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MODELING AND FORECASTING THE MAIN INDICATORS IN THE ECONOMIC DEVELOPMENT OF THE TEXTILE INDUSTRY

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ABSTRACT

This article presents a comprehensive methodological approach to modeling and forecasting the main indicators of economic development in Uzbekistan's textile industry. Key determinants such as investment volume, average annual fixed assets, employment, and the number of industrial enterprises are evaluated using a multiple regression model. Correlation and multicollinearity analyses reveal the strength and nature of relationships among the variables, allowing for a deeper understanding of their economic implications. The results show that investment and fixed assets exert a positive influence on textile output, whereas the increase in employment demonstrates a negative relationship, indicating inefficiencies in resource utilization. Forecast scenarios for 2024–2030 suggest continued growth in textile production, capital investment, fixed assets, and employment. The proposed forecasting model provides valuable insights for strategic industrial planning, strengthening investment policies, and enhancing the competitiveness of the textile sector by promoting higher value-added production.

Keywords: Investment potential, industrial enterprises, resources, material resources, labor resources, financial resources, innovative resources, fixed assets, working capital.

INTRODUCTION

As a result of the significant inflow of investments into the textile industry of our country in recent years, the level of technological advancement has been steadily increasing year by year. Moreover, in recent years, large-scale economic reforms have been implemented by the government to attract foreign investors to this sector and to enhance its investment attractiveness.

Over the past three years, about 2 billion USD have been invested in the industry, and more than 260 large textile enterprises have been launched [1]. The textile industry accounts for 4.8 percent of the country's GDP, 25 percent of industrial output, 13 percent of production fixed assets, and, most importantly, 32 percent of industrial employment [2].

Currently, extensive economic reforms are being carried out in our country to promote the development of industrial sectors. In particular, the Decree of the President of the Republic of Uzbekistan No. PF-60 dated January 28, 2022, "On the Development Strategy of New Uzbekistan for 2022–2026", was adopted. According to paragraph 3 of the Decree, a set of priority tasks have been identified to ensure the rapid development of the national economy and achieve high growth rates, which, in turn, will contribute to the sustainable development of the sector [3].

The effective implementation of these tasks necessitates improving the evaluation of industrial sectors in our country, particularly the performance of the textile industry.

Analysis of the Literature Related to the Topic. There are various approaches proposed by scholars to determine investment potential. According to N. D. Guskova, "investment potential takes into account macroeconomic characteristics, the saturation of the region with production factors, consumer demand of the population, and other parameters" [4].

L. S. Valinurova and O. B. Kazakov suggest defining investment potential as "a set of investment resources that includes tangible, financial, and intangible assets (ownership of industrial facilities, extraction of mineral resources, accumulation of socio-economic and market relations data, accumulated experience, etc.)" [5].

According to V. Y. Katasonov, the investment potential of an economic entity at any level can be defined as "the maximum total of all internal resources (financial, material, scientific-technical, and human resources) accumulated as a result of previous economic activity, which can be used to support investment activity (in the form of capital investments) without disrupting the entity's current economic operations" [6].

F. S. Tumusov defines investment potential as "a set of potential investment resources that represent accumulated capital, which, as potential investment demand in the investment market, can be transformed into real investment demand to meet material, financial, and intellectual needs for capital expansion" [7].

Uzbek economists, in particular A. Vakhabov, Sh. Khajibakiyev, and N. Muminov, define the essence of investment as follows: "Investments are monetary funds, targeted bank deposits, shares, other securities, technologies, machinery, equipment, licenses, loans, any other property or property rights, and intellectual assets invested in business entities and other types of activities with the purpose of obtaining profit or achieving a positive social effect" [8].

In the development of the textile industry, it is advisable to consider investment opportunities and their utilization as an integrated system. The main elements of this system, based on the views of the aforementioned scholars, will be analyzed in detail in the main part of this article.

Research Methodology. In this study, extensive use has been made of the analysis of existing scientific research on the

utilization of investment opportunities in the economic development of the textile industry, as well as the examination and economic analysis of statistical data. The research also employs methods of logical reasoning, scientific abstraction, data grouping, induction, and deduction.

Analysis and Results. Modeling and forecasting the main indicators of the textile industry encompass several important aspects of necessity and benefit. This process plays a crucial role in improving the efficiency of the sector, determining future development directions, and supporting strategic decision-making.

Based on the data provided by the Association, it is advisable to construct a multiple econometric model. A multiple econometric model includes a set of factors that influence the variation of the dependent variable.

In constructing such a model, it is first necessary to select relevant variables. In our case, the dependent variable (Y) is the volume of textile industry output (in million USD). The independent variables are as follows:

X_1 – volume of investments, million USD;

X_2 – average annual value of fixed assets, million USD;

X_3 – number of employed persons, thousand people;

X_4 – number of textile enterprises, units.

According to official statistics, in 2023, the volume of textile industry output in the Republic amounted to 8,200 million USD, the volume of investments in the sector was 2,071.4 million USD, the average annual value of fixed assets was 6,130 million USD, the number of employed persons was 255.0 thousand, and the number of textile enterprises reached 18.9 thousand.

A general statistical analysis for the period 2010–2023 shows that the average annual volume of textile industry output in the country was 4,980.3 million USD, the average annual volume of investments amounted to 493.6 million USD, the average annual value of fixed assets equaled 4,329.1 million USD, the average annual number of employed persons was 170.5 thousand, and the average annual number of textile enterprises totaled 9.9 thousand.

During this period, the trend analysis indicates that the volume of textile production in 2023 increased 1.95 times compared to 2010 and 1.82 times compared to 2020. Similarly, the volume of investments grew 17.35 times and 4.37 times, respectively; the average annual value of fixed assets increased 1.95 times and 1.17 times; the number of employed persons rose 2.21 times and 1.20 times; and the number of textile enterprises expanded 3.32 times.

Table 1. Main Indicators of the Textile Industry

Year	Volume of textile industry output, mln USD (Y)	Volume of investments, mln USD (X_1)	Average annual value of fixed assets, mln USD (X_2)	Number of employed persons, thousand (X_3)	Number of textile enterprises, units (X_4)
2010	4200	119,4	3150	115,5	5690
2011	4175	149,8	3340	116,0	5800
2012	4265	180,9	3400	119,0	6110
2013	4500	160,4	3510	123,0	6200
2014	4995	173,1	3620	131,0	6500
2015	5268	187,2	3740	140,0	6900
2016	5447	190,2	3810	151,0	7600
2017	2820	250,5	4010	162,0	7700
2018	3837	548,7	4308	184,0	8900
2019	4100	832,3	4810	202,0	11900
2020	4508	474,1	5220	213,0	12100
2021	6184	733,3	5570	231,0	15900
2022	7226	839,1	5990	245,0	18400
2023	8200	2071,4	6130	255,0	18900

First, the degree of correlation between the volume of textile industry output (Y) and the selected factors (X_1, X_2, X_3, X_4) was determined.

According to the results of the correlation analysis, there is a moderate direct correlation ($r > 0.5$) between the dependent variable (Y) and all independent factors (X_1, X_2, X_3, X_4).

However, a strong intercorrelation (multicollinearity) was observed among the independent variables X_1, X_2, X_3, and X_4, which indicates the presence of close linear relationships between them.

If two or more highly correlated variables are included in the model, in addition to the regression equation, another linear dependence arises — this phenomenon is known as multicollinearity.

It distorts the estimated regression coefficients and complicates their economic interpretation.

Therefore, it is considered reasonable to exclude the variable

"number of textile enterprises (X_4)" from the model, as it shows a strong correlation with several other variables and, both economically and logically, has a relatively smaller direct impact on the dependent variable (Y).

Consequently, the quantitative influence of the factors X_1 (volume of investments), X_2 (average annual value of fixed assets), and X_3 (number of employed persons) on the dependent variable Y (volume of textile industry output) can be evaluated through a multiple linear regression model.

The unknown parameters of this regression model were estimated using the Ordinary Least Squares (OLS) method, and the model's evaluation criteria were calculated using the Stata software.

The resulting regression model is as follows:

$$y = -1067{,}6 + 1{,}3x_1 + 4{,}7x_2 - 87{,}9x_3$$

$$(A = 0{,}74\%;\ S_y = 0{,}047;\ t_{a_0} = 22{,}14;$$

$$t_{a_1} = 172{,}68;\ R^2 = 0{,}97;\ F = 490{,}15;\ DW = 2{,}48)$$

The model satisfies all statistical evaluation criteria, confirming its adequacy and reliability. According to the results of the regression analysis, the dependent variable (Y) shows a positive relationship with the factors X_1 (investments) and X_2 (fixed assets), while X_3 (employment) has a negative relationship with Y, indicating an inverse effect.

Table 2. Forecasted Values of the Main Indicators of the Textile Industry

Year	**Textile industry output, mln USD (Y)** $y_t = 265{,}99 - 0{,}74y_{t-2} + 0{,}99e_{t-2}$	**Investments, mln USD (X_1)** $x_{1_t} = 141{,}74 - 0{,}13x_{1_{t-1}}$	**Average annual value of fixed assets, mln USD (x_2)** $x_2 = 2834{,}27e^{0{,}0532t}$	**Number of employed persons, thousand(x_3)** $x_3 = 97{,}665e^{0{,}069t}$
2024	8309,3	2075,9	6294,7	274,9
2025	8465,1	2234,9	6638,6	294,5
2026	8769,4	2374,5	7001,3	315,6
2027	9143,1	2516,5	7383,8	338,1
2028	9456,1	2658,2	7787,2	362,3
2029	9675,6	2799,9	8212,6	388,2
2030	9874,7	2941,7	8661,3	415,9

In addition, long-term forecast indicators for 2024–2030 were developed based on models constructed for the volume of textile industry products ( ) and the factors affecting it: investments in the sector ( ), fixed assets ( ) and the number of employees in the sector ( ) (Table 5).

According to the forecast scenarios for the main indicators reflecting the economic development of the textile industry, by 2030, the volume of textile industry products may reach USD 9,874.7 million, an increase of 1.21% compared to the current period; the volume of investments in fixed capital in the sector may reach 2,941.7 billion UZS, or 1.41 times more; and the number of employees in the industry may increase to 415.9 thousand people, or 1.63 times.

Conclusion and Recommendations. In conclusion, an improved investment strategy for textile enterprises in the country includes the following key directions:

Developing theoretical knowledge related to the sector by strengthening the link between scientific research centers and production enterprises, i.e., analyzing existing practical problems from a theoretical perspective and implementing practical solutions based on recommendations;

Attracting broader investments to the sector by creating more opportunities for investors, including increasing the level of tax incentives;

Promoting innovative development within the framework of the innovation development programs adopted in Uzbekistan;

Enhancing the system of international scientific, technical, and innovative cooperation, increasing exports of high-tech products, and raising the share of finished goods in production;

Developing and introducing new technologies, including nanotechnology, nanomaterials, and information systems technologies, with the aim of expanding the production and export of high-quality finished textile products, promoting national brands in global markets, and localizing the production of modern accessories and fittings;

Organizing innovative product production within industrial enterprises, including product and technological modifications, changes in product assortment, and training and retraining personnel to service equipment using new technologies;

Developing cooperation with foreign countries based on bilateral and multilateral agreements and programs in areas such as technology and license development, purchase and sale, joint scientific-technical conferences, and exhibitions;

Implementing structural and technological restructuring measures to preserve and develop the intellectual potential of light industry, including establishing a scientific-production center for the light industry;

Developing scientific foundations to expand the technology and assortment of low-linear-density yarns from medium-fiber cotton, including creating new types of cotton and blended fabrics based on the new yarn assortment;

Promoting changes in the production of competitive, high-consumption products for domestic and international markets, and advancing technologies for new types of textile materials using nanotechnology and plasma treatment methods, including the development of smart textiles with specific functional properties. Conducting research with experts from academic institutes, leading university scientists, and high-tech equipment

from leading global production companies will allow textile enterprises to master the production of entirely new types of products.

The implementation of these directions in the textile sector will generate a synergistic effect positively influencing production levels. Carrying out these initiatives will reduce costs while improving quality, which in turn will increase the competitiveness of both products and the entire industry.

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