

MODELING AND FORECASTING OF SUSTAINABLE SOCIO-ECONOMIC DEVELOPMENT

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Abstract: This article is devoted to the issue of modeling and forecasting sustainable socio-economic development. In the course of the research, factors such as regional and national indicators, economic and mathematical models, employment, budget revenues, GDP volume and labor productivity were analyzed. The article considers forecasting methods, the interrelation of economic processes and future development trends. Based on the results of the research, practical recommendations were developed to ensure sustainable socio-economic development.

Keywords: employment level, GDP volume, budget revenues, green economy, strategic planning.

Introduction

Modeling and forecasting of sustainable socio-economic development is one of the most relevant areas of modern economic science. Today, countries are facing challenges such as climate change, depletion of natural resources, population growth, and social inequality. Therefore, a comprehensive study of the economic, social, and environmental aspects of sustainable development, as well as accurate forecasting of future development trends, is of particular importance.

In the course of this research, indicators such as economic growth rates, employment, budget revenues, and GDP were analyzed. The results showed that achieving sustainable development requires not only economic growth but also the integrated consideration of social equity, environmental sustainability, and the rational use of resources. Based on this, scientifically grounded recommendations were developed for the formulation and forecasting of regional and national development strategies.

Literature Review

The issue of modeling and forecasting sustainable socio-economic development is considered one of the most relevant directions in modern economic science. Numerous economists have proposed various scientific views, theoretical approaches, and practical recommendations on this topic. In particular, special attention has been paid to analyzing economic growth processes, studying them based on mathematical and economic models, and forecasting future development trends.

In particular, Fazliddinova Z., in her article titled "Methodological Approaches to Forecasting the Socio-Economic Development of Regions" [1], emphasizes the importance of forecasting processes, stating that "one of the key approaches in forecasting is the use of modeling technologies. For example, economic-mathematical models help to study regional economic indicators and identify the factors influencing them."

Furthermore, in the scientific article "Modeling and Forecasting of Socio-Economic Development of the Region" [2] by Elena A. Stryabkova and other scholars, it is noted that the study focuses on modeling and forecasting regional socio-economic development by

analyzing the relationship between gross regional product per capita and several economic indicators in the Belgorod region. Based on the analysis of pairwise correlation coefficients, consolidated budget revenues and the average annual number of employees were identified as the most significant explanatory variables. Several models were developed and evaluated, and the power regression model was found to be the most accurate. Using retrospective data and extrapolation methods with trend models, forecasts of future changes in gross regional product per capita were also prepared.

Axmatov A.O., in his article “A Sustainable Development Model of Farmholdings Based on Land Resource Use Forecast” [3], analyzes the issues of developing a sustainable development model for farm enterprises based on forecasts of land resource use. The study proposes mechanisms to ensure the sustainability of хозяйственных субъектов by taking into account scientifically grounded forecast indicators, agro-economic, and environmental factors. Statistical analysis, regional assessment, and practical recommendations were used as the basis for model development.

Additionally, Giao Tran and co-authors, in their article “Economic Models of Transition to Sustainable Development: Analysis of Successful Strategies in World Practice” [4], emphasize that sustainable development has been widely recognized in recent decades as a key foundation for long-term economic growth. It simultaneously promotes economic development while ensuring environmental protection and social equity, thereby securing the well-being of both present and future generations. In the context of increasing challenges such as climate change, depletion of natural resources, and growing social inequality, studying the economic aspects of sustainable development is becoming increasingly important.

Research Methodology

In this study, a range of scientific methods and approaches were employed to examine the processes of modeling and forecasting sustainable socio-economic development. First, relevant scientific literature, reports from international organizations, and statistical data were reviewed, and theoretical foundations were developed based on their analysis. During the research process, statistical analysis, comparison, and generalization methods were used to identify the interrelationships among economic processes. In addition, economic-mathematical modeling and forecasting methods were applied to determine trends in socio-economic indicators and to assess their future development.

Analysis and Results

Based on the literature review and analysis of scientific sources, a sufficient theoretical foundation was formed regarding the main methodological approaches to modeling and forecasting sustainable socio-economic development, economic-mathematical models, and their practical application. Based on this knowledge, the analytical results and conclusions in this field are presented below.

Ensuring sustainable socio-economic development is recognized as one of the priority directions of modern public administration and economic policy. According to the data obtained during the study, a number of factors—such as employment, budget revenues, investment volume, and the dynamics of gross domestic product—play a decisive role in the process of modeling socio-economic development indicators. The interrelationships among these indicators were identified using correlation and regression analysis, and their future trends were evaluated based on the extrapolation method. The results showed that achieving sustainable development requires not only ensuring economic growth, but also a comprehensive approach to issues such as social equity, environmental balance, and the

rational use of resources. The calculations developed on the basis of forecasting models can serve as an important practical tool in the development of regional development strategies.

In recent years, various resolutions and decrees aimed at ensuring sustainable economic development have also been adopted in our country. As an example, one can refer to the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 83 dated February 21, 2022, “On Additional Measures to Accelerate the Implementation of National Goals and Objectives in the Field of Sustainable Development until 2030” [5]. The main objective of this resolution is to define specific tasks, responsible executors, and an action plan for the implementation of 17 national sustainable development goals in Uzbekistan by 2030.

The relevance of this resolution to the topic lies in the following:

First, the resolution provides clear quantitative indicators for modeling. For example, Task 8.1 sets a target to increase GDP per capita by 2.6 times, while Task 8.5 establishes specific forecast parameters such as increasing employment by 1.4 times and labor productivity by 3.1 times. These indicators can serve directly as input data for economic-mathematical modeling.

Second, the resolution formalizes monitoring and forecasting mechanisms. The assignment given to the interdepartmental working group to “develop forecast indicators for each parameter for the years 2022–2026 and 2030” confirms the existence of forecasting practices at the state level within the research methodology.

Third, the resolution strengthens a comprehensive approach. The integration of areas such as social protection, healthcare, education, ecology, and economic well-being within a single system substantiates the necessity of a multidimensional approach in sustainable development models.

It should also be emphasized that Resolution No. 83 of the Cabinet of Ministers of the Republic of Uzbekistan (2022) represents a practical example of institutional strengthening of sustainable development. It establishes clear quantitative targets for socio-economic indicators up to 2030. The defined parameters for GDP growth, employment levels, and poverty reduction can serve as a basis for economic-mathematical modeling and forecasting, while the monitoring system enables the comparison of forecast results with actual indicators.

Table 1

Actual and Forecast Indicators of Sustainable Socio-Economic Development of the Republic of Uzbekistan (2022–2030) [6]

Indicator	2024	2025	2026	2027	2028	2029
Population (mln)	37.0	37.05	–	–	–	39.5
Real growth (%)	6.5	5.9	5.8	5.7	5.7	–
GDP (USD billion)	114.96	132.48	148.18	164.16	181.77	–
GDP per capita (USD)	3,113	3,514	3,849	4,177	4,530	5,000

Unemployment (%)	5.5	5.0	4.5	4.0	3.7	3.5
Green energy (%)	—	—	—	—	—	—

The presented table demonstrates positive trends in the sustainable socio-economic development indicators of Uzbekistan for the period 2024–2030. The population is expected to increase from 37 million to 41 million, which creates opportunities for demographic stability and effective planning of labor resources. Although the economic growth rate is projected to decline from 6.5% to 5.7%, GDP is expected to grow from USD 114.96 billion to USD 181.77 billion, while GDP per capita will increase from USD 3,113 to USD 5,500. This indicates an improvement in living standards and economic efficiency.

At the same time, the unemployment rate is expected to decrease from 5.5% to 3.3%, contributing to labor market stability. From the perspective of environmental sustainability, the share of renewable energy sources is planned to exceed 25% by 2030, supporting the development of a green economy and increasing energy efficiency. Overall, these indicators clearly reflect Uzbekistan's prospects for achieving sustainable development in both economic and social spheres.

Conclusion and Recommendations

The results of this study indicate that, in the process of modeling and forecasting sustainable socio-economic development, increasing the rate of economic growth alone is not sufficient. In this process, along with economic indicators such as employment, budget revenues, investment volume, GDP, and labor productivity, issues of social equity, environmental sustainability, and the rational use of resources must also be considered in an integrated manner. The study also demonstrates that scientifically grounded forecasts and economic-mathematical models serve as important practical tools in the development of regional and national development strategies. In addition, state regulatory documents, such as Resolution No. 83 of 2022, make it possible to regulate forecasting and monitoring mechanisms and to define strategic objectives based on clear quantitative indicators.

Based on the results and analysis of the study, the following recommendations for modeling and forecasting sustainable socio-economic development have been developed:

First, it is necessary to introduce an assessment system based on integrated models that combine economic, social, and environmental indicators when developing sustainable socio-economic development strategies.

Second, it is recommended to coordinate regional and intersectoral forecasting processes at the state level and to implement monitoring and extrapolation mechanisms in practice.

Third, investment policy, budget planning, and social programs should be aligned with specific indicators based on the results of economic-mathematical models and forecasting.

Fourth, issues such as the green economy, energy efficiency, and environmental sustainability should be considered as priority directions in the strategic planning process.

If these recommendations are implemented, the likelihood of achieving Uzbekistan's national goals for sustainable socio-economic development by 2030 can be significantly increased.

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