

**PRODUCTION OF PHARMACEUTICAL PRODUCTS:  
PROCESSES AND METHODS FOR IMPROVING EFFICIENCY –  
GLOBAL EXPERIENCE**

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**Abstract.** The article examines pharmaceutical production processes, key trends in the global pharmaceutical market, and ways to improve industry efficiency. The study analyzes the size of the global market, the activities of leading pharmaceutical companies, and the growing demand for biopharmaceutical and innovative medicines. It also assesses the current state of Uzbekistan’s pharmaceutical industry, including production dynamics, regional structure, and foreign trade indicators. The results highlight high import dependence and a low level of localization. The paper concludes with recommendations to expand domestic production and enhance export potential.

**Keywords:** pharmaceutical industry, biopharmaceuticals, medicines, production efficiency, global market, import dependence, localization, export.

**Introduction**

The pharmaceutical industry is one of the strategic sectors of the global healthcare system, playing a crucial role in ensuring public health, maintaining economic stability, and fostering innovative development. In recent years, global demographic changes, population aging, the increase in chronic and infectious diseases, as well as growing investments in healthcare have significantly increased the demand for pharmaceutical products.

In the global pharmaceutical market, biopharmaceuticals, personalized therapy, biosimilars, and artificial intelligence-based developments are emerging as priority

areas. These trends are making it increasingly important to improve production processes, enhance product quality, and reduce production costs.

In Uzbekistan, the pharmaceutical industry has also developed rapidly in recent years, achieving growth in production volumes. However, a high level of dependence on imports, the predominance of imported raw materials and active pharmaceutical ingredients (APIs), and the regional concentration of production continue to limit the sector's efficiency. In this regard, the present study aims to analyze the processes of pharmaceutical production and methods for improving efficiency based on global experience, as well as to develop practical conclusions applicable to national conditions.

### **Literature Review**

Issues related to the development and efficiency of the pharmaceutical industry have been widely discussed in global economic literature. Studies conducted by the OECD, World Health Organization, and World Bank analyze the growth of the pharmaceutical market in relation to per capita drug expenditure, the share of innovative medicines, and government regulatory mechanisms.

International analytical platforms such as Fierce Pharma and IQVIA provide comprehensive analyses of pharmaceutical companies' financial indicators, R&D investments, and market segmentation. These studies identify biopharmaceuticals and medicines for oncology, immunology, and metabolic diseases as the fastest-growing segments.

Scientific literature also considers increasing the level of localization as one of the key factors in reducing production costs and enhancing competitiveness. At the same time, regional economic research emphasizes that the concentration of pharmaceutical production may lead to higher logistics costs and economic imbalances between regions.

In the context of Uzbekistan, research on the pharmaceutical industry has mainly focused on state support measures, import substitution policies, and export potential

development, while a comprehensive analysis of production efficiency remains a relevant and pressing issue.

### **Analysis and Results**

According to the analysis, the global pharmaceutical market was valued at approximately USD 1.65 trillion in 2024. By the end of 2025, this figure is expected to reach USD 1.74 trillion. By 2035, the market volume is projected to grow to USD 3.53 trillion, with a compound annual growth rate (CAGR) of 6.49% over the period.<sup>1</sup>

According to the 2024 ranking of the largest biopharmaceutical companies published by Fierce Pharma, the global pharmaceutical market in 2024 was characterized by innovative development, structural transformation, and strong demand for medicines targeting metabolic, oncological, and immunological diseases. In recent years, large multinational corporations have significantly expanded their investments in research and development (R&D), contributing to positive revenue dynamics.<sup>2</sup> This can be observed in the following examples:

1. Johnson & Johnson (USA) ranked first, generating USD 88.8 billion in revenue (+4% compared to 2023). The company achieved stable growth due to diversification across pharmaceutical, biotechnology, and medical device segments.
2. Roche (Switzerland) reported revenues of USD 65.3 billion, maintaining its leading position in biodiagnostics and biotechnology, which form the core of its portfolio.
3. Merck & Co. (USA) generated USD 64.2 billion in revenue (+7%). The primary growth driver was the anticancer drug Keytruda, reflecting the company's strong focus on specialized therapeutic strategies.

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<sup>1</sup> <https://www.sphericalinsights.com/ru/reports/pharmaceutical-market>

<sup>2</sup> [https://pharmnewskz.com/ru/article/top-20-krupneyshih-farmkompaniy-po-obemu-vyruchki-v-2024-godu\\_24684](https://pharmnewskz.com/ru/article/top-20-krupneyshih-farmkompaniy-po-obemu-vyruchki-v-2024-godu_24684)

4. Pfizer (USA) recorded USD 63.6 billion in revenue (+7%), ranking fourth. After a post-pandemic decline, the company began recovery, supported by portfolio expansion in oncology and immunology.

5. AbbVie (USA) generated USD 56.3 billion (+4%). Despite declining sales of Humira, new products such as Skyrizi and Rinvoq ensured continued growth, demonstrating successful portfolio diversification.

6. AstraZeneca (United Kingdom) earned USD 54.1 billion (+18%), becoming one of the fastest-growing companies in 2024. High demand for oncology drugs such as Tagrisso and Imfinzi significantly contributed to overall growth.

7. Novartis (Switzerland) reported revenues of USD 50.3 billion (+11%). The company's "focused medicines" strategy strengthened specialization in high-value therapeutic areas, positively impacting financial results.

8. Bristol-Myers Squibb (USA) generated USD 48.3 billion (+7%), with high-performing immunology and oncology drugs serving as key growth drivers.

9. Eli Lilly (USA) achieved USD 45 billion in revenue (+32%), making it one of the fastest-growing companies in the ranking. The global demand for the anti-obesity and antidiabetic drug Mounjaro became a strategic turning point for the company, reflecting the emergence of new global pharmaceutical trends.

10. Sanofi (France) reported USD 44.46 billion in revenue (+11%). New research in immunology and rare diseases has ensured stable growth, strengthening its position as one of Europe's leading biopharmaceutical corporations.

**Information about the top 10 largest pharmaceutical product-manufacturing companies in 2024.<sup>3</sup>**

<sup>3</sup>[https://pharmnewskz.com/ru/article/top-20-krupneyshih-farmkompaniy-po-obemu-vyruchki-v-2024-godu\\_24684](https://pharmnewskz.com/ru/article/top-20-krupneyshih-farmkompaniy-po-obemu-vyruchki-v-2024-godu_24684)

Rank	Company	Revenue 2024	Revenue 2023	Countries
1	Johnson & Johnson	\$88,8 mlrd	\$85,2 mlrd	USA
2	Roche	\$65,3 mlrd	\$65,3 mlrd	Switzerland
3	Merck & Co.	\$64,2 mlrd	\$60,1 mlrd	USA
4	Pfizer	\$63,6 mlrd	\$59,6 mlrd	USA
5	AbbVie	\$56,3 mlrd	\$54,3 mlrd	USA
6	AstraZeneca	\$54,1 mlrd	\$45,8 mlrd	United Kingdom
7	Novartis	\$50,3 mlrd	\$45,4 mlrd	Switzerland
8	Bristol-Myers Squibb	\$48,3 mlrd	\$45 mlrd	USA
9	Eli Lilly	\$45 mlrd	\$34,1 mlrd	USA
10	Sanofi	\$44,46 mlrd	\$40,1 mlrd	France

**Global demand for certain medicines is increasing depending on conditions, climate, and other factors.** In the USA, demand for pharmaceutical products is very high, with a primary focus on biopharmaceuticals. Among these, medicines for oncology, immunotherapy, diabetes, and cardiovascular diseases are of particular importance. Additionally, psychotropic and antidepressant drugs are widely used among the population.

In 2024, the US pharmaceutical market was valued at approximately USD 520 billion, with biopharmaceutical products accounting for about 55% of the market (major companies such as Johnson & Johnson, Pfizer, and Merck are active in this sector).

In the field of traditional medicine, natural supplements—vitamins, minerals, and herbal products—are used by approximately 40% of the population. Moreover, practices such as yoga, meditation, and phytotherapy are also widespread.

In China, the main pharmaceutical products include antibiotics and antiviral drugs. Traditional Chinese Medicine (TCM) also plays an important role in maintaining public health. In 2024, the Chinese pharmaceutical market was estimated at approximately USD 150 billion, with the TCM market accounting for USD 18.75 billion, growing at an annual CAGR of 8.5%. More than 70% of the population uses traditional medicine, including herbal remedies, acupuncture, massage, and moxibustion.

In Germany and other European Union countries, the main pharmaceutical demand focuses on oncology, diabetes, cardiovascular, and psychotropic drugs. At the same time, phytotherapy and homeopathy are widely used as traditional medicine practices. Approximately 35–40% of the population uses natural medicines. The European natural medicine market is valued at around USD 23 billion, and it is projected to grow at a CAGR of 8% between 2025 and 2030.

In Africa and South America, the main medicines include those targeting infectious and parasitic diseases (malaria, tuberculosis, HIV). Traditional medicine practices—such as herbal medicine, shamans, and local remedies—are widespread, with approximately 70% of the population using these methods.

Today, in many countries around the world, traditional medicine and conventional healing practices continue to play an important role in healthcare. For example, in South Korea, traditional medicine—particularly Hanbang (Korean traditional herbal medicine)—is officially recognized by the government and applied based on scientific principles. Additionally, specialized centers and scientific seminars are organized to integrate traditional medicine with modern medical practices.<sup>4</sup>

As reported by the World Health Organization (WHO), traditional and complementary medicine (therapies that supplement and support conventional

<sup>4</sup> <https://soglom.uz/archives/14825>

treatment) is practiced in over 170 countries worldwide. This is not only characteristic of developing nations but also indicates a growing interest in traditional medicine in developed countries.<sup>5</sup>

According to the Organisation for Economic Co-operation and Development (OECD), annual per capita spending on medicines varies significantly between countries.

High-spending countries include the USA (\$1,713), Germany (\$1,158), and Switzerland (\$1,061), where private healthcare and innovative medicines are widely used.

Low-spending countries include Denmark (\$404), Chile (\$455), and Estonia (\$458), where drug prices are regulated by the government.<sup>6</sup>

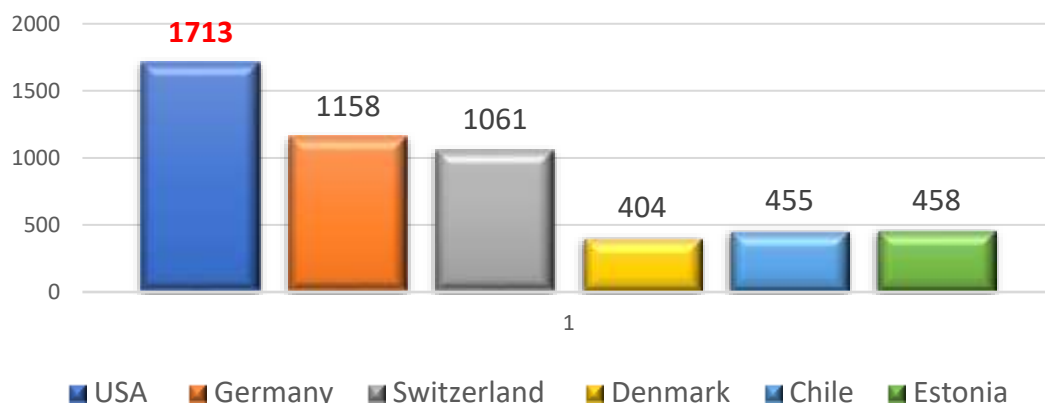
Based on fiscal check data, last year the population of Uzbekistan spent more than UZS 19.7 trillion on medicinal products. The highest expenditures were recorded in Tashkent (1.7 million UZS), Bukhara region (746 thousand UZS), and Samarkand region (660 thousand UZS). The lowest expenditures were observed in Surkhandarya (289.5 thousand UZS), Karakalpakstan (302.3 thousand UZS), and Kashkadarya region (308.9 thousand UZS).<sup>7</sup>

<sup>5</sup> <https://www.who.int/news-room/questions-and-answers/item/traditional-medicine>

<sup>6</sup> [https://www.oecd.org/en/publications/health-at-a-glance-2025\\_8f9e3f98-en/full-report/pharmaceutical-expenditure\\_ab82eef9.html](https://www.oecd.org/en/publications/health-at-a-glance-2025_8f9e3f98-en/full-report/pharmaceutical-expenditure_ab82eef9.html)

<sup>7</sup> <https://kun.uz/ru/news/2025/03/01/skolko-uzbekistansy-tratyat-na-lekarstva>

**Per capita spending on retail pharmaceutical products in foreign countries  
(expressed in USD)**



*Манба:* [https://www.oecd.org/en/publications/health-at-a-glance-2025\\_8f9e3f98-en/full-report/pharmaceutical-expenditure\\_ab82eef9.html](https://www.oecd.org/en/publications/health-at-a-glance-2025_8f9e3f98-en/full-report/pharmaceutical-expenditure_ab82eef9.html)

From 2017 to 2024, reforms in the sector focused on developing the industry, expanding domestic production, increasing export volumes, and reducing imports through localization. By 2024, pharmaceutical production had increased 3.5 times compared to 2017.

In 2024, in terms of regional production structure, Tashkent city remained the absolute leader in pharmaceutical manufacturing, accounting for 61.9% of total production. Sirdaryo region ranked second with a 13.2% share, while Tashkent region accounted for 11.1%. This indicates a well-developed industrial cooperation around the capital.<sup>8</sup>

**Conclusions and Recommendations**

The analysis conducted indicates that the pharmaceutical industry is one of the strategic sectors in the global economy, characterized by high value-added output and innovation-based development. In recent years, the steady growth of the global

<sup>8</sup> Source: Based on data from the State Committee of the Republic of Uzbekistan on Statistics.

pharmaceutical market has been driven by increasing demand for biopharmaceuticals, oncology, immunology, and metabolic disease treatments.

In Uzbekistan, the 3.5-fold increase in pharmaceutical production volumes between 2017 and 2024 demonstrates the effectiveness of reforms implemented within the sector. However, the high share of imports in the domestic market, the reliance on foreign sources for raw materials and active pharmaceutical ingredients (APIs), and the regional concentration of production capacities limit the sector's sustainable economic development.

*Based on the analysis, the following recommendations have been proposed to enhance the efficiency of the pharmaceutical industry:*

*Reduce foreign currency expenditures by increasing the localization of drug groups with high import dependence;*

*Lower production costs by establishing domestic production of pharmaceutical raw materials and APIs;*

*Enhance competitiveness in foreign markets by providing financial and institutional support to export-oriented enterprises;*

*Reduce logistics costs and increase regional employment by establishing new production capacities in different regions;*

*Improve overall efficiency by implementing innovative technologies and digital management solutions in production processes.*

Implementing these recommendations will help reduce production costs, decrease import dependence, and ensure the long-term sustainable development of the pharmaceutical sector.

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