



STATISTICAL ASSESSMENT OF THE CONFIDENCE INTERVAL OF THE AVERAGE PROFIT OBTAINED IN A MONTH BASED ON SURVEYS

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A B S T R A C T	KEY WORDS
The article discusses the issues of collecting and processing statistical data for statistical evaluation based on surveys regarding the confidence interval of the average profit of industrial enterprises over a month.	Industrial enterprises, confidence interval, questionnaire, respondents, export, import, statistical assessment.

Introduction

The Decree No. PD-158 of the President of the Republic of Uzbekistan dated September 11, 2023, regarding the "Uzbekistan - 2030" strategy states: "To develop the 'driver' sectors of industry and fully utilize the industrial potential of regions, the goals to be achieved by 2030 include, among others, increasing the volume of added value in industry to 45 billion dollars and creating 2.5 million high-income jobs, producing import-substituting products by large enterprises and expanding cooperation with regional enterprises, implementing an active incentive system for enterprises that establish industrial cooperation, creating modern technological industrial zones in every district, conducting geological exploration works in an area of 60,000 square kilometers, achieving a 100 percent level of reprocessing yarn in the textile industry and establishing the production of 400,000 tons of synthetic and blended fabrics to meet the demand for high-quality textiles, increasing the volume of construction materials production by twofold, expanding the production of new types of energy-efficient materials, covering 70 percent of the need for pharmaceutical products through domestic manufacturers, increasing the added value by attracting more than 30 prestigious foreign brands in the leather and footwear industry, and enhancing the production of furniture."

Methodology

Statistical observation, grouping methods, absolute, relative, and average quantities, and graphical methods were used.

Results

In the context of transitioning to market relations, the development of a precise and scientifically grounded regional policy and its practical implementation play a crucial role in demonstrating the efficient functioning of the economy of the Republic of Uzbekistan and in the appropriate utilization of existing resources.

The industrial sector is considered a production branch that encompasses the processing of raw materials, the extraction of underground resources, the production of means of production, and the creation of consumer goods.

For this reason, "the producers of official statistics adhere to concepts, classifications, and methodologies that are internationally recommended in the processing of statistical data."

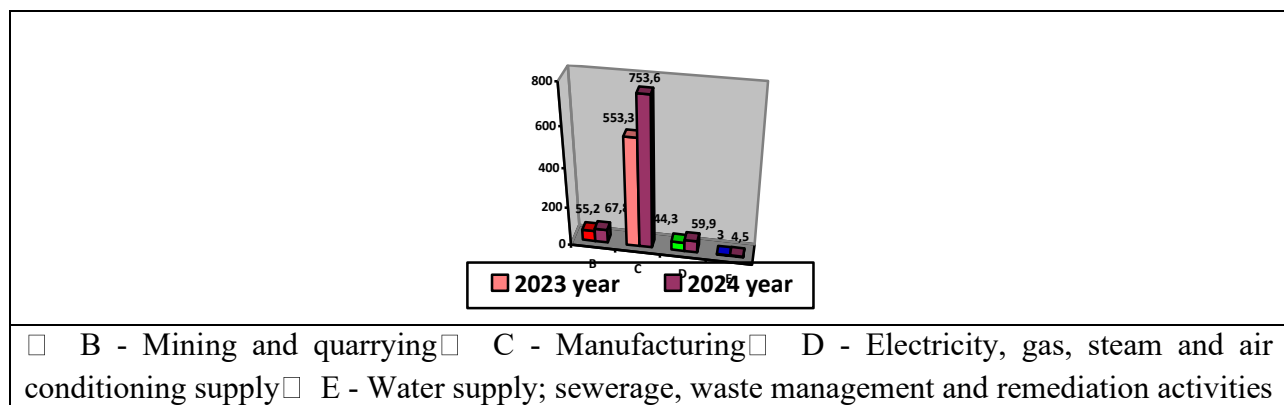


Figure 1. Industrial production by types of economic activity in the Republic of Uzbekistan in 2023–2024 (in trillion soums)

In 2023, our republic's enterprises produced industrial products worth 655.8 trillion soums, with the physical volume index of industrial production reaching 106.0% compared to 2022. The physical volume index of industrial production is a relative indicator that describes the change in the volume of produced goods (works, services) during comparable periods.

Currently, "there are 69,400 industrial enterprises operating in our republic, of which 11,800 (17.0% of the total registered enterprises) are located in Tashkent city, 7,800 (11.2%) in Fergana region, 7,300 (10.5%) in Tashkent region, 6,200 (8.9%) in Samarkand region, and 5,500 (7.9%) in Andijan region."

In 2024, the largest share of industrial production will come from the industrial sector, accounting for 753.6 trillion soums, which constitutes 85.1% of total industrial production.

The main factor in the decline of the total industrial production physical volume is observed in the mining industry and the processing of non-metallic minerals, with a decrease of 1.9%, and in water supply, canalization systems, waste collection, and utilization, with a decrease of 5.5%.

Additionally, there has been a 7.7% decline in the production (reprocessing) industry, as well as increases of 5.5% in the supply of electricity, gas, steam, and air conditioning.

The manufacturing sector accounts for the largest share of industrial production, contributing 553.3 trillion soums, which constitutes 84.4% of total industrial output. (Figure 1)

Regional factors influence the character and direction of economic reforms being implemented in our country, the rates and ratios of production factors' development, and the acceleration of structural changes in the economy. The analysis of regional development issues in the light industry sector,

which defines national economic development, and the development of light industry from a regional perspective involves scientifically based proposals and practical recommendations that are considered priority tasks in the context of economic liberalization.

Analysis

When we refer to the rational organization of industrial production from a regional perspective, it means taking into account the characteristics of the market economy, modern trends in global agricultural development, and the interests of the country and regional entities. This involves assessing the regional labor distribution opportunities for industrial production, the natural and economic potential of the regions, and effectively utilizing economic relations among the regions to fully meet the population's needs for industrial products and ensure the socio-economic efficiency of light industry production in the region.

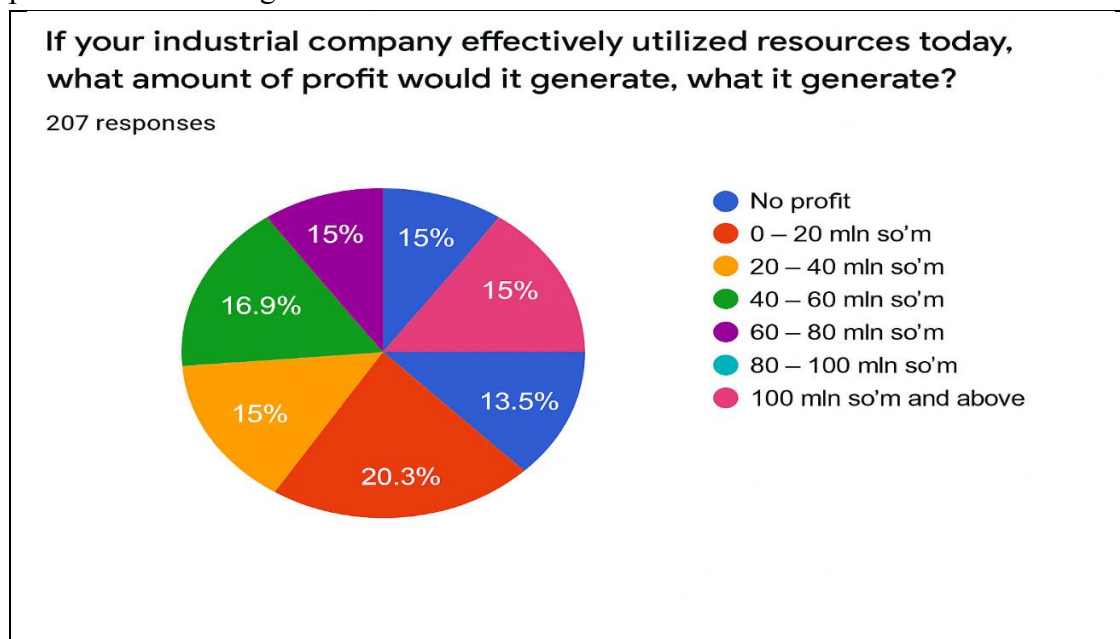


Figure 2. The share of profits earned by industrial enterprises operating in the Republic of Uzbekistan (as a percentage), as of May 1, 2025

In the conducted surveys, among 207 respondents from industrial enterprises operating in the Republic of Uzbekistan, 28 (13.5%) do not benefit, 42 (20.3%) benefit from 0-20 million soums, 31 (15.0%) benefit from 20-40 million soums, 35 (16.9%) benefit from 40-60 million soums, 21 (10.1%) benefit from 60-80 million soums, 19 (9.2%) benefit from 80-100 million soums, and 31 (15%) benefit from more than 100 million soums, indicating the presence of industrial enterprises in these categories (see Figure 2).

To study the benefits obtained by industrial enterprises operating in the Republic of Uzbekistan, observations were conducted on a random sample of 207 out of 112,490 industrial enterprises, and the following data was obtained.

1-table Groups of industrial enterprises operating in the Republic of Uzbekistan by monthly profit in the sample survey

Groups of industrial enterprises operating in the Republic of Uzbekistan by the amount of profit received, mln UZS	Number of industrial enterprises, units (f_i)	Class midpoint, (x_i)	$x_i f_i$	$x_i - \bar{x}$	$(x_i - \bar{x})^2$	$(x_i - \bar{x})^2 f_i$
0-20	70	10	700	-38,16	1456,186	101932,992
20-40	31	30	930	-18,16	329,7856	10223,3536
40-60	35	50	1750	1,84	3,3856	118,496
60-80	21	70	1470	21,84	476,9856	10016,6976
80-100	19	90	1710	41,84	1750,586	33261,1264
Over 100	31	110	3410	61,84	3824,186	118549,754
Total	n=207	x=48,16	9970			274102,419

a) 0,997 We determine the confidence interval for the average monthly profit of industrial enterprises based on probability Sanoat korxonalarining bir oyda olgan o'rtacha foydasi amounts to 48.16 million UZS:

$$\bar{x} = \frac{\sum x f}{\sum f} = \frac{9970}{207} = 48,16 \text{ mln sum.}$$

the variance of the sample data set amounts to 1,324.2 million UZS.

$$\sigma^2 = \frac{\sum (x - \bar{x})^2 f}{\sum f} = \frac{274102,419}{207} = 1324,2 \text{ mln. sum}$$

Given that the confidence level $R = 0.997$, the corresponding t-value is 3. The standard error of the sample is 7.58 million UZS

$$\Delta_{\bar{x}} = t * \mu_{\bar{x}} = \sqrt{\frac{\sigma^2}{n} \left(1 - \frac{n}{N}\right)} = \sqrt{\frac{1324,2}{207} \left(1 - \frac{207}{112490}\right)} = 3\sqrt{6,4 * 0,9982} = 7,58$$

The confidence interval for the population mean is expected to lie within the range of 25.42 million to 70.9 million soums.

$$\bar{x} - \Delta_x \leq \bar{x} \leq \bar{x} + \Delta_x,$$

$$48,16 - 7,58 \leq \bar{x} \leq 48,16 + 7,58$$

$$26,84 - 5,29 \leq 26,84 \leq 26,84 + 5,29$$

$$40,58 \leq \bar{x} \leq 55,74.$$

Therefore, at a confidence level of 0.860, the average profit of industrial enterprises is expected to lie between 40.58 million and 55.74 million UZS.

b) 0,954 The confidence interval is determined for the share of industrial enterprises in the Republic of Uzbekistan with a profit level exceeding 60 million soums

$R = W \pm \Delta_W$ In this case

$$W = m/n = 71/207 = 0,343 \text{ yoki } 34,3 \%$$

It is known that when the probability $R = 0.954$, the confidence coefficient t is equal to 2.

$$\Delta_w = t * \mu_w = t \sqrt{\frac{w(1-w)}{n} \left(1 - \frac{n}{N}\right)} = 2 \sqrt{\frac{0,343(1-0,343)}{207} \left(1 - \frac{207}{112490}\right)} = 2\sqrt{0,00109 * 0,9982} = 0,06$$

yoki 6 %

$$0.343 - 0,06 \leq 0,343 \leq 0,343 + 0,06$$

$$0,283 \leq 0,343 \leq 0,403$$

$$28,3\% \leq 34,3\% \leq 40,3\%$$

Thus, it is possible to emphasize with certainty that the profitability level of industrial enterprises operating in the Republic of Uzbekistan varies between 28.3% and 40.3%. (Table 1).

Currently, the modernization of production and the implementation of technical and technological re-equipment measures are being carried out on a large scale across almost all sectors and industries of our republic's economy, expanding the opportunities for producing competitive products. However, a serious problem in this regard is that the high level of product prices negatively affects their competitiveness. Therefore, in the decree of the President of the Republic of Uzbekistan titled "Measures to Support Enterprises in the Real Sector of the Economy, Ensure Their Sustainable Operation, and Enhance Export Potential" (Decree No. 4058 dated November 28, 2008), it was also stipulated to ensure the competitiveness of local manufacturing enterprises by reducing product prices to levels not exceeding 20% of the cost through the efficient use of all resources.

Conclusions and Recommendations

In the Republic of Uzbekistan, industrial enterprises must have the capacity to operate independently by forming mechanisms of a market economy. Statistical studies indicate that the majority of today's industrial enterprises have limited knowledge and skills, which results in a moderate level of profitability.

-The state influences the development and coordination of regional industry through the following factors:

-Construction of infrastructure facilities serving industrial enterprises with the involvement of public funds;

-Allocation of part of capital investments from the budget to reduce the expenses of private investors;

-Participation in the construction of industrial enterprises;

-Provision of concessional loans for the construction of industrial enterprises;

-Introduction of tax benefits;

-Training of qualified personnel for new industrial enterprises at the expense of the state budget;

-Provision of privileges and incentives for the construction of industrial enterprises in economically underdeveloped regions;

-Restriction or prohibition of industrial construction based on ecological conditions, etc.

In conclusion, our country possesses sufficient resources and reserves for the development of industry and for it to become a leading sector of the national economy. In this regard, rapidly growing sectors such as the fuel and energy complex, chemical industry, food industry, pharmaceuticals, pulp and paper industry, as well as ferrous and non-ferrous metallurgy, mechanical engineering, and automotive industry, are making a significant contribution to strengthening Uzbekistan's position in the global market.

In particular, since gaining independence, our Republic has successfully implemented economic and structural policies aimed at transforming from an agrarian country into a freely industrially developed state.

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