World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 9, April 2022,
ISSN: 2749-3628

FORECASTING THE ECONOMIC DEVELOPMENT OF INDUSTRIAL POTENTIAL ON THE BASIS OF TREND MODELS IN THE SUSTAINABLE DEVELOPMENT OF INDUSTRY IN SAMARKAND REGION

Yakhshilikov Jasur Juraboyevich
Independent researcher of
Samarkand State University

Article history:

Received: 2nd February 2022
Accepted: 2nd March 2022
Published: 13th April 2022

Abstract:

This article analyzes the factors of sustainable development of the manufacturing industry of the regions. At the same time, proposals and conclusions have been developed through the analysis and forecasting of the state of industrial potential in sustainable development. The object of research is the regional industry of Samarkand region.

Keywords: Econometrics, trend model, industry, regional analysis, sustainable development.

INTRODUCTION

Industry is one of the main sectors of the republic's economy. This is due to the fact that the industry is radically different from other industries and industries in its value-added creation, its role in meeting the needs of the population, its high-level production locomotive. The development of the industrial sector in the regions will lead to the sustainable development of the national economy. The process of diversification will be improved through the processing of all extracted and cultivated resources in the industrial sector, the production of new products from them, and an increase in the range and range [1].

The experience of developing and newly industrialized countries shows that much of the economic success in these countries is due to profound structural changes in industry, especially in manufacturing[2].

The dynamism of the industrial sector also has a significant positive impact on the development of other sectors and sectors of the economy. In particular, the development of food and light industry will stimulate the development of agriculture, forestry and fisheries. The development of the manufacturing industry also has a strong influence on the development of the service sector (banking, insurance, communications services, trade and transport). In particular, many service industries are directly dependent on the manufacturing industry, and without these services, manufactured goods simply do not reach consumers. The manufacturing industry also has a positive impact on the development of scientific research, wholesale and retail trade, repair and maintenance of automobiles.

This means that the development of the country is inextricably linked with the sustainable development of economic sectors, especially industry. This, in turn, necessitates the study of the analysis of the production capacities of the regions and the forecasting of production capacities.

As a result of the measures taken in recent years to industrialize the economy of Uzbekistan, industrial production and its share in the export of goods are growing. In particular, in 2020, the country produced industrial products worth 367.1 trillion soums, the share of which in exports was about 86.7%. For example, during this period, Samarkand region produced industrial products worth 18.1 trillion soums, the share of which in exports was about 61.4%. It is obvious that the industry is the main locomotive of the economy, in this regard, the development of the industry is of strategic importance for countries.

In general, the development of industries is directly related to the effective use of the internal potential of enterprises, the effectiveness of internal potential is assessed by the level of physical and mental performance of employees, material resources, financial resources and the use of production technologies [3].

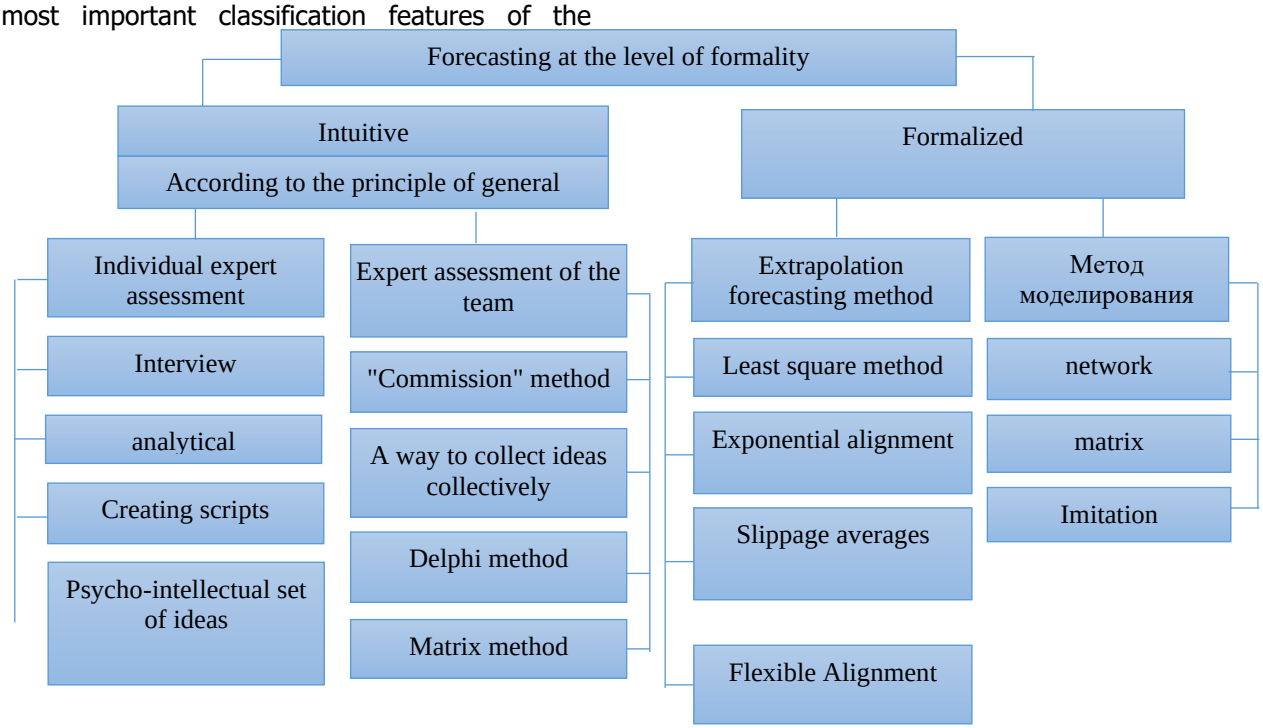
An important role in this is played by the forecast of industry indicators. That is, the main goal of forecasting economic development is to study it in accordance with the economic processes taking place in the real sector, and to approach the expected values.

In other words, forecasting is another stage in the process of regulating the economy or part of the development of a program for the socio-economic development of the country [4].

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 9, April 2022,
ISSN: 2749-3628

RESEARCH METHODOLOGY AND RESULTS

To date, according to scientists, there are more than 150 different forecasting methods. However, in practice, 15-20 are used as the main ones (Fig. 1). The available sources present various principles for classifying forecasting methods. One of the most important classification features of the forecasting method is the degree of formality, which fully covers forecasting methods. The second is the general principle of applying the forecasting method as a classification feature, the third is the method of obtaining forecast information, the fourth main feature is the specific characteristics of forecast objects [5].



Methods for forecasting of formality level

Forecasting future volumes of industrial production makes it possible to develop the most optimal options for the industrial development policy of the region, show alternative ways of developing industries, set priorities for the development of industries, and conduct a systematic analysis of the mechanisms of their development [6].

However, the forecast assumes that the indicator will be monotonic with respect to the time factor. Otherwise, this result will not be able to indicate the future real state of the indicator [7].

It should be noted that one of the most difficult tasks of predictive analysis is the choice of the correct analytical correlation. When choosing the type of function that describes the trend, the parameters determined by the least squares method are often compared empirically, i.e., functions c are compared by the mean square error of the value [8].

Thus, industrial indicators are selected on the basis of trend forecasting models and multivariate regression models for a specific period of time, comparing model errors as the most optimal predictive indicators on different models.

There are the following types of trend models.

When forecasting economic and social processes, such trend functions as linear, parabolic, exponential, exponential and logarithmic are used:

Linear trend model → $y_t = \beta_0 + \beta_1 T + \varepsilon$ (1)

Parabolic trend model → $y_t = \beta_0 + \beta_1 T + \beta_2 T^2 + \varepsilon$ (2)

Exponential trend models → $y_t = \beta_0 e^{\beta_1 T} + \varepsilon$; $y_t = \beta_0 T^{\beta_1} + \varepsilon$ (3)

Logarithmic trend model → $y_t = \beta_0 + \beta_1 \ln(T) + \varepsilon$ (4)

where: y_t is the expected value of the forecast at time t, t is the time factor, e (2.718) is the base of the natural logarithm.

Based on the above econometric models, it is possible to develop medium-term forecast values of economic indicators of the industry of the Samarkand region. For example, the volume of industrial production (*Q*), the volume of investments in industry (*K*), the number of people employed in industry (*L*), the volume of fixed assets used in industry (*FA*) (Table 1).

Dynamics of economic indicators of the industry of Samarkand region [9]

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 9, April 2022,
ISSN: 2749-3628

Year	Volume of industrial output (billion sum)	The volume of investments in industry (billion sum)	Number of people employed in industry (thousand people)	The amount of fixed assets used in industry (billion soums)
2010	2011,2	252,6	1815,7	516,7
2011	2485,6	319,8	1902,6	573,5
2012	3222,0	388,7	1943,7	653,8
2013	3880,1	493,5	1973,8	764,9
2014	4966,4	379,1	2003,8	872,0
2015	6095,5	550,2	2033,6	1029,0
2016	7446,0	1043,0	2058,2	1193,6
2017	9242,0	762,0	2079,6	926,9
2018	13488,1	1803,9	2103,4	1243,4
2019	15783,6	1290,1	2117,1	2385,5
2020	18072,8	5820,4	2130,4	5349,2

These figures are given at current prices. Another important aspect of forecasting is that the indicators must be expressed in the price of a certain period, which increases the level of accuracy (validity) of the forecast.

Therefore, the indicators must be expressed in prices for a certain period according to the following formula.

$$y_t = y_{t-1} \cdot \left(\frac{y_t}{y_{t-1}} \cdot 100 \right) \div 100 \qquad (5)$$

According to this formula, the volume of industrial output (*Q*), the volume of investments in industry (*K*), the number of people employed in industry (*L*) and the volume of fixed assets used in industry (*FA*) were adjusted to 2020 prices (Table 2).

Dynamics of economic indicators of the industry of the Samarkand region (in 2020 prices)

№	Indicators	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	*Q*	5720,6	6576,7	7034,0	7529,5	8395,1	9110,2	10126,2	12004,4	15012,6	16635,9	18072,8
2	*K*	950,5	1150,4	1364,2	1444,6	1092,2	1368,8	2509,6	1734,6	3125,0	1661,6	5820,4
3	*L*	1815,7	1902,6	1943,7	1973,8	2003,8	2033,6	2058,2	2079,6	2103,4	2117,1	2130,4
4	*FA*	1259,6	1298,9	1383,9	1516,0	1628,9	1820,2	1997,6	1355,9	1591,5	2650,3	5349,2

Here, the volume of industrial output (*Q*) is a dependent indicator. The volume of investment in industry (*K*), the number of people employed in the industry (*L*) and the amount of fixed assets used in industry (*FA*) are independent variables. The quantitative relationship between these indicators should be assessed on the basis of correlation analysis.

Correlation matrix of paired coefficients

	Q	*K*	*L*	*FA*
Q	1	0,764162337	0,886697877	0,738325263
K	0,764162337	1	0,631630398	0,880118076
L	0,886697877	0,631630398	1	0,570064738
FA	0,738325263	0,880118076	0,570064738	1

The results of the correlation analysis showed that there is no close relationship between the dependent and independent variables included in the model. Therefore, the quantitative dependence of these factors can be analyzed on the basis of a multivariate regression model.

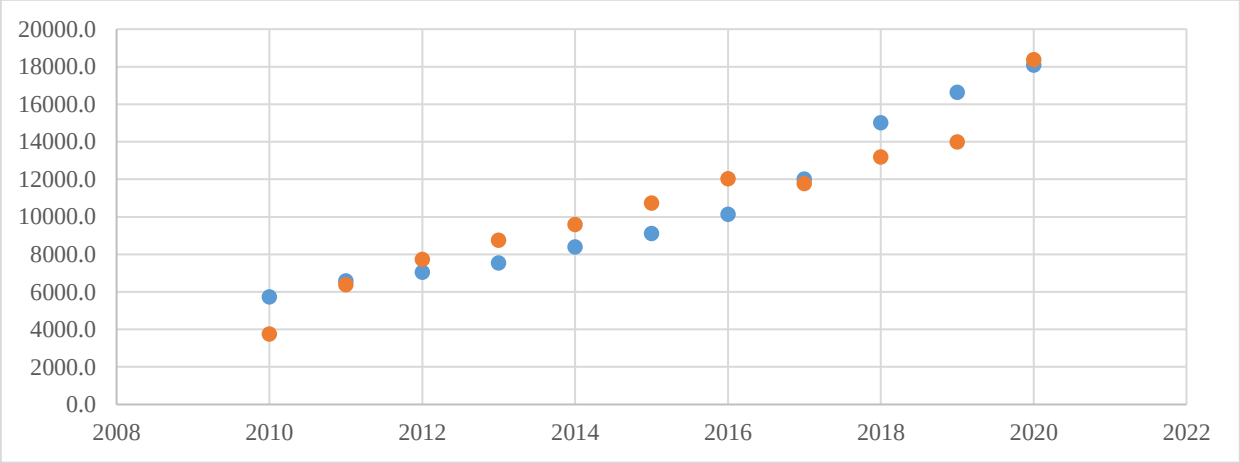
$$Q = -50254,2 + 0.372543\,K + 28,92388\,L + 0,902696$$

($R^2 = 0,86$; $F = 15,5604$)

The criteria for evaluating the structured model and its parameters showed that the model is positive. This can also be seen from the difference between the actual and model values of the resulting indicator, i.e., the standard error

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 9, April 2022,
ISSN: 2749-3628

Figure 2. Dynamics of real and model values of industrial output



- model values
- actual values

Also, linear, parabolic, exponential and logarithmic trend models were developed, representing the volume of investment in industry, the number of people employed in industry and the change in the number of fixed assets used in industry over time as independent variables in the model (Table 4).

Trend models that reflect changes in industry performance over time.

(Table 4)

	The volume of investments in industry	Number of people employed in industry	Number of fixed assets used in industry
Linear	$K = 306{,}13T + 183{,}39$	$L = 28{,}878T + 1841{,}5$	$FA = 241{,}14T + 539{,}72$
Parabolic	$K = 1661{,}2 - 375{,}93T + 56{,}838T^2$	$L = 1782{,}3 + 56{,}177T - 2{,}2749T^2$	$FA = 2108{,}8 - 483{,}06T + 60{,}35T^2$
Exponential	$K = 798{,}13e^{0{,}1292T}$	$L = 1844{,}8e^{0{,}0145T}$	$FA = 1013{,}1e^{0{,}0953T}$
Exponential	$K = 763{,}68T^{0{,}5151}$	$L = 1810T^{0{,}0666}$	$FA = 1010{,}5T^{0{,}361}$
Logarithmic	$K = 217{,}24 + 1133{,}1\ln(T)$	$L = 1805{,}1 + 131{,}72\ln(T)$	$FA = 619{,}76 + 859{,}01\ln(T)$

Trend models reflecting changes in industry performance over time were evaluated according to the evaluation criteria and the most appropriate ones were selected. In particular, it was found that the parabola trend models in terms of the volume of investments in industry and the fixed assets used in industry, as well as the linear trend model in terms of the number of people employed in industry, are adequate. During the study, medium-term forecast values were developed based on a multivariate regression model of industrial production. (Table 5).

Forecast values of indicators reflecting the economic situation of the industry of the Samarkand region (for 2020)

Table 5

№	INDICATORS	2022	2023	2024	2025	2026
1	Volume of industrial output (billion sum)	21685,9	23987,7	26440,7	29045,1	31800,8
2	The volume of investments in industry (billion sum)	6379,7	7538,4	8810,8	10196,8	11696,6
3	Number of people employed in industry (thousand people)	2216,9	2245,8	2274,7	2303,5	2332,4
4	The amount of fixed assets used in industry (billion soums)	6028,2	7174,6	8441,7	9829,4	11337,9

According to the forecast, by 2026 the volume of industrial production in the Samarkand region can increase by 1.5 times, investments in industry by 1.8 times, the number of people employed in industry by

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 9, April 2022,
ISSN: 2749-3628

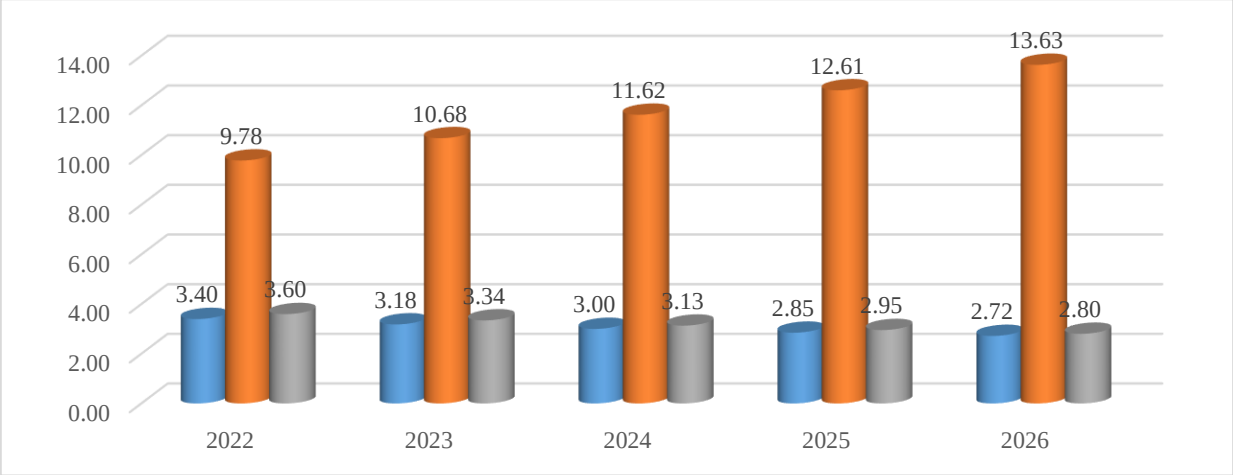
1.1 times and the volume of fixed assets used in industry by 1.9 times .

In addition, medium-term forecast values have been developed for such indicators as the efficiency of investments in industry, labor productivity in industry and the efficiency of using fixed assets in industry, which are key indicators of the economic potential of the region's industry (Table 6).

Forecast performance indicators reflecting the economic potential of the industry of the Samarkand region

№	INDICATORS	2022	2023	2024	2025	2026
1	Efficiency of investments in industry, billion soums	3,40	3,18	3,00	2,85	2,72
2	Labor productivity billion soums/ thousand people	9,78	10,68	11,62	12,61	13,63
3	Efficiency of use of fixed assets in industry, billion soums	3,60	3,34	3,13	2,95	2,80

According to the forecast, by 2026 labor productivity in the industry of the region will increase by 1.4 times and, conversely, the efficiency of investments in industry and fixed assets used in industry will decrease by 1.3 times. (Fig. 3).



The results of the forecast show that the decline in investment in industry and the efficiency of the use of fixed assets in industry may be due to the fact that industry over this period spent large amounts of money on capital and fixed assets.

CONCLUSION

It is known that these factors are only a part of industrial production resources. It goes without saying that if the volume of some factors of industrial production changes, and the rest remain unchanged, then there will be no sharp changes in the volume of industrial production. Although this is one side of the issue, on the other hand, it is also related to changes in domestic consumption and demand in the external market.

Based on this study, for the further development of the industrial sector, in particular the industrial sector of the Samarkand region and increasing its economic potential, the following is proposed:

- Creation of favorable conditions for mutually beneficial relations between enterprises producing industrial products and transport companies that supply and sell raw materials to these enterprises;
- Ensuring the competitiveness and diversification of domestic industrial products, developing promising strategies and mechanisms for the further development of industries through the efficient use of available natural and economic resources;
- Strengthen support for the manufacturing industry, which contributes the most to value creation;
- In-depth analysis of the impact of investment flows on the development of the industrial sector, forecasting expected results and taking measures to implement them;
- Creation of modern trade and logistics centers in the regions that ensure the launch of domestic industrial products to world markets,

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 9, April 2022,
ISSN: 2749-3628

increase competitiveness, increase the share of exports and reduce the volume of imported products due to import-substituting industrial products;

- The focus on minimizing costs and increasing revenue and quality at industrial enterprises based on the widespread use of modern digital technologies and scientific achievements will contribute to the implementation of the research indicators.

REFERENCES

1. Mamadjonov D. O'zbekiston Respublikasida sanoat tarmog'ini rivojlantirishning asosiy omillari // "Biznes - Ekspert" iqtisodiy ilmiy-amaliy oylik nashr. 2018. №10. 3 - b.
2. UNIDO. Industrial Development Report 2016. The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development. Vienna, Austria. 2015. http://www.unido.org
3. Rustamov N.I. Sanoat tarmoqlarini ichki imkoniyatlaridan samarali foydalanish asosida rivojlantirish. I.f.f.d. (PhD) dissertatsiyasi avtoreferati, TDIU, Toshkent – 2018. 23 b.
4. Irmatov M.M., Haydarov M.T.«Iqtisodiy va ijtimoiy rivojlanishni prognozlashtirish» - (O'quv qo'llanma) – T.: TDIU, 2005. – 248 b.
5. Mambetjanov Q.Q. Makroiqtisodiy tahlil va prognozlash. O'quv-uslubiy majmua, O'zMU, T. 2020. – 37 b.
6. Tadjiev T.M. Sanoat ishlab chiqarishini rivojlantirishning ekonometrik modellari. I.f.f.d. (PhD) dissertatsiyasi avtoreferati, QDU. rganch 2021. – 19 b.
7. Usmonov B.X. Mashinasozlik tarmog'ida asosiy kapitalga kiritilgan investitsiyalar samaradorligini baholash va tarmoqqa jalb qilinayotgan investitsiyalar hajmini prognozlash // "Iqtisodiyot va innovatsion texnologiyalar" ilmiy elektron jurnali. № 3, may-iyunь, 2017. – 14 b.
8. Abdullaev I.S. Iqtisodiyot tarmoqlarining rivojlanishini prognozlash usullari // "Iqtisodiyot va innovatsion texnologiyalar" ilmiy elektron jurnali. № 4, iyulь-avgust, 2018. – 5 b.
9. https://samstat.uz/uz/rasmiy-statistika/macro-indicators-2 Samarkand regional department of statistics
10. Altissimo, F, A Bassanetti, R Cristadoro, M Forni, M Hallin, M Lippi, L Reichlin and G Veronese (2001): "Eurocoin: a real time coincident indicator of the euro area business cycle", CEPR Discussion Paper, no 3108