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Development Prospects Labor Income of the Population of the Republic of Kazakhstan: Economic Efficiency and Priorities of Regulation

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ABSTRACT

This study examines the main factors influencing the formation of labor resources, which are interconnected with demographic changes that affect labor resources and, as a result, economic growth. This, of course, depends on several complex factors, including the nature and pace of demographic change, the functioning of labor and capital markets, macroeconomic and trade policy management, and the management and accumulation of human capital. However, the labor change model can take into account significant differences in past economic performance between regions and helps to identify more and less promising conditions for future economic growth. Understanding the challenges and implications of a country's changing population size and age structure, population replacement trends and prospects, and the links between demographic processes and labor and income generation will help the government develop policies that build on the economic potential inherent in the changes that are currently taking place.

INTRODUCTION

Ensuring the rational use of labor resources in all regions of the country is one of the most important tasks of the socio-economic development of the economic complex of Kazakhstan. To solve it, an objective assessment of the labor resources available to the society, the needs of the economic complex in the labor force and ways for the most efficient and complete use of labor resources in the country and regions, based on the interests of the whole society, is required.

The world is undergoing unprecedented demographic change, with important economic implications that are clearly affecting the workforce. The size, growth, age structure and geographical distribution of the population affect the economy due to the systematic features of the human life cycle. Labor productivity is highest in the middle years of life, and hence the increase in population in middle age makes a direct contribution to national production. The "dependent" population in young and old age consumes much more than it produces with its own labor, which affects the standard of living and the transfer between generations. The global economic impact of the population reflects national differences in the life cycle, interacting with national differences in demographic changes and productivity (Mason and Lee, 2022).

1. LITERATURE REVIEW

The aggravation of the global environmental crisis is associated with a population explosion and the need to meet the growing material needs of people, which leads to the expansion of the scale of economic activity. To consider the labor incomes of the population, it is necessary to understand the labor resources, which occupy an important place and are one of the indicators, the state of which makes it possible to judge the national well-being, stability and effectiveness of socio-economic transformations (Okuneviciute Neverauskiene et al., 2021; Kamarudin et al., 2021).

Some authors believe that labor resources are a category that occupies an intermediate position between the economic categories "labor potential" and "total labor force". They note that labor resources are the able-bodied part of the population, which, having physical or intellectual capabilities, is able to produce material goods and provide services. For example, some argue that "*labor resources are the part of the population of a country capable of participating in the national economy at a given level of development of the productive forces and within the framework of given production relations*."

Labor resources are the part of the population that has the necessary physical and intellectual abilities and knowledge to work in any field. From this definition, it means that labor resources include both real workers who are already employed in the country's economy, and potential workers who are not employed, but can work. Labor resources are a set of people with the ability to work, along with many others. When analyzing them, the task is to explore a certain category of the population with all its inherent abilities and needs, and above all, to work.

Age profiles of consumption and labor income were constructed using methods from NTA (Lee, 2014), (Mason et al. 2017). Age profiles were constructed for 186 countries, of which 60 (accounting for 85% of the world's population) were estimated directly by national research teams in the NTA network (www.ntaccounts.org). Profiles for another 126 countries were estimated indirectly using the methods described in the SI (Mason et al., 2017). Many economists expect population aging to lead to an increase in the capital-labor ratio (deepening of capital), which will increase labor productivity, lower interest rates, and increase output (Eggertsson et al., 2019; Rasticova et al., 2019; Gorzen-Mitka et al., 2017). Capital deepening is expected because more wealth per capita will be needed to fund longer retirements, and the proportion of older people who own wealth will rise. However, retirement wealth can take two forms:

- The first is real or financial assets such as accumulated pension funds, retirement accounts, equity in a home, business or farm.
- Another form is "*transfer wealth*" - the expected value of net future support from the family or, typically, from unfunded public pensions, health care, or long-term care that support older people but rely heavily on taxes paid by adults people of the first age. Unlike capital, transfer wealth does not increase productivity or output and is a liability for future generations.

The results of a study by M. Mustofa (2022) showed that the level of education, work experience, gender, marital status, vocational training, and hours worked, digital devices and job status affect labor income. The impact of output and wages on labor demand was reviewed by Fakhri J. Hasanov, Jeyhun I. Mikayilov, Muhammad Javid, Moayad Al-Rasasi, Frederick Joutz & Mohammed B. Alabdullah (2021). Based on the influence function regression method, Luca Bonacini, Giovanni Gallo & Sergio Scicchitano (2021) explore the potential consequences in the distribution of labor income.

According to Baert S., Lippens L., Moens E., Sterkens P., Weytjens J. (2020), Alon T. (2020) "*many businesses are widely adopting work-from-home and telecommuting options. It is likely that some of these changes continue, leading to greater job flexibility in the future*". Many scholars are investigating the income growth generated by remote jobs (Adams-Prassl et al., 2020; Dingel and Neiman, 2020; Koren and Peto, 2020; Leibovici et al. 2020; Mongey et al., 2020).

An analysis of the current state of labor mobility and the prospects for its development within the framework of the general strategy of the third modernization allows us to determine the following main goals for regulating these processes.

- Ensuring the needs of the economy in the necessary labor force, subordinating migration to the solution of medium-term and long-term goals and objectives of the country's socio-economic development.
- Formation of an optimal system of population resettlement across the territory of the Republic of Kazakhstan.
- Ensuring the national security of the Republic of Kazakhstan in the context of threats associated with migration.

Economists continue to express concern about downward pressure on economic growth from labor and capital shortages and falling asset prices going forward as a growing and older cohort of older people seek to support themselves by eliminating investment. Another major problem is related to fiscal stress. The public treasury will be strained by rising pension obligations and spending on health care and long-term care associated with an expected increase in the incidence and prevalence of chronic diseases.

Human populations experience a demographic transition at different times and at different rates (Kashnitsky et al. 2021). While rapidly growing population growth and persistently high birth rates continue to be major challenges in the least developed countries. As a result of such global changes in socio-economic indicators, changes have certainly been made to the implementation of strategies for full and partial localization, ensuring that economic and social goals are adapted in accordance with the socio-economic policies of states. Knowledge of the impact of regional economic well-being on global resource use and environmental emissions has increased significantly in recent years, according to L. Yang et al. (2020).

If we consider the development of labor resources and labor incomes, then in Kazakhstan the regions have distinctive features depending on the level of socio-economic development, human resources, production potential, innovation activity, which depend on:

- activation of investments and support of the innovative environment in priority sectors of the economy, development of entrepreneurship, advanced training of personnel;
- improving the quality of urban services, using the resources of the innovative environment of a single-industry town.

2. METHODOLOGY

The factors that influence the development of labor resources and, in the future, the formation of labor income can be seen in accordance with the data presented in Table 1.

Table 1. Summary table of factors influencing the development of labor resources and the formation of labor incomes of the population

Year	*Population, thousand people*	*Number of births*	*Number of dead*	*Natural growth*	*General birth rate per 1000 people*	*General mortality rate per 1000 people*	*Natural increase per 1000 people*	*Total fertility rate*
01.11	16 324	367 752	145 875	221 877	22.5	8.9	13.6	2.60
01.12	16 559	372 544	144 213	228 331	22.5	8.7	13.8	2.59
01.13	16 900	379 121	141 220	237 901	22.5	8.4	14.1	2.62
01.14	17 035	393 421	137 630	255 791	22.7	8.0	14.7	2.64
01.15	17 289	401 066	132 236	268 830	23.1	7.6	15.5	2.76
01.16	17 557	398 561	131 867	266 694	22.7	7.5	15.2	2.73
01.17	17 818	400 640	131 373	269 567	22.52	7.4	15.6	2.8
01.18	18 014	390 520	130 033	260 487	21.7	7.2	14.4	2.73
01.19	18 137	397 947	130 515	267 432	21.8	7.1	14.7	2.84
01.20	18 448	403 064	133 489	269 575	21.8	7.2	14.6	2.90
01.21	18 632	425 625	162 613	263 062	22.8	8.7	12.5	3.13

Source*:* compiled by the authors according to Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan

The increase in population in the last 5 years would have been even greater (260–270 thousand people) if it were not for the increasing migration loss, which also affects labor resources and the formation of labor incomes (Table 2).

Table 2. Population growth

Year	*Population*	*Population growth*
01.11	16 148 504	1.22 %
01.12	16 372 451	1.39 %
01.13	16 621 809	1.52 %
01.14	16 889 949	1.61 %
01.15	17 165 505	1.63 %
01.16	17 438 422	1.59 %
01.17	17 702 163	1.51 %
01.18	17 956 486	1.44 %
01.19	18 200 804	1.36 %
01.20	18 436 475	1.29 %
01.21	18 664 683	1.24 %

Source*:* compiled by the authors according to Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan

The population of the country as of March 1, 2021 amounted to 18,917.2 thousand people, including urban - 11 million 187.2 thousand (59.1 percent), rural - 7 million 730 thousand - 40.9 percent of people. Compared to March 1, 2020, the population increased by 245.3 thousand people, or 1.3 percent. The natural population growth in January-February 2021 amounted to 42 thousand people (increased by 0.2 percent compared to January-February 2020). The total coefficient of natural increase per 1000 population was 13.71. The state policy in relation to labor resources should be aimed at achieving a demographic optimum, which implies such a population reproduction regime in which the demographic situation is in a relatively equilibrium state. The demographic optimum includes the optimal intensity of birth and death processes, as well as the reproduction of demographic structures and population migration (Table 3).

Table 3. Number of those who left the Republic of Kazakhstan (human)

Regions	01.11	01.12	01.13	01.14	01.15	01.16	01.17	01.18	01.19	01.20	01.21
Republic of Kazakhstan	26541	32920	29722	24384	28946	30047	34900	37725	41868	45225	29 088
Akmola	2 247	3 013	2 758	2 291	2 466	2 569	2 569	2 875	2 926	3 208	1 934
Aktuibinsk	757	888	853	647	531	722	833	1 131	1 360	1 958	1 618
Almaty	1 394	1 457	1 531	1 189	942	859	1 035	1 003	1 269	1 380	1 236
Atyrau	181	163	105	169	145	170	146	129	244	345	256
West Kazakhstan	1 149	1 510	1 153	865	801	989	770	1 080	1 557	1 770	1 095
Zhambyl	1 042	665	779	800	1 242	1 111	1 032	1 044	941	1 166	1 005
Karaganda	3 445	4 094	3 796	3 519	4 346	4 661	6 090	6 228	5 664	5 776	4 106
Kostanay	2 686	3 758	3 185	2 718	3 873	3 359	4 356	5 047	6 056	5 708	3 347
Kyzylorda	62	55	36	35	34	59	65	55	72	75	52
Mangistau	658	600	550	541	718	523	379	474	503	567	245
Pavlodar	1 998	3 014	2 929	2 578	2 965	3 395	4 419	4 382	4 590	5 594	3 166
North Kazakhstan	2 592	3 692	2 915	2 673	3 391	2 986	3 276	3 445	3 890	4 315	2 352
Turkestan*	836	867	690	703	785	885	723	741	331	350	212
East Kazakhstan	4 099	5 142	4 882	3 164	3 682	4 219	4 330	5 117	6 269	7 143	3 868
Nur-Sultan city	871	956	625	453	612	660	1 158	1 439	1 955	1 851	1 414
Almaty city	2 524	3 046	2 935	2 039	2 413	2 880	3 719	3 535	3 545	3 622	2 650
Shymkent city	-	-	-	-	-	-	-	-	696	397	532

Source*:* compiled by the authors according to Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan

According to the data presented in Table 3, a positive balance of migration has developed in four regions of the country:

- Almaty (7,955 people);
- Shymkent (5,681 people);
- Nur-Sultan (6,260 people);
- Mangistau region (319 people).

Thus, we can draw the following conclusions that in the modern world, part of the developed countries in terms of labor resources are experiencing a demographic crisis, while the other part is trying to avoid this or minimize the negative effect through the implementation of state programs to stimulate the birth rate and attract migrants. Most of the developed countries are faced with two interrelated global challenges - a declining birth rate and an aging population.

By improving health care and food quality, the life expectancy of the population increases, while the reduction in the birth rate in the country leads to the aging of most of the population, thereby increasing the burden on the state budget due to increased spending on healthcare and pensions. In terms of regions, it can be seen that an increase in the share of retirement age takes place almost everywhere. A significant increase in this indicator is observed in the East Kazakhstan region and in Almaty. At the same time, there is a decrease in this indicator in Atyrau and Kyzylorda regions (Figure 1).

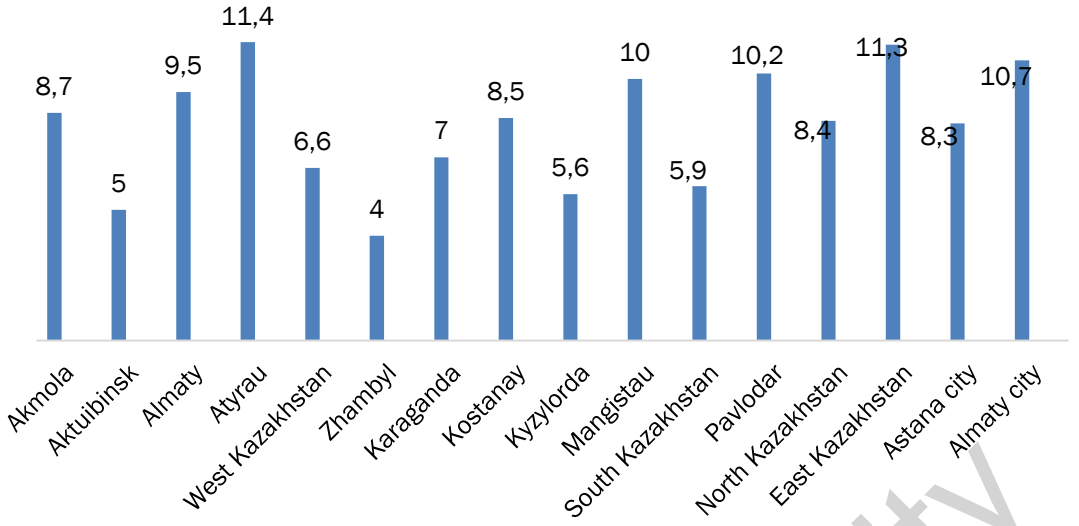

Figure 1. Comparative analysis by regions of the Republic of Kazakhstan

Source*:* compiled by the authors

On the 14th of April 2022, a government decree approved the Program to increase the income of the population until 2025. Moreover, based on the document, it implies an increase in salaries for state employees, an increase in the number of new jobs and protection of the purchasing power of the population's income. We are talking about the fact that the state intends to take systemic measures so that the wages of Kazakhstan do not depreciate as quickly as they do now.

Consider the trend in the development of incomes and expenditures of the population, which can be seen in Table 4.

Table 4. Income development trend and household consumption

Indicator	*01.11*	*01.12*	*01.13*	*01.14*	*01.15*	*01.16*	*01.17*	*01.18*	*01.19*	*01.20*	*01.21*
Per capita nominal cash income population, tenge	39014	45 918	51860	56453	62271	67321	76575	83710	93135	104282	116126
Index of nominal cash income, as a percentage of the previous year	113,8	117,7	112,9	108,9	110,3	108,1	113,7	109,3	111,3	112,1	111,4
Index of real money income, as a percentage of the previous year	106,3	108,7	107,5	102,9	103,4	101,4	99,3	101,8	105,0	106,4	104,3
Subsistence minimum (average per capita), tenge	13487	16 072	16815	17789	19068	19647	21612	23783	27072	29342	33 015
Share population with	6,5	5,5	3,8	2,9	2,8	2,7	2,6	2,7	4,3	4,3	5,3

income below the subsistence level, in percent											
Per capita nominal cash household income, tenge	39014	45 918	51860	56453	62271	67321	76575	83710	93135	104282	116126
Nominal cash income index, as a percentage of the previous year	113,8	117,7	112,9	108,9	110,3	108,1	113,7	109,3	111,3	112,1	111,4

Source*:* compiled by the authors according to Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan

Nevertheless, despite the growth in nominal cash incomes of the population, we will cite official statistics, in which the confidence of the population is, in principle, low, but even that states a drop in the quality of life (Table 5).

Table 5. Dynamics of the development of monetary incomes of the population as of the end of 2022

Indicator	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*IVкв.2021*
Cash income, including:	**100**									
- labor income	**1,3**	**81,2**	**80,5**	**80,1**	**78,3**	**76,3**	**74,2**	**72,3**	**67,0**	**70,1**
employment income	71,0	70,1	69,7	69,3	68,0	65,7	63,3	61,9	7,9	60,8
self-employment and business income	10,3	11,1	10,8	10,8	10,3	10,6	10,9	10,4	9,1	9,3
- social transfers, including:	**14,9**	**15,1**	**15,8**	**16,6**	**18,1**	**19,7**	**21,5**	**23,8**	**28,6**	**25,3**
- pensions	11,9	15,1	15,8	16,6	18,1	19,7	1,5	23,8	28,6	25,3
- allowances	2,6	2,5	2,5	2,5	2,8	2,9	2,8	2,9	4,5	3,7
TSA and Housing Assistance	0,02	0,01	0,01	0,02	0,03	0,02	0,04	0,2	0,1	0,04
- scholarships	0,4	0,4	0,5	0,4	0,4	0,4	0,4	0,4	0,5	0,6
- property income	0,4	0,3	0,3	0,4	0,4	0,4	0,5	0,5	0,4	0,5
- material assistance from relatives, alimony, other income	3,4	3,4	3,4	2,9	3,2	3,6	3,8	3,4	4	4,1

Source*:* compiled by the authors according to Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan

In the fourth quarter of 2021, the average per capita was 214.5 thousand tenge. Of these, labor incomes accounted for 150.2 thousand, or 70.1%. The rest is social transfers, which include pensions, allowances, TSA, housing assistance and scholarships. Moreover, in the fourth quarter of 2021, social payments in the structure of cash income increased by 10.6% than they were in the same period in 2020. This is the average for the republic. But in some regions - in East Kazakhstan and North Kazakhstan - social payments exceeded a third in the structure of income, that is, the Accounts Committee recorded a drop in income from employment and an increase in income from social transfers.

3. RESULTS AND DISCUSSION

The share of wages in the structure of GDP in 2021 was only 30.9%, which indicates a low level of earnings in Kazakhstan. For comparison, in developed countries this figure ranges from 45% to 55%.

And over the past five years, there has been no positive dynamics in the direction of growth in incomes of the population due to labor activity. In 2017, they also accounted for 30.5% of GDP. Inflation eats away at people's

incomes every year. For five years, its official total level amounted to almost 34%. There are doubts that commercial employers diligently indexed the salary of their employees at least at this level.

To determine the forecast values of the average per capita nominal cash income of the population for 2023-2025. a trend model was built, during which the following steps were performed: Checking the time series for anomalous observations. For this, the Irwin criterion was used (Table 6)

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Table 6. Checking for anomalous observations in a time series

Year	Average per capita nominal cash income of the population, tenge	Observed value of the Irwin criterion	Calculation formulas
2010	39014		Observed value of the Irwin criterion $\lambda_t = \frac{\lvert y_t - y_{t-1} \rvert}{\sigma_y},\ t = \overline{2,12}$ Critical value of the Irwin criterion $\lambda_{0,05} = 1{,}5$
2011	45918	0,244	
2012	51860	0,210	
2013	56453	0,162	
2014	62271	0,205	
2015	67321	0,178	
2016	76575	0,327	
2017	83710	0,252	
2018	93135	0,333	
2019	104282	0,393	
2020	116126	0,418	
2021	126781	0,376	

Source: compiled by the authors according to Data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan

The initial time series with a probability of 95% does not contain anomalous observations, since all observed values of the Irwin criterion are less than the critical value. Using the criteria of "ascending" and "descending" series, it was found that the considered time series contains a trend component (Table 7).

Table 7. Checking for a Trend

General view of the criterion of "ascending" and "descending" series (violation of at least one inequality is sufficient for a trend to exist)	Estimated values with a chance of error $0{,}05 < \alpha < 0{,}0975$
$\nu(n) > \left[\frac{2n-1}{3} - 1{,}96\sqrt{\frac{16n-29}{90}}\right]$	1 < 5
$K_{\max} < [K_0(n)]$	11 > 5

Source: compiled by the authors

The evaluation of the quality of the obtained model was carried out in two directions: verification of the adequacy and evaluation of the accuracy of the model. To test the adequacy of the model, a number of residuals were examined, i.e. discrepancy between the levels calculated by the model and actual observations. The most important properties of the residual component are: the equality of the mathematical expectation to zero, the randomness of the residuals and their compliance with the normal distribution law.

The results of the analysis of a number of residuals in order to check the model for adequacy are shown in Table 8.

Table 8. Checking the adequacy of the model

Property under test	*Used statistics*		*The border*	*Conclusion*
	Name, calculation formula	Received value		
Accident	Criterion of "peaks" (turning points) $p > \left[\frac{2}{3}(n-2) - 1{,}96\sqrt{\frac{16n-29}{90}}\right]$	5 > 4	4	Adequate
Normality	RS- criterion $RS = \frac{e_{\max} - e_{\min}}{S}$	3,97	2,80-3,91	Adequate
Equality of the mathematical expectation of the levels of a series of residues to zero	*t*- student statistics $t_{observ.} = \frac{\left\lvert \bar{e} \right\rvert}{S}\sqrt{n}$	0	2,23	Adequate

Source*:* compiled by the authors

To assess the accuracy of the model, the average relative approximation error was calculated:

$$E_{rel.} = \frac{1}{n}\sum_{i=1}^{n}\frac{\left\lvert e_t \right\rvert}{y_t} \quad 100\% = 4{,}35\%,$$

a value that indicates a good level of model accuracy. Thus, the model is qualitative and can be used for forecasting.

To calculate the point forecast, the corresponding values of the variable were substituted into the constructed model. To build an interval forecast, a confidence interval was determined at a significance level $\alpha = 0{,}05$.

The results of building point and interval forecasts for 2023-2025. are presented in Table 9.

Table 9. Point and interval forecasts for the values of average per capita nominal cash income of the population for 2023-2025

Year	Point forecast, tenge	Interval forecast, tenge	
		Max	Min
2023	135 203,24	123 459,72	146 946,76
2024	142 969,83	130 789,53	155 150,12
2025	150 736,41	138 082,75	163 390,08

Source*:* compiled and calculated by the authors

Understanding the problems and consequences of changes in the size and age structure of the country's population, trends and prospects for population reproduction, as well as the relationship of demographic processes with economic and social development will help the government develop a policy that will be based on the economic potential inherent in demographic changes that affect the development of labor resources and the formation of labor incomes of the population.

The state policy in relation to labor resources is necessary to increase the level of employment of the population and equalize the conditions for the development of regions. Therefore, it is necessary to apply new approaches to the use of regional factors and the study of interregional relations in order to develop specific development strategies for each region of Kazakhstan is necessary, since:

- without raising the standard of living it is impossible to qualitatively improve the demographic situation;

- without an influx of investments, it is impossible to improve the standard of living and develop the economy;

- Without developed institutions and clear rules of the game, it is impossible to attract investments and maintain macroeconomic stability.

In the near future, a change in the qualitative structure of the labor force and an increase in the influx of able-bodied young people are expected, which will cause an additional burden on the labor market.

By 2030, 37% of the workforce in Kazakhstan will represent Generation Z. A change of generations will also accompany a change in the views of young people on work. This is the generation that is ready to make financial concessions for the sake of a flexible work schedule, the balance between professional and personal life is important for them. Therefore, it will be important for employers to adapt to new requirements in order to retain talent.

Recently, there has been an increase in non-standard forms of employment - over 10 years, the number of digital labor platforms in the world has increased 5 times. Platform employment is becoming a real way of earning and professional development for more and more people. It becomes possible to search for narrow specialists to solve specific problems, so 40% of global companies plan to increase the number of freelancers in their work. And in Kazakhstan, according to experts, today there are about 300 thousand freelancers.

You can also imagine a number of new strategic initiatives that have been formed taking into account the listed challenges, where the emphasis is on large-scale digitalization of the social and labor sphere (Figure 1).

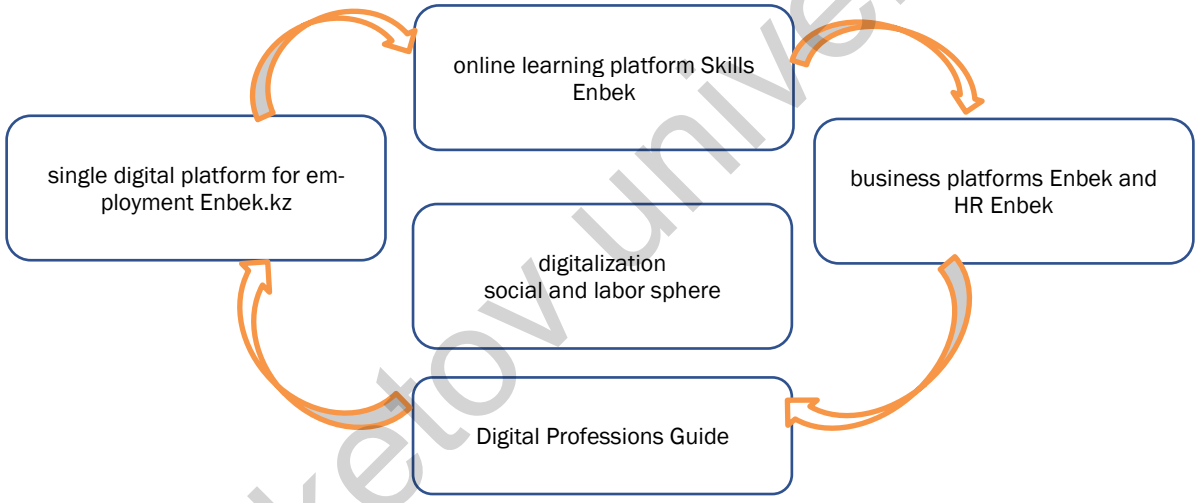

Figure 1. Strategic initiatives in the social and labor sphere

Source: compiled by the authors

On the basis of the Electronic Labor Exchange, a single digital employment ecosystem has been built, or, in other words, an online supermarket of employment services for the population. This ecosystem will accompany citizens on their professional path: from choosing a career to formalizing an employment relationship.

The ecosystem will consist of several elements: a single digital platform for employment Enbek.kz, an online learning platform Skills Enbek, the implementation of which will make the idea of lifelong learning come true, the Business Enbek and HR Enbek platforms, as well as the planned Digital Guide to Professions. In addition, it is planned to implement the Digital Family Map project. This tool allows to quickly identify families in the zone of social risks and provide them with the necessary support measures. The system collects data from the information systems of state bodies and organizations, on the basis of which it makes an assessment of the well-being of the family according to established criteria, such as income, health, education, housing and social conditions. This allows you to automatically determine the needs of families and proactively provide them with appropriate social support.

CONCLUSION

The listed initiatives will be reflected in the main strategic documents and enshrined at the legislative level - in the Program for Increasing the Income of the Population until 2025, the National Project for the Development of Entrepreneurship for 2021-2025, in the law "On Professional Qualifications" being developed and the Social Code. They are expected to help meet the challenges of promoting productive employment and increasing household incomes by 27% by 2025. In general, the initiatives are aimed at the implementation of 4 areas:

- improving the quality of the workforce through training and retraining;
- liberalization of the labor market through legislative regulation and provision of social protection for flexible employment workers;
- development of labor market infrastructure to improve the quality of services provided to the population;
- large-scale digitalization of services through the creation of a digital ecosystem of the labor market.
- the development of professional standards will continue and certification of skills will be carried out through centers for the recognition of qualifications. In addition, work is underway to develop a law "On Professional Qualifications" and create a National Qualifications Authority.

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