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EXPORT PERFORMANCE OF PHARMACEUTICAL INDUSTRY

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ABSTRACT

The pharmaceutical industry plays a significant role in global healthcare and international trade. This study examines the export performance of the pharmaceutical industry with a focus on India, which is recognized as a major supplier of generic medicines worldwide. The research analyzes export trends over the period 2015–16 to 2025–26 using secondary data. Key analytical tools such as year-wise export analysis, Compound Annual Growth Rate (CAGR), product-wise export performance, market-wise distribution, Revealed Comparative Advantage (RCA), SWOT analysis, and PESTLE framework have been applied. The findings reveal consistent growth in pharmaceutical exports, strong comparative advantage in vaccines and generic medicines, and increasing global demand. However, challenges such as regulatory compliance, dependency on imported APIs, and global competition persist. The study concludes that strategic investment in innovation, diversification, and supply chain efficiency is essential for sustaining export growth.

KEYWORDS: Pharmaceutical exports, CAGR, RCA, Export performance, Generic medicines, SWOT analysis, PESTLE analysis, International trade.

INTRODUCTION

The pharmaceutical industry is a crucial contributor to global healthcare and economic development. India has emerged as a leading exporter of pharmaceutical products, particularly generic medicines, due to its cost-effective production and strong manufacturing capabilities.

Pharmaceutical exports involve a systematic cycle including production, regulatory approval, marketing, distribution, and performance evaluation. With increasing global demand for affordable medicines, the industry has witnessed steady growth. However, factors such as regulatory requirements, competition, and technological advancements significantly influence export performance.

STATEMENT OF THE PROBLEM

Although the pharmaceutical industry has achieved significant growth in global markets, maintaining consistent export performance remains a major challenge. The export performance cycle of pharmaceutical products is complex and involves multiple stages that require strict coordination and regulatory compliance. Delays in approvals, quality issues, supply chain disruptions, and fluctuating global demand can negatively impact export performance. Pharmaceutical exporters face intense competition from multinational companies and emerging economies. Price controls, currency fluctuations, patent restrictions, and trade barriers further affect profitability and market expansion. Additionally, stringent regulations imposed by international authorities create compliance burdens, increasing operational costs and risks. Many pharmaceutical firms struggle to effectively manage the entire export cycle—from production planning and documentation to logistics and post-export evaluation. Inefficient coordination between departments, lack of market intelligence, and limited diversification into new markets may reduce export growth potential. External factors such as global health crises, geopolitical tensions, and changes in trade agreements also create uncertainty in export performance. Therefore, there is a need to systematically examine the export performance cycle of pharmaceutical products to identify the key challenges, measure performance indicators, and suggest strategies for improvement. This study aims to analyze these issues and provide practical recommendations to strengthen export performance and ensure sustainable competitiveness in international markets.

OBJECTIVES OF THE STUDY

1. To study product-wise export performance
2. To identify factors influencing export performance

REVIEW OF LITERATURE

Desai (2021)Exchange Rate Fluctuations and Export Competitiveness analyzed how currency fluctuations affect pharmaceutical exports and found that volatility impacts pricing, profitability, and global competitiveness. Rao (2022) – Trade Agreements and Market Access

examined international trade agreements and found that bilateral and multilateral agreements facilitate easier market entry for exporters. Chatterjee (2023)Digital Transformation in Pharma Trade explored digital transformation and highlighted the role of AI, blockchain, and automation in improving export processes. Mishra (2024) Export Financing and Credit Facilities studied financial support systems and found that export credit and financial assistance improve export capacity and stability. Sinha (2024)Global Demand Trends in Pharmaceutical Exports analyzed changing global demand patterns and explained that aging populations and healthcare needs drive export growth. Arora (2024)Quality Standards and International Competitiveness emphasized that maintaining high-quality standards ensures long-term competitiveness in global markets. Srivastava (2025) Trade Barriers and Export Challenges examined tariff and non-tariff barriers affecting pharmaceutical exports and suggested policy reforms to overcome these challenges. Kaur (2025) Future Prospects of Pharmaceutical Exports analyzed future trends and concluded that innovation, digitalization, and policy support will shape the growth of pharmaceutical exports.

RESEARCH METHODOLOGY

Research Design: Descriptive

Data Type: Secondary data

Sources: Journals, government reports, trade databases

Period of Study: 2015–16 to 2025–26

Tools used: Year wise export analysis, CAGR, Product and Market wise export analysis, RCA, SWOT, PESTLE

ANALYSIS AND INTERPRETATION

1. Year-wise Export Analysis

Exports increased from USD 21 billion (2015–16) to USD 33.20 billion (2025–26).

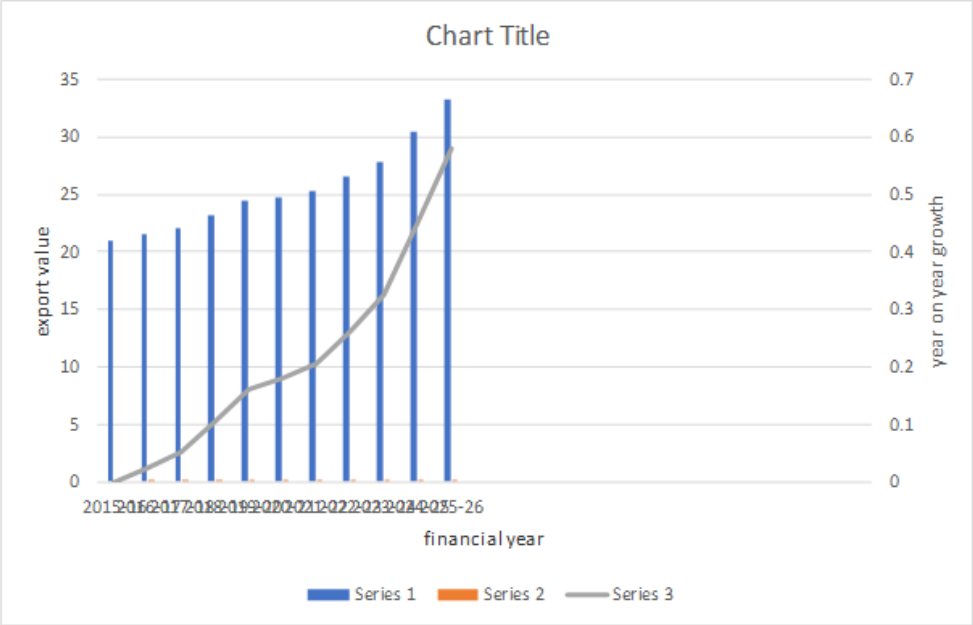
- Growth trend: steady and positive
- Dip in 2020–21 due to global disruptions
- •Strong recovery post-pandemic

Year-wise Export Value and Growth Performance of India's Pharmaceutical Industry (2015–16 to 2025–26)

Financial Year	Export Value (USD Billion)	Year-on-Year Growth (%)	Cumulative Growth from 2015 (%)
2015-16	21.00	-	-
2016-17	21.50	2.38%	2.38%
2017-18	22.10	2.79%	5.24%
2018-19	23.20	4.98%	10.48%
2019-20	24.40	5.17%	16.19%
2020-21	24.80	1.64%	18.10%
2021-22	25.30	2.02%	20.48%
2022-23	26.50	4.74%	26.19%
2023-24	27.85	5.09%	32.62%
2024-25	30.47	9.41%	45.10%
2025-26	33.20	8.96%	58.10%

The data indicates a consistent upward trend in India's pharmaceutical export value from USD 21.00 billion in 2015–16 to USD 33.20 billion (projected) in 2025–26. The year-on-year growth rate shows moderate fluctuations, starting at 2.38% in 2016–17 and gradually increasing to a peak of 9.41% in 2024–25, before slightly declining to 8.96% in the projected year. Notably, growth remained relatively stable between 2017–18 and 2019–20, followed by a slowdown in 2020–21 (1.64%), possibly due to global disruptions. However, the industry quickly recovered, maintaining steady growth thereafter. The cumulative growth steadily rises throughout the period, reaching 58.10% by 2025–26, reflecting sustained expansion in export performance.

The overall trend suggests that India's pharmaceutical industry has demonstrated strong and resilient export performance over the years. Despite minor fluctuations and external challenges, the continuous increase in export value and cumulative growth highlights the sector's stability and global competitiveness. The recovery after the dip in 2020–21 indicates the industry's adaptability to changing global conditions. The increasing growth rates in recent years also suggest rising global demand and improved market penetration. This steady progress implies a positive outlook for the pharmaceutical export sector, with strong potential for further growth in international markets.



2. CAGR Analysis

•Average CAGR around 3%–4%

•Fluctuations due to global factors

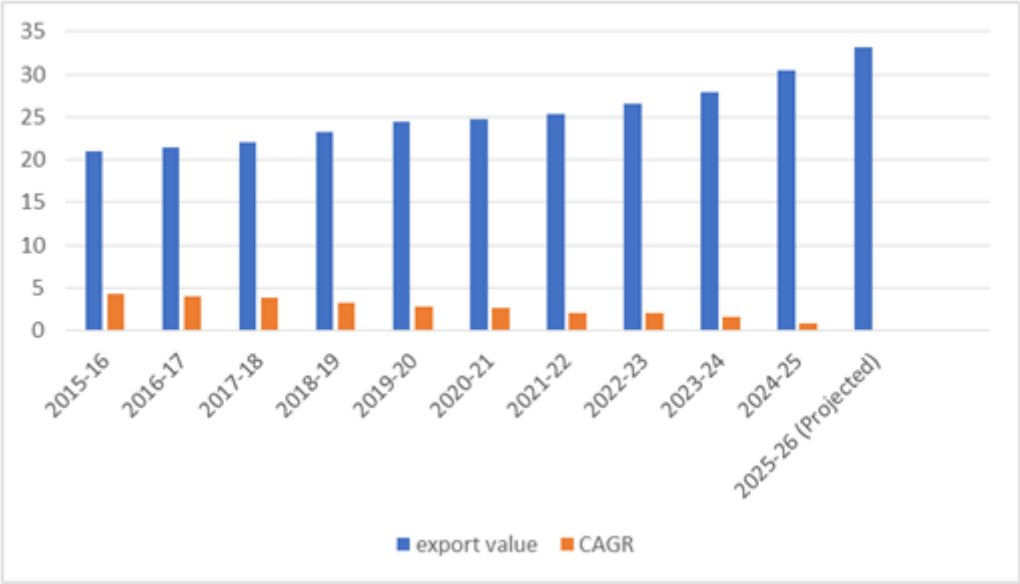
CAGR-Based Analysis of Export Performance of India's Pharmaceutical Industry (2015–16 to 2025–26)"

Financial Year	Export Value (USD Billion)	CAGR
2015-16	21.00	4.25
2016-17	21.50	4.03
2017-18	22.10	3.77
2018-19	23.20	3.31
2019-20	24.40	2.84
2020-21	24.80	2.69
2021-22	25.30	2.05
2022-23	26.50	2.07
2023-24	27.85	1.61

Financial Year	Export Value (USD Billion)	CAGR
2024-25	30.47	0.78
2025-26 (Projected)	33.20	-

The data shows fluctuations in the year-on-year growth rate of pharmaceutical exports over the given period. Initially, the growth rate remains moderate, with gradual increases between 2016–17 and 2019–20. A noticeable decline occurs in 2020–21, indicating a temporary slowdown, after which the growth rate recovers steadily. From 2021–22 onwards, the growth trend improves, reaching higher levels in the later years, with a peak observed around 2024–25 and slightly stabilizing in the projected period. Overall, the pattern reflects variability but maintains a generally upward movement in recent years.

The fluctuating growth rates suggest that the pharmaceutical export sector is influenced by both domestic and global factors such as demand changes, policy shifts, and external disruptions. The decline during 2020–21 indicates the impact of unforeseen global challenges, while the subsequent recovery highlights the resilience and adaptability of the industry. The stronger growth rates in recent and projected years indicate increasing global demand and improved export performance. This trend signifies a positive outlook, with the industry expected to sustain its growth momentum in the future.



3. Product-wise Export Analysis

- Drug formulations: highest share (~66%)
- Vaccines: highest growth (8.5% CAGR)
- APIs: strong contribution

PRODUCT CATEGORY-WISE CAGR:

Based on available data and industry trends, estimated CAGR for major product categories:

Product Category (HS Code)	CAGR (2015-2025)	Growth Characterization
HS 300490 (Medicaments mixed/unmixed)	4.5%	Steady growth, largest segment
HS 300420 (Antibiotics)	3.2%	Moderate growth, mature market
HS 300410 (Penicillin's/Streptomycin's)	2.8%	Slow growth, declining share
HS 300220 (Vaccines)	8.5%	High growth, strategic importance
HS 300210 (Blood/Plasma products)	6.2%	Above-average growth, specialized segment

The product category-wise CAGR data reveals clear differences in growth performance across segments of the pharmaceutical industry. Vaccines (HS 300220) show the highest CAGR at 8.5%, indicating strong and rapid expansion, followed by blood and plasma products (6.2%), which also demonstrate above-average growth. Medicaments (HS 300490), being the largest segment, record a steady growth rate of 4.5%, reflecting consistent demand in global markets. In contrast, antibiotics (3.2%) and penicillin's/streptomycin's (2.8%) exhibit relatively lower growth rates, suggesting slower expansion and possible market saturation in these traditional segments.

The variation in CAGR across product categories indicates a shift in global demand towards advanced and specialized pharmaceutical products. The high growth in vaccines and blood/plasma products highlights their increasing importance, especially due to rising healthcare needs and global health initiatives. The steady performance of medicaments ensures stability in export earnings, while the slower growth of antibiotics and penicillin-

based products suggests declining competitiveness or maturity in those markets. Overall, the data implies that the industry is gradually moving towards high-value, innovation-driven segments, which can enhance future export potential

4.Market-wise Export Distribution

Geographic Distribution of Pharmaceutical Exports:

India's pharmaceutical exports are distributed across more than 200 countries, with significant concentration in a few major markets. The geographic distribution reflects both the size of destination markets and India's competitive positioning in different regions.

Major Export Destinations (FY 2024-25):

Region/Country	**Export Value (USD Million)**	**Share of Total (%)**	**YoY Growth (%)**
United States	8,953	29.4%	14.29%
NAFTA (Total)	9,805	32.2%	14.06%
Europe	7,500	24.6%	6.5%
Africa	4,200	13.8%	-1.74%
Latin America & Caribbean	3,800	12.5%	5.2%
Asia-Pacific	3,500	11.5%	3.8%
Middle East	1,200	3.9%	4.5%
Others	1,509	5.0%	8.2%
Total	**30,467**	**100.0%**	**9.39%**

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5. RCA Calculation for Indian Pharmaceutical Exports:

Based on available data:

India's Export Data (FY 2024-25):

- Pharmaceutical exports (Xij): USD 30.47 billion
- Total merchandise exports (Xit): USD 437 billion (approximate)
- India's pharmaceutical export share: 30.47 / 437 = 0.0697 or 6.97%

World Export Data (2024):

- World pharmaceutical exports (Xwj): USD 650 billion (approximate)
- Total world merchandise exports (Xwt): USD 20,000 billion (approximate)
- World pharmaceutical export share: 650 / 20,000 = 0.0325 or 3.25%

RCA Calculation:

RCA = (0.0697) / (0.0325)

RCA = 2.14

Product-specific RCA Analysis:

Research by Hooda and Anu (2025) provides detailed RCA analysis for specific pharmaceutical product categories.

Product Category	**RCA Index**	**Interpretation**
Bulk Medicines	2.8	Very Strong Advantage
Pharmaceutical Inputs	2.5	Very Strong Advantage

Product Category	RCA Index	Interpretation
Chemical Inputs (General Purpose)	2.2	Strong Advantage
Drug Formulations	2.1	Strong Advantage
Vaccines	3.5	Exceptional Advantage
Medical Technology Equipment	0.6	Comparative Disadvantage
Hospital & Laboratory Inputs	0.8	Comparative Disadvantage

The table presents product-wise export performance of the pharmaceutical industry using the Revealed Comparative Advantage (RCA) index. Bulk medicines (2.8) and pharmaceutical inputs (2.5) record very high RCA values, indicating strong export competitiveness and significant global demand. Chemical inputs (2.2) and drug formulations (2.1) also show strong advantage, reflecting India's efficiency in producing both intermediate and finished pharmaceutical products. Vaccines stand out with the highest RCA value of 3.5, highlighting exceptional performance and global leadership in this segment. In contrast, medical technology equipment (0.6) and hospital & laboratory inputs (0.8) have RCA values below 1, indicating weaker export performance and lower competitiveness in these categories

The data indicates that India's pharmaceutical export strength is mainly concentrated in bulk drugs, generics, and vaccines, where it enjoys a strong to exceptional comparative advantage. This reflects the country's cost efficiency, large-scale production capacity, and established presence in global markets. However, the low RCA values in medical technology equipment and hospital inputs suggest dependence on imports and limited domestic capabilities in high-technology segments. Overall, the export pattern highlights a strong foundation in traditional pharmaceutical products along with the need for strategic investment in advanced medical technologies to improve competitiveness and achieve balanced growth.

6. SWOT Matrix and Strategic Implications:

The SWOT analysis reveals that India's pharmaceutical export sector possesses significant strengths, particularly in cost-competitive manufacturing, regulatory compliance, and global market presence. However, weaknesses related to API dependency and limited innovation require strategic attention.

Opportunities in biosimilars, emerging markets, and contract manufacturing offer substantial growth potential. Threats from regulatory scrutiny, competition, and pricing pressures necessitate continuous improvement and strategic adaptation.

Strategic Priorities Emerging from SWOT:

1. **Leverage Strengths:** Capitalize on cost competitiveness and manufacturing capabilities to expand market share in generic and biosimilar markets.
2. **Address Weaknesses:** Reduce API import dependency through domestic manufacturing initiatives; increase R&D investment for innovation.
3. **Exploit Opportunities:** Aggressively pursue biosimilar development, expand in emerging markets, and grow contract manufacturing business.
4. **Mitigate Threats:** Strengthen quality and compliance systems, diversify supply chains, and develop strategies to address pricing pressures.

7. PESTLE Analysis

PESTLE analysis examines six macro-environmental factors affecting India's pharmaceutical export performance: Political, Economic, Social, Technological, Legal, and Environmental.

POLITICAL FACTORS:

Favorable Factors:

1. **Government Support:** Strong government commitment to pharmaceutical sector development through PLI scheme, bulk drug parks, and export promotion initiatives [1]
2. **Diplomatic Relations:** India's "Vaccine Maitri" initiative enhancing diplomatic relationships through pharmaceutical exports
3. **Trade Agreements:** Participation in various trade agreements facilitating market access
4. **Stable Political Environment:** Democratic governance providing policy stability

Unfavorable Factors:

1. **Geopolitical Tensions:** Trade tensions between major economies affecting global trade environment
2. **Protectionism:** Rising protectionist sentiments in some countries
3. **Regulatory Nationalism:** Some countries promoting domestic pharmaceutical manufacturing
4. **Political Uncertainties:** Political changes in destination countries affecting trade policies

Impact on Exports: Political factors have mixed impact. While domestic political support is strong, international political dynamics create both opportunities (diplomatic leverage through pharmaceutical exports) and challenges (protectionism, trade tensions).

FINDINGS

To study the product-wise export performance of the pharmaceutical industry Drug formulations and biologicals dominate exports, contributing over 75% of total pharmaceutical exports. India has a strong comparative advantage in vaccines (RCA = 3.5), making it a global leader in vaccine supply. Bulk drugs and APIs (RCA = 2.8) and pharmaceutical intermediates (RCA = 2.5)also show strong export performance. India shows comparative disadvantage in medical devices and laboratory equipment, indicating a gap in high-tech segments. The product mix reflects a focus on generics and cost-effective medicines, strengthening global competitiveness. Emerging segments like biosimilars and specialty drugs present future growth opportunities.

To identify the major factors influencing the export performance of pharmaceutical products Cost Competitiveness and Manufacturing Strength India's pharmaceutical exports are driven by low-cost production, strong manufacturing infrastructure, and a skilled workforce, enabling global competitiveness in generic medicines. Regulatory Compliance and Export Orientation High compliance with international standards (USFDA, WHO-GMP) and a strong export intensity (55.09%) enhance India's credibility and dependence on global markets. Dependency and Innovation Challenges Heavy reliance on imported APIs and limited investment in R&D restrict growth in high-value segments like biotechnology and patented drugs. Growth Opportunities in Global Markets Rising demand for affordable medicines, expansion in emerging markets, and opportunities in biosimilars and contract manufacturing support export growth. External Threats and Environmental Factors Stringent regulations, global competition, pricing pressures, and geopolitical and environment

SUGGESTIONS

1. Enhance Cost Efficiency and Production Capacity

Pharmaceutical firms should adopt advanced manufacturing technologies and automation to further reduce production costs and improve efficiency, helping maintain global price competitiveness.

2. Strengthen Regulatory Compliance Systems

Companies must invest in quality control systems and regular audits to ensure continuous compliance with international standards like USFDA and WHO-GMP, reducing the risk of export rejections.

3. Reduce Dependency on API Imports

The government and industry should promote domestic API production through incentives and infrastructure support to minimize reliance on imports and ensure supply chain stability.

4. Increase Investment in R&D and Innovation Firms should focus on research and development to enter high-value segments such as biosimilars, specialty drugs, and patented medicines, improving long-term competitiveness.

CONCLUSION

The pharmaceutical industry plays a critical role in improving global health and supporting economic development. Through continuous research, innovation, and technological advancement, pharmaceutical companies develop medicines that help prevent, manage, and cure diseases.The industry operates through a complex network of research institutions, manufacturing facilities, regulatory authorities, and distribution systems. Each of these components contributes to the safe and efficient production of medicines. As healthcare demands continue to increase, the pharmaceutical industry will remain essential in addressing global health challenges. Future growth in the industry will depend on advancements in biotechnology, digital technologies, and collaborative research efforts. By maintaining high standards of quality, safety, and innovation, the pharmaceutical industry will continue to play a vital role in enhancing healthcare systems and improving the quality of life for people around the world.

FUTURE SCOPE OF THE STUDY

The future of the pharmaceutical industry appears promising due to continuous advancements in science and technology. Emerging fields such as biotechnology, personalized medicine, and gene therapy are expected to transform the healthcare sector in the coming years. Digital technologies and artificial intelligence are also playing an increasing role in pharmaceutical research and development. These technologies can analyze large amounts of data and help researchers identify potential drug candidates more efficiently. In addition, global collaboration among pharmaceutical companies, research institutions, and healthcare organizations is expected to accelerate medical innovation. These partnerships will help develop new treatments for complex diseases and improve global healthcare outcomes. As

healthcare demands continue to grow, the pharmaceutical industry will remain a vital component of the global economy and healthcare system. Continuous investment in research, innovation, and quality manufacturing will ensure the industry's long-term sustainability and success.

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