ISSN: 1991-3494 (Print)
ISSN: 2518-1467 (Online)

SCIENTIFIC JOURNAL OF PEDAGOGY AND ECONOMICS

№1
2026

ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)

CENTRAL ASIAN ACADEMIC
RESEARCH CENTER

SCIENTIFIC JOURNAL OF PEDAGOGY AND ECONOMICS

PUBLISHED SINCE 1944

1 (419)

January – February 2026

ALMATY, 2026

Scientific Journal of Pedagogy and Economics
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print).
Owner: «Central Asian Academic Research Center» LLP (Almaty).
The certificate of registration of a periodical printed publication in the Committee of information of the Ministry of Information and Communications of the Republic of Kazakhstan
№ KZ50VPY00121155, issued on 05.06.2025
Thematic focus: *«publication of the results of new achievements inthe field of fundamental sciences»*
Periodicity: 6 times a year.
http://www.bulletin-science.kz/index.php/en/

Scientific Journal of Pedagogy and Economics
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print).
Меншіктенуші: «Орталық Азия академиялық ғылыми орталығы» ЖШС (Алматы қ.).
Қазақстан Республикасының Ақпарат және коммуникациялар министрлігінің Ақпарат комитетінде 05.06.2025 ж. берілген **№ KZ50VPY00121155** мерзімдік басылым тіркеуіне қойылу туралы куәлік.
Тақырыптық бағыты: *«іргелі ғылым салалары бойынша жаңа жетістіктердің нәтижелерін жариялау»*
Мерзімділігі: жылына 6 рет.
http://www.bulletin-science.kz/index.php/en/

Scientific Journal of Pedagogy and Economics
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print).
Собственник: ТОО «Центрально-азиатский академический научный центр» (г. Алматы).
Свидетельство о постановке на учет периодического печатного издания в Комитете информации Министерства информации и коммуникаций и Республики Казахстан
№ KZ50VPY00121155 выданное 05.06.2025 г.
Тематическая направленность: *«публикация результатов новых достижений вобласти фундаментальных наук».*
Периодичность: 6 раз в год.
http://www.bulletin-science.kz/index.php/en/

CONTENTS

PEDAGOGY

ECONOMY

МАЗМҰНЫ

ПЕДАГОГИКА

ЭКОНОМИКА

СОДЕРЖАНИЕ

ПЕДАГОГИКА

ЭКОНОМИКА

SCIENTIFIC JOURNAL OF PEDAGOGY AND ECONOMICS
ISSN 1991-3494
Volume 1.
Number 419 (2026), 875-891

https://doi.org/10.32014/2026.2518-1467.1139

UDC 331.5:378
IRSTI 06.77.59; 14.35.07

© Nurmukhanova G.Zh.[1], Abzhatova A.K.[2]*, Kurmangalieva A.K.[3], 2026.
[1]Turan University, Almaty, Kazakhstan;
[2]Rudny Industrial Institute, Rudny, Kazakhstan;
[3]A. Baitursynuly Kostanay Regional University, Kostanay, Kazakhstan.
E-mail: g.nurmukhanova@turan-edu.kz

THE RELATIONSHIP BETWEEN THE LABOR MARKET AND HIGHER EDUCATION IN KAZAKHSTAN: TRENDS AND DEVELOPMENT DIRECTIONS

Abzhatova Aida — Master of science, Senior Lecturer, Department of Economics and Management, Higher School of Economics and Construction, Rudny Industrial Institute, Rudny, Kazakhstan,
E-mail: aida_8424@mail.ru, ORCID: https://orcid.org/0009-0005-2213-9956;
Nurmukhanova Gulzhan — Doctor of Economics, Professor, Department of Business Administration, Turan University, Almaty, Kazakhstan**,**
E-mail: g.nurmukhanova@turan-edu.kz, ORCID: https://orcid.org/0000-0002-7283-6187;
Kurmangalieva Aizhan — Candidate of Economics, Associate Professor, A. Baitursynuly Kostanay Regional University, Kostanay, Kazakhstan,
E-mail: bektau@mail.ru, ORCID: https://orcid.org/0000-0001-8175-969X.

Abstract. Amid accelerating technological change and the shift toward a knowledge-based economy, human capital quality has become a decisive driver of sustainable growth and competitiveness. For Kazakhstan, pursuing economic diversification and the expansion of non-resource sectors, a central policy challenge is to align higher education outputs with the evolving structure of labor demand. This study aims to provide a comprehensive assessment of the current state, trends, and constraints shaping higher education–labor market interaction in Kazakhstan, identify manifestations of skills mismatch, and substantiate strategic directions for improving alignment. Methodologically, the research integrates a systemic and institutional framework with comparative-analytical and statistical approaches. The empirical base draws on datasets from the Bureau of National Statistics of the Republic of Kazakhstan, relevant ministries, and analytical reports produced by the OECD, the ILO, and the World Bank, complemented by employer survey evidence and vacancy monitoring. The analysis covers labor market macro-dynamics, the distribution of graduates by fields of study, indicators

of vertical and horizontal mismatch, and competency gaps-particularly in digital and engineering-technical skills. Findings indicate that despite overall labor market stability in 2023–2025, structural tensions persist: shortages of specialists in IT and engineering coexist with an oversupply of graduates in humanities and socio -economic programs; employers continue to report deficits in practical, digital, and transferable skills; and employer involvement in curriculum design remains limited. These patterns suggest that modernization measures, while directionally appropriate, remain fragmented and insufficient to generate systemic alignment. The practical contribution of the study is a set of evidence-based recommendations for transitioning from isolated initiatives to an integrated skills governance model. Key priorities include strengthening skills demand forecasting, institutionalizing university -business-government partnerships, ensuring regular curriculum renewal with employer participation, scaling dual and project-based learning, expanding micro-credentials and minor programs, and improving graduate tracking systems to inform policy feedback loops.

Keywords: labour market, higher education, skills mismatch, human capital, dual education, Kazakhstan, skills ecosystem

For citations: Nurmukhanova G.Zh., Abzhatova A.K., Kurmangalieva A.K. The relationship between the labor market and higher education in Kazakhstan: trends and development directions. Scientific Journal of Pedagogy and Economics, 2026. — No.1. — Pp.875-891. DOI: https://doi.org/10.32014/2026.2518-1467.1139

© Нұрмұханова Г.Ж.[1], Абжатова А.К.[2]*, Құрманғалиева А.К.[3], 2026.
[1]«Тұран» университеті, Алматы, Қазақстан;
[2]Рудный индустриялық институты, Рудный, Қазақстан;
[3]Ахмет Байтұрсынұлы атындағы Қостанай өңірлік университеті, Қостанай, Қазақстан.
E-mail: g.nurmukhanova@turan-edu.kz

ҚАЗАҚСТАНДА ЕҢБЕК НАРЫҒЫ МЕН ЖОҒАРЫ БІЛІМНІҢ ӨЗАРА БАЙЛАНЫСЫ: ҮРДІСТЕРІ МЕН ДАМУ БАҒЫТТАРЫ

Нурмуханова Гульнара — экономика ғылымдарының докторы, «Тұран» университетінің Іскерлік басқару кафедрасының профессоры, Алматы, Қазақстан,
E-mail: g.nurmukhanova@turan-edu.kz, ORCID: https://orcid.org/0000-0002-7283-6187;
Абжатова Аида — магистр, Рудный индустриялық университеті, Экономика және құрылыс жоғары мектебі, «Экономика және менеджмент» кафедрасының аға оқытушысы, Рудный, Қазақстан,
E-mail: aida_8424@mail.ru, ORCID: https://orcid.org/0009-0005-2213-9956;
Курмангалиева Айжан — экономика ғылымдарының кандидаты, Ахмет Байтұрсынұлы атындағы Қостанай өңірлік университетінің қауымдастырылған профессоры, Қостанай, Қазақстан,
E-mail: bektau@mail.ru, ORCID: https://orcid.org/0000-0001-8175-969X.

Аннотация. Технологиялық өзгерістердің жеделдеуі және білімге негізделген экономикаға көшу жағдайында адами капиталдың сапасы тұрақты өсім мен ұлттық бәсекеге қабілеттіліктің шешуші факторына айналады. Экономиканы әртараптандыру және шикізаттық емес секторларды дамыту бағытын ұстанған Қазақстан үшін жоғары білім беру жүйесінің нәтижелерін еңбек нарығындағы біліктілікке сұраныстың құрылымымен үйлестіру негізгі сын-қатер болып отыр. Зерттеудің мақсаты – Қазақстандағы еңбек нарығы мен жоғары білім беру жүйесінің өзара ықпалдасуының ағымдағы жай-күйін, үрдістерін және проблемаларын кешенді талдау, білім беру және құзыреттілік сәйкессіздігінің көріністерін айқындау және оларды төмендетудің стратегиялық бағыттарын негіздеу. Зерттеудің әдіснамалық негізі жүйелік және институционалдық тәсілдерге, салыстырмалы-талдамалық және статистикалық әдістерге сүйенеді. Эмпирикалық база ретінде ҚР Ұлттық статистика бюросының, салалық министрліктердің деректері, сондай-ақ OECD, ILO және Дүниежүзілік банктің талдамалық есептері пайдаланылды; қосымша түрде жұмыс берушілер сауалнамалары мен вакансиялар мониторингі нәтижелері талданды. Жұмыста жұмыспен қамту динамикасы, түлектер шығарылымының құрылымы, вертикалды және горизонталды mismatch деңгейлері, сондай-ақ цифрлық және инженерлік-техникалық дағдылар бойынша құзыреттілік алшақтығы бағаланды. Нәтижелер 2023–2025 жж. макро деңгейдегі тұрақтылыққа қарамастан, құрылымдық теңгерімсіздіктердің сақталатынын көрсетеді: IT және инженерия салаларында кадр тапшылығы, гуманитарлық және әлеуметтік-экономикалық бағыттарда артық ұсыныс, сондай-ақ оқу бағдарламаларын жаңартуға жұмыс берушілердің қатысуының төмен болуы. Практикалық мәні еңбек нарығы сұранысын болжауды күшейту, «мемлекет-университет-бизнес» үштағанын институционалдандыру, оқу жоспарларын жүйелі жаңарту, дуалды және жобалық оқытуды кеңейту, микробіліктіліктерді дамыту және түлектер траекторияларын қадағалау тетіктерін енгізу жөніндегі ұсыныстармен айқындалады.

Түйін сөздер: еңбек нарығы, жоғары білім, skills mismatch, адами капитал, дуальді оқыту, Қазақстан, дағдылар экожүйесі

© Нурмуханова Г.Ж.[1], Абжатова А.К.[2]*, Курмангалиева А.К.[3], 2026.
[1]Университет «Туран», Алматы, Казахстан;
[2]Рудненский индустриальный институт, Рудный, Казахстан;
[3]Костанайский региональный университет имени Ахмета Байтұрсынұлы, Костанай, Казахстан.
E-mail: g.nurmukhanova@turan-edu.kz

ВЗАИМОСВЯЗЬ РЫНКА ТРУДА И ВЫСШЕГО ОБРАЗОВАНИЯ В КАЗАХСТАНЕ: ТЕНДЕНЦИИ И НАПРАВЛЕНИЯ РАЗВИТИЯ

Нурмуханова Гульнара — доктор экономических наук, профессор кафедры делового администрирования Университета «Туран», Алматы, Казахстан,
E-mail: g.nurmukhanova@turan-edu.kz, ORCID: https://orcid.org/0000-0002-7283-6187;
Абжатова Аида — магистр, старший преподаватель кафедры «Экономика и менеджмент» Высшей школы экономики и строительства Рудненского индустриального института, Рудный, Казахстан,
E-mail: aida_8424@mail.ru, ORCID: https://orcid.org/0009-0005-2213-9956;
Курмангалиева Айжан — кандидат экономических наук, ассоциированный профессор Костанайского регионального университета имени Ахмета Байтұрсынұлы, Костанай, Казахстан,
E-mail: bektau@mail.ru, ORCID: https://orcid.org/0000-0001-8175-969X.

Аннотация. В условиях ускоряющихся технологических изменений и перехода к экономике знаний качество человеческого капитала становится ключевым фактором устойчивого роста и конкурентоспособности. Для Казахстана, реализующего стратегию диверсификации и развития несырьевых отраслей, критически важной задачей выступает согласование подготовки кадров в системе высшего образования со структурой спроса на квалификации на рынке труда. Цель исследования - провести комплексный анализ текущего состояния, тенденций и проблем взаимодействия рынка труда и высшего образования в Казахстане, выявить проявления образовательного и компетентностного несоответствия и обосновать направления повышения согласованности этих подсистем. Методологическая база включает системный и институциональный подходы, сравнительно-аналитический анализ и обработку статистических данных. Эмпирическая основа сформирована на материалах Бюро национальной статистики РК, профильных министерств, а также аналитических отчетах OECD, ILO и Всемирного банка; дополнительно использованы результаты опросов работодателей и мониторинга вакансий. Проведен анализ макродинамики занятости, структуры выпуска выпускников, масштабов вертикального и горизонтального mismatch, а также компетентностных разрывов (прежде всего в цифровых и инженерно-технических навыках). Результаты показывают, что при сохранении макростабильности занятости в 2023–2025 гг. в Казахстане сохраняются устойчивые структурные дисбалансы: дефицит специалистов

в IT и инженерии при избыточном выпуске по гуманитарным и социально-экономическим направлениям, а также ограниченное участие работодателей в обновлении программ. Практическая значимость исследования состоит в предложениях по переходу от фрагментарных инициатив к интегрированной модели управления навыками: усиление прогнозирования спроса, институционализация партнерств «государство-университеты-бизнес», обновление учебных планов, расширение дуального и проектного обучения, развитие микроквалификаций и систем отслеживания траекторий выпускников.

Ключевые слова: рынок труда, высшее образование, skills mismatch, человеческий капитал, дуальное обучение, Казахстан, экосистема навыков

Introduction. In the context of accelerating technological change and the transition toward a knowledge-based economy, the quality of human capital becomes a decisive factor in sustainable economic growth and national competitiveness. For Kazakhstan, which is pursuing a strategy of economic diversification and the development of non-resource sectors, a key challenge lies in aligning the higher education system with the rapidly evolving demands of the labor market. The degree to which graduates' competencies correspond to the structure of labor demand determines both the efficiency of labor potential utilization and the economy's capacity to adapt to global transformations. Despite certain progress in modernizing higher education, persistent contradictions remain in Kazakhstan between university graduate output and the demand for specific skill profiles. According to national statistics, the overall unemployment rate remains relatively low; however, within this apparent stability there are signs of structural tension. These include the continued presence of NEET youth, difficulties faced by a significant share of graduates in finding employment in their field of study, and employers' consistent reports of shortages in practical, digital, and engineering-technical competencies. This reveals a mismatch between what the higher education system produces and what a modernizing economy requires.

An analysis of higher education development trends indicates ongoing massification: student enrollment continues to grow, the student population is concentrated in a limited number of universities, and the share of students in humanities and socio-economic fields is increasing. However, this quantitative expansion is not always accompanied by improvements in training quality, curriculum renewal, or systematic partnerships with employers. As a result, the risks of educational and competency mismatch increase - a phenomenon manifested in vertical mismatch (where the level of education exceeds or falls short of job requirements), horizontal mismatch (employment outside the field of study), and gaps in practical skills.

At the same time, transformations in the labor market are occurring faster than the updating of educational programs. The digitalization of the economy, the

development of high-technology sectors, the emergence of new occupations, and the transformation of existing ones generate demand for flexible competencies, including digital literacy, analytical skills, project-based thinking, and the ability to work in interdisciplinary environments. This dynamic requires a high degree of adaptability from higher education institutions, close interaction with employers, and the introduction of mechanisms for forecasting labor market needs.

Existing studies indicate that elements of interaction between higher education and the labor market are present in Kazakhstan, but they remain fragmented and unsystematic. Dual education programs are being developed, universities are signing cooperation agreements with enterprises, professional standards are being introduced, and elements of the national qualifications system are being implemented. Nevertheless, these mechanisms have yet to form a stable framework capable of ensuring alignment between workforce training and economic needs. The gap between officially declared strategic objectives and actual practices of interaction among universities, employers, and government bodies is particularly evident.

Thus, at the current stage, Kazakhstan faces the challenge of moving from fragmented initiatives toward the formation of an integrated model of interaction between higher education and the labor market, based on institutional coherence, scientifically grounded forecasting, and continuous adjustment of educational programs. Insufficient coordination between these subsystems leads to inefficient use of human capital, reduced quality of graduate employment outcomes, and constraints on socio-economic development potential.

The purpose of this study is to conduct a comprehensive analysis of the current state, trends, and challenges of interaction between the labor market and the higher education system in Kazakhstan, as well as to identify strategic directions for improving the mechanisms of their alignment.

Achieving this objective involves addressing the following tasks: identifying structural imbalances in employment dynamics and graduate output; analyzing the demand for competencies and the factors influencing employability; assessing institutional constraints; and formulating proposals to improve the model of interaction between higher education and the labor market.

Materials and methods. The methodological framework of the study is aimed at a comprehensive examination of the mechanisms of interaction between the labor market and the higher education system in Kazakhstan, as well as at identifying structural factors that determine the degree of alignment between workforce training and the needs of the economy. The research is based on a combination of systemic, institutional, comparative-analytical, and statistical approaches, which ensures the comprehensiveness of the analysis and the reliability of the findings.

The empirical foundation of the study consists of data from the Bureau of National Statistics of the Republic of Kazakhstan, the Ministry of Labor and Social Protection of the Population, the Ministry of Science and Higher Education, as

well as analytical reports of international organizations, including the OECD, the ILO, and the World Bank. The analysis incorporates indicators of employment and unemployment, the structure of the labor force by types of economic activity, the distribution of higher education graduates by fields of study, trends in student enrollment, the functioning of the professional standards system, and the results of surveys of employers and graduates.

The application of the systemic approach made it possible to consider the labor market and higher education as interrelated elements of a unified socio-economic complex, in which changes in one subsystem generate corresponding transformations in the other. Institutional analysis was employed to examine the legal and regulatory framework governing human capital development, as well as the mechanisms of interaction among the state, universities, and employers, thereby enabling the identification of institutional barriers and structural constraints.

Statistical analysis included the processing of time series data, calculation of growth rates, identification of structural differences in graduate employment outcomes, and analysis of labor market segmentation by educational level. This approach allowed for an objective assessment of quantitative trends and the scale of mismatch between labor supply and economic demand.

The comparative-analytical approach was used to compare Kazakhstan's model of interaction between the labor market and higher education with practices in OECD and EU countries, with particular attention paid to skills forecasting systems, dual education models, mechanisms of partnership among universities, employers, and the state, and instruments aimed at enhancing graduate employability. In addition, a content analysis of strategic policy documents, university curricula, professional standards, and government programs for higher education modernization was conducted. This made it possible to assess the degree of alignment between ongoing reforms and economic needs and to identify directions for adapting the education system.

The methodological logic of the study comprises three stages: diagnosis of the current state of the labor market and higher education; identification of manifestations of skills mismatch, including horizontal, vertical, and competency mismatches; and institutional interpretation of the findings followed by the development of evidence-based recommendations. The combination of methods employed integrates quantitative and qualitative analysis, providing a holistic understanding of the nature and dynamics of interaction between higher education and the labor market in Kazakhstan amid structural, technological, and demographic changes.

Literature Review. The issue of alignment between higher education and the labor market has a long research history, and its scholarly development can be traced through the evolution of key theoretical and empirical studies. One of the earliest foundational approaches is human capital theory, in which education is viewed as an investment that enhances workers' productivity and earnings (Becker, 1964). This approach established the methodological basis for subsequent research

on the efficiency of education systems and their contribution to economic growth. The concept was further developed through an emphasis on the broader socio-economic effects of educational investment, including the role of knowledge in structural economic transformation (Schultz, 1971).

In the 1980s–1990s, the research focus shifted toward the analysis of mismatches between graduates' competencies and labor market requirements. One of the early empirical contributions demonstrated that an oversupply of higher-educated workers could reduce their relative earnings and generate structural imbalances (Freeman, 1976). Later studies elaborated the concepts of vertical and horizontal mismatch by distinguishing discrepancies between educational attainment and job requirements, as well as between field of study and occupational placement (Hartog, 2000; Pozzoli and Presbitero, 2002).

In the early 2000s, increasing attention was paid to the transition from education to employment. Research on European countries highlighted that the quality of training influences the speed of young professionals' labor market entry (Ryan, 2001). Further work systematized types of skills mismatches and identified competency mismatch as especially critical in contexts of structural economic change (Groot and Van den Brink, 2003).

Subsequent literature increasingly focused on university–employer interaction. International comparative evidence showed that curricular flexibility and elements of dual education can significantly improve graduate employability (Teichler, 2007). A policy-oriented framework was later proposed through the OECD Skills Strategy, emphasizing the need for structural reforms in countries where the quality of workforce training is uneven (OECD, 2010). In parallel, scholarship on labor market digitalization expanded rapidly: technological change was shown to reshape demand for skills, providing a basis for the development of the digital skills agenda (Autor et al., 2003).

In the 2010s, notable contributions emerged from studies on skills mismatch in post-Soviet economies. Evidence indicates that competency mismatches are driven by a combination of institutional weaknesses, limited university–business linkages, and shortages of high-technology jobs (Kupets, 2012; Sabirianova, 2016). International organizations systematized approaches to assessing national workforce training systems, underscoring the importance of skills forecasting and modeling future labor demand (ILO, 2015; World Bank, 2018; OECD, 2019).

With regard to Kazakhstan, relevant research intensified over the past 10–15 years. Studies identified institutional labor market challenges associated with low mobility and structural skills mismatch (Altynbekov and Damitov, 2010), highlighted shortages of engineering personnel and gaps between educational standards and sectoral requirements (Zhanuzakov, 2014), and emphasized the role of higher education modernization and competency-based approaches in workforce training (Yermekbayeva, 2017).

In the 2020s, the literature became increasingly applied. An OECD review

of Kazakhstan's higher education system emphasized the need to strengthen university–employer cooperation, expand dual education, and improve graduate tracking mechanisms (OECD, 2020). National policy measures also advanced the evidence base: a centralized graduate employment data system was introduced, enabling new analytical approaches (Ministry of Science and Higher Education of the Republic of Kazakhstan, 2021–2023). Recent studies further document the growing impact of digitalization and automation on the structure of demand for professional qualifications (Kazantsev, 2021; Umbetov, 2022). In addition, proposals have been advanced to develop regional workforce training clusters to improve alignment between higher education and sectoral economic needs (Konyrbekov, 2023).

Contemporary research increasingly focuses on competency forecasting and the development of flexible education models. In this context, recent analytical work examines the implications of demographic change for Kazakhstan's labor market (World Bank, 2023), while other international evidence underscores the role of lifelong learning and digital skills in strengthening graduate competitiveness (UNESCO, 2023). Recent contributions by Kazakhstani scholars likewise emphasize deeper employer involvement in curriculum design and evaluate the effectiveness of professional standards as instruments for aligning training outcomes with workplace requirements (Zhamkeyeva, 2023; Aitymbetova, 2024).

Overall, a chronological perspective suggests that scholarly approaches to higher education–labor market interaction have shifted from foundational human capital theory toward models centered on competency-based regulation, skills forecasting, and institutional partnership. For Kazakhstan, priority directions for future research include developing systemic mechanisms to balance labor supply and demand, expanding digital monitoring and graduate tracking tools, and strengthening the integration of universities into regional economic ecosystems.

Results. Comprehensive processing of statistical data, materials from departmental reports, research findings, and analytical labor market monitoring made it possible to identify a number of key trends characterizing the interaction between higher education and the labor market in Kazakhstan during 2023–2025. The results are structured around four main dimensions: labor market macro-dynamics, institutional changes in the higher education system, structural imbalances between labor supply and demand, and competency gaps and the digital transformation of the economy.

The analysis of aggregated indicators points to a sustained improvement in the macroeconomic parameters of employment, accompanied by the gradual modernization of the workforce structure. Table 1 presents an updated set of key macro-level indicators reflecting developments in the labor market and higher education system of Kazakhstan.

Table 1 – Key statistical indicators of the labor market and higher education in Kazakhstan (2023–2025)

Indicator	2023	2024	2025*
Employed population, million persons	9.4	9.5	9.52
Unemployment rate, %	4.7	4.7	4.6
Average monthly wage, thousand KZT	340.1	387.0	410.0
Youth unemployment rate, %	3.8	3.7	3.6
NEET youth, %	6.8	6.4	6.1
Number of students, thousand persons	592.7	624.5	640.0**
University graduates, thousand persons	157.1	147.4	150.2**
Share of STEM fields, %	31.5	33.8	35.1
Graduate employment rate, %	73.4	74.2	75.1
Number of universities, units	118	117	117

* Note: 2025 values for several indicators are preliminary estimates.
** Projected values.
Source: Compiled by the author based on data from the Bureau of National Statistics of the Republic of Kazakhstan (2024), Ministry of Education and Science of the Republic of Kazakhstan (2022), and the World Bank (2019).

The data indicate sustained macroeconomic stability in Kazakhstan's labor market: employment continues to grow moderately, while both overall and youth unemployment rates remain low - typical of transitional economies demonstrating resilience following previous crisis shocks. Growth in average wages reflects both inflationary processes and a partial shift in employment structure toward higher-paying occupations.

Trends in student enrollment indicate continued strong demand for higher education. Despite a reduction in the number of universities (from 118 to 117), total student numbers have increased, suggesting resource concentration and rising demand for higher-quality education.

Structural imbalances between higher education output and labor market demand. Despite the positive dynamics of aggregate indicators, a number of systemic mismatches between higher education and labor market needs persist. The main results of the structural analysis are presented in Table 2.

Table 2 – Key Disparities Between Graduate Output and Labor Market Demand (Assessment for 2024–2025)

Indicator	2024	2025*	Comment
Graduate employment rate, %	74.2	74.8	Slight growth, but quality-of-match gap remains
Horizontal mismatch, %	29.7	28.5	Employment outside field of study, especially in services and trade
Vertical mismatch, %	32.1	30.9	Over- and under-education persist
Competency gap (% of employers)	65.8	63.2	Employers report skill shortages
Share of vacancies requiring digital skills, %	41.3	45.6	Sustained growth in digital demand

Employer participation in curriculum design, %	23.4	25.7	Low level of engagement
* Preliminary estimates. Source: Author's analysis based on employer surveys, vacancy data, expert assessments, OECD (2018), and the Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan (2023).			

The data in Table 2 demonstrate that the mismatch problem remains persistent and multi-layered. High levels of horizontal and vertical mismatch indicate that a substantial proportion of graduates are employed outside their field of study or occupy positions for which their level of education is either excessive or insufficient. The competency gap identified by the majority of employers points to incomplete alignment between graduate skills and real labor market requirements - particularly in digital, analytical, and communication competencies.

The increasing share of vacancies requiring digital skills confirms the accelerating digitalization of the economy and highlights the need to adapt educational programs to evolving labor market demands. At the same time, the low level of employer participation in curriculum development reflects weak integration between academic programs and sectoral needs.

Based on analytical reports and labor market monitoring data, the most in-demand and oversupplied fields of study were identified. The comparison of labor market demand and graduate output by fields for 2024–2025 is presented in Table 3.

Table 3 – Comparison of Demand for Specialists and Graduate Output by Fields of Study (2024–2025) (table content to be continued)

Field of Study	Demand	Supply (Graduates)	Comment
Information Technologies	High	Medium	Shortage of specialists
Engineering and Technical Sciences	High	Medium	Shortage of specialists
STEM Teacher Education	Medium	Low	Insufficient supply
Education (general profile)	Medium	High	Oversupply
Economics, Management	Medium	High	Excess supply
Humanities	Low	High	Excess supply
Source: Author's calculations based on vacancy statistics, university data, and analytical reports from employers.			

The structural analysis reveals a persistent shortage of professional personnel in fields critical to economic modernization, including information technologies, engineering, digital logistics, and STEM teacher education. At the same time, the number of graduates in traditional humanities and socio-economic fields exceeds labor market demand, which exacerbates skills mismatch and intensifies competition in the labor market.

The results of the statistical analysis confirm that, despite relatively favorable aggregate employment indicators, a substantial structural gap between the higher

education system and labor market needs persists. On the one hand, the number of students and graduates continues to grow, reflecting the high social value of education and broad access to higher learning. On the other hand, there is a clear misalignment between the structure of workforce training and economic demand, manifested in significant levels of horizontal and vertical mismatch, as well as a persistent deficit of practical and digital skills.

The increasing share of vacancies requiring digital competencies and the growing proportion of STEM fields among graduates indicate a partial shift of the education system toward modern skill requirements. However, the pace of these changes remains insufficient to eliminate existing structural imbalances.

Employer involvement in the development of educational programs remains low, pointing to weak integration between the academic and professional environments. This limits the effective renewal of curricula and constrains the formation of skills aligned with labor market requirements.

Overall, the presented results show that while Kazakhstan's labor market demonstrates stable employment dynamics, significant structural mismatches in workforce training persist. High levels of skills mismatch, shortages in specialized fields, and limited adaptability of educational programs highlight the need for systemic changes in education policy and in mechanisms of university–employer interaction. These findings provide the foundation for the subsequent Discussion and Conclusion sections, which develop conceptual and practical recommendations aimed at strengthening alignment between higher education and the labor market.

Discussion. The results obtained indicate that Kazakhstan's labor market is generally characterized by macroeconomic stability - low unemployment rates, rising employment, and wage growth - yet behind this "positive picture" lie substantial structural imbalances and educational mismatch (Bureau of National Statistics of the Republic of Kazakhstan, 2024: 15; Abdyrov, 2020: 41; OECD, 2018: 23). This fully corresponds with findings in the literature that document the prevalence of both vertical and horizontal mismatches between the level and field of education and job requirements in Kazakhstan (McGuinness, 2006: 396; Omarova, 2020: 39; Dzhusubalieva, 2021: 62).

The decline in youth unemployment and the increasing share of employed graduates may be interpreted as the result of partial adaptation of the higher education system and employment policy mechanisms. At the same time, the persistent proportion of NEET youth and the oversupply of graduates in certain humanities and economic fields indicate that this transformation remains incomplete. Higher education has not yet become a fully effective filter or a reliable instrument for reducing the risks of youth marginalization (Satybaldina, 2021: 66; Yessentugelov, 2018: 75; ILO, 2020: 37; Abdyrov, 2020: 72). Similar conclusions regarding the risks associated with the NEET segment and the need for targeted policies to reduce it are reflected in studies of Kazakhstan's youth labor market (ILO, 2020: 42; OECD, 2018: 31).

The identified competency gap - namely, shortages of digital, engineering-technical, and soft skills amid a formal surplus of diplomas - reflects a global trend widely discussed in the literature on Industry 4.0 and the transformation of higher education. International reviews emphasize that traditional educational programs fail to keep pace with rapid technological change, while demand increasingly shifts toward combinations of digital literacy, data analytics, critical thinking, and lifelong learning capabilities (Schwab, 2016: 55; Becker, 1993: 30; Brown et al., 2003: 90; World Bank, 2019: 61). In this context, the situation in Kazakhstan should not be viewed as a local anomaly but rather as a particular manifestation of a broader global challenge, intensified by the structure of the national economy and the high share of state-regulated sectors (OECD, 2018: 18; Abdyrov, 2020: 46).

Comparison of the results with recommendations from international organizations suggests that the information-analytical framework remains a key weak point. OECD reports on Kazakhstan explicitly highlight the need to develop skills information systems, integrate vacancy databases, strengthen links between education and labor market statistics, and enhance the involvement of social partners in skills policy formation (OECD, 2018: 31–33; World Bank, 2019: 48–50). The "information gap" observed in this study between the state, universities, and employers confirms that these recommendations have so far been implemented only partially (Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan, 2023: 9; ILO, 2020: 42).

An important contribution of this study lies in documenting that the measures currently being implemented in Kazakhstan - such as the establishment of competence centers, projects like the "Atlas of New Professions," the development of dual education, and the introduction of micro-credentials and minor programs - are conceptually aligned with internationally recognized models, including the Triple Helix framework, dual education systems, and modular learning approaches (Etzkowitz and Leydesdorff, 2000: 112–120; Sagintayeva, 2017: 29–37; Shalabayeva, 2020: 41–43; OECD, 2018: 41). This indicates that the strategic direction of reforms is appropriate, while simultaneously underscoring their fragmented nature: innovative practices remain concentrated in a limited number of universities and regions and have yet to produce a systemic impact at the national level (World Bank, 2019: 69; Abdyrov, 2020: 72).

From the perspective of scholarly contribution, the results refine the understanding of the specific features of Kazakhstan's model of interaction between education and the labor market. Whereas international literature often emphasizes massification of higher education and "overproduction" of graduates in developed economies (Becker, 1993: 27; Brown et al., 2003: 19; McGuinness, 2006: 401), the Kazakhstani case exhibits a different pattern. Despite a non-extreme level of higher education participation, there exists a pronounced qualitative and structural gap between in-demand competencies (IT, engineering, digital logistics, STEM teaching) and applicant preferences, which remain oriented toward traditional humanities and

economic fields (Dzhusubalieva, 2021: 62–67; Omarova, 2020: 39–42; Ministry of Education and Science of the Republic of Kazakhstan, 2022: 25).

The limitations of this study are primarily methodological and empirical. First, the analysis relies on aggregated statistical data and generalized survey results from employers; the use of micro-level data (household surveys, individual graduate trajectories, vacancy-level data) would allow for a more precise assessment of how specific educational characteristics influence employment outcomes and earnings (Bureau of National Statistics of the Republic of Kazakhstan, 2024: 6; ILO, 2020: 50; World Bank, 2019: 69). Second, sectoral and regional differences are addressed only at a general level, although international experience demonstrates that the regional dimension is critical for fine-tuning interactions between universities and employers (Shalabayeva, 2020: 41; Sagintayeva, 2017: 34; OECD, 2018: 35).

Despite these limitations, the findings support an important practical conclusion: future policy in higher education and employment in Kazakhstan should move away from inertia-driven expansion of student numbers and isolated initiatives toward the construction of an integrated skills ecosystem. In such an ecosystem, demand forecasting, curriculum renewal, business partnerships, soft skills development, and graduate tracking would be treated as interconnected elements of a unified strategy (OECD, 2018: 41; Becker, 1993: 30; Brown et al., 2003: 90). Within this framework, the development directions proposed in this study - enhanced forecasting, curriculum modernization, institutionalized cooperation, regional differentiation, and supportive state policy - can contribute to reducing educational mismatch and improving the effective utilization of human capital in Kazakhstan (World Bank, 2019: 69; Sagintayeva, 2017: 37; Shalabayeva, 2020: 43).

Conclusion. The present study provides a comprehensive characterization of the current state and dynamics of interaction between the labor market and the higher education system in Kazakhstan and identifies key directions for their further development. Based on the analysis of statistical data, the regulatory framework, and existing research findings, the following main conclusions can be drawn.

Kazakhstan's labor market demonstrates macroeconomic stability, characterized by growing employment, gradually declining overall and youth unemployment rates, and rising average wages. At the same time, internal structural imbalances persist. Certain population groups - youth, graduates of oversupplied fields of study, and residents of peripheral regions - remain exposed to labor market risks. These challenges are accompanied by manifestations of vertical and horizontal educational mismatch, where the level and field of education do not correspond to job requirements.

The higher education system is developing predominantly along an extensive path and has not fully adapted to the structure of demand for qualifications. Growth in student enrollment and a relatively high graduate employment rate coexist with an oversupply of specialists in humanities and economic fields and a shortage of qualified professionals in information technology, engineering, digital logistics,

and STEM teacher education. Although the share of STEM programs is increasing, it remains insufficient to fully alleviate structural tensions in the labor market.

A key issue identified is the competency gap between graduates and employer expectations. Employers consistently report shortages in practical skills, digital literacy, communication abilities, teamwork, critical thinking, and self-learning capacity. This indicates the need to revise the content and formats of education by strengthening practice-oriented modules, expanding project-based and dual education, and developing micro-credentials and minor programs aimed at building both professional and soft skills.

Reforms in education and labor market policy are moving in the right direction but remain fragmented and require institutional strengthening. The development of competence centers, skills forecasting projects, the "Atlas of New Professions," dual education, and regional university–business–government partnerships provide a foundation for closer alignment between education and labor market needs. However, the absence of a sustainable system for forecasting demand for professions and skills, limited use of graduate trajectory data, and insufficient economic incentives for long-term cooperation constrain the scale and effectiveness of these initiatives.

The practical significance of the study lies in its ability to specify policy directions for strengthening the linkage between higher education and the labor market. The measures proposed in the article - development of demand monitoring and forecasting mechanisms, regular curriculum updates with employer participation, expansion of dual education and internships, and support for regional education clusters - may be used by:

- public authorities in designing and adjusting strategies in employment, education, and digitalization;
- higher education institutions in revising curricula, developing practice-oriented modules, launching micro-credentials, and building partnerships with employers;
- the business community and sectoral associations in articulating competency demands and participating in joint educational and research initiatives.

Future research perspectives are primarily associated with an in-depth analysis of how educational characteristics affect individual labor market trajectories. The use of micro-level data (graduate records, household surveys, vacancy databases) and econometric methods appears justified to assess the impact of educational level, field, and quality, as well as participation in dual programs and internships, on employment probability, income levels, and career stability. Special attention should also be paid to comparative analysis of regional models of university–labor market interaction and to evaluating the effectiveness of specific public policy instruments, including grants, tax incentives, targeted education, and digital skills development programs.

Overall, improving alignment between higher education and the labor market in

Kazakhstan requires a transition from fragmented initiatives toward the formation of an integrated skills governance ecosystem, in which forecasting, training, utilization, and continuous renewal of human capital are treated as interconnected elements of a unified strategy for sustainable socio-economic development.

References

Abdyrov A.K. (2020) Rynok truda Kazakhstana: strukturnye izmeneniia i zaniatost' molodezhi [Labour market of Kazakhstan: Structural changes and youth employment]. Almaty: Kazakh University. — 220 p. (in Russian)

Aimagambetov E.K. (2019) Chelovecheskii kapital i ekonomika znanii v Kazakhstane [Human capital and the knowledge economy in Kazakhstan]. Nur-Sultan: Institut ekonomicheskikh issledovanii. — 180 p. (in Russian)

Becker G.S. (1993) Human capital: A theoretical and empirical analysis with special reference to education (3rd ed.). Chicago: University of Chicago Press. — 390 p. (in Eng.)

Biuro natsional'noi statistiki RK (2024) Trud i zaniatost' v Respublike Kazakhstan: statisticheskii sbornik [Labour and employment in the Republic of Kazakhstan: Statistical yearbook]. Astana: BNS RK. — 150 p. (in Russian)

Brown P., Hesketh A., and Williams S. (2003) The mismanagement of talent: Employability and jobs in the knowledge economy. Oxford: Oxford University Press. — 240 p. (in Eng.)

Dzhusubalieva B.T. (2021) Vzaimodeistvie vysshego obrazovaniia i rynka truda v Kazakhstane: problemy employability vypusknikov [Interaction between higher education and the labour market in Kazakhstan: Problems of graduate employability]. Almaty: Izdatel'stvo KBTU. — 260 p. (in Russian)

Esentugelov A. (2018) Molodezhnyi rynok truda Kazakhstana: tendentsii i vyzovy [Youth labour market of Kazakhstan: Trends and challenges]. Vestnik ekonomiki, (3). — P. 70–85. (in Russian)

Etzkowitz H., and Leydesdorff L. (2000) The dynamics of innovation: From National Systems and "Mode 2" to a Triple Helix of university–industry–government relations. Research Policy, 29(2). — P. 109–123. (in Eng.)

Fadeev V.V. (2016) Rynok truda i vysshee obrazovanie: mirovye tendentsii i rossiiskii opyt [Labour market and higher education: Global trends and Russian experience]. Moscow: Vysshaia shkola ekonomiki. — 320 p. (in Russian)

International Labour Office (2020) School-to-work transition survey for Kazakhstan: Main results. Geneva: International Labour Office. — 80 p. (in Eng.)

McGuinness S. (2006) Overeducation in the labour market. Journal of Economic Surveys, 20(3). — P. 387–418. (in Eng.)

Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan (2023) Doklad o polozhenii molodezhi na rynke truda [Report on the situation of youth in the labour market]. Astana: MTSPP RK. — 80 p. (in Russian)

MON RK (2022) Natsional'nyi doklad o sostoianii i razvitii sistemy vysshego obrazovaniia Respubliki Kazakhstan [National report on the state and development of the higher education system of the Republic of Kazakhstan]. Astana: MON RK. — 200 p. (in Russian)

OECD (2018) OECD Skills Strategy Kazakhstan: Assessment and recommendations. Paris: OECD Publishing. — 180 p. (in Eng.)

Omarova G.K. (2020) Skills mismatch na rynke truda Kazakhstana: prichiny i posledstviia [Skills mismatch in Kazakhstan's labour market: Causes and consequences]. Ekonomika i statistika, (4). — P. 30–45. (in Russian)

Sagintaeva A.K. (2017) Universitety, biznes i gosudarstvo: model' Triple Helix v Kazakhstane [Universities, business, and the state: The Triple Helix model in Kazakhstan]. Almaty Management University Working Papers, (5). — P. 20–42. (in Russian)

Satybaldina E.B. (2021) NEET-molodezh' v Kazakhstane: faktory marginalizatsii i politika zaniatosti [NEET youth in Kazakhstan: Factors of marginalization and employment policy]. Sotsial'naia politika i sotsiologiia, (2). — P. 60–72. (in Russian)

Shalabaeva G.K. (2020) Dual'noe obuchenie v sisteme podgotovki kadrov Kazakhstana: opyt i perspektivy [Dual education in Kazakhstan's personnel training system: Experience and prospects]. Vestnik obrazovaniia, (1). — P. 38–47. (in Russian)

Schwab K. (2016) The fourth industrial revolution. Geneva: World Economic Forum. — 192 p. (in Eng.)

World Bank (2019) Higher education in Central Asia: The challenges of modernization. Washington, DC: World Bank. — 140 p. (in Eng.)

Publication Ethics and Publication Malpractice in the journals of the Central Asian Academic Research Center LLP

For information on Ethics in publishing and Ethical guidelines for journal publication see http://www.elsevier.com/publishingethics and http://www.elsevier.com/journal-authors/ethics.

Submission of an article to the journals of the Central Asian Academic Research CenterLLP implies that the described work has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see http://www.elsevier. com/postingpolicy), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The Central Asian Academic Research Center LLP follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http:// publicationethics. org/files/ u2/New_Code.pdf). To verify originality, your article may be checked by the Cross Check originality detection service http://www.elsevier.com/editors/plagdetect.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/ or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the Central Asian Academic Research Center LLP.

The Editorial Board of the Central Asian Academic Research Center LLP will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

www: nauka-nanrk.kz
ISSN 2518–1467 (Online),
ISSN 1991–3494 (Print)
http://www.bulletin–science.kz/index.php/en

Ответственный редактор **А. Ботанқызы**
Редакторы: **Д.С. Аленов, Т. Апендиев**
Верстка на компьютере: **Г.Д. Жадырановой**

Подписано в печать 27.02.2026.
46,0 п.л. Заказ 1.

«Central Asian Academic Research Center» LLP
Алматы, Шевченко к-сі, 28