

Development Forecast of The Building Materials Market

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Abstract. The article examines the state of the construction materials market and analyzes the factors affecting it. The share of Namangan region in the production of building materials in our republic has been determined. Using the STATA-16 program, future indicators of the factors affecting the development of the building materials market in the region were analyzed and forecasted. Conclusions and recommendations on the development of the construction materials market in Namangan region are given.

Keywords. Building materials market, retail turnover, level of housing supply, export-import, STATA-16 program, mathematical models, the factors affecting.

1. INTRODUCTION.

The 22nd goal of the decree of the President of the Republic of Uzbekistan No. PF-60 of January 28, 2022 "On the development strategy of the New Uzbekistan for 2022-2026" is to continue the industrial policy aimed at ensuring the stability of the national economy and increasing the share of industry in the gross domestic product, by increasing the volume of output of industrial products 1.4 times. It is indicated to increase the volume of production of building materials twice. In 2022-2026, a program for the further development of the building materials sector has been developed in our country by implementing projects worth 5 billion US dollars.

2. METHODOLOGY

Methodological-theoretical foundations of the problems of the construction materials market were studied by well-known scientists in the world Chamberlin E., Sherer F., Morris. D., J. Tirols[1]. They studied the characteristics of the construction materials industry, the structure of the market and the processes of price, sales and service in its operation in the conditions of the market economy. From Russia and other CIS countries scientists such as Izard U., Lavrov A.M., Nekrasov N.N., Novoselov A.S. A.Lyosha, A.G.Granberg and R.I.Shnier[2] studied the development issues of the regional building materials market. Changes in the structure of supply and demand in the construction materials market, introduction of new construction technologies, introduction of competitive enterprises and new products to the market, competition with foreign firms and other relations were researched by Avdasheva S.B., Rozanova N.M., Vuros L [3]. Khodiev, B. Y., Mustafakulov, S. I. [4] investigated methods for control efficiency evaluation of the production capacities, Ziedulla, H. [6], Tursunov B. O. [5,7,8,9], Zarova, E. V. [11] and others researched methods of production capacity usage management in textile enterprises.

Abdurakhmanova G. K., Fayziyeva, D. S. and others studied methodical aspects of establishing a control system over compliance with principles of decent work and social security in textile enterprises. [10]

3. DATA ANALYSIS AND FINDINGS.

During the analyzed period, the production of building materials in Namangan region increased by 3.6 times, and in 2021 this indicator reached 693.6 billion soums. The volume of production of industrial products in the region in 2021 was 14,584.80 billion soums, and the production of construction materials made up 4.75% of it.

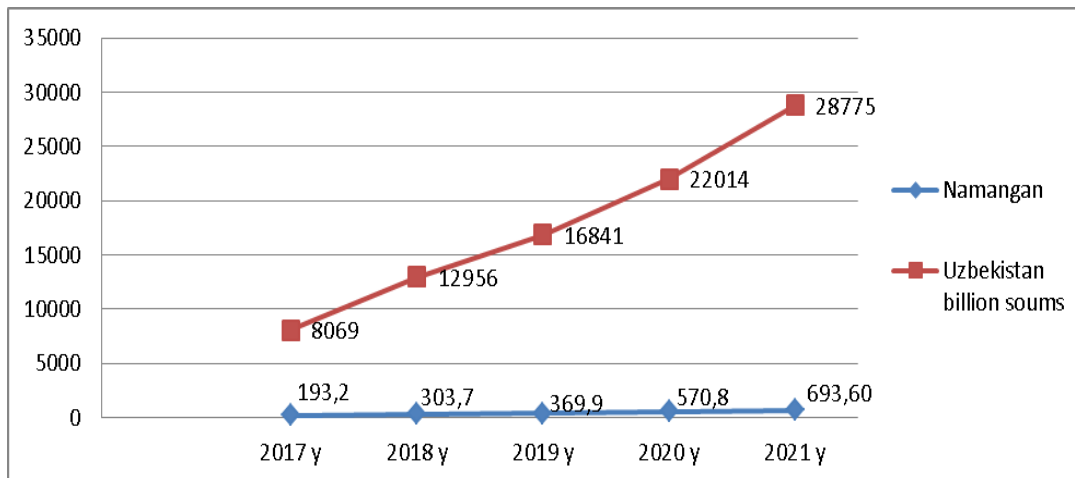


Figure 1. Analysis of construction materials production in Uzbekistan, including Namangan region, in 2017 - 2021

Import and export play an important role in meeting the demand for construction materials. No region can meet the existing demand for building materials with its local production.

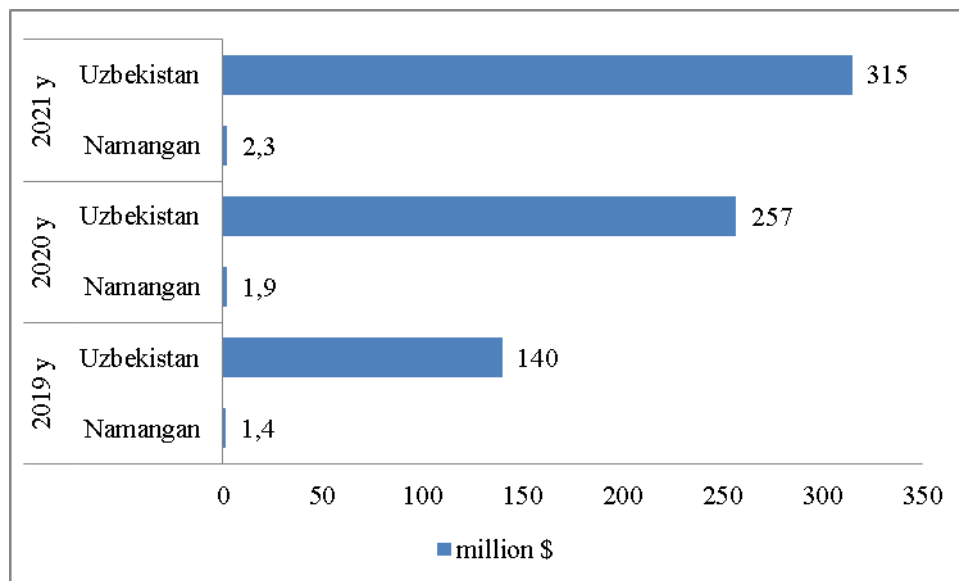


Figure 2. Analysis of construction materials exported in Uzbekistan and Namangan regions in 2019-2021

The export of construction materials in Namangan region increased by 1.6 times during the last 3 years (2019-2022) and compared to 2019, construction materials worth 844.8 thousand US dollars were exported. Construction materials make up a high share of exports. Although the volume of production of construction materials in the region has increased by 3.6 times, the volume of import of construction materials still remains high.

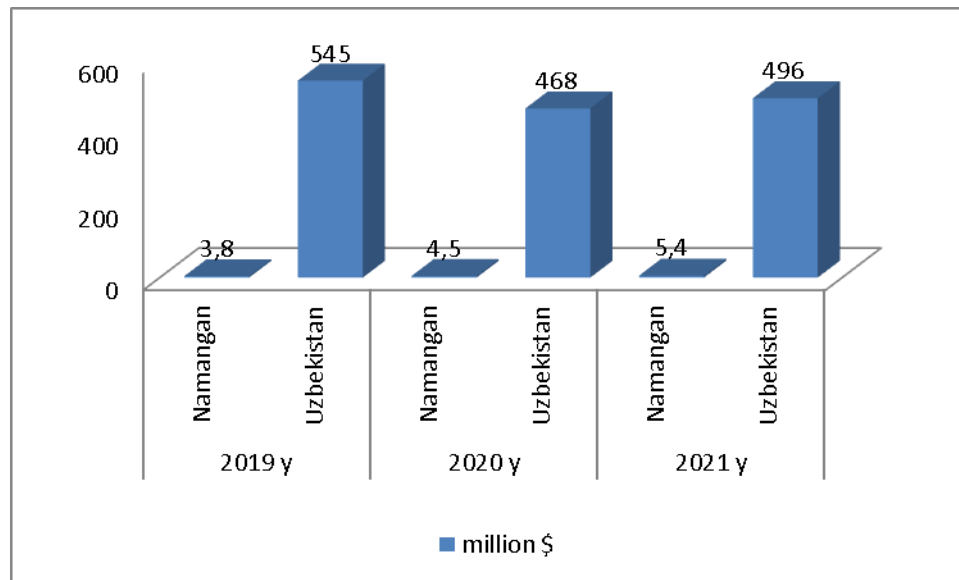


Figure 3. Analysis of imported construction materials in Uzbekistan and Namangan regions in 2019-2021

In Namangan region, the volume of import of building materials increased 1.5 times during 2019-2021. Wood materials, fittings, and some types of varnish and paint products constituted the greatest share in the import volume of construction materials.

By analyzing the factors affecting the development of the building materials market, it was studied whether their development affects the level of housing provision of the population. The development of the construction materials market results in the development of the level of housing provision of the population as well.

Below is an analysis of Namangan region indicators of factors affecting the level of housing provision of the population.

Table 1: Analysis of Namangan region indicators of factors affecting the level of housing provision of the population

Years	Population Growth (X ₁)	Gross income per capita (X ₂) (Thousand soums)	Fixed capital investments per capita (X ₃) (thousand soums)	Production volume of construction materials per capita (X ₄) (per 1000 people) (thousand soums)	Volume of import of construction materials per capita (X ₅) (\$)	Volume of construction materials retail turnover per capita (X ₆)	Volume of construction works per capita (X ₇) (soums)	Level of housing provision of the population (Y) (sq.m)
2010	2258.50	1566.70	290.00	21.89	1.89	1318.8	154040.29	14.20
2011	2379.50	2170.00	318.40	28.56	2.01	1678.7	200000.00	15.40
2012	2420.60	2644.00	376.00	31.47	2.28	2268.8	226761.96	15.50

2013	2458.70	3168.10	485.60	38.67	3.12	2853.5	297270.92	16.10
2014	2504.10	3636.50	714.70	46.24	3.34	3506.5	355576.85	16.20
2015	2554.20	4113.20	863.80	55.27	3.69	4166.7	395583.74	16.10
2016	2603.40	4745.50	1074.80	60.23	4.69	5173.5	495467.47	16.30
2017	2652.40	5733.30	1340.30	72.84	6.15	6346.3	556175.54	15.10
2018	2699.60	6887.60	2992.50	112.5	16.3	7826.6	836272.04	15.20
2019	2752.90	8293.10	344.10	134.37	13.66	9915.1	1260852.19	16.00
2020	2810.80	9427.40	4229.20	222.43	15.69	11531.9	1664366.02	16.50

In order to evaluate the influence of the factors forming the potential of the population's level of housing provision, we are looking for a mathematical model in the form $y = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5 + a_6x_6 + a_7x_7$. Here y is the level of housing provision of the population, x_1 is the population growth; x_2 - total income per capita; x_3 - fixed capital investments per capita; x_4 - production volume of building materials per capita; x_5 - volume of import of construction materials per capita; x_6 - volume of retail turnover of construction materials per capita; x_7 - volume of construction works per capita, a_0, a_1, \dots, a_7 – fixed numbers. The least squares method of mathematical statistics was used to find the coefficients a_0, a_1, \dots, a_7 . In this sense, using the "STATA-16" program, the econometric model representing the level of housing provision of the population of Namangan region, $R^2=0.9405$, $t_{calculate}=2.6$ and $F_{calculate}=6.78$ (When $\alpha= 0.05$ ($t_{table}=2.11$ and $F_{table}=2.272$) criteria, the reliable and adequate model is as follows:

$$y = -19,52465 + 0,015382 x_1 + 0,000306x_2 + 0,000824x_3 - 0,084729 x_4 - 0,116443x_5 - 0,00164x_6 + 0,000016 x_7$$

The analysis of the mathematical model shows that the above indicators have a direct impact on the development of the building materials industry and market. Growth of population income, per capita capital investment is the main source, while the remaining indicators are the result of the development of the building materials market in the country.

The main factors affecting the development of the construction materials market are the population, the total income per capita, the level of housing, the production of construction materials, and the volume of construction work.

In Namangan region, it is important to analyze the indicators affecting the development of the building materials market in order to forecast future indicators of the building materials market and prepare the necessary recommendations based on them.

Table 2: 2016-2020 analysis of the main indicators affecting the development of the building materials market of Namangan region

We create a separate mathematical model for each of the main indicators that affect the development of the construction materials market of Namangan region:

1. On the basis of the data of 2016-2020 of the main indicators affecting the development of the construction materials market of Namangan region, the dynamics of statistical data on the production volume of construction materials were scientifically analyzed econometrically, and the econometric model was created using the EXCEL program, $R^2=0.985$, $t_{\text{calculate}}=14.03$ and $F_{\text{calculate}} =197.0$ ($t_{\text{table}}=2.11$ and $F_{\text{table}}=2.272$ when $\alpha= 0.05$), the adequate regression model of the change in the volume of the main product is expressed as follows:

$$Y_{\text{Production of building materials}} = 20,336x^2 - 21,544x + 159.82$$

Here: $Y_{\text{Production of building materials}}$ - data on the main indicators affecting the development of the building materials market of Namangan region for 2016-2020; x - time (years).

In this case, it is possible to compare the change in the graph of the production volume of construction materials with the determined model graph, and it becomes possible to observe some deviations that were not visible through economic analysis, and this helps to make scientifically based decisions (Figure 2.1).

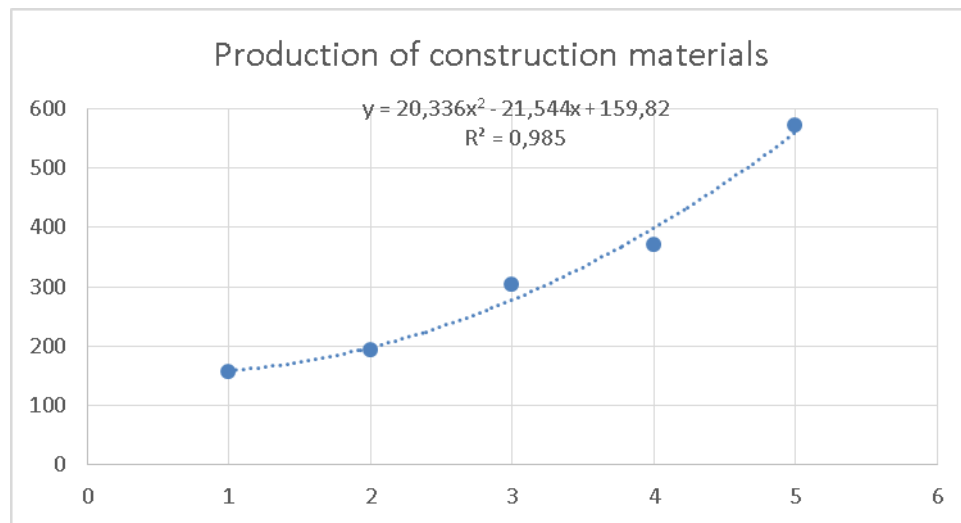


Figure 3. The dynamics of changes in the production volume of construction materials

2. On the basis of the data of 2016-2020 of the main indicators affecting the development of the building materials market of Namangan region, the dynamics of statistical data on the retail sale of building materials were scientifically econometrically analyzed and the econometric model was created using the EXCEL program, $R^2=0.9960$, $t_{\text{calculate}}=27.33$ and An adequate regression model of the change in the volume of the main product in the case where $F_{\text{calculate}}=747.0$ ($t_{\text{table}}=2.11$ and $F_{\text{table}}=2.272$ when $\alpha= 0.05$) is expressed as follows:

$$Y_{\text{Retail sales of building materials}} = 19.321x^2 - 5.1586x + 102.44$$

Here: $Y_{\text{Retail trade of building materials}}$ - information on the main indicators affecting the development of the building materials market of Namangan region for 2016-2020; x - time (years).

In this case, it is possible to compare the changes in the volume of construction materials retail trade with the determined model graph, and it becomes possible to observe some deviations that are not visible through economic analysis, and this helps to make scientifically based decisions (Figure 2.2).

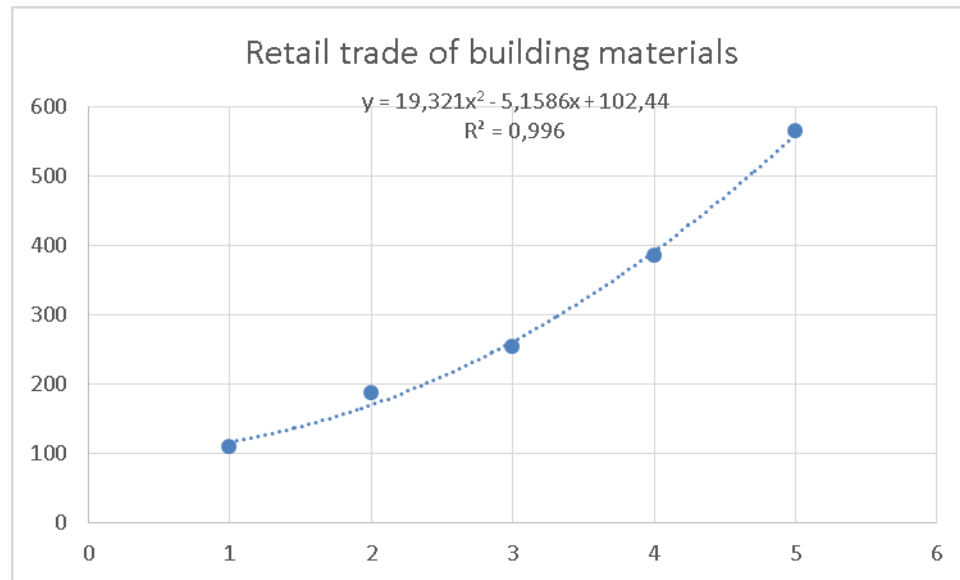


Figure 4. The dynamics of changes in the volume of retail trade of construction materials

Thus, the dynamics of changes in the volume of construction works, the dynamics of changes in the population, the dynamics of changes in total income per capita, the dynamics of changes in the level of housing provision of the population were analyzed and the results are presented in Table 3.

Table 3: Comparison table of econometric model results

Indicator name	Mathematical models	Coefficient of determination
Production of construction materials	$Y = 20,336x^2 - 21,544x + 159,82$	$R^2 = 0,985$
Retail sale of construction materials	$Y = 19,321x^2 - 5,1586x + 102,44$	$R^2 = 0,996$
Size of construction works	$Y = 150,14x^2 - 60,897x + 1128,2$	$R^2 = 0,9912$
Population	$Y = 1,7071x^2 + 41,287x + 2561,2$	$R^2 = 0,9998$
Total income per capita	$Y = 38,871x^2 + 959,13x + 3712,4$	$R^2 = 0,9983$
The level of housing provision of the population	$Y = 0,2929x^2 - 1,6271x + 17,48$	$R^2 = 0,8413$

Based on the data of 2016-2020 of the main indicators affecting the development of the building materials market of Namangan region, the forecast indicators were analyzed based on the mathematical models, and the forecast indicators until 2022-2026 were determined based on Table 3 according to the structure of their industries (Table 4).

Table 4: Forecast indicators for 2022-2026 of the main indicators affecting the development of the building materials market of Namangan region

№	Indicators	Measuring unit	2022 y	2023 y	2024 y	2025 y	2026 y
1	Production of construction materials	billion soums	1006,0	1289,8	1614,3	1979,4	2385,3

2	Retail sale of construction materials	billion soums	1013,0	1297,6	1620,9	1982,8	2383,4
3	Size of construction works	billion soums	8058,78	10250	12741,5	15533,2	18625,3
4	Population	a thousand	2933,86	3000,75	3071,06	3144,78	3221,92
5	Total income per capita	thousand soums	12331	13873,2	15493,1	17190,8	18966,2
6	The level of housing provision of the population	sq. m	13,7336	8,8256	10,505	12,028	19,5732

As can be seen from the data of Table 4, the volume of the main indicators affecting the development of the construction materials market of Namangan region is expected to increase during the forecast years. In 2022-2026, the production of building materials, the retail turnover of building materials and the volume of construction works in Namangan region are forecasted to increase by 2.3 times, the population by 1.1 times, and the total income per capita by 1.5 times.

For the development of the building materials industry, the forecast figures for the years 2022-2026 in the Main Directorate of Economic Development and Poverty Reduction of Namangan region are 889.5 billion soums in 2022, 942.9 billion soums in 2023, 1004.2 billion soums in 2024, 1064.4 billion soums in 2025, and 1128 billion soums in 2026. Our forecast in Table 4 differed slightly over the years. According to the forecasts of the General Directorate, the volume of production of construction materials is expected to increase by 238.8 billion soums in 2022-2026, while in our table this indicator is expected to increase by 1379.3 billion soums.

4. CONCLUSIONS AND SUGGESTIONS

We consider it important to implement the following in the development of the building materials market in Namangan region:

- Namangan region is considered a favorable region for the production of building materials due to its geographical location. Analyzing the composition of the import of construction materials using innovative technologies, it is important to localize imported construction materials and increase production volume;
- In Namangan region, it is necessary to create a cluster that unites building materials manufacturers, construction firms, sellers of building materials and organizations in the region into a single unified system;
- We consider it important to take measures to develop electronic trade of building materials in Namangan region and to create a single electronic trade platform for the region.

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