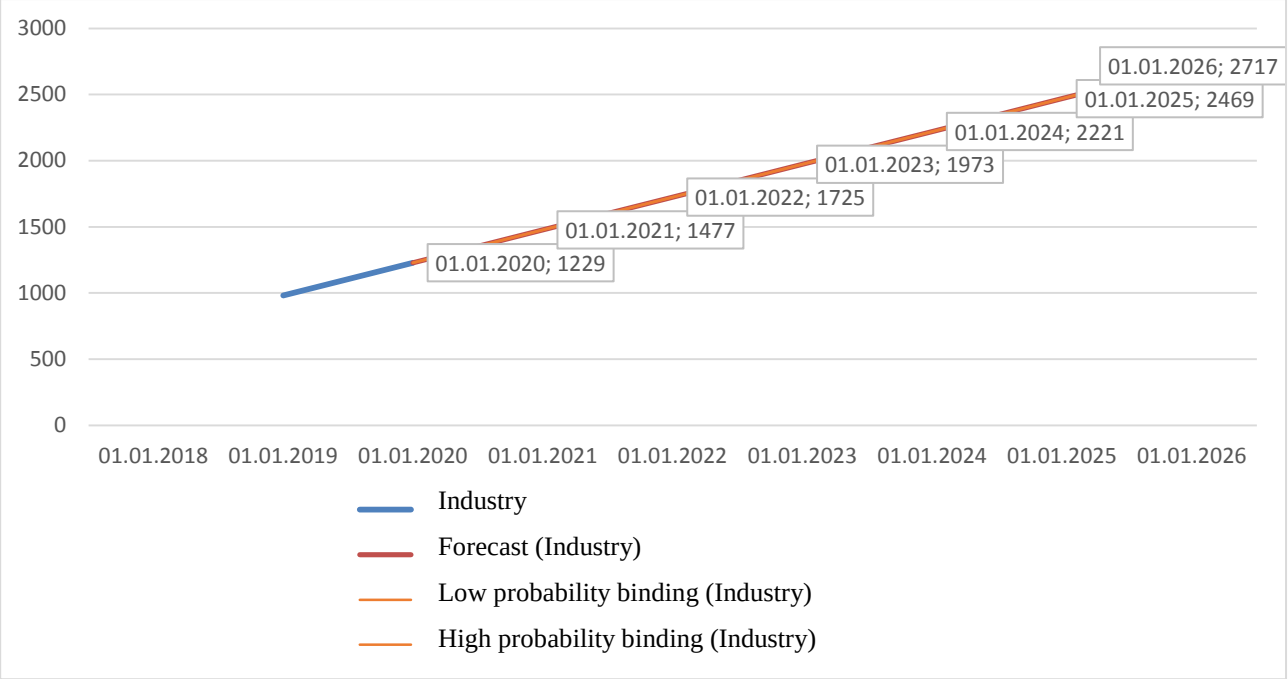

Figure 6 - Forecast of the demand for personnel in the industries of the Karaganda region

Based on the analysis of vacancies in various industries and according to the data of the Labor Development Center JSC of the Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan, the industries with an increased shortage of personnel including those with higher and postgraduate education, in the Karaganda region by 2025 remain as follows:

- manufacturing industry – 31 % (the share of GDP in the structure of the economy of Kazakhstan);
- mining industry – 13 %;
- trade – 13 %;
- other industries – 43 %.

Based on the foregoing, it can be argued that the educational programs of Karaganda Technical University are in demand not only in the region but throughout the country as a whole. This analysis served as the basis for determining the target indicators of the Strategic Plan of NLC "Karaganda Technical University" Development for 2021-2025.

The analysis of the state of the University activities, the assessment of the innovative potential of the team, trends in the development of the labor market and the forecast demand for personnel, as well as priority areas identified in the Strategic Development Plan of the Ministry of Education and Science of the Republic of Kazakhstan for 2020-2024, identified the main categories for carrying out the SWOT-analysis of KTU activities for identification key internal and external factors:

[1] HRDC: annual report on the labour market

1. Ensuring high-quality training of competitive personnel.

2. Modernizing the content of higher and postgraduate education in the context of global trends.

3. Improving management and monitoring of the development of higher and postgraduate education.

4. Digitalization and infrastructure development of higher educational institutions.

5. Developing the intellectual potential of science.

6. Modernizing scientific infrastructure and digitalization of science.

	Strengths	**Weaknesses**
Internal environment	*1. Ensuring high-quality training of competitive personnel* - high places in national and international ratings; - successful completion of specialized accreditation and post-accreditation monitoring of educational programs of higher and postgraduate education; - implementation of cross-cutting educational programs "college-university" and applied bachelor's degree; - development of the Corporate University as an implementation of the social partnership mechanism; - adaptation of educational programs taking into account the needs of students for students with disabilities; - high level of employment of graduates; - orientation of academic policy to the needs of students; - implementation of academic mobility programs, including the positive dynamics of the level of outgoing mobility among students; - providing support for the educational process with electronic training courses posted on the KTU portal; - the current system of encouraging talented youth through financial incentives; - sustainable system of educational work.	*1. Ensuring high-quality training of competitive personnel* - decreasing the quality of the teaching staff, lack of personal motivation for self-development and the introduction of new technologies in teaching; - insufficiently high level of English proficiency of teaching staff and students; - low level of proficiency in methods of teaching technical disciplines in English among teaching staff; - low level of external incoming mobility; - insufficient level of funding for academic mobility programs for teaching staff and students at the expense of the university; - low level of language training of applicants; - insufficient number of operating virtual laboratories.
	2. Modernization of the content of higher and postgraduate education in the context of global trends	*Modernization of the content of higher and postgraduate education in the context of global trends* – low level of participation in

	- expansion of the list of new and innovative educational programs[2]; - updating educational programs in accordance with the requirements of the new economy; - the presence in the curricula of disciplines focused on the development of entrepreneurial skills; - operating centers of international level; - involvement of representatives of large international companies in the educational process; - orientation of educational programs towards Industry 4.0; – functioning of the IT Competence Center.	international educational exhibitions and projects; – formal attitude of employers in the region to the design of competence-oriented educational programs; – insufficient level of digital skills of teaching staff for the development of e-learning content; - insufficient number of joint educational programs and double degree programs.
	3. Improving the management and monitoring of the development of higher and postgraduate education - training, advanced training, re-training of scientific and pedagogical personnel; - advanced training of teaching staff for the training of students with special educational needs; - purposeful formation of a youth personnel reserve from among the teaching staff and employees and advanced training in the field of soft & business skills; - functioning of the "Upgrade Center" for monitoring, analysis and management of the processes of the University activities; - availability of financial incentive mechanisms for teaching staff and employees; - systematic and systematic work for the formation of anti-corruption consciousness of employees and students of the university; – successful implementation of a monitoring system and identification of the most significant compliance risks for the University, prevention of conflicts of interest.	*3. Improving the management and monitoring of the development of higher and postgraduate education* – lack of trilingual staff; – low level of development of the system of advanced training of administrative and auxiliary personnel due to the appropriate postgraduate support; – fixed mindsets of teaching staff and employees: unwillingness to develop, denial of existing problems, lack of orientation towards personal growth; – insufficient level of integration of the unified information system of analytics and monitoring of processes with the current IS of the University.
	4. Digitalization and infrastructure development of higher education institutions - updating and strengthening the material and technical base of the university, including with the	*4. Digitalization and infrastructure development of higher education institutions* – the educational process management system based on LMS Moodle is poorly integrated with other university

[2] n 2021, 4 new and 7 innovative educational programs were developed and included in the Register of Educational Programs

	participation of social partners; - ensuring a safe and comfortable learning environment by creating conditions for inclusive education (ramps, elevator, tactile plates, refurbishment of common areas, installation of personnel call buttons, information boards); - annual renewal of the park of educational equipment and computer equipment[3]; - high level of digitalization of the main processes of the University[4]; – high level of the EP book supply.	information systems; – the library stock is mainly in Russian; – absence of an integrated information security system; - absence of the University mobile applications.
	5. Development of the intellectual potential of science - high level of income from R&D in the total income of the university; - operating scientific laboratories and centers focused on innovation and engineering in industry; - carrying out research and development to solve scientific, technical and production problems of industrial enterprises and business structures on a contractual basis; - increasing the number of monographs and patents, publications in high-ranking journals, increase in the level of citation of publications; - availability of dissertation councils for awarding academic degrees; – involvement of KazMIRD and other institutions, teaching staff of the university in consultations and examinations in specialized subject areas; – availability of scientific schools recognized in the Republic of Kazakhstan and abroad; – stable scientific relations with scientists from near and far abroad; – publications in journals with a high impact factor; – international journal "Material and Mechanical Engineering Technology", which is distributed in Europe and	*5. Development of the intellectual potential of science* – low level of participation of teaching staff in international research projects; – inconsistency of ongoing research with international promising scientific areas for obtaining grants for research and development commissioned by sectoral government bodies and national companies; – absence of direct international research funding; – insufficient number of publications in English; – absence of entrepreneurial and research skills among teaching staff; – insufficient development of commercialization of innovations; – insufficient use of research infrastructure.

[3] In the Public Procurement Plan for 2021, an update of the educational equipment park in the amount of 212 367 809.12 tenge was made; as part of the renewal of the digital infrastructure of the university, the purchase of computers in the amount of 57 383 850 tenge (115 pcs.) was made in the Public procurement Plan for 2021.;

[4] updating of server equipment by 30%; introduction of a software and hardware backup complex; Wi-Fi network of about 500 points in university buildings and dormitories; television broadcasting of programs in university buildings and dormitories; video surveillance in computer classrooms, libraries and dormitories; an educational process management system based on LMS Moodle; an operating software and hardware complex for access control.

	America, Vietnam, China, Japan, Russia, CIS; – focus on the integration of IT with various industries; – availability of 8 postdoctoral programs; – availability of scholarships for young scientists.	
	6. Modernization of scientific infrastructure and digitalization of science - development of material and technical base for research activities[5]; – operation and development of Business Skills Park.	*6. Modernization of scientific infrastructure and digitalization of science* – absence of an electronic database for recording the scientific achievements of the teaching staff and the university as a whole; – low level of information processes in the field of notifying scientists about ongoing competitions for grant and program-targeted funding.
External environment	**Opportunities**	**Threats**
	1. Ensuring high-quality training of competitive personnel - improvement of positions in national and international ratings; - development of new areas of academic mobility, including with far-abroad countries; - cooperation in the formation of a positive image of the university in the international market of educational services; - cooperation with Kazakh and foreign partner universities on library resources; - Increasing income from non-grant programs through student recruitment; - compliance of educational programs of Kazakh universities with international standards and criteria; – increasing the share of foreign students; – development of cooperation with universities included in the TOP-700 of the QS-WUR world ranking; – participation of teaching staff in international educational projects; – attraction of foreign teaching staff and scientists of the TOP universities of the world; – purposeful formation of the student body in accordance with the needs of the region.	*1. Ensuring high-quality training of competitive personnel* – slowdown in internationalization processes due to the COVID-19 pandemic; – dependence on global trends in the market of educational services; – growing competition between universities; – reduction in the number of grants for graduate and doctoral studies; – outflow of applicants to foreign universities; – decreasing the level of incoming academic mobility due to the COVID-19 pandemic; – growing rating of QS-partners; – decrease in the position in the world rankings; – absence of funds and resources for student grants, scientific research and staff development; – imperfection of support systems for digital learning systems.

[5] The Public Procurement Plan for 2021 includes the renewal of the laboratory equipment fleet in the amount of 333,547,945.70 tenge; the renewal of the digital infrastructure of the university in the amount of 213,418,262 tenge.

	2. Modernization of the content of higher and postgraduate education in the context of global trends - development of personnel potential and human resources management system of universities; - development of joint educational programs, including double degree, MBA, DBA with leading world-class universities; - introduction of new educational technologies in the process of training specialists (knowledge transfer); – increasing satisfaction of employers with the level of training of graduates.	*2. Modernization of the content of higher and postgraduate education in the context of global trends* – absence of clear coordination on the part of the republican educational and methodological councils for educational programs aimed at improving the quality of educational programs; – decreasing the level of training of applicants; – development of new and innovative educational programs without taking into account international practice; – training of personnel at all levels of education without taking into account the development of economic sectors in the regions and the Republic of Kazakhstan as a whole; – obsolescence of knowledge in the areas taught; – the current system of personnel training, material and infrastructure resources of universities do not meet the expectations of stakeholders, including employers; – decreased motivation of foreign partners to cooperate; – existing qualification requirements for the qualification levels of specialists do not correspond to new production technologies; – imbalance of labor resources when forecasting the need for personnel in sectors of the economy.
	3. Improvement of management and monitoring of the development of higher and postgraduate education - the University brand development; - development of an alumni association in order to receive help and support from them; - systematic professional development of administrative personnel in the field of development of managerial and communication skills; – increasing the number of employees who speak three languages.	*3. Improvement of management and monitoring of the development of higher and postgraduate education* – absence of clear regulations for information flows along the vertical and horizontal levels of management, which leads to a decrease in the efficiency of information dissemination; – reducing the volume of state financing; – formalism of advanced training of the teaching staff at industrial enterprises of the sectors of the economy.
	4. Digitalization and infrastructure development of higher education institutions - updating the digital material and technical base of the university, including through social partners, government programs;	*4. Digitalization and infrastructure development of higher education institutions* - the growing level of threats to information security in connection with the active digitalization of services and services of the University.

	– mutual provision of access to digital library collections within the framework of partnership agreements with foreign universities.	
	5. Development of the intellectual potential of science - development of joint research with foreign partners; - development of research works in the priority areas of Industry 4.0; - presentation of research results at the international level; - implementation of scientific projects through the conclusion of tripartite agreements (university-scientific organization-business); - increasing the level of citation of publications; - development of existing research laboratories and research centers to the level of consortium research structures to improve the efficiency of implementation and commercialization of scientific results; - increasing the number of partners represented by leading foreign science parks – attraction of new investment partners to the implementation of scientific research.	*5. Development of the intellectual potential of science* – emigration of scientific personnel to realize their scientific potential; – decreasing the level of knowledge and technology transfer; – decreased interest of the labor market in ongoing scientific research; – decreasing the investment income based on the results of innovative and scientific activities; – decreasing the efficiency and effectiveness of scientific research and applied developments offered by universities for real production; – decreased investment attractiveness of the University.
	6. Modernization of scientific infrastructure and digitalization of science - updating the material and technical base of the university, including at the expense of PTS, economic contract and grant financing; – modernization of the university infrastructure in accordance with the tasks of scientific clusters.	*6. Modernization of scientific infrastructure and digitalization of science* – moral obsolescence of laboratory equipment in connection with the development of technologies; – reducing the cost of purchasing laboratory equipment due to the decrease in the financial stability of the university.

Based on the results of the analysis, potential risks and priority areas of activity of KTU have been identified. The results obtained are aimed at developing a Strategic Plan of the University Development, which makes it possible to ensure selecting and implementing strategic trends for the university development in close cooperation with the labor market in order to ensure the quality of training specialists with higher and postgraduate education.

4. VISION

Karaganda Technical University is a world-class innovation and entrepreneurship university that ensures the integration of education, science, innovation, production and business based on the socio-cultural values of modern Kazakhstan.

5. MISSION

Ensuring high quality of innovative engineering education, scientific research and entrepreneurship for sustainable socio-economic development of Central Kazakhstan.

6. STRATEGY OF THE DEVELOPMENT PLAN IMPLEMENTATION

6.1 The University place and role in the system of higher and postgraduate education of Kazakhstan

The high status of the University as a leading scientific and educational center of the Karaganda region is confirmed by the institutional accreditation of the university by the Independent Agency for Accreditation and Rating "IAAR" (certificate No. AA0136 dated 20/12/2018).

In 2019, 68 educational programs were accredited (rating agencies ACQUIN, KAZSEE, IAAR, IQAA), and in 2020, 8 more, which is 92.7% (Table 10).

Table 10 - information on accredited programs in the context of three years

Name of the accreditation agency	Number of accredited EP by year		
	2018	2019	2020
KazSEE	-	11	
IAAR	-	17	
HAOKO	-	15	
ACQUIN	-	7	8
Total	**-**	**68**	**8**

According to the IQAA National Rating in 2020, the university took 2nd place among the best technical universities in Kazakhstan and 2nd place in the nomination "Rating of websites of Kazakhstan universities. In the annual ranking of educational programs according to the IAAR, the university took 1st place in the field of education "Engineering, manufacturing and construction industries" and 3rd place in the General Ranking of universities of the country.

For the first time in its history, Karaganda Technical University entered one of the most prestigious rankings – the QS World University Rankings. In the final ranking table of the TOP 1000 world universities for 2018, the map immediately took a position in the 751+ cluster among more than 4,000 universities from 85 countries of the world. In addition, the university has been occupying a high position in the international rankings given in Table 11 over the past years.

Table 11 - information about the positioning of the KTU in international rankings

Name of the international rating	**2018**	**2019**	**2020**
QS World University Rankings	751+	751+	801+
QS University Rankings: EECA	171	197	197
UI Green Metric: World University Rankings		482	421
RANKPRO: Worldwide Professional University Rankings	577	600+	-
ARES: Academic Ranking of World Universities-European Standard	BBB+	BBB+	BBB+
UNIRANK: World University Rankings	3763	2765	3261
WEBOMETRICS	5835	5574	4706

The University annually participates in national rankings conducted by NCE "Atameken ", IQAA, IAAR. Information on the relevant positions of this rating is

presented in a three-year period (see Table 12).

Table 12 - Information about the KTU positioning in national rankings.

Name of the rating	2018	2019	2020
National IQAA Ranking	3rd place	3rd place	2nd place
NCE "Atameken "	Atameken: 17 specialties in the top ten	Atameken: 16 specialties in the top ten	Atameken: 21 specialties/EP ranked in the top ten
IAAR	46 specialties out of 50 specialties in the top ten	48 specialties out of 50 specialties in the top ten	42 specialties/EP out of 50 specialties in the top ten

For example, in 2020, according to the results of the ranking of NCE "Atameken", 3 bachelor's degree programs ("Mining", "Technological Machines and Equipment", " Professional training ") took first place, 7 bachelor's degree programs ("Transport Construction", "Production of Building Materials, Products and Structures", "Metallurgy", "Mechanical Engineering", "Heat Power Engineering", "Materials Science and Technology of New Materials", "Geology and Exploration of Mineral Deposits") took 2nd place. In general, out of 35 educational programs of Karaganda Technical University, 24 educational programs entered the TOP 10.

NLC "KTU" is a major integrator of scientific and technical knowledge in central Kazakhstan, which has a high educational and investment attractiveness. University activity contribute to the sustainable development of internationally recognized engineering education and research with an emphasis on intercultural interaction.

As a result of the implementation of the goals and objectives of the Strategic Development Plan, Karaganda Technical University will occupy a leading position in the system of higher and postgraduate education in Kazakhstan, whose activities will be based on the following Principles:

1. Continuing education is aimed at the formation of the competencies of future specialists associated with the sustainable development of scientific research and production.

2. Collective responsibility of the subjects of the scientific, industrial and educational process is the training of personnel with *Continuing education* competencies in demand in various sectors of the economy, creative thinking and entrepreneurial skills.

3. Future planning is a consistent assessment of the level of need for engineering and technical personnel, considering the development of economic sectors.

4. Human capital development is the directed, continuous and systematic development of scientific and pedagogical personnel in accordance with the competence structure required for an innovative economy.

5. Guaranteed demand – training of personnel aimed at meeting the needs of the labor market.

6. Corporate governance is the implementation of a fundamentally new policy of educational organizations regarding the division of powers and the

determination of the total responsibility of all participants in the educational process.

7. Modernization of the educational and production environment – purposeful bringing of the existing educational, scientific laboratories, information resources of the organization of education in accordance with the basic needs of production.

6.2 Academic policy

The academic policy of the University is a system of measures, rules and procedures for planning and managing educational activities and effective organization of the educational process aimed at improving the quality of education and the implementation of student-centered learning. Its development is based on normative legal acts regulating the activities of organizations of higher and postgraduate education.

The content of the Academic Policy regulates such processes as the Organization of educational process, Conducting ongoing monitoring of academic performance, Conducting boundary control of academic performance, Conducting midterm assessment, Transfer of the student to the next course, Organization of training for the study of additional disciplines, elimination of academic debt and academic difference, Transfer of disciplines studied in other educational institutions according to other educational programs, Criteria for assessing students' knowledge, Choosing an educational trajectory by students, Registration to attend training sessions, Research (experimental research) work of students, Independent work of students, Research (experimental research) work of students, Organization and internship, Organization and conduct of the state exam on the Modern history of Kazakhstan, Academic mobility of students, Qualification E\examination of undergraduate students, Qualification examination of students in master's and doctoral studies, Registration of the history of educational achievements of students, Transfer and restoration of students, Provision of academic leave to students, Expulsion of students from the university, The procedure for awarding vacant educational grants released in the process of obtaining higher and postgraduate education, Procedure for payment of state scholarships, Tuition fees.

The sections contain all the necessary information both for students and for the teaching staff, which allows you to quickly find answers to questions related to the educational process at the University.

The Regulation on Academic Policy was approved by the decision of the Academic Council (Minutes No. 5 of December 26, 2018).

The content of the Academic Policy is amended in accordance with the newly adopted or when amendments are made to the existing regulatory legal acts regulating the educational activities of the University.

In 2020, changes were made to the organization of the educational process in connection with the pandemic (Covid 19) - training using distance learning technologies (DLT), organization of an examination session, final certification in online format.

6.3 Innovative potential development and its achievement

The innovative potential of the KTU consists of significant own and integrated human, material, technical and intangible resources, including:

– a large contingent of students with a share of undergraduates and doctoral students;

– a highly qualified teaching staff;

– recognized scientific schools;

– the modern scientific and educational infrastructure of the university and the educational and production facilities of the consortium "Corporate University";

– the digital educational and scientific ecosystem, its licensed software;

– educational programs and scientific projects that are in demand by production.

For example, in 2018 and 2019, the university was aimed at implementing the following priority research areas:

1. Rational use of natural resources, including water resources, geology, processing, new materials and technologies, safe products and structures;

2. Power engineering and mechanical engineering;

3. Information, telecommunication and space technologies, scientific research in the field of natural sciences;

4. Life and Health Sciences;

5. Scientific foundations of "Mangilik el" (education of the XXI century, fundamental and applied research in the field of humanities);

6. Sustainable development of the agroindustrial complex and safety of agricultural products;

7. National security and defense, without the "secret" stamp.

With the change in the priority scientific directions of the Republic of Kazakhstan in 2020, the range of scientific activities of the University was expanded to:

1. Power engineering and mechanical engineering;

2. Rational use of water resources, flora and fauna, ecology;

3. Geology, extraction and processing of mineral and hydrocarbon raw materials, new materials, technology, safe products and structures;

4. Information, communication and space technologies;

5. Sustainable development of the agroindustrial complex and safety of agricultural products;

6. Life and health science;

7. Research in the field of social sciences and humanities;

8. Research in the field of education and science;

9. National security and defense;

10. Scientific research in the field of natural sciences.

In 2021, research in the field of technological modernization and digitalization of science and production will be in the trend, the following areas of research are expected in the priorities of the development of the region and the university:

1. Advanced technologies of prospecting, extraction, transportation and processing of mineral and hydrocarbon raw materials;

2. Advanced technologies in the mining and metallurgical complex;
3. Advanced technologies in the agroindustrial complex, food industry and agrochemistry;
4. Advanced technologies in the pharmaceutical industry, medical industry, biotechnology, bioengineering, genetic engineering;
5. Advanced technologies of chemistry and petrochemistry;
6. Advanced engineering technologies, including the use of new materials;
7. Alternative energy, renewable energy sources;
8. Energy efficiency technologies;
9. Infocommunication technologies;
10. Advanced technologies in light industry;
11. Advanced technologies in the furniture and woodworking industry;
12. Advanced technologies in construction, including the use of new materials;
13. Advanced technologies in the packaging industry;
14. Robotics;
15. Nano- and space technologies;
16. Power engineering.

In order to further develop the innovative potential, Karaganda Technical University plans to:

– strengthen the connection of science with production on the basis of the innovation and educational consortium "Corporate University" functioning on the basis of the university;

– develop scientific infrastructure and collaboration with leading scientific centers of the world in the framework of joint research;

– allocate university grants for the research of young scientists, as well as for the continuation of research in postdoctoral studies;

– develop a digital educational and scientific ecosystem;

– increase the publication activity based on research results and the citation of highly rated publications;

– modernize the existing and purchase new educational and laboratory equipment, licensed software;

– increase the share of undergraduates and doctoral students in the total contingent of students;

– increase the share of teaching staff, students, undergraduates and doctoral students actively involved in R&D.

6.4 Commercialization of scientific-technical developments

The activities of the commercialization office are aimed at the formation of the entrepreneurial orientation of the KTU. University scientists take an active part in competitions of state budget financing and JSC "Science Foundation".

The share of commercialized projects since 2018, one project has been implemented through a grant from JSC "Science Foundation" for commercialization for a total amount of funding of 170.0 million tenge.

In 2020, the KTU Commercialization Office completed the implementation of

the grant of Technology Transfer/Commercialization Offices in the amount of 116,330,000 tenge. The grant is aimed at increasing the potential and strengthening the institutional capabilities of the university.

The university has created the Enactus KTU team and the KTU business Club with the involvement of business practitioners who serve to develop an entrepreneurial culture among students. The Rector's Office supports the Enactus team. Meetings with participants are held, projects that will be implemented by our students and presented at the "National Competition of the Enactus-Kazakhstan program" are discussed.

In 2018, the Enactus KSTU team became a semi-finalist of the National Student Entrepreneurship Cup. In 2019, one of the projects of the Enactus KSTU team took second place.

In order to support youth initiatives in the creation of new startups, a business incubator Business skills park has also been created at the University. At the moment, new equipment and equipment is being equipped.

In order to develop this direction, it is necessary:

– to ensure the participation of scientists and University staff in competitions aimed at creating new companies for the provision of high-tech services and the production of goods, the commercialization of RSSTA;

– to carry out active work together with JSC "Science Foundation" to find and attract private investors to provide financing or co-financing of projects within the framework of the competition;

– to prepare projects for participation in competitions of JSC "Science Foundation" for grant financing of scientific projects for the purpose of their commercialization;

– to organize the interaction of the Enactus KTU team with student groups;

– to participate in various development programs.

7. WAYS OF ACHIEVING THE PURPOSE OF THE DEVELOPMENT PLAN

Based on the analysis of the current situation, the goal set in the Strategic Development Plan of KTU will be achieved by implementing the following tasks:

Task 1. *Ensuring a high level of personnel training for the economy of the future, taking into account the development of digital technologies with competencies in demand in various sectors of the economy, creative thinking and entrepreneurial skills*

– annual updating of existing, design of new and innovative educational programs, evaluation of learning outcomes based on professional standards;

– involvement of regional employers and foreign partners in the development of educational programs on an ongoing basis;

– attracting foreign scientists for consultations on the development of curricula within the framework of partnership agreements;

– implementation of multilingual education with a focus on intercultural and collaborative communication;

– introduction of new educational technologies in the process of training specialists through the integration of training with scientific research and production;

– provision of additional education and development of additional digital qualifications;

– using the production capabilities of partner enterprises to organize practice-oriented and creative training;

– conducting a survey of employers in the framework of related industries focused on obtaining new professions;

– development of Business Skills Pak as a means of forming competencies for small and medium-sized businesses;

– application of the international practice of creating a postgraduate support group and postgraduate training programs;

– active involvement of existing foreign partners in academic mobility programs;

– ensuring the university's permanent presence and presentation on the international arena through participation in international educational events to increase the reputation and recognition of the university;

– development of a methodology for language training of university staff and students as a condition for the development of key methodological competencies for teaching and learning in English;

– development of programs for the organization of academic mobility of students, funded by extra-budgetary funds and funds of the university;

– attracting and supporting international students;

– improvement of the library system in order to increase the availability of available resources for students;

– participation in international exchange programs following the example of

Erasmus+, DAAD and Fullbright.

Task 2. *Ensuring succession and continuity of training aimed at creating equal conditions for quality education of all categories of students, in accordance with the needs of the economy and taking into account modern achievements of science and industry*

– development and implementation of new educational programs focused on the needs of regional labor markets, as part of the integration of training with scientific research and production;

– development of the material and technical base and strengthening ties with production;

– development of educational programs based on Worldskills Kazakhstan standards;

– provision of additional education and development of additional digital qualifications;

– corporate training of enterprise specialists in the communicative and technical skills of the profession in accordance with the concept of lifelong learning;

– carrying out activities to strengthen the brand of the university in order to attract promising young people to study;

– strengthening ties with technical and vocational education organizations;

– development of the system of early profiling and professional orientation of students;

– activation of the work of the Centers of Working Professions of the University to provide educational services to the population, including through the Employment Center;

– development of a plan for the organization of psychological and pedagogical support of inclusive education at the university;

– advanced training of teaching staff and administrative staff of the university to work with students with special educational needs (hereinafter - SEN) and disabilities;

– improving the system of material and technical support for inclusive education;

– improvement of educational and methodological support for the organization of training of students with SEN and disabilities, including distance learning;

– improvement of individualized forms of control and evaluation of educational achievements of students with disabilities, adapted to their capabilities;

– introduction of adaptive (for students with SEN and disabilities) academic disciplines into the university's educational programs;

– organization of measures to increase the level of tolerance of the socio-cultural environment;

– providing volunteer assistance to students with SEN and disabilities.

Task 3. *Formation of an effective holistic system of assessment of the quality of education at the University in the context of its further recognition at the world and national levels*

– conducting a survey of stakeholders on the most popular competencies of

specialists;

– organization of internships of the teaching staff at the enterprises of the region in order to study new production technologies;

– involvement of labor market representatives in the design of competence-oriented educational programs;

– involvement of leading specialists of enterprises and organizations of the Corporate University in the educational process of the university;

– development of a set of measures to improve the quality of theses and master's theses;

– assistance in the procedure of independent certification of engineers (university graduates) at the KazSEE International Certification Center, the European Federation of National Engineering Associations (FEANI): assistance in obtaining the "European Engineer Passport" EngineerING Card; registration of engineering specialties in FEANI;

– identification of key competencies of future engineers to work in international companies, training of future technical specialists to study in other countries and with the necessary foreign language and educational horizons;

– expanding the list of foreign partners;

– search for new programs and grants for the mobility of teaching staff.

***Task 4**. Continuous and systematic development of the University's scientific and pedagogical staff in accordance with the competence structure required for the innovative economy*

– development of professional development programs in key areas of the innovative economy in the short and long term with the use of new forms and methods of conducting;

– organization of trainings for teaching staff and personnel reserve on anti-corruption culture, academic leadership and effective management in education and science with the involvement of foreign specialists on the principle of "Life-long learning";

– organization of advanced training courses for teaching staff on digital learning technologies and educational process management with the participation of foreign trainers;

– professional development of the teaching staff and scientists on the development of linguistic and cross-cultural competencies;

– conducting trainings for teaching staff on corporate culture with a focus on the implementation of the principles of team building, collaboration and the connection of corporate culture with the results of work;

– creation of networking for the implementation of cooperation between teaching staff and foreign professors for self-improvement of professional qualities of a teacher and a scientist;

– search for new areas of cooperation within the educational activities of the university, as well as for the provision of specialized services on the basis of existing institutes of the university;

– search for new programs and competitions to finance collaborative initiatives;

– improving the mechanisms for organizing internships of teaching staff at

industrial enterprises;

– organization of interaction with employers in the development of a mechanism for professional development, including an integrated entrepreneurial culture of scientific and pedagogical workers;

– expanding the list of postdoctoral programs, including through the introduction of minor programs;

– improvement of the incentive system for teaching staff and employees based on the results of scientific, educational, methodological, innovative and entrepreneurial activities.

Task 5. *Development of the intellectual potential of science, increasing the demand for scientific developments and integration of scientific research into the world scientific space*

– increasing the number of partnership agreements in the field of science and innovation with universities abroad;

– attracting foreign partners to joint research activities and commercialization of the results obtained by organizing an open dialogue platform;

– creation of a network digital library of scientific resources together with foreign partners;

– development of a system of incentives for teaching staff and scientists to expand international cooperation and form a network of international collaborators;

– stimulating entrepreneurial activity of teaching staff and students, including for participation in projects to find sponsors for the implementation of start-ups;

– identification of priority areas of scientific research in order to purchase laboratory equipment conforming to international standards;

– strengthening of communication with regional and republican industrial enterprises to identify the need for scientific research and execution of business contracts by order of enterprises, provision of consulting services.

Task 6. *Implementation of a set of measures to develop a sense of patriotism, high moral and leadership qualities among students, involving them in strengthening the spiritual and moral values of the National Patriotic Idea "Mangilik El" and the culture of a healthy lifestyle*

– activation of the work of the "Rukhani Zhangyru" project office on the development of activities and the search for new ways to implement the program in the university's cancers;

– involvement of students in clubs and circles of the university;

– development of mechanisms to support creative and sports initiatives at the expense of the endowment fund;

– actualization of the Model of patriotic education "Formation of a New Kazakhstan Patriotism";

– improving the efficiency of student self-government;

– development of the debate movement;

– conducting seminars and trainings on the development of students' leadership qualities;

– development of volunteer and charity programs;

– development of the Alumni Association;

– conducting anti-corruption activities among students with the involvement of law enforcement officials;

– carrying out activities in the field of information and propaganda work in the field of healthy lifestyle formation;

– development of new programs of charitable targeted assistance to disabled students, orphaned students and students left without parental care.

Task 7*. Ensuring increased transparency and efficiency of the University's management and financing system*

– smooth diversification of university funding;

– creation of an endowment fund and development of effective mechanisms for its functioning;

– ensuring the participation of university executives in domestic and foreign advanced training courses in the field of management;

– development of a set of active measures aimed at team building and the formation of skills for solving common tasks in a team [6];

– formation of a high level of anti-corruption culture;

– involvement of active students in the system of collegial management of the university;

– improving the process of digitalization of academic and research activities of the university.

Task 8. *Improving the material and technical base of the University, ensuring a safe and comfortable learning environment, modernization and digitalization of scientific and educational infrastructure, reducing the shortage of places in dormitories*

– ensuring a safe and comfortable learning environment by creating conditions for inclusive education: installation of elevators, provision of buildings with ramps, re-equipment of common areas in accordance with the needs of students with disabilities, installation of staff call buttons and information signs, installation of tactile plates in buildings;

– replenishment of the information environment of the university with modern personal computers, laboratory equipment, educational and methodical literature in accordance with modern requirements;

– implementation of measures to improve video monitoring systems and access control system;

– formation of the digital ecosystem of education. Creation of an interactive online map of the university with the provision of information about the university, including a virtual scientific laboratory, the results of the analysis of their resource availability and effectiveness;

– development of the university infrastructure, including the repair of buildings and dormitories;

– updating the material and technical base of the university, including at the

[6] Teambuilding

expense of social partners, income from RW and contractual activities.

8. EXPECTED RESULTS

As a result of the implementation of the proposed measures, the share of educational programs developed on the basis of industry qualifications frameworks and professional standards in accordance with the needs of the new economy will increase, which will ensure guaranteed employment and recognition of the qualifications of future specialists due to the compliance of the level of training of graduates to conduct professional activities. In particular, special emphasis will be placed on the development of "soft" skills and the formation of a willingness to flexibly respond to changing labor market conditions and the requirements of the new economy.

The results of the implementation of the target indicators will be an increase in the number of enterprises of the Corporate University participating in on-the-job training programs, as well as providing the needs of the region with highly qualified specialists through flexible retraining programs.

A database of educational courses will be formed, including digital ones, which are in demand at the industrial enterprises of the region.

The list of applied bachelor's degree programs focused on the needs of the region will be expanded, which will ensure the continuity of the chosen educational trajectory.

An increase in the level of preparation of applicants for admission to engineering educational programs will be provided by opening engineering classes in schools, lyceums and gymnasiums of the city for the purpose of early profiling.

The originality and level of completion of theses and the scientific value of master's theses will be increased.

As a result of the events, a sustainable research ecosystem will be formed, the quality of scientific research and the level of commercialization of results will increase, which will ensure the growth of income from research and innovation activities.

The citation level of publications will increase. The share of faculty participation in international seminars, conferences, forums will be increased, which will expand the network of international partners in the field of science and innovation to strengthen the image of the university in the global scientific space.

Focusing on priority areas of scientific research will have a positive impact on increasing the share of R&D commissioned by enterprises, the number of start-up projects of teaching staff and students, and will entail updating the database of laboratory equipment, including at the expense of partners.

A network digital library with partner universities will be created.

The number of employees with a PhD degree among the teaching staff and administrative and managerial staff will be increased.

The events held will strengthen the international brand of the university, expand international relations, ensure an increase in the share of foreign students from the total number, which will strengthen the university's position in international rankings.

The quality of technical education will be improved in accordance with international standards and the formation of an integral system of compliance of

students' professional competencies with international standards will be ensured.

The number of students enrolled in external incoming mobility programs will increase. The percentage of external outgoing mobility will increase, including through university funding.

The number of foreign scientists involved in conducting classes at the university will be increased both remotely and in the traditional format.

Comfortable conditions will be created in KTU for the education of students with SEN and disabilities, which will contribute to increasing the coverage of persons with special educational needs with higher and postgraduate education and the development of tolerance among the student contingent.

A wide coverage of students will be provided with activities within the framework of the program "Rukhani Zhangyru".

There will be an increase in the number of winners and prize-winners of scientific, creative and sports events, active participation of young people in charity events and the volunteer movement.

Work will continue on the prevention of corruption manifestations, the formation of high moral qualities among students, a sense of patriotism and respect for their native country, a healthy lifestyle culture, environmental culture.

The number of students with organizational skills and leadership qualities, formed corporate culture, commitment to the values of the university and feeling proud of alma mater will increase.

The complex of implemented measures will create a comfortable and safe environment, ensure free movement on the university campus for students with SEN and disabilities.

The modernization of access control and management systems, guaranteed power supply will be carried out and the information security system of KTU will be implemented, aimed at the smooth functioning of the university's digital campus.

An effective scientific infrastructure of the university will be created that meets modern requirements. Conditions will be created for the application of new technologies, obtaining new knowledge from the implementation of joint projects with international scientific foundations and leading universities of foreign countries.

The material and technical base of the university will continue to be developed taking into account global trends and the needs of the national economy to ensure a high level of provision of educational, research and consulting services.

The implementation of the proposed measures will allow achieving a high level of development of the university's human resources potential by modernizing the existing system of the concept of advanced training of teaching staff, increasing entrepreneurial activity and collaborative communication, as well as updating the digital competencies of teaching staff.

The quality of teaching will be improved, the process of introducing new pedagogical teaching technologies will be launched by improving the pedagogical skills of teaching staff.

The level of intercultural communication between teaching staff and scientists will be increased to present the results of scientific research at the international level with an increase in publication activity.

The strengthening of ties with regional industries and the improvement of the quality of education will continue due to the compliance of the disciplines taught with

modern production requirements;

The development of the university's brand at the national and global levels will be ensured, the efficiency of corporate governance of the university will be improved through the development of professional development programs for heads of structural divisions and teaching staff in the field of implementing the principles of collective collaboration and anti-corruption culture.

The university's revenues will grow due to changes in existing and the emergence of new sources of funding, including the endowment fund.

A program to support student initiatives in the management of the educational process will be implemented.

9. IMPLEMENTATION OF THE STRATEGIC DEVELOPMENT PLAN

9.1 STRATEGIC TREND 1: TRAINING PERSONNEL FOR THE FUTURE ECONOMY

The goal of Strategic Trend 1: Training of highly qualified specialists with in-demand competencies in accordance with international standards for scientific and technological breakthrough in the region.

Tasks and target indicators

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
1. *Ensuring a high level of personnel training for the economy of the future, taking into account the development of digital technologies with competencies in demand in various sectors of the economy, creative thinking and entrepreneurial skills*							
1	Share of grants at the expense of LEA funds, employers	%	0,09	0,12	0,15	0,18	0,18
2	The share of employers and business structures involved in the educational process	%	-	5	7	8	9
3	The share of implemented and updated EP from the total number of EP	%	-	80	85	90	95
4	The share of educational programs of higher and postgraduate education implemented in three languages	%	40	45	50	60	70
5	The share of innovative educational programs developed by order of industry associations and enterprises	%	85	95	97	98	98
6	The proportion of students covered by the elements of dual education	%	40	50	55	60	70
7	The share of educational programs aimed at developing students' entrepreneurial skills	%	85	90	100	100	100
8	The number of EP implemented using remote technologies	unit	75	80	85	92	95
9	The share of EP implemented using remote technologies	%	-	100	100	100	100
10	The increase in the number of electronic resources introduced into the educational process	%	-	5,7	7,4	8,5	8,5
11	The share of disciplines in which online courses have been developed	%	80	85	90	95	95
12	The proportion of students	%	40	50	55	60	70

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
	covered by the elements of dual education						
2. Ensuring succession and continuity of training aimed at creating equal conditions for quality education of all categories of students, in accordance with the needs of the economy and taking into account modern achievements of science and industry							
1	Training of specialists with higher and postgraduate education	ppl.	9046	9148	9258	9356	9356
2	Admission to the 1st year, bachelor's degree, total	ppl.	2180	2260	2348	2426	2426
3	Admission to the 1st year, bachelor's degree, state order	ppl.	1242	1267	1311	1356	1356
4	Admission to the 1st year, bachelor's degree, contract	ppl.	938	993	1037	1070	1070
5	Admission to the 1st year, master's degree, total	ppl.	283	303	323	343	343
6	Admission to the 1st year, master's degree, state order	ppl.	253	268	283	298	298
7	Admission to the 1st year, master's degree, contract	ppl.	30	35	40	45	45
8	Admission to the 1st year, doctoral studies, total	ppl.	46	51	56	61	61
9	Admission to the 1st year, doctoral studies, state order	ppl.	46	51	56	61	61
10	Number of undergraduate students, total	ppl.	8239	8319	8407	8485	8485
11	Number of full-time undergraduate students, state order	ppl.	4831	4856	4900	4945	4945
12	Number of full-time undergraduate students, contract	ppl.	3408	3463	3507	3540	3540
13	Number of undergraduates, total	ppl.	667	684	701	716	716
14	Number of undergraduates, state order	ppl.	592	607	622	637	637
15	Number of undergraduates, contract	ppl.	75	77	79	81	81
16	Number of doctoral students, total	ppl.	140	145	150	155	155
17	Number of doctoral students, state order	ppl.	140	145	150	155	155
18	Number of winners and prize-winners of scientific, creative and sports events	ppl.	115	125	135	145	145
19	The share of those who entered the university with the signs "Altyn Belgi", winners of international Olympiads and competitions of scientific projects of the last three years,	%	1,7	2,0	2,1	2,3	2,5

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
	winners of the presidential, republican Olympiads and competitions of scientific projects of the current academic year (awarded with diplomas of 1, 2, 3 degrees) from their total number						
20	The number of students studying at the expense of employers	ppl.	270	275	280	285	285
21	The proportion of students studying in English from the total number of students	%	0,07	0,1	0,15	0,2	0,2
22	The share of students studying within the framework of multilingualism, of the total number of students	%	40	50	60	70	80
23	Training of specialists with technical and vocational education (college)	ppl.	620	620	620	620	620
24	Number of students, contract (college)	ppl.	620	620	620	620	620
25	Admission to the 1st year, contract (college)	ppl.	150	150	150	150	150
26	Number of trainees who have completed advanced training courses	ppl.	1100	1100	1100	1100	1100
27	The share of graduates who have been trained in scientific and educational laboratories from the total number of graduates	%	-	57	72	84	84
28	The number of end-to-end educational programs of applied bachelor's degree, focused on the formation of flexible and professional skills (soft skills, hard skills)	unit	4	5	6	7	9
29	The number of engineering classes opened by the University in schools, lyceums and gymnasiums of the city for the purpose of early profiling	unit	5	7	10	12	15
30	Other additional educational services	ppl.	1100	1100	1100	1100	1100
3. Formation of an effective holistic system of assessment of the quality of education at the University in the context of its further recognition at the world and national levels							
1	Composite index of satisfaction with educational programs of higher and postgraduate education of the university	%	60	70	80	85	90

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
	according to the results of a sociological survey						
2	Improving the positions of educational programs in the rating of NCE "Atameken"	%	10	15	20	25	30
3	The share of employed graduates in the first year after graduation (from the total number of graduates)	%	73	74	75	76	77
4	The share of employed graduates in the first year after graduation according to the state educational order	%	-	75	76	77	78
5	The ratio of the average salary of a university graduate to the average monthly salary in the Republic of Kazakhstan (according to official data stat.gov.kz)		0,57	0,58	0,59	0,61	0,61
6	Reduction of the proportion of repeated inspections of evaluated works (diploma projects/works, master's projects/works) of students for the presence of plagiarism	%	5	8	10	15	20

9.2 STRATEGIC TREND 2: FORMING A SUSTAINABLE RESEARCH ECOSYSTEM

The goal of Strategic Trend 2: Improving the quality of scientific developments for the implementation of research results in the real sector of the economy and the expansion of international collaborations.

Tasks and target indicators

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
5. Development of the intellectual potential of science, increasing the demand for scientific developments and integration of scientific research into the world scientific space							
1	RW services (research work)	unit	82	82	82	82	82
2	The amount of RW income from the total income of the university	%	-	10,98	11,5	12,0	12,0
3	The number of young scientists who have received a university grant for research activities	ppl.	3	5	7	9	10
4	The proportion of young scientists who have received a university grant for research activities	%	-	3,5	4,5	5,5	5,5
5	The share of young researchers involved	%	-	5,1	6,6	7,4	7,4
6	The share of attracted foreign scientists with a high h-index	%	-	0,15	0,30	0,50	0,50
7	Number of patents obtained by university scientists	amt.	59	62	65	67	69
8	Growth of publications in rating publications from the total number of publications over the past three years	%	7,2	7,6	8,0	8,2	8,2
9	The citation level of publications based on the Web of Science Core Collection (Clarivate Analytics) of the total number of publications	%	53	54	57	59	63
10	Number of post-doctoral programs implemented	amt.	1	1	1	1	1
11	Share of implemented post-doctoral programs	%	-	100	100	100	100
12	The share of projects funded by LEA and business representatives	%	-	72	72	72	72
13	Number of student experimental design bureaus	unit	2	3	4	5	5
14	The number of startup projects implemented by employees studying at the university	unit	3	5	7	10	11
15	The share of startup projects implemented by employees studying at the university	%	-	20	25	30	32

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
16	The number of funded educational and research projects carried out on the basis of the university	amt.	16	17	18	19	20
17	The share of funded educational and research projects carried out on the basis of the university	%	-	28	30	33	35
18	Share of research conducted using a digital platform	%	-	52	55	57	57
19	The share of income received from scientific activities, innovative developments and commercialized projects from the total budget of the university	%	11	13	15	17	17

9.3 STRATEGIC TREND 3: UNIVERSITY INTERNATIONALIZATION

The goal of Strategic Trend 3: Development and implementation of a model for the development of the internationalization potential of KTU for the implementation of sustainable and feasible strategies for the internationalization of the educational process of training technical specialists, taking into account the national and international context.

Tasks and target indicators

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
1. Ensuring a high level of personnel training for the economy of the future, taking into account the development of digital technologies with competencies in demand in various sectors of the economy, creative thinking and entrepreneurial skills							
1	The share of foreign students in the higher education system of the total number of students	%	4,2	4,4	4,6	4,8	4,8
2	Number of students enrolled in academic mobility	ppl.	65	75	85	100	110
3	The share of students studying within the framework of academic mobility funded by the university, of the total number of students	%	0,15	0,17	0,19	0,21	0,23
4	The number of EP implemented in the educational process in English	unit	7	8	9	10	11
5	The number of educational programs within the framework of double-degree education with partner universities from among the top 700 of the QS rating	unit	2	3	4	5	6
6	The share of educational programs in the framework of double-degree education with partner universities from among the top 700 of the QS rating	%	-	2,25	3,0	3,7	3,7
3. Formation of an effective holistic system of assessment of the quality of education at the University in the context of its further recognition at the world and national levels							
1	The university's place in the international QS WUR rating		801+	801+	801+	801+	801+
2	The university's place in the international ranking of QS EECA		180	180	180	180	180
3	The university's place in the international Webometrics ranking		4707	4707	4707	4707	4707
4	Number of branches of the university abroad (including joint branches with other universities of the Republic of Kazakhstan)	unit	1	1	1	1	1
5	The share of attracted teaching	%	0,5	0,6	0,7	0,8	1,0

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
	staff and top managers from abroad from the total number of teaching staff						
6	The share of educational programs that have passed international accreditation in agencies that are full members of international European networks for ensuring the quality of education and are included in the register of the authorized body in the field of education	%	80	85	90	95	100
7	Количество международных научных и образовательных проектов	unit	2	3	5	7	9
8	The share of implemented international scientific projects from the total number of projects	%	-	0,10	0,12	0,15	0,17

9.4 STRATEGIC TREND 4: SOCIAL DEVELOPMENT

The goal of Strategic Trend 4: Sustainable development of spiritual and moral values and leadership qualities among young people.

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
2. Ensuring succession and continuity of training aimed at creating equal conditions for quality education of all categories of students, in accordance with the needs of the economy and taking into account modern achievements of science and industry							
1	The share of students with special educational needs from their total number	%	0,1	0,15	0,2	0,25	0,3
2	The level of provision of conditions for students with special educational needs (curricula, elevators, ramps, handrails)	amt.	3	4	5	6	7
6. Implementation of a set of measures to develop a sense of patriotism, high moral and leadership qualities among students, involving them in strengthening the spiritual and moral values of the National Patriotic Idea "Mangilik El" and the culture of a healthy lifestyle							
1	The increase in the number of events within the framework of the "Rukhani Zhangyru" program from their total number	%	12	15	17	20	25
2	The increase of students involved in the youth patriotic club "Otan" from their total number	%	15	20	25	30	35
3	The proportion of students, undergraduates and doctoral students who possess organizational skills and leadership qualities within the framework of the implementation of the program "Personnel Policy"	%	18	20	22	25	27
4	The share of students engaged in volunteer activities from the total number of students enrolled in bachelor's degree programs	%	2,0	2,4	2,7	3,0	3,2
5	The proportion of students taking an active part in the public life of the university, district, city	%	80	83	87	90	91
6	For students from the total number of university students involved in the activities of student organizations, student clubs, youth affairs committees	%	50	53	57	60	63

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
7	The increase in the number of students involved in the activities of the student charity movement "Akniet" to support children from orphanages and boarding schools, from their total number	%	20	25	27	30	32
8	The increase in funding for charitable targeted assistance to disabled students, orphaned students and students left without parental care, relative to the amount of funding in this area	%	20	25	30	35	40
9	The increase in the number of winners and prize-winners of scientific, creative and sports events from their total number	%	12	15	17	20	23
10	The number of anti-corruption activities among students ("Clean session", "No plagiarism", "No corruption", "School of Integrity", "Academic integrity") with the involvement of volunteers of the project "Accelerators of good"	unit	4	7	9	12	15

9.5 STRATEGIC TREND 5: INFRASTRUCTURE AND DIGITALIZATION

The goal of Strategic Trend 5: Infrastructure development, strengthening and improvement of the material and technical base of the University, digitalization of scientific and educational activities aimed at improving the quality of educational, research and consulting services.

Tasks and target indicators

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
8. Improving the material and technical base of the University, ensuring a safe and comfortable learning environment, modernization and digitalization of scientific and educational infrastructure, reducing the shortage of places in dormitories							
1	The volume of attracted investments for the development of the university from the total income of the university	%	8,03	8,57	8,87	9,0	9,1
2	Increase in funding for digitalization of all types of University activities	%	25	30	35	40	43
3	The share of expenses for the development of educational laboratories from the total budget of the university	%	3,2	3,5	3,7	4,0	4,0
4	The share of laboratory development costs from the total budget of the university	%	5,1	5,3	5,5	5,7	5,7
5	The share of expenses for the development of educational and scientific laboratories from the total budget of the university	%	-	8,8	9,2	9,7	9,7
6	Number of implemented virtual laboratories	unit	2	2	3	4	5
7	Availability of the online educational portal of the university		1	1	1	1	1
8	Availability of an information system for distance education		1	1	1	1	1
9	The number of online portals created, including on the principle of "one window"	unit	1	1	1	1	1
10	Number of information systems for determining borrowing in order to implement the principles of academic integrity of the	unit	1	1	1	1	1

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
	university (availability of an agreement)						
11	The number of proctoring systems to ensure the interim and final certification	unit	1	1	1	1	1
12	Availability of an electronic document management system		1	1	1	1	1
13	The share of updated certified scientific equipment of the university	%	13,5	13,7	14,0	14,3	14,3
14	Number of beds created for nonresident students	unit	1504	1504	1504	1504	1504

9.6 STRATEGIC TREND 6: EFFECTIVE MANAGEMENT AND CORPORATE CULTURE

Goal of Strategic Trend 6: Formation of an effective management system of the university's activities, development of human resources and achievement of a high level of corporate culture.

Tasks and target indicators

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
4. Continuous and systematic development of the University's scientific and pedagogical staff in accordance with the competence structure required for the innovative economy							
1	The share of doctors and candidates of sciences, PhD doctors from the total number of teaching staff in the context of educational programs	%	51	53	55	57	60
2	Number of teaching staff with academic degrees of Doctor of Sciences	чел.	35	30	25	20	15
3	Number of teaching staff with PhD degrees	чел.	202	200	198	195	190
4	Number of teaching staff with PhD degrees	чел.	40	45	50	55	60
5	The share of teaching staff teaching in English from the total number of teaching staff	%	7,9	10,5	12,5	15,8	15,8
6	Percentage of teaching staff with international certificates confirming foreign language proficiency in accordance with the pan-European competencies (standards) of foreign language proficiency	%	6,5	6,5	7,0	7,5	7,5
7	Percentage of teaching staff who have completed advanced training and foreign internship	%	42	50	55	60	60
8	The share of teaching staff who have passed advanced training in the framework of improving pedagogical skills	%	60	70	80	90	100
9	The share of university teaching staff participating in educational and research projects from the total number of teaching staff	%	75	78	80	85	85
10	The share of teaching staff and employees stimulated by the results of scientific, educational, methodological, innovative and entrepreneurial activities	%	55	60	65	70	80
11	The share of teaching staff and	%	75	90	100	100	100

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
	employees who have been trained to improve the level of cyberculture and cyber hygiene in the framework of digitalization of the university's activities						
12	The ratio of the average salary of university teaching staff to the average monthly salary in the Republic of Kazakhstan		1	1	1	1	1
7. Ensuring increased transparency and efficiency of the University's management and financing system							
1	Gradual increase in the proportion of women in executive bodies, based on the results of the competition for vacant positions of the Board	%	-	30	30	30	30
2	Gradual increase in the proportion of women on the Board of Directors, based on the results of the evaluation of the work of the Board of Directors for the year in accordance with the decision of the Sole Shareholder	%	-	25	30	30	30
3	Gradual increase in the share of female managers in the structural divisions of organizations	%	-	30	50	50	50
4	The share of active students involved in the University management system	%	17	20	22	25	30
5	For heads of structural divisions who have passed advanced training in the field of management	%	40	50	55	60	70
6	The level of implemented new qualification requirements (standards) for talent management, human resources development		1	1	1	1	1
7	The share of updating the management system, organizational structure, architecture and personnel policy in the conditions of academic freedom of the university	%	-	1,2	1,5	1,7	1,7
8	Increase in the level of KPIs of heads of structural divisions of the University	%	12	15	17	20	25
9	Positioning of the university in social networks		5	5	5	5	5
10	The share of funds in the endowment fund from the total	%	-	0,1	0,3	0,7	0,9

No.	Indicators	Un. of mes.	Planning period				
			2021	2022	2023	2024	2025
	income of the university						

9.7 STRATEGIC RESOURCES

1. Effective management system

The existing management system of KTU ensures a high level of organization of academic, research and innovation activities and compliance with corporate governance standards.

The University's corporate governance system is aimed at improving the efficiency of internal and external processes, ensuring transparency and accountability, strengthening the reputation and brand of KTU at the national and international levels, delineating powers and responsibilities between structural units and officials and reducing the cost of raising capital.

2. Corporate culture

The unity of strategic guidelines and effective personnel policy ensure the formation of a holistic perception of the activities of the staff and faculty of the university, based on the principles of academic integrity, collective responsibility, tolerance and respect for the established traditions and values of the university.

3. HiPo employees

The presence of employees with high potential is one of the main factors determining the success of the university. The human resources development system, aimed at identifying and developing talents, is designed to become a key source of competitive advantage. The involvement of HiPo employees in the university management processes ensures the most effective achievement of corporate goals and increase of their personal potential.

4. Developed infrastructure

KTU campus provides academic, research and socio-cultural needs of employees and students. The systematic development of the material and technical base and the digital ecosystem, the purposeful expansion of the inclusive environment is focused on improving the quality of educational, research and consulting services.

5. Financial support

Funds from the following sources of financing will be allocated for the implementation of the Strategic Development Plan in 2021-2025: the republican budget; public-private partnership funds; funds received from organizations and enterprises under contracts; special funds allocated by international scientific, educational foundations and organizations; income from the results of the implementation of scientific clusters, commercialization of innovative projects and the results of the activities of innovative enterprises and entrepreneurship; own funds of the University; charitable contributions of sponsors, voluntary donations of legal entities and individuals, patronage, including endowment fund; funds from other sources not prohibited by the legislation of the Republic of Kazakhstan.

As sources of formation of the endowment fund, the funds of KTU as the founder of the fund, charitable donations of graduates, organizations and enterprises, income from scientific, technical and commercial activities of the university, as well as other income not prohibited by the legislation of the Republic of Kazakhstan are identified.

The directions of spending the income of the endowment fund will be:

1. Support for KTU students from socially vulnerable categories, as well as those who have significant success in educational, scientific, sports or social activities by providing study grants and scholarships;

2. Development of professional and scientific potential of teachers and staff of KTU by paying for training, internships, advanced training in promising areas with subsequent training in KTU;

3. Development of student potential by financing the activities of the Youth Association "Zhas Orda" aimed at the socio-cultural development of students;

4. Development of the university campus infrastructure: modernization and opening of named classrooms, coworking spaces, alleys, sports grounds, cultural and creative facilities, dormitories, sports and recreation camp "Polytechnic", etc.;

5. Investments in startups and spin-out companies of teachers and students of KTU.

The structure of the necessary financial resources is dominated by expenditures on: modernization and creation of modern scientific and innovative infrastructure; development of fundamental and applied research; commercialization of scientific research; ensuring a high-quality educational process based on world practice; development of modern information and communication infrastructure; implementation of professional development programs for personnel; international academic and student exchanges; procedures for international certification, accreditation and patenting, etc. The extra-budgetary funds of KTU received from the sale of educational services, scientific, innovative, industrial and entrepreneurial activities are supposed to be directed to the development of educational and laboratory, information, research and material base of the university.