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Analysis of Employment Policy Effectiveness in Kazakhstan: Regional Clustering Approach

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ABSTRACT

Effective evaluation of public employment programs in transition economies requires analytical frameworks that can address institutional complexity, spatial disparities, and inconsistent performance monitoring. The purpose of this article is to conduct a state audit of the implementation of the "Enbek" employment program in Kazakhstan from 2017 to 2021, taking into account both spatial and institutional aspects. The study employs a combination of pre- and post-analysis, regional comparative assessment, hierarchical clustering, and benchmarking against official unemployment targets to assess policy coherence and execution. The empirical base comprises panel data from 17 regions of Kazakhstan, covering the period from 2014 to 2024. The results demonstrate the achievement of the national target for the unemployment rate (<4.8%) and a decrease in the share of informal employment from 25% to 12.5%. However, pronounced regional imbalances and institutional constraints remain. The findings of the cluster analysis reveal three regional typologies reflecting disparities in labor market structure and policy responsiveness. Regions with developed labor infrastructure exhibit relative stability, while peripheral regions remain characterized by persistent structural misalignments. However, the results suggest that current evaluation methods are insufficient to fully assess the effectiveness of employment programs across different regions. Future research should focus on developing indicators for regional inclusivity, integrating program sustainability assessments into strategic planning, and institutionalising the adaptation of public employment tools.

KEYWORDS: Employment, Employment Economics, Regional Policy, State Audit, Business Activity, Enbek Program, Kazakhstan

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1. INTRODUCTION

Employment policy has become an integral part of state regulation, aimed at reducing unemployment, ensuring access to employment opportunities, and promoting economic stability and sustainability. While global practices include a variety of instruments, such as the European Union's active labor market policies and targeted support measures in Latin America and Asia, the relevance of these approaches depends on national context and institutional capacities. International organizations have institutionalized employment as a component of social justice. The International Labour Organization (ILO, 2023) defines decent work as a fundamental right that ensures dignity, income stability, and social inclusion. Within the United Nations Sustainable Development Goals framework, full and productive employment is consolidated in SDG 8, which assigns responsibility for its achievement to national governments (United Nations, 2015).

Kazakhstan's employment system is characterized by structural imbalances inherent to resource-dependent economies in transition. Significant regional asymmetries, a high prevalence of informal labor, and weak institutional capacity in policy enforcement have resulted in a persistent misalignment between declared goals and actual outcomes. Although strategic planning mechanisms have been introduced and formal conformity with international frameworks has been established, their practical impact remains limited. The distribution of responsibilities across administrative levels is poorly coordinated, performance control mechanisms are underdeveloped, and vertical feedback remains fragmented.

Against this backdrop, the state program Enbek (2017–2021) was launched as a national policy tool to stimulate productive employment and expand mass entrepreneurship (Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan, 2018). Quantitative targets were defined to increase employment, formalize labor relations, and reduce interregional disparities in labor market development. However, existing assessments focus primarily on financial execution and generalized employment statistics, lacking analysis of spatial variation or institutional coherence.

The present study conducts a comprehensive performance audit of the Enbek program. The analysis is based on a combination of statistical methods, regional profiling, and cluster-based evaluation. The object of investigation is the alignment between program objectives and actual results in the field of employment, with a focus on territorial divergence, sectoral structure, and the dynamics of informal employment. The goal of the study is to assess the effectiveness of Enbek through the lens of public audit, linking spatial heterogeneity in implementation to the structural characteristics of Kazakhstan's administrative and labor systems. The research contributes a context-specific analytical framework that integrates quantitative benchmarks and regional typologies into the evaluation of national employment policy.

2. LITERATURE REVIEW

Employment is seen as a key focus in public policy strategies in all countries, and the development and implementation of programmes in this area have become institutionalised. According to Schneider and Ingram (1988), public policy is shaped through a deliberate process of selecting objectives, instruments, and the logic of action, where the fit between design intent and actual implementation plays an important role. However, in practice, this fit is often violated, as shown by the research of Mosher and Trubek (2003), who show how the European Employment Strategy (EES) has identified a discrepancy between normative guidelines and actual institutional constraints. At the same time, as Wilthagen, Tros, and Van Lieshout (2004) emphasize, the EU has developed an approach of flexicurity, which emphasizes a balance between employment flexibility and social stability. Still, its application also faces

difficulties associated with the fragmentation of labor markets. Heyes (2011) points out that even within the framework of programs aimed at adapting the labor market to economic crises, employment mechanisms can exacerbate rather than alleviate inequalities if there is no absolute protection for those employed. These problems are particularly evident in the process of transferring the implementation of employment policies to non-governmental agencies, which, as Bredgaard and Larsen (2007) show, leads to a loss of control over performance and complicates the audit of implementation. This raises the need for new approaches, such as those proposed by Rodrik (2022), which explicitly focus industrial policy on creating quality jobs rather than solely on quantitative indicators. From a political economy perspective, as Juhász and Lane (2024) emphasize, the success of such programs depends not only on the substantive decisions but also on the interaction between political actors, which requires a flexible adaptation of the strategy to the specific context. Thus, the review demonstrates that the effectiveness of employment programs is determined by their content and the degree to which the mechanisms for implementation, monitoring, and adaptation to the institutional environment are integrated.

Employment occupies a central place in the system of state social obligations and is institutionally embedded in national strategic programs. The influence of international organizations, primarily the International Labor Organization (ILO), has shaped the normative foundation of employment policy, particularly through the global dissemination of the concept of decent work (Standing, 2010). This framework integrates legal standards with operational indicators such as wage levels, employment stability, and social protection (Burchell et al., 2014). The practical implementation of these standards in national policy depends on institutional consolidation mechanisms, including labor legislation and regulatory coordination (Çoçka et al., 2017; Koliev, 2022). However, studies consistently highlight practical barriers to implementation. Limited administrative capacity, political fragmentation, and inadequate monitoring hinder alignment with ILO conventions, even when they are formally ratified (Rukevwe & Nwachukwu, 2024). As a result, the performance of employment programs often falls short of declared international commitments, underscoring the need for stronger procedural transparency and policy accountability.

Auditing in public programs has moved away from formal reporting toward examining how policies are implemented in practice. Ha (2005) presents audit as a management function embedded across all stages of a policy cycle. Liimatainen et al. (2008) propose an architectural model where evaluation focuses on the alignment between a program and the institutional, informational, and administrative structures of the public sector. Slobodianyk et al. (2018) highlight the role of regulatory clarity, transparency, and administrative accountability, particularly in regional initiatives. International institutions have further refined these approaches. The ILO (2020) recommends evaluating employment programs not only by outcomes but also by their sustainability, inclusiveness, and structural impact on labor markets. Quantitative indicators alone are insufficient; spatial and social dimensions must also be incorporated. Together, these perspectives emphasize identifying institutional limitations and operational inconsistencies rather than simply verifying formal compliance.

Program evaluation methodologies have undergone a substantive transformation, shifting from isolated financial inspections toward analytical frameworks that capture institutional structures and spatial disparities. The Inter-American Development Bank (2016) proposed an audit model focused on territorial clusters, emphasizing the assessment of network interactions, institutional coverage, and regionally differentiated development trajectories. The integration of quantitative and qualitative dimensions enables the detection of inconsistencies in policy implementation across territorial units. Peters and Pierre (2020)

emphasized the transition from program-specific reviews to institutional auditing, focusing on decision-making architecture, coordination channels, and the distribution of administrative functions. In a similar vein, Noch and Sonjaya (2024) conceptualized audit as a forward-looking component of strategic planning designed to evaluate implementation risks, construct scenarios, and adapt policy instruments to address institutional constraints.

Employment policy in Kazakhstan reflects contradictions typical of resource-dependent transition economies. Initial programmatic efforts, according to Kalyuzhnova and Nygaard (2008), were focused on short-term macroeconomic stabilization and did not imply institutional consolidation. The modernization of management through a program-targeted approach and the introduction of strategic planning in the 2000s marked a formal shift, but it did not eliminate the fragmentation of mechanisms. Bhuiyan and Amagoh (2011) revealed weak monitoring, a lack of vertical accountability, and inadequate feedback between management levels. Bekniyazova et al. (2021) confirmed the discrepancy between the stated goals, indicators, and actual implementation mechanisms, indicating institutional incoherence and a lack of operational logic. There is a misalignment between strategic planning and operational outcomes. Deficient functional integration, weak monitoring mechanisms, and uneven indicator systems hinder implementation. Structural imbalances are intensified by administrative divergence and territorial disparities. The identified discrepancies necessitate a methodology that can capture temporal and spatial deviations, identify institutional constraints, and facilitate a comparison between policy intent and actual outcomes. The evaluation of the Enbek program requires a multidimensional audit approach that includes time series analysis, regional typology, and cluster grouping. Comparison with target benchmarks, such as the 4.8% unemployment threshold, enables the identification of deviations and an assessment of the extent to which the stated effects have been achieved. Existing control methods, limited by budgetary and reporting parameters, do not provide a holistic picture of territorial coverage and institutional capacity. A transition to an integrated evaluation system that combines quantitative, spatial, and substantive parameters is necessary. The choice of methodology, based on a comparison of implementation periods, territorial differentiation, and alignment with program guidelines, enables the development of a multi-level model for auditing state employment policy tailored to the Kazakh institutional context.

3. METHODOLOGY

As part of the assessment of the implementation of the state program “Enbek” (2017-2021), a preliminary review of the regulations and strategic goals laid down in this initiative was conducted. The program analysis identified key areas related to employment issues, including reducing unemployment, increasing sustainable employment opportunities, and mitigating regional imbalances. The methodology employed is based on approaches previously used in international practice for auditing state programs (Peck, 2004; IDB, 2016; ILO, 2020), and adapted to the specificities of the Kazakhstani model.

These aspects formed the basis of Table 1, which presents the program's main objectives, related problems, and expected results, allowing for the focus on the most significant targets.

Each task reflects structural and territorial issues facing the state's labor market management system. Thus, reducing the unemployment rate focuses on achieving a key indicator - reducing the official unemployment rate to ≤4.8%. This goal requires a comparison of target values with actual data by region, as well as an assessment of their change over time. The second task, increasing sustainable employment, is associated with the need for a qualitative shift from unstable, informal

TABLE 1. Target objectives of the state program "Enbek" in terms of employment

Objective	Problem	Expected result	Indicator (available in data)
Reduce unemployment	Stable unemployment, especially in regions with low activity	Reduction of unemployment to ≤ 4.8%	Unemployment rate (%) by region
Increase sustainable employment	Prevalence of short-term, unstable employment	Increase in formal and long-term employment	Employment and Income Index
Reduce regional imbalances	Uneven distribution of employment across regions	More equal employment structure	Dynamics of the number of employees by region (2013–2023)

Note: compiled by authors based on the Bureau of National Statistics (2024)

employment to stable, formal employment, which is reflected in the dynamics of the integral index "Employment and Income". The third task - eliminating regional imbalances - raises the issue of territorial inequality in access to employment opportunities, which requires spatial and cluster analysis of regional differences.

By this, a multi-stage method was proposed, which included comparing periods before and after the program's implementation, analyzing dynamics by region, constructing visual profiles, and grouping regions based on the similarity of their development trajectories (Figure 1).

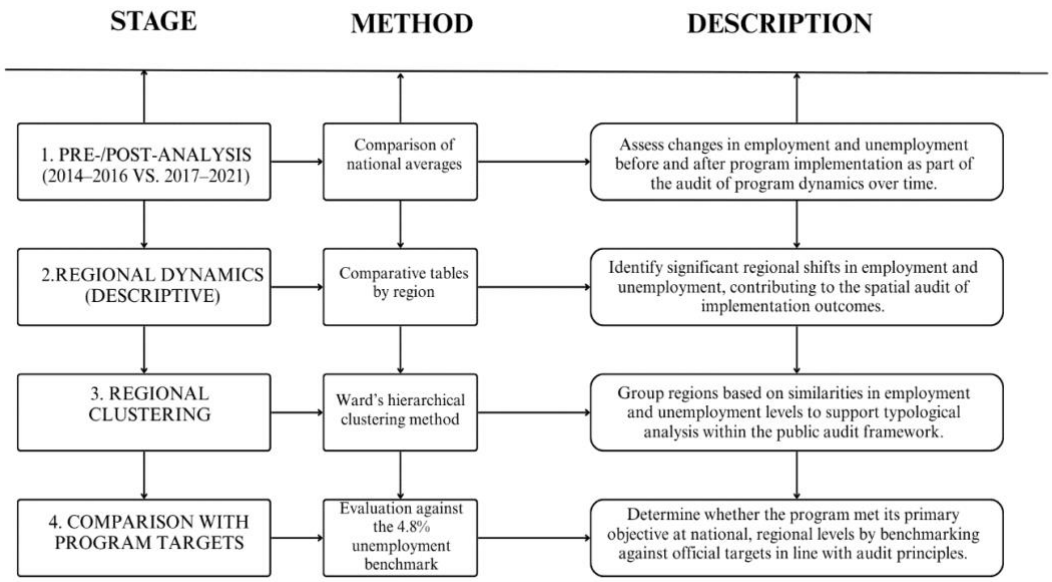

FIGURE 1. Methodological framework for public audit of the "Enbek" state employment program

The research methodology comprises four main stages of the analytical procedure, applied to assess the "Enbek" program through the lens of public audit. The sequence begins with time-based comparisons and continues through regional differentiation, cluster identification, and outcome verification. Each stage addresses a specific dimension of policy

performance, system-wide shifts over time, territorial divergence in employment outcomes, structural segmentation of regions, and verification against official targets. The proposed methodology ensures a formal assessment and the identification of spatial and institutional constraints that affect the program's implementation. Six key indicators were selected to conduct a comprehensive assessment of the implementation of state employment policy, within the scope of a public audit, reflecting both quantitative and structural characteristics of the labor market.

Table 2 presents the characteristics of the variables, including coding and units of measurement.

TABLE 2. Indicators Used in the Public Audit of the Employment Program

Indicator	Code	Unit of measurement
Employment rate to working-age population, %	EMP	%
Unemployment rate to working-age population, %	UNEMP	%
Share of informal employment in total employment, %	INFORM	%
Share of employment in agriculture, %	AGRIC	%
Share of employment in industry and construction, %	INDUS	%
Labor compensation as a share of GDP, %	LAB_GDP	%

Note: compiled by authors based on Bureau of National Statistics (2024)

The selected variables capture essential dimensions of the labor market: levels of employment and unemployment, the extent of informality, sectoral composition, and the economic role of labor income. The inclusion of these indicators corresponds to the strategic priorities of the "Enbek" program and relies on the availability of regionally and temporally comparable statistical data for the evaluation period.

The approaches reviewed in the literature demonstrated that public audit is losing its pure control function and is increasingly acting as a tool for substantive assessment of program effectiveness and institutional viability. The variety of methods, ranging from system monitoring (Ha, 2005) and architectural compatibility (Liimatainen et al., 2008) to compliance auditing (Slobodianyk et al., 2018) and strategic diagnostics (Noch & Sonjaya, 2024), confirms the need for multi-level analysis. Studies by the IDB (2016), ILO (2020), and Peters and Pierre (2020) emphasize the importance of transitioning from formal evaluation to measuring real impact, especially in employment. The proposed methodology is based on international standards, enabling the audit to serve as an analytical platform for assessing public employment.

4. RESULTS AND DISCUSSION

State employment programs serve as a central mechanism for economic regulation and social stabilization. In Kazakhstan, public initiatives in the labor market have acquired strategic importance due to persistent regional imbalances, the scale of informal employment, and limited diversification of employment sources. The Enbek state program (2017–2021) was introduced as a key policy instrument to stimulate productive employment and support entrepreneurial activity, with a particular focus on regional alignment. A structured evaluation of the program begins with the analysis of key labor market indicators across Kazakhstan. This stage provides a quantitative foundation for identifying variations in employment structure and program impact.

Table 3 presents descriptive statistics for key variables, including employment and unemployment levels, the share of informal employment, and the role of labor income in gross domestic product over the period 2014-2024.

TABLE 3. Descriptive Statistics Analysis

Indicator	Valid	Missing	Mean	Std. Devi.	Minimum	Maximum
EMP	12	0	77.992	0.532	77.400	79.100
INFORM	12	0	16.788	4.736	12.500	25.000
UNEMP	12	0	4.967	0.150	4.800	5.300
AGRIC	12	0	15.244	3.639	11.600	24.194
INDUS	12	0	19.375	2.184	12.570	20.783
LAB_GDP	12	0	30.838	0.558	30.300	32.192

Note: compiled by authors

The analysis of descriptive statistics for key employment indicators in Kazakhstan from 2014 to 2024 demonstrates the overall stability of the employment level (77.99% on average), with a gradual decrease in the unemployment rate toward the target value of 4.8% by 2024. A significant reduction in the share of the informal sector — from 25% to 12.5% — indicates increased formalization of labor relations, which is in line with the strategic guidelines of the Enbek program. At the same time, a pronounced transformation of the sectoral structure of employment is observed: the share of those employed in agriculture decreased from 24.2% to 11.6%, reflecting the transition of the labor force to other sectors of the economy, while employment in industry also decreased (from 20.8% to 12.6%), which may indicate weak sustainability of industrial growth. The share of wages in GDP remained relatively stable but low (30.8% on average), indicating the continued limited participation of hired workers in forming the country's total income. Taken together, these data provide an empirical basis for a public audit of employment policy, reflecting gradual structural shifts in the labor market that have occurred in the context of economic modernization, digitalization, and the impact of macroeconomic shocks, including the effects of the COVID-19 pandemic in 2020 and subsequent recovery years.

To visualize changes in the labor market in the Republic of Kazakhstan within the context of implementing the state program "Enbek," a graph was constructed to reflect the dynamics of six key indicators for the period from 2014 to 2024 (Figure 2).

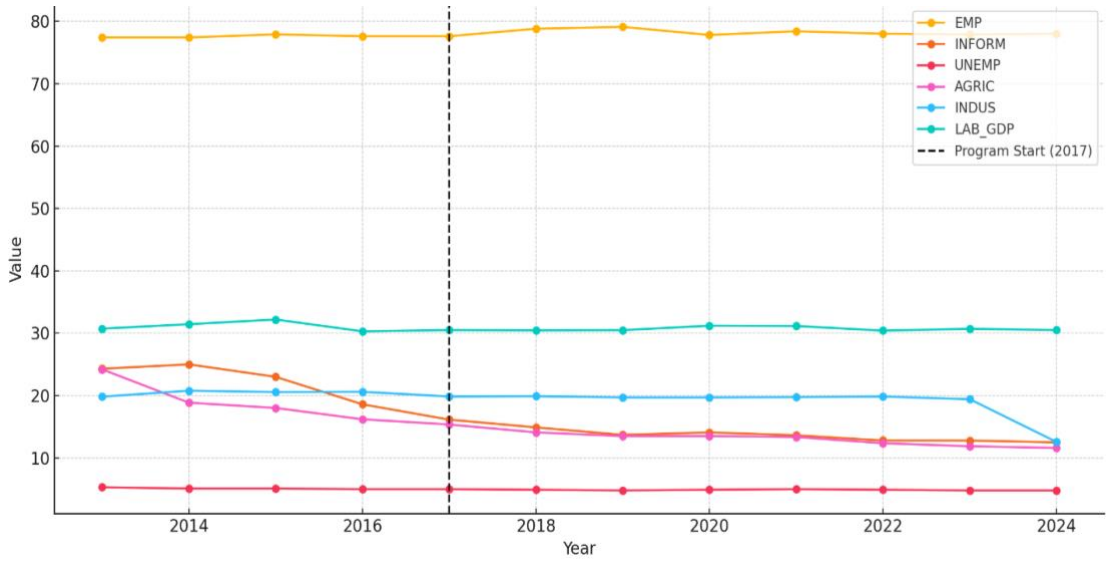

FIGURE 2. Labour market indicators in Kazakhstan for 2014-2024

The vertical line for 2017 marks the start of the program, which allows for a clear distinction between the stages "before" and "after" its implementation. The graph analysis indicates that the employment rate (EMP) has remained generally stable, with a slight increase in the first few years after the program's launch. The unemployment rate (UNEMP) has shown a moderate decline, from 5.1% in 2014 to the target of 4.8% by 2024. The positive dynamics in reducing the share of the informal sector (INFORM) are most clearly visible: from 25% in 2014 to 12.5% in 2024, which indicates successful efforts to formalize employment. At the same time, the share of workers in agriculture (AGRIC) has almost halved over the decade, from 18.9% to 11.6%, reflecting a structural shift in the economy. In the industry and construction (INDUS) sector, the share of employment remained stable until 2023 but decreased sharply in 2024, which warrants a separate analysis. The share of wages in GDP (LAB_GDP) remained virtually unchanged, without sustained growth, indicating weak dynamics of income redistribution in favor of labor resources. Thus, the graph records the program's achievements in reducing unemployment and informal employment but emphasizes the need to strengthen structural and institutional mechanisms in industrial policy and income justice. For an in-depth public audit of regional differences and dynamics in the labor market, an analysis of data on two key indicators was conducted: the number of employed and the number of unemployed in the regions of Kazakhstan from 2014 to 2024.

Table 4 presents data on the number of people employed in Kazakhstan's regions.

TABLE 4. Dynamics of the number of employed people by regions of Kazakhstan in 2014-2024

Region	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Akmola	422,7	408,1	416,4	408,3	408,7	408	398	397	421,4	407,1	401,8
Aktobe	410	404,8	408,6	408,9	417,6	416,5	416,4	419,8	424,7	434,9	457,9
Almaty	1013,3	943	985,3	988,4	994,5	991	974	973	697,7	704,8	722,3
Atyrau	286,1	296,3	296,4	300,1	304	316,3	314,5	317,7	326,7	335,1	347,8
West Kazakhstan	316,8	309,3	319,5	320,2	321	321,7	321	322,3	330,9	333,3	336,8
Zhambyl	530,2	498,5	501,1	505,3	507	507	503,8	502,7	539,5	543,7	544,8
Karaganda	678,4	670	656,4	652,4	654	648,9	641,8	643,4	534,8	535,8	542,7
Kostanay	493,9	484,2	493,5	492,1	488,2	484,8	466,3	475,2	453,8	449,5	439,3
Kyzylorda	311,1	307,8	328,6	330,6	332,9	332,3	329,4	330,1	330,1	331,5	334,5
Mangystau	248,8	277	277,8	277,8	304,7	305,5	308,4	331,7	332,7	336,7	347,4
Pavlodar	420,3	405,1	401,1	396,4	393,3	390,5	387,1	383,7	384,2	385,2	386,1
North Kazakhstan	313,8	312,8	303,1	295,2	296,2	293,4	289,3	287,3	279,1	274,5	267,7
Turkestan	876,9	780,9	789,3	779,1	789	784,3	779,4	777,6	792,2	800,6	817,1
East Kazakhstan	705,5	679,7	684,3	687,6	679	681	669,5	668,3	366,5	368,8	367
Astana city	431,6	466,1	466,1	497,5	507,5	553,3	563,4	580,3	625,5	658,7	685,1
Almaty city	764,5	838,5	867,9	889,6	911,9	936,5	959,3	982,8	998	1045,5	1083
Shymkent city	286,3	351,1	358	355,8	385,4	409,8	410,3	414,3	426,1	433,5	446,4

Note: compiled by authors

The most noticeable increase in employed people is observed in the Aktobe region - from 410.0 thousand people in 2014 to 457.9 thousand in 2024 (+47.9 thousand). A significant increase was also recorded in the city of Astana - from 431.6 thousand to 685.1 thousand people (+253.5 thousand). In the city of Almaty, the number of employed people increased from 764,500 to 1,083,000 people (+318,500). Such dynamics reflect the increasing concentration of economic activity in cities of national significance. At the same

time, a significant decrease in the number of employed people is observed in the East Kazakhstan region, from 705.5 thousand people in 2014 to 367.0 thousand in 2024 (-338.5 thousand), and in the Karaganda region from 678.4 thousand to 542.7 thousand people (-135.7 thousand). A steady decrease is also observed in the Kostanay region (-54.6 thousand) and the North Kazakhstan region (-46.1 thousand), which may indicate migration flows, deindustrialization, or a change in the economy's structure. These regional trends serve as a key reference point for conducting a public audit of spatial disparities in employment outcomes.

Table 5 presents data on the number of unemployed by regions of Kazakhstan.

TABLE 5. Dynamics of the number of unemployed by regions of Kazakhstan in 2014-2024

Region	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Akmola	22	21,8	21,6	20,6	20,5	20,3	20,3	20,5	21	20,5	19,4
Aktobe	20,9	21,8	20,7	20,6	21,1	20,8	20,9	21,2	21,5	21,7	22,6
Almaty	52	49,5	49,4	49,1	48,7	47,8	48,7	48,5	34,1	34,8	34,9
Atyrau	15,2	15,7	15,4	15,6	15,7	16,1	16,2	16,3	16,6	17	17,7
West Kazakhstan	16,8	16,7	16,4	16,4	16,4	16,4	16,8	16,4	17,4	17	17,2
Zhambyl	27,5	26,7	25,6	25,8	26	25,4	25,7	25,7	28,2	27,2	27,3
Karaganda	34,7	37,7	34,2	32,6	31,4	30	30,7	30	24,8	22,9	22,9
Kostanay	26,1	26,1	25,7	25	24,5	24,1	24,1	24,1	23,2	22,6	21,6
Kyzylorda	16,4	16,6	17,1	16,8	16,8	16,8	16,9	17	17	17	16,9
Mangystau	13	14,9	14,5	14,2	15,5	15,4	15,8	16,9	17,7	17,6	18,3
Pavlodar	21	21	20,3	19,9	19,6	19,1	19,6	19,4	19,2	19,3	19,2
North Kazakhstan	16,5	16,8	15,8	15,2	15,1	14,9	15,1	14,7	14,2	13,8	12,9
Turkestan	50,7	44,6	42,8	42,5	43	41,9	42,5	41,8	43,1	41,7	41,6
East Kazakhstan	35,5	35,9	34,9	34,7	34,6	34,1	34,1	33,5	18,1	18	17,5
Astana city	23	22,7	22,7	24	24	25,5	27,1	28,1	29,9	31,2	31,4
Almaty city	44,8	46,5	48,4	49,6	49,8	50	52,2	53,5	53	52,5	52
Shymkent city	16	19,3	20	19,7	21	22,1	22,2	21,9	22,4	22,2	22,6

Note: compiled by authors

The most significant decrease in the number of unemployed was recorded in the East Kazakhstan region, from 35.5 thousand people in 2014 to 17.5 thousand in 2024 (-18 thousand), as well as in the Karaganda region from 34.7 thousand to 22.9 thousand people (-11.8 thousand). In the Kostanay and North Kazakhstan regions, there is also a steady decrease in unemployment (-4.5 thousand and -3.6 thousand, respectively), due to population migration and a decrease in economic activity. At the same time, in the cities of Almaty and Astana, the number of unemployed increased over the analyzed period: in Almaty from 44.8 thousand to 52.0 thousand, in Astana, from 23.0 thousand to 31.4 thousand people. Such dynamics may reflect an increase in the labor supply due to internal migration. In addition, the unemployment rate in the Zhambyl region remains consistently high, about 27-28 thousand people throughout the entire period. These differences underscore the need for differentiated regional employment policies that take into account local socio-economic conditions and highlight the importance of public audit in monitoring spatial imbalances in labor market performance.

Cluster analysis, based on the number of employed and unemployed individuals, enabled the categorization of Kazakhstan's regions by their labor profile type. Based on the Ward method, dendrograms were constructed separately for employment (Figure 2) and unemployment (Figure 3), allowing for the visualization of differences and similarities between the regions. Based on the analysis

results, three stable clusters were identified, each of which unites regions with close values of key indicators. This typology provides an analytical basis for conducting a public audit of spatial differentiation in the implementation of employment policies.

Figure 3 shows a dendrogram constructed from employment data, which enables the visual identification of differences between regions in terms of the scale of population involvement in the economy.

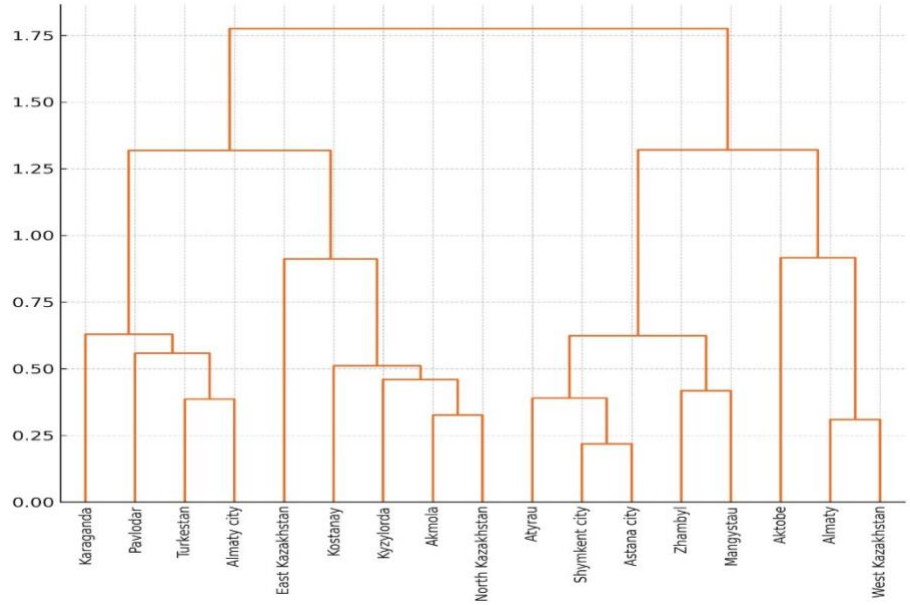

FIGURE 3. Dendrogram of regions of Kazakhstan by number of employed (Ward's method)

The analysis of the dendrogram presented in Figure 2 shows that the regions of Kazakhstan are grouped into three clusters based on the number of employed individuals. The first cluster comprises the Almaty, Astana, Karaganda, and Turkestan regions, where the most significant volume of the economically active population and a high level of labor market involvement are observed. The second cluster comprises the East Kazakhstan, Kostanay, Pavlodar, Akmola, Aktobe, Mangistau, and Zhambyl regions, characterized by moderate employment and relatively stable labor markets. The third cluster comprises the Abay, Zhetysu, Ulytau, North Kazakhstan, and Atyrau regions, which are characterized by the lowest employment rates and limited labor resources. Clustering provides a recording of differences in the distribution of employed individuals by region. It identifies groups that require differentiated approaches in public policy, while also supporting public audit tasks related to territorial segmentation.

Figure 4 illustrates a dendrogram constructed from data on the number of unemployed individuals by region in Kazakhstan, facilitating the visual identification of groups with varying levels of labor market tension.

The analysis of the dendrogram shows the formation of three clusters. The first cluster comprises Almaty, Astana, and the Turkestan region, where the highest unemployment rates are recorded in absolute terms, which is attributed to both population size and the influx of labor migrants. The second cluster includes the Karaganda, East Kazakhstan, Kostanay, Pavlodar, Akmola, Aktobe, and Zhambyl regions, where the unemployment rate is moderate and relatively stable. The third cluster includes the Ulytau, Zhetysu, Abay, North Kazakhstan, Mangistau, and Atyrau regions, which are distinguished by the lowest values in

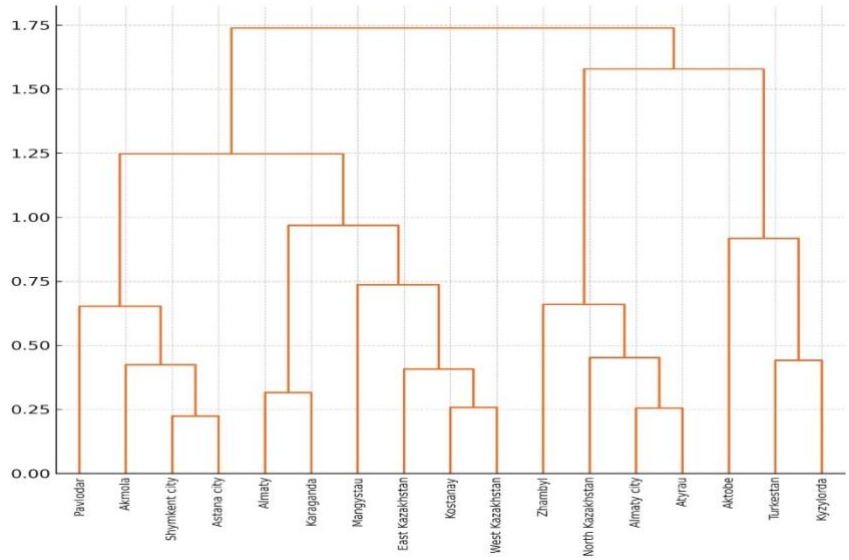

FIGURE 4. Dendrogram of regions of Kazakhstan by number of unemployed (Ward's method)

terms of the number of unemployed, which may be due to both low population density and failure to take into account hidden unemployment. The results highlight the importance of considering territorial differences when devising measures to reduce unemployment and underscore the role of public audit in identifying structural imbalances. For a more accurate interpretation of the results and to reflect the typical profile of the region within the corresponding cluster, cluster centroids were calculated – average values for the number of employed and the number of unemployed (in thousands of people) for each cluster (Table 6).

TABLE 6. Cluster centroids for employment and unemployment (in thousands of people)

Region	Employment			Unemployment		
	1	2	3	1	2	3
Akmola	410.100	402.925	413.875	20.300	20.633	21.900
Aktobe	439.167	417.575	408.075	21.933	20.883	21.350
Almaty	708.267	983.125	982.500	34.600	48.700	50.750
Atyrau	336.533	313.125	294.725	17.100	15.883	15.450
West Kazakhstan	333.667	321.500	316.450	17.200	16.467	16.750
Zhambyl	542.667	505.125	508.775	27.567	25.700	27.100
Karaganda	537.767	647.025	664.300	23.533	31.483	36.200
Kostanay	447.533	478.625	490.925	22.467	24.583	26.100
Kyzylorda	332.033	331.175	319.525	16.967	16.900	16.500
Mangystau	338.933	312.575	270.350	17.867	15.383	13.950
Pavlodar	385.167	388.650	405.725	19.233	19.650	21.000
North Kazakhstan	273.767	291.550	306.225	13.633	15.133	16.650
Turkestan	803.300	782.575	806.550	42.133	42.417	47.650
East Kazakhstan	367.433	674.450	689.275	17.867	34.317	35.700
Astana city	656.433	551.125	465.325	30.833	25.233	22.850
Almaty city	1042.167	947.625	840.125	52.500	50.583	45.650
Shymkent city	435.333	404.950	337.800	22.400	21.150	17.650

Note: compiled by authors

Clusters identified based on the number of employed individuals demonstrate noticeable territorial differentiation. The first cluster comprises regions with the highest employment values, including the cities of Almaty and Astana, as well as the Turkestan region, regions characterized by developed infrastructure, high population density, and robust economic activity. The second cluster comprises regions with an average level of employment, including Karaganda, East Kazakhstan, Kostanay, and Zhambyl regions, where a stable but less intensive labor potential is present. The third cluster is represented by regions with the lowest number of employed individuals: North Kazakhstan, Atyrau, Abay, Zhetysu, and Ulytau regions, which may be due to both demographic characteristics and a limited economic base. The employment centroids capture these differences, showing that in the first cluster, the employment figures exceed 900,000 people, while in the third, they do not reach even 400,000 people. A three-tier structure can also be traced to the number of unemployed people. The first cluster comprises the Almaty and Astana cities, as well as the Turkestan region territories with the highest number of unemployed individuals, which is attributed to the size of the labor market and the influx of migration. The second cluster comprises regions with average unemployment rates, including Karaganda, East Kazakhstan, Kostanay, Zhambyl, and Pavlodar regions. The third cluster comprises regions with the lowest number of unemployed individuals — North Kazakhstan, Atyrau, Mangistau regions, and the city of Shymkent, which may indicate a limited labor force or incomplete registration of the unemployed. The centroids by the number of unemployed confirm this structure: for the first cluster, the values exceed 50 thousand; for the second, they are in the range of 25–35 thousand; and for the third, they do not exceed 20 thousand. These groupings serve as a foundation for territorial segmentation in the public audit of labor market performance.

Regional variation in employment and unemployment levels stems from differences in demographic density, industrial base, and administrative capacity. Urban centers attract labor due to their superior infrastructure and service availability, while peripheral regions struggle with weak economic diversification and high outmigration rates.

A comparison of dendrograms and calculated centroids shows that the clustering results using the Ward method and the cluster's numerical characteristics mutually confirm each other. The spatial structure revealed graphically is entirely consistent with the ranges of values recorded in the centroids, which confirms the correctness and stability of the chosen approach (Table 7).

TABLE 7. Public audit-based assessment of the implementation of the "Enbek" program objectives

Component	Target by 2021	Observed Outcome (2024)	Evaluation
Unemployment rate	≤ 4.8%	4.8% (national average)	Target met at the national level
Employment rate	Steady growth	Relatively stable (~78%)	Partially met (no significant increase)
Informal employment share	Decreasing trend	Reduced from 25% (2014) to 12.5% (2024)	Target achieved
Structural balance (agriculture)	Decreased dependency	Drop from 18.9% to 11.6%	Target achieved
Industrial employment share	Stable or moderate growth	Slight decline to 12.57%	Not achieved (decline observed)
Labor income share in GDP	Increase or stabilization	Stable ~30.5%	Target not achieved
Regional differentiation	Reduced gaps	Cluster analysis shows persistent gaps	Partially achieved

Note: compiled by authors

An analysis of the state program "Enbek" implementation, based on key quantitative indicators and regional typology, allows for drawing comprehensive conclusions about the degree of achievement of goals and the effectiveness of the mechanisms applied. From the public audit perspective, the main target — reducing the unemployment rate to 4.8% — was achieved at the national level. At the same time, the persistence of differences between regions identified in the cluster analysis indicates territorial unevenness of the impact. In the cities of Almaty and Astana, the number of unemployed increased despite high economic activity and labor flow density, which may indicate an imbalance in migration and infrastructure policies within the program.

Employment rate – Partially met

The relatively stable employment rate, without significant growth, may reflect limited job creation in the private sector and a mismatch between labor supply and structural economic shifts. The decrease in the share of people employed in the informal sector from 25% to 12.5% should be recognized as a significant achievement. This change reflects the expansion of coverage through formal employment arrangements, increased digitalization of the labor market, and the development of legal mechanisms for protecting workers. In addition, there is a significant shift in the sectoral structure, as evidenced by a reduction in agricultural employment from 18.9% to 11.6%, indicating de-agrarianization; however, this is not accompanied by growth in industry.

Industrial employment share – Not achieved

The decline in industrial employment indicates a lack of synchronization between employment policy and industrial strategy. While the "Enbek" state program formally declares support for job creation in the industrial sector, actual employment figures show a downward trend. This suggests that current industrial development measures either do not prioritize labor-intensive growth or fail to account for employment generation altogether. Specifically, several structural factors may have contributed to the decline: the introduction of automation has reduced demand for low-skilled labor; the focus on capital-intensive mega projects—such as resource extraction and centralized manufacturing plants—has limited labor absorption capacity; and the insufficient integration of small and medium-sized enterprises (SMEs), which typically generate more jobs, has further constrained employment growth. The imbalance between large-scale investment and inclusive employment mechanisms highlights the need for industrial policy to incorporate labor-market sensitivity as a key performance criterion.

Labor income share in GDP – Not achieved

Stagnation in labor income share suggests persistent income inequality and weak bargaining power of employees due to the dominance of capital-intensive sectors. The share of people employed in industry and construction has decreased to 12.57%, which contradicts the stated priorities of the program and requires strengthening support measures in the sector.

Regional differentiation – Partially achieved

Regional clustering by the number of employed and unemployed confirmed the stability of differences and identified groups with pronounced inequality in labor potential. Regions with high employment, such as Almaty, Astana, and the Turkestan region, form the core of labor growth. Despite the formal implementation of uniform policy measures, significant disparities remain due to differences in infrastructure, labor mobility, and local economic capacity.

These results provide an empirical foundation for territorial segmentation within public audit procedures and emphasize the relevance of differentiated assessment in labor policy evaluation. The applied methodology demonstrates how public audit tools can be used to link quantitative performance with spatial and institutional dimensions of employment policy implementation.

One of the key limitations in achieving the declared objectives of the "Enbek" program relates to insufficient expansion of

employment opportunities in the industrial sector. Despite formal prioritization, actual job creation in the industry remains modest, with employment levels continuing to decline.

One of the key constraints on industrial employment growth is the prevalence of capital-intensive investment models that prioritize technological renewal without parallel expansion of workforce demand. Employment dynamics are further weakened by the limited involvement of small and medium-sized enterprises, which typically maintain higher labor intensity. Therefore, the sector's capacity to accommodate workers shifting from agriculture and informal occupations has reduced. The decline in labor demand is most noticeable in standard and medium-skill job categories, where mechanized systems increasingly replace manual processes. Instead of balancing modernization with job creation, industrial policy has reinforced a model less responsive to labor market needs.

Divergences in regional labor dynamics additionally complicate the implementation of employment programs. In particular, the Abay, Zhetysu, and Ulytau regions record not only low employment volumes but also stagnant or negative trends over the analyzed period, as confirmed by cluster centroids. Moreover, such areas as Abay, Zhetysu, and Ulytau continue to exhibit narrow sectoral specialization and limited administrative mechanisms for responding to labor market changes. In contrast, Almaty and Astana maintain higher employment volumes, supported by developed service sectors, centralized institutional functions, and steady labor inflows from other regions.

The spatial concentration of economic activity has intensified regional asymmetries. Ongoing migration to urban centers, without a corresponding expansion of employment capacity, has increased pressure on housing, transport systems, and municipal services. Regions with sustained out-migration exhibit reduced workforce engagement and erosion of local labor capacity, which constrains economic renewal and institutional responsiveness. The absorption capacity of regional economies in growth centers remains insufficient to accommodate continuous labor inflows, while departure regions face prolonged depopulation and economic attenuation. The imbalance between labor supply and demand across space calls for a more spatially adaptive employment strategy.

Corrective measures should not only address the structural gaps in industrial employment but also recognize the territorial unevenness of labor market responses. Support for labor-intensive production, sectoral diversification in lagging regions, and alignment between regional development tools and employment policy are necessary to restore the redistributive and stabilizing function of labor markets in the national context.

5. CONCLUSIONS

The assessment of the “Enbek” state employment program highlights the value of integrating public audit logic with spatially sensitive evaluation tools. Through a multi-stage methodology that combines temporal comparison, regional analysis, clustering, and target benchmarking, the study revealed not only the partial success in achieving national-level indicators, such as the 4.8% unemployment threshold, but also the persistence of structural and territorial disparities. The results indicate that employment programs implemented in transition economies require not only macro-level objectives but also mechanisms for regional differentiation, ongoing monitoring, and institutional flexibility. The use of hierarchical clustering revealed clear groupings of regions based on employment performance, supporting the need for adaptive policy measures tailored to distinct labor market profiles. Moving forward, public audit-based methodologies should be further developed to account for local implementation gaps, coordination challenges, and long-term sustainability of employment outcomes. This study reinforces the importance of designing employment strategies that are not only

quantitatively trackable but also qualitatively responsive to institutional and regional conditions.

Based on the empirical findings, several measures are recommended to improve the effectiveness of the "Enbek" program:

(1) Align industrial support tools with employment-generation targets by prioritizing labor-intensive industries in investment incentives.

(2) enhance regional components of the program through differentiated instruments targeting structurally weak labor markets;

(3) strengthen monitoring and feedback mechanisms to identify implementation delays or mismatches at the local level; and

(4) Reinforce the institutional capacity of local employment centers to act as mediators between state policy and regional labor needs.

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