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Human Capital Development and Transformation of Labor Resources in Kazakhstan

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Abstract

In the context of structural and demographic changes, accelerated digitalization, and increasing demands on the quality of the workforce, the analysis of labor resources is of key importance for the sustainable socio-economic development of Kazakhstan. The purpose of this article is to analyze the dynamics and structural transformation of the labor force in Kazakhstan with an emphasis on the development of human capital, changes in age, gender, educational, and sectoral employment structure. The methodological basis of the research consists of methods of comparative, structural, and economic-statistical analysis, as well as trend analysis, used to assess the dynamics of employment, unemployment, and qualitative characteristics of the workforce. The empirical base of the study is based on official data from the Bureau of National Statistics (2024), materials from sample surveys of the labor force, as well as regulatory documents in the field of employment and qualifications. The results of the study showed that in 2019-2024. The employment rate in the country remained at a high level (about 65%), while the unemployment rate remained stable in the range of 4.7-4.9%. The number of employees increased by almost 5%, while the share of workers with higher and technical education increased, which together account for more than 90% of employment. The prospects for further research are related to the development of models for forecasting the demand for competencies, evaluating the effectiveness of the National Qualifications System, and analyzing the impact of digital transformation on employment quality and labor productivity.

Keywords: Labor Market, Employment, Quality of Employment, Human Capital, Social Sustainability, Social Transformation, Social Risk, Unemployment

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Қазақстанда адами капиталды дамыту және еңбек ресурстарын трансформациялау

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Түйін

Құрылымдық және демографиялық өзгерістер, цифрландырудың жеделдеуі және жұмыс күшінің сапасына қойылатын талаптардың артуы жағдайында еңбек ресурстарын талдау Қазақстанның әлеуметтік-экономикалық дамуының тұрақтылығын қамтамасыз ету үшін ерекше маңызға ие. Осы мақаланың мақсаты – адами капиталдың дамуына басымдық бере отырып, Қазақстандағы еңбек ресурстарының динамикасы мен құрылымдық трансформациясын, сондай-ақ жұмыспен қамтудың жас ерекшелік, гендерлік, білім беру және салалық құрылымындағы өзгерістерді талдау. Зерттеудің әдіснамалық негізін жұмыспен қамту, жұмыссыздық және жұмыс күшінің сапалық сипаттамаларының динамикасын бағалау үшін қолданылған салыстырмалы, құрылымдық және экономикалық-статистикалық талдау әдістері, сондай-ақ трендтік талдау құрайды. Зерттеудің эмпирикалық базасы Қазақстан Республикасы Ұлттық статистика бюросының ресми деректері, жұмыс күші бойынша іріктемелі зерттеулер материалдары, сондай-ақ жұмыспен қамту және біліктілік саласындағы нормативтік-құқықтық құжаттар негізінде қалыптастырылды. Зерттеу нәтижелері 2019–2024 жылдары елдегі жұмыспен қамту деңгейінің жоғары деңгейде (шамамен 65%) сақталғанын, ал жұмыссыздық деңгейінің 4,7–4,9% аралығында тұрақты болғанын көрсетті. Жұмыспен қамтылғандар саны шамамен 5%-ға артты, бұл ретте жоғары және техникалық білімі бар қызметкерлердің үлесі өсті, олар жиынтығында жұмыспен қамтылғандардың 90%-дан астамын құрайды. Болашақ зерттеулердің перспективалары құзыреттерге сұранысты болжау модельдерін дамытуға, Ұлттық біліктілік жүйесінің тиімділігін бағалауға және цифрлық трансформацияның жұмыспен қамту сапасы мен еңбек өнімділігіне әсерін талдауға байланысты.

Түйін сөздер: еңбек нарығы, жұмыспен қамту, жұмыспен қамту сапасы, адами капитал, әлеуметтік тұрақтылық, әлеуметтік трансформация, әлеуметтік тәуекел, жұмыссыздық

Развитие человеческого капитала и трансформация трудовых ресурсов в Казахстане

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Аннотация

В условиях структурных и демографических изменений, ускоренной цифровизации и роста требований к качеству рабочей силы анализ трудовых ресурсов приобретает ключевое значение для устойчивого социально-экономического развития Казахстана. Целью данной статьи является анализ динамики и структурной трансформации трудовых ресурсов в Казахстане с акцентом на развитие человеческого капитала, изменения в возрастной, гендерной, образовательной и отраслевой структуре занятости. Методологическую основу исследования составляют методы сравнительного, структурного и экономико-статистического анализа, а также трендовый анализ, применённые для оценки динамики занятости, безработицы и качественных характеристик рабочей силы. Эмпирическая база исследования сформирована на основе официальных данных Бюро национальной статистики Республики Казахстан, материалов выборочных обследований рабочей силы, а также нормативно-правовых документов в сфере занятости и квалификаций. Результаты исследования показали, что в 2019–2024 гг. уровень занятости в стране сохранялся на высоком уровне (около 65%), а уровень безработицы оставался стабильным в пределах 4,7–4,9%. Численность занятых увеличилась почти на 5%, при одновременном росте доли работников с высшим и техническим образованием, которые в совокупности формируют более 90% занятости. Перспективы дальнейших исследований связаны с развитием моделей прогнозирования спроса на компетенции, оценкой эффективности Национальной системы квалификаций и анализом влияния цифровой трансформации на качество занятости и производительность труда.

Ключевые слова: рынок труда, занятость, качество занятости, человеческий капитал, социальная устойчивость, социальная трансформация, социальный риск, безработа

Introduction

Labor resources constitute one of the key components of a state's economic development. The effective utilization of the workforce determines the potential for increasing labor productivity, stimulating economic growth. Modernizing economic sectors. And strengthening the social well-being of the population. In the context of Kazakhstan, the analysis of labor resources is particularly relevant due to ongoing demographic changes, the development of the digital economy, and rising requirements for workers' competencies. And shifts in the sectoral structure of employment. An important factor is the compliance of national statistical data with the standards of the International Labour Organization (hereinafter – ILO), which ensures data comparability and enables in-depth scientific analysis of labor market phenomena and trends.

Today, the development of labor resources is not merely a statistical category but one of the key pillars of Kazakhstan's socio-economic stability. Amid rapid technological shifts, demographic waves, and the evolving logic of the global market, the individual – along with their education, qualifications, and adaptability – becomes the central driver of economic growth. Therefore, analyzing the current state and dynamics of labor resources essentially represents an exploration of the country's future.

The period from 2019 to 2024 proved to be both a time of significant challenges and new opportunities for Kazakhstan's labor market. The economy experienced a pandemic shock, restructured sectoral priorities, accelerated digitalization, and faced increasing demands for workforce quality. Nevertheless, the labor market demonstrated resilience: employment increased from 8.78 million to 9.21 million people, while the unemployment rate remained within the range of 4.7-4.9%. Behind these figures lie enterprise adaptability, rapid structural adjustments, and the growing importance of human capital.

Changes in the age structure of employment are particularly illustrative. Kazakhstan is gradually entering a phase of mature demographic balance, where the primary burden falls on the most economically active age groups – those aged 25 to 54. This cohort accounts for nearly 70% of total employment, forming the so-called "core" of the labor force – the segment that determines production dynamics, innovation potential, and household income stability. In contrast, youth participation has declined, highlighting the need for flexible educational pathways and new approaches to early professional orientation.

Equally significant are shifts in the educational structure of employment. In recent years, the share of workers with vocational and technical education has increased, reflecting a stronger orientation toward mid-level competencies. At the same time, nearly half of all employed individuals possess higher education. Kazakhstan is increasingly becoming a society in which human capital represents a tangible resource rather than a declarative concept. At the same time, structural imbalances are becoming more evident, including skill mismatches with sectoral demands, shortages of technical specialists, and an oversupply of labor in traditional fields.

The sectoral structure of employment is also transforming. The share of agriculture is declining, while trade, healthcare, education, construction, information and communication technologies, and the financial sector are strengthening their positions.

The economy is gradually shifting toward services and knowledge-based activities, which necessitate new professional standards, workforce training systems, and qualification assessment mechanisms. In this context, the role of the National Qualifications System (2025) becomes critically important, as it integrates education, business, and the state through unified requirements for the quality of human capital. At the same time, one of the key challenges of recent years has been the decline in real wages, which intensifies social risks and limits opportunities for human capital accumulation. Despite growth in nominal incomes, the purchasing power of the population decreased in 2022-2023, making the issue of job quality and fair remuneration particularly acute.

Thus, the analysis of Kazakhstan's labor resources in 2019-2024 reveals not merely changes in statistical indicators but deep processes shaping the future of the national economy. These include transformations in labor demand, educational strategies. Sectoral distribution, qualification requirements, and the population's standard of living. Understanding these processes is a necessary prerequisite for effective public policy aimed at modernizing the labor market, increasing productivity, and strengthening social balance within society. Thus, the purpose of this article is to analyze the dynamics and structural transformation of the labor force in Kazakhstan with an emphasis on the development of human capital, changes in age, gender, educational, and sectoral employment structure.

Literature Review

The analysis of labor resources and the labor market represents a key area of economic research, encompassing issues of employment, human capital, migration, and the efficiency of workforce utilization. In the global academic literature, one of the foundational contributions is the human capital theory developed by Becker (1993), which establishes a clear relationship between investments in education and labor productivity. Other classical works, including those by Samuelson and Nordhaus (2009), emphasize the mechanisms of labor supply and demand, as well as the role of institutional factors in shaping labor market outcomes.

A substantial contribution to the study of structural changes in labor markets was made by Autor, who analyzed the impact of technological automation on the displacement of middle-skilled jobs (Autor, 2015). Research by Freeman addresses the transformation of the global workforce in the context of an open world economy (Freeman, 2007). In the post-Soviet space, the works of Kapelyushnikov are particularly significant, as they analyze the institutional characteristics of labor market development in transition economies and examine the factors behind low labor mobility and employment flexibility (Kapelyushnikov, 2012).

O'Clery (2022) examined the concept of labor network "modularity," demonstrating how workers' skills and mobility shaped labor market structures. This approach was particularly relevant for the development of network-based methodologies used to analyze labor resource configurations. Koval (2022) investigated the architecture of online labor management platforms (the human cloud), emphasizing their role in assessing qualification–competency structures and the application of digital tools in

human resource management. Li (2022) analyzed the impact of the IT revolution on the redistribution and transformation of labor resources across economic sectors. Furthermore, Qiu (2024) explored the relationship between the digital economy and the evolution of labor resource structures, highlighting skill shifts and changing qualification requirements.

Sakib (2023) examined the influence of emerging trends and challenges on the availability of labor resources and their application in external HRO/HR services. Lee (2023) focused on the analysis of labor resource development in the construction sector, examining employment structures, workforce needs, and labor productivity monitoring. Dong et al. (2024) described the factors influencing employment and workforce structure within enterprises – policy, market, and firm–level employment – using empirical models of value creation and the effects of employment structure. Wysocka (2021) emphasized demographic effects in the study of labor resource conditions and structures, including age composition and the share of the working-age population.

In Kazakhstan, the analysis of labor resources has been developing in the context of economic modernization and demographic change. One significant direction includes labor market studies conducted by Sabirova (2020) and Kaliyeva (2020), who examined skill mismatches between workforce qualifications and employer needs, as well as challenges related to youth employment. Aliyeva (2025) analyzed the impact of state employment policy on regional disparities in labor activity. Particular attention to labor market digitalization is given by Insebayeva and Beyssembayev (2023), who study the effects of digital platforms on employment structures and skill demand. Beisembina (2025) examines the development of human capital and the quality of labor resources in Kazakhstan.

Joint studies by KISI (the Kazakhstan Institute for Strategic Studies) also analyze the impact of demographic challenges on youth employment growth and substantiate the need to enhance the efficiency of labor resource utilization in the context of the transition to an innovation-driven economy (KISI, 2025). Thus, both domestic and international studies form a comprehensive theoretical and empirical foundation for analyzing Kazakhstan's labor market. They emphasize the importance of human capital, institutional factors, demographic dynamics, and technological change in shaping a high-quality labor potential.

Methodology

The methodological framework of the study is based on a comprehensive approach to examining the dynamics and structure of labor resources in the Republic of Kazakhstan over the period 2019-2024. The research employs comparative, structural, descriptive, economic–statistical, and trend analysis methods, which made it possible to identify key patterns in labor market development and to assess the impact of demographic, economic, and institutional factors on its formation.

The methodological concept of the study is based on an integrated approach to the analysis of the dynamics and structural changes of the labor resources of the Republic of Kazakhstan for the period 2019-2024 and includes a sequence of interrelated analytical stages. At the first stage, a theoretical and methodological research base was formed,

including an analysis of domestic and foreign scientific publications on the labor market, human capital and structural transformation of employment, as well as the study of international and national regulatory documents in the field of employment and qualifications. At the second stage, empirical data was collected and systematized based on official statistics from the Bureau of National Statistics of the Republic of Kazakhstan, materials from sample surveys of the labor force and administrative data from bodies implementing state employment policy. The comparability of the indicators has been verified, taking into account the methodology of the ILO and changes in national legal norms. At the third stage, comparative and structural analysis methods were applied to assess changes in the level of employment, unemployment and economic activity of the population, as well as transformations in the age, gender, educational and sectoral structure of the workforce. At the fourth stage, economic and statistical methods were used, including the calculation of relative indicators, growth rates, shares and indices, which made it possible to quantify the dynamics of key characteristics of the labor market and the quality of the workforce. At the fifth stage, a trend analysis was conducted aimed at identifying sustainable trends and long-term trajectories of labor development in the context of demographic changes and digital transformation of the economy. At the final stage, the interpretation of the results was carried out, conclusions and practice-oriented recommendations were formulated, aimed at improving state policy in the field of workforce development, human capital and forecasting labor market needs.

Comparative analysis was used to examine changes in employment, unemployment, and economic activity indicators over time, as well as to assess differences by gender. Age groups and types of economic activity. Structural analysis enabled the identification of the distribution proportions of labor resources across economic sectors, the determination of dominant industries, and the tracking of changes in the occupational and qualification structure of the workforce.

Economic and statistical methods included the calculation of relative and average values, growth rates, shares, and indices of real and nominal wages, providing a quantitative assessment of the ongoing changes. Trend analysis was applied to identify dynamic patterns and to determine the presence of long-term trajectories in labor market development.

The empirical basis of the study was formed using data from the Bureau of National Statistics (2024), regulatory and legal acts governing employment and qualification systems, statistical compilations, and materials from academic publications. The processing of the collected information involved methods of systematization, aggregation, and tabular and graphical data presentation, ensuring the clarity and reliability of the results obtained. This methodological approach made it possible to conduct a comprehensive analysis of labor resources and to draw well-founded conclusions regarding the current state and prospects of Kazakhstan's labor market.

Results

Given that the structure of employment has a significant impact on socio-economic development, the following section analysis the dynamics of labor resources. The analysis of labor resource dynamics indicates that the overall level of employment in the

Republic of Kazakhstan remains consistently high. In 2024, the employment-to-population ratio amounted to 65%, while the unemployment rate stood at 4.7% (Figure 1).

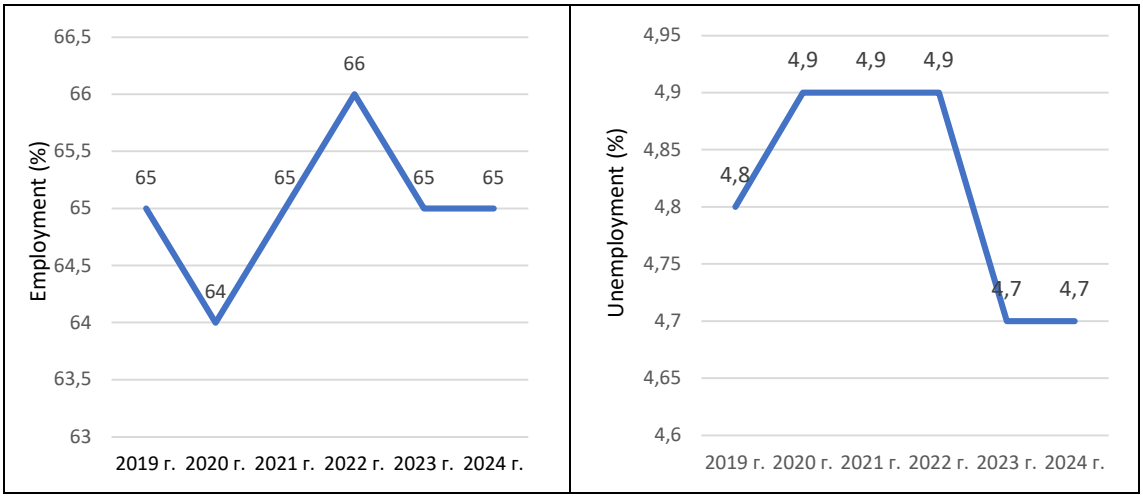


Figure 1. The level of employment and unemployment in Kazakhstan for 2019-2024

In 2024, the unemployment rate, calculated in accordance with the ILO methodology, remained stable compared to 2023 and amounted to 4.7%. As of the end of December 2024, a total of 191.9 thousand individuals were registered as unemployed with the employment authorities of the Ministry of Labor and Social Protection of the population of the Republic of Kazakhstan. The share of registered unemployed in 2024 increased by 0.2 percentage points compared to 2023, reaching 2% of the labor force. The youth unemployment rate among individuals aged 15 to 34 amounted to 3.1% (Figure 2).

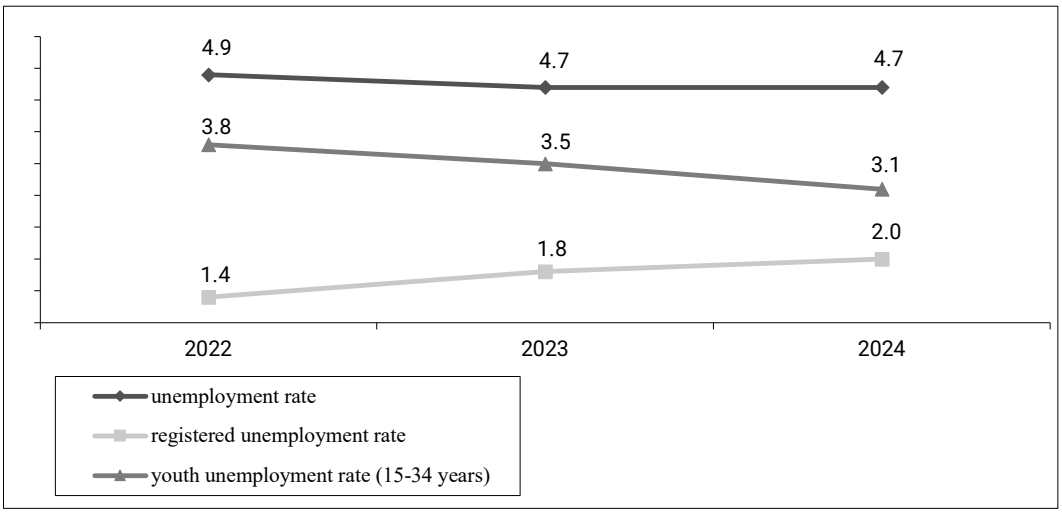


Figure 2. Unemployment rate, %

Following the 2020 pandemic, labor market trends indicate a confident recovery: the number of employed persons increased to 9.2 million, while the economically active population reached 9.66 million. The growth of the labor force can be attributed to population increase, rising educational attainment, improved conditions for labor migration, and the expansion of self-employment opportunities. According to the data presented in Table 1, between 2019 and 2024, the population of Kazakhstan increased by 8.9%, from 18.39 million to 20.03 million people, reflecting demographic growth and an expansion of the potential labor supply. In parallel, the labor force increased by 4.8%, while the employed population grew by 4.9%, indicating the economy's capacity to absorb additional labor supply while maintaining a relatively low unemployment rate of 4.7%.

Thus, the share of employed persons in the total population amounted to 65% in 2024, which is 0.2 percentage points higher than in 2019, despite a temporary decline in 2020-2021 due to the consequences of the pandemic. The absolute number of unemployed individuals in 2024 was slightly lower than in 2019, while the overall unemployment rate decreased from 4.8% to 4.7% (Table 1).

Table 1. Key labor market indicators in Kazakhstan for 2019-2024

Indicator	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Population size	18394642	18630920	18878966	19503159	19766 807	2003384 2
Labor force, thousand persons	9 221,5	9 180,8	9 256,8	9 429,8	9 534,1	9664,0
Employed population	8 780,8	8 732,0	8 807,1	8 971,5	9 081,9	9214,2
Employees, thousands of persons	6 681,6	6 686,7	6 710,2	6 847,3	6 893,4	7015,1
Self-employed population, thousand persons	2 099,2	2 045,4	2 096,9	2 124,2	2 188,5	2199,1
Unemployed population, thousand persons	440,7	448,8	449,6	458,3	452,2	449,8
Unemployment rate, %	4,8	4,9	4,9	4,9	4,7	4,7
Youth unemployment rate, % (aged 15-24)	3,6	3,8	3,7	3,8	3,8	3,7
Youth unemployment rate, % (aged 15-34)	3,7	3,8	3,8	3,8	3,5	3,1
Long-term unemployment rate, %	2,2	2,2	2,1	2,3	1,2	1,0
Average duration of unemployment, months	5,4	5,2	6,7	7,0	5,9	4,9
Persons outside the labor force, thousand persons	3 934,0	4 076,8	4 093,3	4 301,4	4 393,5	4512,8
*Data are based on ILO methodology and annual labor force sample surveys. **Changes in the legal definition of youth in Kazakhstan (extension of the upper age limit to 35 years since 2023) are taken into account.						

Note: compiled by the authors

This trend is characteristic of an economy that has experienced a shock (the pandemic), followed by recovery and a moderate improvement in labor market conditions. The number of employees increased throughout the entire period under review, indicating a strengthening of the formal sector and, most likely, growth in the number of jobs within organizations. At the same time, the number of self-employed individuals also increased, albeit at a more moderate pace, confirming the gradual reallocation of labor from informal and semi-formal employment towards more stable wage employment.

According to the data in Table 1, of the 9.2 million employed persons in 2024, 76.1% were employees and 23.9% were self-employed. This reflects the preservation of the overall employment structure alongside absolute growth in both categories: the number of employees increased by 4.99%, while self-employment rose by 4.7%. The simultaneous increase in both wage employment and self-employment against the backdrop of declining unemployment indicates an expansion of employment opportunities and a certain diversification of forms of economic participation. This trend corresponds to a process of structural transformation, whereby a portion of the self-employed is gradually integrated into the formal sector, while another segment consolidates within sustainable entrepreneurial activity.

The youth unemployment rate (ages 15-24) remains relatively stable but has shown a slight decline in recent years, which may be interpreted as an improvement in young people's entry conditions into the labor market. Unemployment indicators for the broader age group of 15-34 years also demonstrate a downward trend, reflecting reduced risks of prolonged transitions from education to stable employment.

The long-term unemployment rate (the share of individuals searching for a job for an extended period) declined by the end of the period compared to 2019-2020. This dynamic is positive, as long-term unemployment leads to skill depreciation and social marginalization. The reduction in this indicator may be attributed to stronger labor demand and more active employment policies.

The average duration of unemployment, measured in months, decreased by 2024 compared to its peak values in 2021-2022, indicating more effective job placement and increased "throughput capacity" of the labor market. A decline in this indicator contributes to reducing the social costs of unemployment and suggests improved matching between workers' qualifications and employers' requirements. The number of persons outside the labor force increased, which may be associated with both demographic factors (a growing share of inactive age groups) and institutional factors (extended education, caregiving responsibilities, and early exits from employment).

The age structure of the labor force is one of the key indicators of labor market conditions, economic productivity, and the quality of human capital (Republic of Kazakhstan, 2016). Kazakhstan, like most countries in the region, is facing demographic changes, including a declining share of youth and gradual population aging. In this context, the analysis of employment distribution by age groups becomes particularly relevant, as it allows for the identification of strategic risks and opportunities for labor market development. During the analyzed period, the number of employed persons increased from 8.78 million in 2019 to 9.21 million in 2024, corresponding to a growth

of 4.9%. Despite a temporary decline in employment in 2020 due to the impact of the COVID-19 pandemic, the subsequent years demonstrate steady recovery and gradual growth.

Employment growth was accompanied by changes in its age structure, reflecting underlying demographic processes (Table 2).

Table 2. Employed population by age group in Kazakhstan for 2019-2024, thousand persons

Year	Total	Including by age group, years						
		15	16-24	25-34	35-44	45-54	55-64	65 and over
2019	8780,829	333	1055,316	2697,658	2214,188	1825,603	930,965	56,766
2020	8732,040	634	1052,083	2645,787	2219,081	1809,399	936,799	68,257
2021	8807,113	194	1014,127	2619,867	2280,732	1839,710	982,186	70,297
2022	8971,539	508	931,181	2637,692	2470,136	1835,420	1019,885	76,717
2023	9081,920	298	942,032	2613,461	2537,309	1820,071	1076,616	92,133
2024	9214,184	299	970,787	2658,338	2581,886	1827,955	1073,383	101,536

Note: compiled by the authors

Thus, the age cohort of 35-44 years is the most numerous, increasing from 2.21 million persons in 2019 to 2.58 million in 2024. This group accounted for 28% of total employment, underscoring its central role in the country's production system. This cohort is characterized by a high level of professional qualifications, stable employment, and maximum economic activity. The growth in its size indicates a shift of the economic core toward mature age groups. The 25-34 age cohort accounts for approximately 20% of total employment (2.61-2.70 million persons in 2023-2024). Despite a slight decline in numbers after 2019, this group provides an inflow of young, skilled workers and remains the most mobile segment of the labor market. The decline may be associated with a demographic wave, as the cohort born during the fertility decline of the 1990s entered the 25-34 age range.

The 25-34 age cohort accounts for approximately 20% of total employment (2.61-2.70 million persons in 2023-2024). Despite a slight decline in numbers after 2019, this group provides an inflow of young, skilled workers and remains the most mobile segment of the labor market. The decline may be associated with a demographic wave, as cohorts born during the fertility decline of the 1990s entered the 28-34 age range. The share of the 45-54 age group has also remained at around 20% (1.82-1.84 million persons). This cohort consists of experienced professionals, often occupying managerial positions. Its stability highlights its importance for the reproduction of skilled labor.

Youth employment (up to 28 years of age) shows a downward trend. The number of individuals aged 16-24 decreased from 1.05 million in 2019 to 0.93 million in 2022. This decline can be attributed to the demographic downturn of the early 2000s, intensified competition in the labor market, longer durations of education, and difficulties associated with first-time employment. These factors may pose potential risks of a shortage of young workers in the medium term. The increase in the number of employed persons aged 55-64, from 930 thousand to 1.07 million, can, in our view, be explained by the increase in

the retirement age, the active labor market participation of pre-retirement individuals, and the development of non-standard forms of employment that are more suitable for older workers.

The increase in the number of employed persons aged 65 and over during the period 2019-2024 amounted to 44.8 thousand individuals and is associated with improvements in the health status of older people, rising life expectancy, and the expansion of the service sector and self-employment opportunities. Thus, the core of the labor force consists of workers aged 29-54, who account for 68% of total employment, or nearly two-thirds of all workers in the country. The predominance of individuals aged 35-44 (approximately 2.58 million persons) and 29-34 (over 1.85 million persons) is particularly notable. In percentage terms, the distribution is as follows: individuals aged 35-44 account for 28% of total employment; those aged 29-35 account for 20%; the 45-54 age group accounts for 20%; youth (under 28 years of age) account for approximately 19%. At the same time, the labor force is undergoing an aging process, characterized by a declining share of youth and increasing participation of older workers. These trends necessitate the adaptation of employment policies, vocational education systems, and social protection mechanisms.

The identified trends of labor resource dynamics make it possible to further assess the gender structure of employment in greater detail (Figure 3).

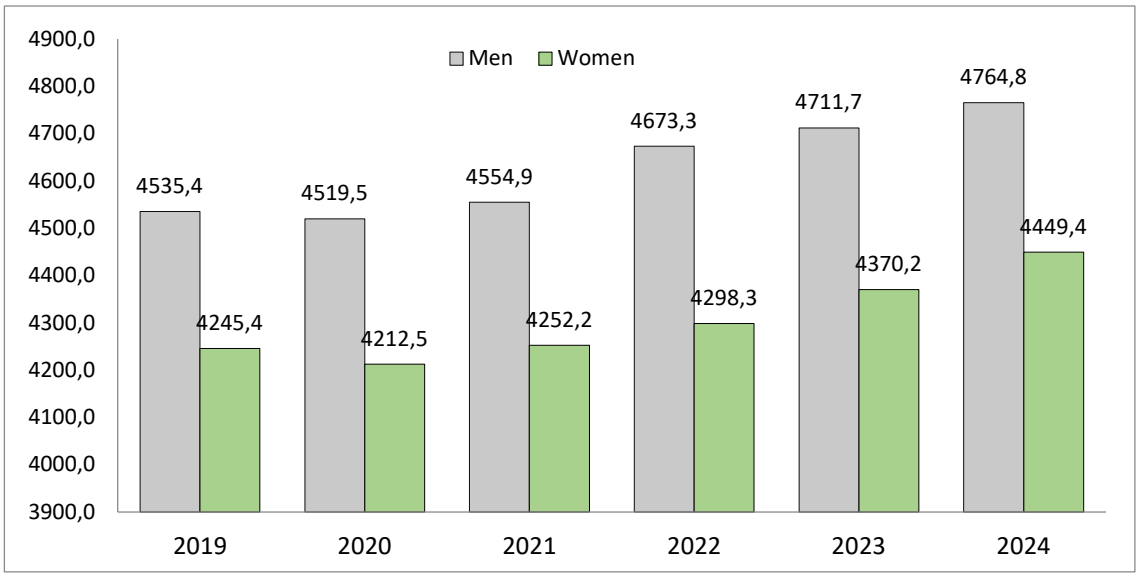


Figure 3. Employed population by gender in Kazakhstan for 2019-2024

The gender structure of the labor market reveals a certain degree of asymmetry. In 2024, the labor force participation rate among men amounted to 73.5%, while among women it was approximately 63.3%. At the same time, 36.7% of women were outside the labor force. Consequently, the gender gap in employment levels reaches around 10 percentage points. However, this gap has been gradually narrowing due to the increasing share of women with higher education and the development of flexible forms of employment. According to the data presented in Table 3, an analysis of statistical

indicators for 2022-2024 reveals several key trends: an increase in the share of workers with higher education, a rise in the educational attainment of the self-employed, and changes in the proportions between wage employees and self-employed individuals.

Additional data for in-depth analysis: annual industry breakdown of employment (the number of women and men in each industry), regional salary structure, distribution by job level and age cohort, and data on bonuses and administrative payments. These additional variables will allow us to more accurately identify the specific factors that caused the widening gap in 2023 and where targeted interventions are needed.

Table 3 presents the calculated gender pay gap alongside primary wage data, providing a consolidated view of key indicators for this period.

Table 3. Employed population by employment status and educational attainment for 2019-2024, thousand persons

Indicator	Year	Population with educational attainment. total	Including		
			Higher and postgraduate education	Technical and vocational education	Primary, lower secondary, and general secondary education
Employed population, total (persons)	2019	8 780, 829	3 422,471	-	1 656,419
	2020	8 732, 040	3 709,231	-	1 591,817
	2021	8 807,113	28,016	-	5 241,734
	2022	8 971,539	4 017,424	4 370,784	583,331
	2023	9 081,920	3 982,708	4 471,157	628,055
	2024	9 214,184	3 915,025	4 741,623	557,536
Wage employees (persons)	2019	6 697,623	2 923,428	-	985,010
	2020	6 686,666	3 142,199	-	928,445
	2021	6 710,206	26,070	-	3 685,021
	2022	6 847,300	3 324,412	3 236,262	286,626
	2023	6 893,429	3 294,190	3 284,438	314,801
	2024	7 015,108	3 256,473	3 472,657	285,978
Self-employed workers (persons)	2019	-	-	-	-
	2020	-	-	-	-
	2021	-	-	-	-
	2022	2 124,239	693,012	1 134,522	296,705
	2023	2 188,491	688,518	1 186,719	313,254
	2024	2 199,076	658,552	1 268,966	271,558

Note: compiled by the authors

The analysis demonstrates a gradual modernization of human capital and a structural transformation of the labor market. In terms of educational attainment, the employment structure is as follows: 42.5% of employed individuals have higher and postgraduate education; 51.5% have technical and vocational education; 6% have secondary or lower levels of education. This indicates that nearly every second worker possesses higher education, and the share of skilled labor continues to increase steadily. Compared to 2019, the growth in the proportion of individuals with higher education is estimated at approximately +3 percentage points, which is consistent with trends in economic digitalization and the modernization of labor potential.

During 2022-2024, a stable upward trend in the number of workers with higher and technical education was observed, reflecting qualitative growth in human capital. Despite a moderate decline in the number of employed individuals with higher education in 2023-2024 (a decrease of 2.5% compared to 2022, corresponding to a reduction of 34.7 thousand persons in 2023 and an additional 67.7 thousand persons in 2024), this category remains the largest in absolute terms. It accounts for approximately 42-44% of total employment and constitutes the core segment of the skilled workforce. This decline may be associated with demographic factors, migration dynamics, and the redistribution of employment across educational levels. The analysis revealed a steady increase in the number of employed persons with technical and vocational education: by 100.4 thousand in 2023 and by 270.4 thousand in 2024. The total increase over the two years amounted to 370.8 thousand persons, or approximately 8.5%.

At the same time, the dynamics of employment among individuals with primary, lower secondary, and general secondary education were uneven. In 2023, their number increased by 44.7 thousand, followed by a decline of 70.5 thousand in 2024; overall, however, the figures remained within the range of 0.55-0.63 million persons. The main contributing factors include the displacement of unskilled labor, modernization of economic sectors, the growing importance of education and qualifications, and generational replacement effects, whereby younger cohorts are more educated than older ones.

Thus, the employment structure is increasingly dominated by skilled workers. The two largest groups – those with higher education and those with technical and vocational higher education – together accounted for more than 90% of total employment in 2024. The fastest growth is observed in the technical and vocational education group, reflecting the industrial and service-oriented transformation of the economy. The group with lower levels of education is shrinking, indicating a reallocation of labor toward more highly skilled occupations. Having analyzed the distribution of employment by gender and age, the discussion now turns to the sectoral structure of the labor market. The sectoral composition also exhibits signs of structural transformation. The largest sectors in terms of employment in 2024 are presented in Table 4.

Table 4. Sectoral structure of employment

Sector	Share of employment, %	Change, 2019→2024
Trade and motor vehicle repair	16,6	+0,7 p.p.
Education	13,0	+0,9 p.p.
Industry	12,6	+0,2 p.p.
Agriculture	11,2	-1,8 p.p.
Transportation and storage	7,3	+0,4 p.p.
Construction	7,2	+0,5 p.p.
Healthcare and social services	6,3	+0,5 p.p.
Other services	4,2	+0,8 p.p.

Note: compiled by the authors

A comparison between 2019 and 2024 reveals a noticeable decline in employment in the agricultural sector (from 1.18 million to 1.03 million persons, or a decrease of 13%), alongside simultaneous growth in trade, education, construction, and services. This

is a transition from a resource–based economy toward a service-oriented model. Employment is also increasing in the information and communication sector (+16,8%) and in financial activities (+6.3%), confirming the ongoing process of digitalization and the transition to a knowledge-based economy (Table 5).

Table 5. Employed population by major economic activities, thousand persons

Indicator	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Employed in the economy, total	8 780,8	8 732,0	8 807,1	8 971,5	9 081,9	9214,2
Agriculture, forestry, and fishing	1184,7	1175,1	1176,4	1108,9	1078,7	1 027,9
Industry	1094,9	1089,2	1098,0	1121,2	1121,5	1 157,8
Mining and quarrying	279,9	276,9	277,9	274,8	277,5	284,3
Manufacturing	583,6	581,8	585,6	613,7	605,6	625,9
Electricity, gas, steam, hot water supply, and air conditioning	150,2	149,0	150,1	148,1	148,9	155,1
Water supply; waste collection, treatment, and disposal; remediation activities	81,2	81,5	84,3	84,6	89,6	0,1
Construction	635,6	630,9	641,4	658,9	642,3	665,5
Wholesale and retail trade; repair of motor vehicles and motorcycles	1431,1	1421,3	1451,9	1497,9	1515,1	1 529,0
Transportation and storage	637,9	617,5	609,5	640,6	647,7	670,1
Accommodation and food service activities	196,9	193,7	190,9	198,4	214,3	232,5
Information and communication	161,7	159,7	161,7	166,5	187,8	188,5
Financial and insurance activities	190,5	189,0	184,9	186,3	201,7	202,5
Real estate activities	154,5	158,4	168,4	166,1	151,1	162,9
Professional, scientific, and technical activities	256,4	254,7	247,3	253,7	265,0	263,6
Administrative and support service activities	292,3	285,5	287,5	280,8	272,8	277,2
Public administration and defense; compulsory social security	495,3	489,3	484,1	508,5	523,7	517,0
Education	1108,7	1109,5	1120,1	1142,3	1183,0	1 198,4
Human health and social work activities	502,7	512,4	526,0	561,2	577,5	583,9
Arts, entertainment, and recreation	142,0	138,4	134,7	137,9	139,4	154,2
Other service activities	295,8	307,5	324,4	342,5	360,2	383,3

Note: compiled by the authors

Thus, the growth of the services sector, ICT, logistics, and financial activities aligns with the global trend of digitalization and the transition to a knowledge-based economy. A logical continuation of the analysis of sectoral employment distribution is the study of wage dynamics. In 2023, the nominal wage index increased to 115.3 (2019-100);

however, the real wage index amounted to only 102.7, indicating a decline in purchasing power of 5-6% due to inflation. Therefore, nominal wages show a stable upward trend, while real wages are declining under the influence of inflation. Despite the growth in nominal incomes, real household incomes are decreasing, posing challenges for ensuring an adequate standard of living and necessitating adjustments in wage policy and social protection measures. It is also notable that the real wage index decreased from 108.8 in 2021 to 102.7 in 2023 (Figure 4).

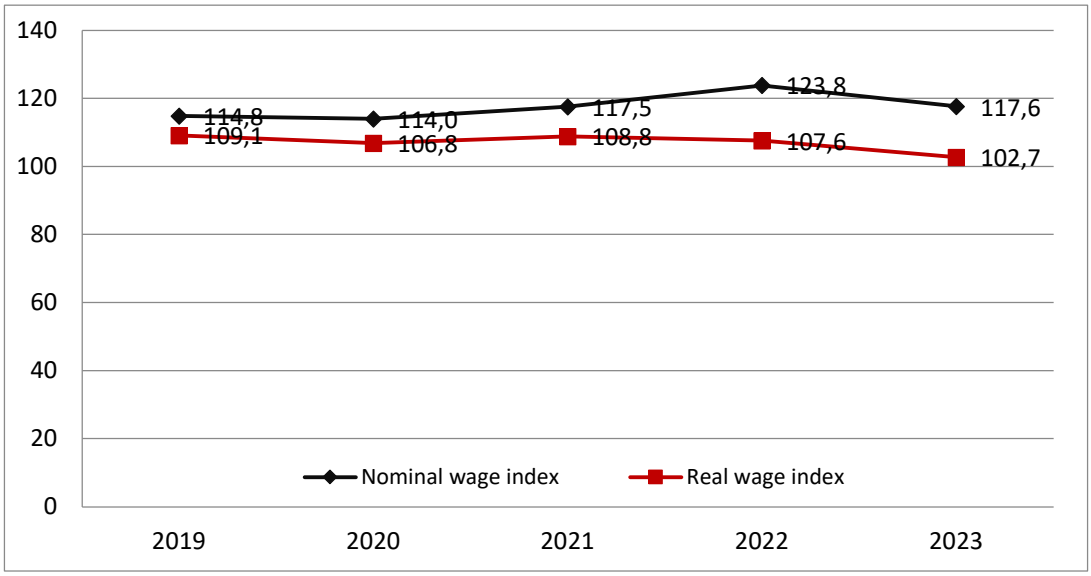


Figure 4. Nominal and real wage indices for 2019-2023

This gap reflects the decline in household purchasing power, the influence of macroeconomic factors, and the need to modernize the wage system. The analysis of the dynamics and structure of Kazakhstan's labor resources for 2019-2024 allows the following conclusions.

(1) The labor market is resilient, demonstrating a high employment level (65%) and low unemployment (4.7%).

(2) Structural renewal of employment is occurring – occurring-the formal sector is expanding, long-term unemployment is decreasing, and youth unemployment is stabilizing.

(3) Educational and professional modernization of the workforce is evident, with technical and higher-educated personnel dominating.

(4) The services sector is becoming the leading driver of employment, consistent with the global trend toward digitalization and the knowledge-based economy.

(5) The main challenge remains the decline in real wages, necessitating improvements in income regulation mechanisms and increased labor productivity.

In Kazakhstan, the qualifications and competencies of labor resources are regulated and developed through the National Qualification System (hereinafter – NQS). The NQS represents a comprehensive set of legal and institutional tools aimed at aligning the

demand for qualified personnel from the labor market with the supply of qualifications from the education system (Republic of Kazakhstan, 2023).

The NQS is a systematic description of qualification levels recognized in Kazakhstan's labor market. The NQS consists of eight levels, each of which defines the requirements for workers' knowledge, skills, and competencies and includes:

(1) Professional standards – documents establishing general requirements for knowledge, skills, abilities, and work experience in a specific professional field. For example, in human resource management, standards have been approved for strategic HR, organizational development, and workforce planning, recruitment, and other areas.

(2) Qualification assessment and recognition centers – accredited organizations that evaluate and recognize candidates' professional qualifications. Recognition can be mandatory or voluntary, depending on industry and employer requirements.

The NQS is designed to align educational programs with employer demands, improve workforce quality, and develop a competitive human capital potential.

Conclusions

The conducted analysis of the transformation of labor resources in the Republic of Kazakhstan for 2019-2024 allows for a number of substantive conclusions, reflecting key trends and challenges in the development of the national labor market.

Firstly, during the analyzed period, the labor market was characterized by relative stability and gradual recovery following the crises triggered by the 2020 pandemic. Employment levels remained resilient, and unemployment rates stayed low, indicating the economy's capacity to adapt to both external and internal challenges.

Secondly, the study of the structure of the economically active population revealed gender and age differences. Men exhibit higher labor force participation, while a significant proportion of women remain outside the labor force. The age structure of employment shows a concentration of workers in the most productive age groups (29-44 years), providing favorable potential for economic growth while simultaneously requiring strategic attention to support young specialists and pre-retirement workers.

Thirdly, sectoral analysis indicates that Kazakhstan's employment structure remains multi-sectoral. The largest contributions to total employment come from trade, education, industry, and agriculture. At the same time, the role of the services sector – including ICT, finance, logistics, and other areas linked to the digital transformation of the economy-is increasing. These changes reflect a gradual transition toward a knowledge-based economy and the growing complexity of professional requirements.

Fourthly, wage dynamics analysis revealed a discrepancy between nominal income growth and the decline of real wages due to inflation. This highlights the need to adjust social protection mechanisms and improve the wage system to strengthen household purchasing power and reduce inequality.

Fifthly, the NQS plays a particularly important role in the development of labor resources, serving as a key tool to ensure alignment between employer demand and the supply of qualification. The introduction of professional standards and the development of qualification assessment and recognition systems contribute to improving the quality of human capital and fostering sustainable employment in the long term.

Overall, the results indicate that Kazakhstan's labor market development in 2019-2024 occurred under conditions of moderate growth and gradual structural transformation. Key directions for improving state police in the field of labor resources include increasing real incomes, expanding employment opportunities for vulnerable groups, promoting formal employment, developing professional competencies, and implementing tools for forecasting labor market needs. Consistent implementation of these measures will ensure sustainable development of the country's labor potential and enhance the quality of human capital.

Recommendations:

1. Support for youth and women in the labor market – including expanding professional orientation programs, internships, subsidized employment opportunities, accessible retraining measures, the development of flexible employment forms, and the creation of conditions that enable balancing work and family responsibilities.
2. Promotion of formal employment and entrepreneurship – through the development and implementation of state measures to reduce administrative barriers, provide tax incentives for microbusinesses, promote digital business registration, and expand access to microfinance programs. These measures will facilitate the transition of informal activities into the formal sector and strengthen economic activity among the population.
3. Implementation of progressive professional standards and NQS mechanisms – to ensure that the qualification structure of labor resources meets the needs of modern economic sectors. Active updating of professional standards, development of qualification assessment centers, and integration of NQS into educational programs will improve workforce quality, mobility, and alignment of competencies with employer requirements.
4. Ensuring control over inflation and growth of real incomes – through strengthening anti – inflationary policies, modernizing wage systems, and ensuring transparency in wage indexation mechanisms. These measures will help maintain real income levels and stimulate domestic demand, a critical factor for economic growth.
5. Development of a labor demand forecasting system – rapid structural changes in the economy require timely forecasting of future demand for professions and competencies. Creating continuously updated forecasting models and integrating labor market, education, and demographic data will enhance workforce planning efficiency. This will serve as a basis for designing educational programs oriented toward future – oriented industries and reduce mismatches between labor supply and demand.

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Conceptualisation and theoretical framework: MK and IB; research design and methodology: TK; data collection and processing: MK, IB and TK; bibliometric analysis and interpretation: MK, IB and TK; case study analysis and visualisation: MK, IB and TK; draft writing and manuscript structure: MK and IB; editing and critical revision: IB and TK; final review and approval: MK and TK. All authors have read and approved the final version of the manuscript and agreed to its publication.

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