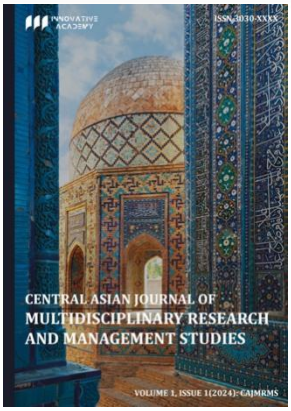

STATISTICAL ANALYSIS OF REFORMS IMPLEMENTED WITHIN THE FRAMEWORK OF SOCIO-ECONOMIC DEVELOPMENT OF REGIONS

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ABSTRACT

This study is devoted to a statistical analysis of reforms being implemented within the framework of socio-economic development of regions. It analyzes the results of regional development programs, the effectiveness of measures aimed at improving the living standards of the population, as well as economic growth indicators. The study, based on statistical data, studies the effectiveness of reforms, positive changes in sectors, and existing shortcomings. As a result, practical recommendations for improving development strategies were developed.

Introduction. Socio-economic development of regions is one of the important factors in the sustainable development of each country and increasing the well-being of the population. Today, one of the main directions of economic development in the world is the implementation of reforms aimed at reducing territorial disparities, effective use of local resources and improving the living standards of the population. This process covers not only economic sectors, but also includes such broad goals as the modernization of social infrastructure, improving education and health services, and ensuring environmental sustainability. After gaining independence, the Republic of Uzbekistan has identified the issue of socio-economic development of regions as a priority area of state policy. The reforms implemented in recent years are aimed at achieving economic stability in all regions of the country, creating new jobs and raising the living standards of the population. In particular, within the framework of the "Integrated Development of Territories" programs, a number of important initiatives have been implemented, such as the modernization of infrastructure facilities, the creation of favorable conditions for the development of entrepreneurship, and the introduction of innovative technologies in agriculture. Statistical data is the main source for assessing the effectiveness of reforms in the field of regional development. These data determine the rates of economic growth, employment levels, real incomes of the population, and other important indicators. Statistical analysis makes it possible to identify trends in regional development, identify existing problems, and determine appropriate measures to eliminate them.

This study analyzes the results of reforms being implemented in the socio-economic development of regions. In particular, the effectiveness of these reforms is assessed based on statistical indicators, and the problems encountered in the processes of regional development

are analyzed. Based on the results of the study, practical recommendations are developed for more effective organization of reforms in the future.

Research methodology. In this article, the following scientific and methodological approaches and methods were used to study the effectiveness of reforms being implemented in the socio-economic development of regions. Primary data were collected through data collection methods. Data collected from local authorities and statistical committees were analyzed to study the indicators achieved as a result of reforms being implemented in the regions. Secondary data were used to study national and international reports, government decisions, development programs, and other popular scientific sources. Statistical analysis methods were used to compare key economic indicators (GDP growth, employment rate, investment volume, infrastructure development) by region and identify general trends. Correlation and regression analyses were also used to identify the relationship between regional development and reform results. For example, the relationship between investment volume and economic growth rates was studied. In addition, it was used to group regions by level of socio-economic development and identify the presence of similar development models. Using the comparative analysis method, the success of reforms was assessed by comparing the development levels of different regions with international and regional standards. Differences in development between different regions of Uzbekistan were studied and existing problems were identified. The long-term results of reforms were assessed by studying changes in data over time. This allowed us to identify the dynamics of reforms and analyze development rates. The opinions of experts in regional economics and social development were collected and analyzed. This approach helped to gain a deeper understanding of the available data. One of our main methods, through qualitative analysis, was used to assess changes in the standard of living of the population and the level of use of services in order to determine the social impact of regional development programs. The research used these methods in a coordinated manner, examining different aspects of the reforms. These approaches allowed for a deep and comprehensive analysis of the effectiveness of the reforms and served as the basis for developing practical recommendations.

Literature analysis. The issues of socio-economic development of regions have been studied by many foreign and domestic scientists, who have created a wealth of scientific information on theoretical approaches, methodologies and practical experience in this area. The study focuses on assessing the effectiveness and efficiency of reforms, based on the work and statistical analysis of foreign and domestic scientists.

Foreign scholars Todaro, MP and Smith, SC, in their work "Economic Development", covered the theoretical foundations of economic development and the factors affecting regional development. Their research highlighted employment, infrastructure, and innovation as the main factors of economic growth.

Porter, ME's work "Competitive Advantage of Nations" extensively discusses the theory of regional competitiveness and clusters. The importance of forming local economic clusters in the development of regions is emphasized. P. Krugman's work on economic geography and regional development revealed the importance of the location of economic resources, transport infrastructure and regional integration. In his book "Geography and Trade", he showed the importance of the active role of government in reducing regional disparities.

JD Sachs's book "The End of Poverty" argues that eliminating regional poverty requires developing social infrastructure and expanding education and health services.

Various OECD reports provide information on effective approaches to regional development and economic policy implementation. In particular, the "Regions in Focus" report compares regional development strategies of different countries.

Many scientific studies and researches have also been conducted by our local scientists, in particular, Turakulov M. and Akbarov A. in their articles on regional economy issues,

statistically analyzed the dynamics of production volume, employment level and investments by region. The reports "Indicators of economic and social development of regions of Uzbekistan", published annually by the Statistics Committee of the Republic of Uzbekistan, include the main statistical indicators of regional development.

Abdukarimov, A., and Sultanov, B. have developed recommendations for reducing regional disparities in local economic development. Their work demonstrates the social impact of small business and private sector development.

Analysis and results.

The socio-economic development of regions is largely dependent on territorial factors, along with material production. The model of the socio-economic state of the region consists of two interrelated strategies. The first is the targeted distribution of resources (financial, material, labor) to consumers. The second is the parameters that control the flow of resources.

We define each form of production in the region by a series of interrelated functions. If we can derive the resource state over time, we can distinguish between the organization and use of resources, and the dynamic model of the resource state of the region will look like this:

$$\frac{dA_{(t)}}{d_t} = U_{(t)} - K_{(t)}, (1)$$

here

- formation of the current state of resources; (2)$U_{(t)} = U_1(t) + \cdots + U_m(t)$

$K(t) = K_1(t) + \cdots + K_n(t)$-consumption of resources per unit of time. (3)

In turn $K_i(t) = \alpha_i(t)A(t)$, (4)

where - coefficients expressing the current distribution of resources over time. To interpret the essence of the problem, we denote the indicators (β1,β2, ..., βm) that control the resource sources U1,U2,...,Um. Then the alternative criterion of the regional strategy - for each time unit t - takes the following form:$\alpha_i(t = 1,2 \cdots , \rightarrow n)$

extr→ (a1, a2,..., an),(b1,b2, ..., bm) Q(A,K(a1, a2,..., an),U(b1,b2, ..., bm)), (5)

where Q is the objective function, which determines the goal of managing the state of resources in the region. U1,U2,...,Um are the structural scenario of the current state of resources when building the model or the output (endogenous) indicators of the model. To interpret the mathematical essence of the model, we define the dynamic model of the structural dependence of the region in the following functional form:

$\frac{dX}{dt} = F_x(X, U, Cu, C, t)$-model of the movement of production resources; (6)

Y = Fy (X, Cu, C, t)- observation model; (7)

U= FU (X, Cu, C, t) - a model representing the strategic behavior of the region; (14)

where Q is the objective function, which determines the goal of managing the state of resources in the region. U1,U2,...,Um are the structural scenario of the current state of resources when building the model or the output (endogenous) indicators of the model.

It is also important to know whether the socio-economic development rates of regions correspond to the growth rate of the population, and whether its working-age population is effectively employed in the economy.

It is important to analyze the economically active population at the regional level because such an analysis:

- To what extent are labor resources located at the regional level and what changes should be made to production areas accordingly;
- determining the number of unemployed people by region;
- It is necessary to study macroeconomic issues such as the state of labor exchanges at the regional level. We can define the formula for calculating labor resources in the regions as follows:

$$Atm=A^{\mu}-(N+\sigma\sigma)+\rho\gamma \quad (8)$$

where (Atmr) is the number of labor resources; A^{μ}-working age population; $N+\sigma\sigma$- disabled people of group 1-2 who are of working age and who are not working, and those who have received preferential pensions. $\rho\gamma$-pensioners and adolescents under 16 years of age employed in manufacturing or service sectors.

We use the following algorithm to calculate the active population in the regional economy.

$$I\phi=ATMR-XX\sigma\sigma\mu \quad (9)$$

here $I\phi$-economically active population; $XX\sigma\sigma\mu$- the number of able-bodied population of working age who are not employed in the national economy.

Persons under working age to calculate the potential replacement rate of labor resources *(Yes)* the number of labor resources (A^{μ}) divided.

$$Mk = \frac{\sum A_e}{\sum A^{\mu}} * 100 \quad (10)$$

We calculate the size of the working-age population (ages 1 to 16) and its growth as follows.

$$Mk = \sum_{i=1}^{n} \sum_{y=1}^{16} A_y^i / \sum_{i=1}^{n} A^i * 100$$

We calculate the growth dynamics of the working-age population using the following algorithm.

$$Mkd=Mkt / Mkt\text{-}1 \; ; (11)$$

To calculate the weight and growth of the working-age population (17 to 55 years old), we use the following formula.

$$My = \sum_{i=1}^{n} \sum_{y=17}^{55} A_y^i / \sum_{i=1}^{n} A^i * 100 \; ; (12)$$

The growth dynamics of the working-age population is calculated as follows.

$$Myd=Myt / Myt\text{-}1 \; ; (13)$$

Since not all of the working-age population is able-bodied, we can determine the employment rate of the able-bodied population using the following algorithm:

$$Bk=\Sigma\delta\kappa/A*1000 \quad (14).$$

The closer this indicator is to 1, the more the population is involved in labor. When the employment rate of the working-age population is divided by 1, the result indicates the degree to which the population is employed.

If the number of people under working age and those of retirement age is divided by the number of people of working age, it becomes clear how many people under working age correspond to one person of working age.

The number of people of retirement age (An) divided by the number of people of working age gives the number of people of retirement age for every person of working age.

$$K\eta = \frac{\sum A\eta}{\sum A\mu} * 100 \quad (15)$$

The level and dynamics of the population over working age (women 55 years old) and over working age (men 60 years old) are calculated as follows:

$$Mu = \left(\sum_{i=1}^{n} \sum_{y}^{55} A_y^i / \sum_{i=1}^{n} A^i\right) * 100 \quad (16)$$

We can determine the growth dynamics of the working-age population as follows.

$$Mud=Mut / Mut\text{-}1 \; ; (17)$$

We use the following formula to calculate labor resources.

$$Mr = \left(\sum_{i=1}^{n} \sum_{y=j}^{k} A_y^i / A^i\right) * 100 \quad (18)$$

Working age employability ($K\mu\lambda$) To calculate the indicator, the number of able-bodied people of working age is divided by the number of working-age people.

$$K\mu\lambda=\Sigma A\mu\alpha/\Sigma A\gamma*1000 \quad (19)$$

*r=1*when is*=1; k=*working-age population; r=When 2 is j=17; k=working-age population; r=When it is 3, j=55; k=population over working age; i=1÷n by districts and cities.
here *Aeat*-number of people under working age; *Aμ*-number of people of working age; Bk – employment rate; *δκ*- the number of employed people; *Kη*- the level of retirement age; *Aη*-number of people of retirement age; *Kμλ*-level of competence at working age; *Aμα* - the number of able-bodied people of working age; M*κ*– population level before working age; MY - population level at working age; Mu- population level after working age; M *κd*- population dynamics before working age; Myd- population dynamics at working age; Mud- population dynamics past working age.
Labor resources are people in society who are able to work, have knowledge and skills, and are able to produce or provide services. The main part of them is the population of working age. According to the Labor Code of the Republic of Uzbekistan, the lower limit of labor resources is 16 years, and the upper limit is 60 years for men and 55 years for women. When determining these limits, the standard of living of the population, the health care, sports and education system, pension provision conditions, social, economic and demographic factors are taken into account.
As for statistical indicators, GDP growth in different regions of Uzbekistan averaged 5.7% in 2022, which indicates the positive impact of regional reforms. The gap between rural and urban areas in terms of living standards is 12%, indicating the need for infrastructure modernization.
International indices, such as the Global Competitiveness Index, reflect changes in Uzbekistan's territorial infrastructure and labor market. The Human Development Index, published by the UNDP, confirms positive changes in the education and healthcare sectors in Uzbekistan.
The Republic of Uzbekistan implemented large-scale reforms for the socio-economic development of regions in 2020-2024. These reforms were aimed at reducing economic disparities between regions, increasing the standard of living of the population, and ensuring sustainable development. Below, the main areas of the reforms implemented during this period and their results are considered based on statistical analysis.
The main areas of reform include regional development programs, infrastructure projects, social sector development, statistical analysis, gross regional product (GRP) growth, employment rate, and infrastructure projects.
Regional development programs. Separate development programs were developed for each region and district, which were implemented taking into account the specific characteristics of the local economy.
Infrastructure projects. Large-scale projects have been implemented to build and modernize roads, water supply, electricity, and other infrastructure facilities.
Development of the social sphere. Measures have been taken to improve the education, healthcare, and social protection systems.
Statistical Analysis. Below are some key indicators of the reforms implemented during 2020-2024.
In addition, development programs have played an important role in reducing economic disparities between regions. For example, positive changes have been noted in the provision of drinking water and energy in rural areas.
Conclusion and suggestions. As a result of large-scale reforms implemented in the socio-economic development of the regions of Uzbekistan in 2020-2024, the following significant achievements were achieved. Sustainable economic growth The growth rates of Gross Regional Product (GRP) remained stable, and economic activity was observed in all regions. Positive trends were noted in the economies of Tashkent, Samarkand and other regions. The employment rate increased. The unemployment rate decreased significantly, and the

employment rate reached 63.0% in 2024 from 60.5% in 2020. This was achieved as a result of the creation of new jobs in rural areas.

Through the “Prosperous Village” and “Prosperous Neighborhood” programs, infrastructure has been significantly upgraded. Projects aimed at solving problems related to transport, drinking water and energy supply have been successfully implemented. The social sphere has developed. The education and healthcare systems have developed significantly, the number of schools and hospitals has increased, and the qualifications of doctors and teachers have been improved. Regional disparities have been reduced. Economic development programs have played an important role in reducing the disparities between rural and urban areas. This has created the basis for ensuring equal use of resources in the regions.

It is necessary to introduce digital technologies. It is necessary to widely use digital platforms in the process of regional development. Further development of the e-government system will provide the population with easy access to government services.

The social protection system must be strengthened. The volume of assistance provided to socially vulnerable segments of the population must be increased and its targeting improved. This will further reduce the level of poverty.

Supporting local economies is also very important. It is necessary to further improve mechanisms for stimulating small and medium-sized businesses in regional development programs. This plays an important role in increasing employment and incomes.

It is necessary to pay attention to environmental protection. In the process of regional development, it is necessary to implement special programs to ensure ecological sustainability and rational use of natural resources.

The analysis and monitoring system needs to be strengthened. Modern monitoring systems need to be introduced to accurately measure and evaluate the results of each reform. This will help increase the effectiveness of new initiatives.

By developing interregional integration, the overall stability of the national economy can be increased by strengthening economic and social ties between regions.

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