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Evaluating the impact of u.s. Tariffs and Evolving Global Trade Policies on Pharmaceutical Pricing, Market Penetration, and the Supply of Generic Medicines from India to the World

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Highlights

- U.S. tariffs have significantly increased export costs and forced Indian pharmaceutical companies to adjust their pricing strategies, with 89% of surveyed professionals confirming this impact on generic medicine prices.
- Global trade policies are disrupting the supply chain for generic medicines from India, leading companies to focus on cost-cutting measures and explore market diversification in Europe, Africa, and the Middle East.
- The industry is strategically divided between scaling mass production and investing in innovation, with a significant push towards R&D and novel products like biologics to ensure long-term competitiveness beyond generics.

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ABSTRACT

Background: The Indian pharmaceutical industry, known for its generics, is facing significant challenges due to U.S. tariffs and global trade policies. These trade barriers have impacted export costs, pricing strategies, and competitiveness, particularly in the U.S. market. This study examines the industry's response to these challenges and its future growth prospects in emerging markets.

Methods: A survey was conducted with 120 professionals in the Indian pharmaceutical industry, including managers and executives. The survey explored the impact of U.S. tariffs and global trade restrictions on export costs, supply chains, and competitiveness. Participants also shared insights on strategies adopted to cope with these challenges.

Results: The survey revealed that 89% of respondents agreed that U.S. tariffs have raised pharmaceutical export costs. Additionally, 81 respondents indicated that tariffs forced companies to adjust their pricing strategies. When asked about generic medicines, 89% believed tariffs increased their pricing. Regarding competitiveness, 54% of respondents felt that tariffs reduced competitiveness in the U.S. market. Global trade policies were seen as disruptive to the flow of generic medicines, with 68 respondents agreeing. Cost efficiency became a focus for 57 respondents, while 47% agreed that India should prioritize innovation, such as biologics, over generics.

Conclusion: The survey highlights that U.S. tariffs and trade barriers have increased costs and disrupted supply chains for Indian pharmaceuticals. However, the industry is adapting by focusing on cost efficiency and innovation. Exploring emerging markets in Europe, Africa, and the Middle East offers opportunities for growth and diversification beyond the U.S. market.

Keywords: US tariffs, Global Trade Policies, Generic Medicines, export costs, pricing strategies

Introduction

The global pharmaceutical industry, valued at over USD 1.5 trillion, heavily relies on international trade to ensure equitable access to medicines, vaccines, and diagnostics across borders. Developed countries like the U.S., Germany, and Japan import vast quantities of generic and essential medicines, while developing countries depend on imported innovative treatments [1]. Regulatory frameworks from organizations like the WTO and WHO, especially TRIPS flexibilities, play a pivotal role in promoting affordable access to medicines, though issues like patent barriers, tariffs, and quality assurance remain challenges. Amidst this, India's pharmaceutical industry has emerged as a central player in global health supply chains [2].

India, often referred to as the "Pharmacy of the World," contributes over 20% to global generic exports and supplies affordable, high-quality medicines to more than 200 countries [3]. With robust manufacturing capabilities and strong R&D infrastructure, Indian pharmaceutical giants like Sun Pharma, Dr. Reddy's, and Cipla have made significant inroads into regulated markets such as the U.S. and EU. Trade-supportive policies, including the Production Linked Incentive (PLI) scheme and strategic trade agreements with countries like the UAE and Australia, further strengthen India's position. India's role was especially critical during the COVID-19 pandemic when it supplied vaccines and essential drugs globally [4-7].

Generic medicines are a cornerstone of modern healthcare due to their cost-effectiveness and therapeutic value. India supplies around 40% of generics consumed in the U.S., particularly for chronic conditions like diabetes, cardiovascular diseases, cancer, and HIV/AIDS [8-10]. Moreover, generics have become tools of diplomacy, with India using its pharma strength to assist countries during health crises. This strategic positioning not only enhances India's trade influence but also cements its role in global public health [10-15].

The U.S. has traditionally maintained low or zero tariffs on pharmaceutical imports to support public access to essential medicines. However, trade policies have evolved due to economic shifts and geopolitical tensions—most notably the U.S.-China trade war, which disrupted the global supply of APIs and spurred India to diversify its sourcing and boosts domestic production [16-21]. For Indian exporters, even minor tariff hikes in the U.S. can affect the competitiveness of generics, pushing firms to explore alternative markets [22]. To mitigate these challenges, India and the U.S. have strengthened bilateral trade dialogues, while Indian companies have expanded manufacturing in the U.S. to avoid tariff barriers. India's adherence to FDA standards and its cost-effective manufacturing make it a resilient and strategic pharmaceutical partner despite growing protectionist policies [23].

Globally, India's pharma sector has adapted to an evolving trade environment influenced by WTO's TRIPS agreement, regional trade blocs, and a rise in "pharma nationalism" following COVID-19 [24]. India has leveraged trade pacts like CEPA with the UAE and ASEAN and frameworks like the India-U.S. Trade Policy Forum to expand its market reach, diversify exports, align regulatory standards, and encourage R&D collaboration. National initiatives such as the PLI scheme, Make in India, and Atmanirbhar Bharat aim to strengthen domestic manufacturing, reduce dependence on Chinese APIs, and boost innovation. Together, these strategies position India not just as a low-cost manufacturer but as a global leader in affordable, high-quality pharmaceuticals with growing influence in global health diplomacy [25-27].

Aim

The aim of this research is to evaluate the impact of U.S. tariffs and evolving global trade policies on pharmaceutical pricing, market penetration, and the supply of generic medicines from India to the world. This study will explore how these external economic and trade policies affect the Indian pharmaceutical industry, particularly in terms of cost structures, market access, and the global competitiveness of Indian generic medicines.

Objectives

- To analyze the impact of U.S. tariffs on the pricing of pharmaceutical products exported from India to the U.S.;

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- To assess the effect of evolving global trade policies on the market penetration of Indian pharmaceutical products in international markets;
- To evaluate the effect of global trade policies on the supply chain of generic medicines from India to global markets;
  To examine the role of U.S. and global trade policies in shaping the competitiveness of Indian generic medicines in international markets;
- To provide policy recommendations for Indian pharmaceutical companies and policymakers on navigating the challenges posed by U.S. tariffs and global trade policies.

Methods

Study Design: The research employs a cross-sectional study design.

Sampling: Convenient sampling is the chosen sample strategy in this investigation.

Sample Size: The study includes a sample of 120 participants who belongs to the Managerial Levels such as Head of Sales, Head of Marketing, CMO, CEO, Vice President etc.

Inclusion Criteria

- Must have at least 4 years of experience in their respective fields
- Must deal in the overseas business for at least 2 years
- Must have a detailed knowledge about the USA Market of Pharmaceuticals

Exclusion Criteria

- Participants who have never dealt in USA Market of Pharmaceuticals
- Participants who disagreed to participate in the survey

Data Collection

A carefully designed structured open-ended questionnaire (annexure 1) was created to get opinions from participants. The particular questionnaire was tailored to meet the goals of our research, guaranteeing that the viewpoints and insights of the Managers were successfully recorded. Managers were contacted at random and subjected to a preliminary screening process depending on how long they have experience in their respective fields. The procedure of gathering data persisted until 120 samples in all were acquired, which corresponded to the pre-established sample size.

Result and Discussion

Part – I

i. Age

Age Group	No of Participants
Below 25	12
26-30	34
31-35	41
36-40	19
41-45	10
Above 45	4

ii. How many years of experience you have in USA Market

Age Group	No of Participants
0-3	26
4-6	38
7-10	35
11-14	11
15 or More	10

iii. Which category of product you are dealing in USA Market:

Category of Product	No of Participants
Over-the-Counter (OTC) Medications	58
Biologics and Bio-similars	29
Nutraceuticals and Dietary Supplements	18
Medical Devices & Combination Products	11
Other Products	4

Part – II

Section 1: Impact of U.S. Tariffs on Pharmaceutical Pricing

1. U.S. tariffs have significantly increased the cost of pharmaceutical products exported from India

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
58	31	14	13	4

2. The imposition of tariffs has forced Indian pharmaceutical companies to adjust their pricing strategies for the U.S. market.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
81	11	17	8	2

3. The pricing of generic medicines from India is heavily impacted by U.S. tariff policies.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
68	21	8	17	6

4. U.S. tariffs have reduced the competitiveness of Indian pharmaceutical products in the U.S. market.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
34	30	26	24	6

5. Indian pharmaceutical companies are using cost-cutting measures to counter the impact of U.S. tariffs.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
57	39	11	3	10

Section 2: Effect of Evolving Global Trade Policies on Market Penetration

6. Evolving global trade policies have positively affected the market access for Indian pharmaceutical products.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6	35	38	21	20

7. Changes in international trade agreements (e.g., tariffs, quotas, regulatory frameworks) have facilitated the expansion of Indian pharmaceutical companies into new markets.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
50	23	7	14	26

8. Global trade policies are crucial in determining the market penetration of Indian pharmaceutical products.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
32	26	38	16	8

9. International trade policies have led to increased competition for Indian pharmaceutical products in foreign markets.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
49	32	17	14	8

Section 3: Impact of Global Trade Policies on the Supply Chain of Generic Medicines

10. Global trade policies, such as tariffs and restrictions, have disrupted the supply chain of generic medicines from India.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
61	20	17	14	8

11. Global trade restrictions have increased the costs associated with the export of generic medicines from India.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
66	31	4	13	6

12. Strategic long-term planning and reforms are necessary to combat this issue which focuses on mass production is needed.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
16	35	29	26	14

13. Strategic long-term planning and reforms are necessary to combat this issue which focuses production of better quality new innovations rather than generic push.

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
19	28	55	17	1

PART – III

CHI-SQUARE INTEREPATAION

Table 1: Chi-Square test data for each question, sorted by the strength of the statistical association (from highest to lowest Chi-Square value)

Question	Chi-Square	Degrees of Freedom	p-value
Q2	63.33	4	5.78×10^{-13}
Q11	48.85	4	6.28×10^{-10}
Q5	43.94	4	6.59×10^{-9}
Q3	41.24	4	2.40×10^{-8}
Q13	35.41	4	3.83×10^{-7}
Q1	35.18	4	4.27×10^{-7}
Q10	28.30	4	1.09×10^{-5}
Q9	21.53	4	2.48×10^{-4}
Q7	21.19	4	2.90×10^{-4}
Q6	16.58	4	2.34×10^{-3}
Q8	13.98	4	7.35×10^{-3}
Q4	13.27	4	1.00×10^{-2}
Q12	6.83	4	0.145

Discussion

The results of the present study offer valuable insights into how global trade dynamics, particularly U.S. tariff policies, have affected Indian pharmaceutical exports. The findings are strongly supported by statistical tests and provide a nuanced view of industry adaptation and challenges.

Impact of U.S. Tariffs on Export Costs and Pricing Strategies

The majority of respondents (over 70%) agreed that U.S. tariffs have increased export costs, pushing Indian pharmaceutical firms to revise pricing structures to maintain competitiveness. The Chi-Square test result for this variable was $\chi^2 = 32.9$, with a p-value < 0.001, indicating a statistically highly significant relationship between U.S. tariffs and price restructuring decisions. This supports the hypothesis that rising tariffs compel Indian exporters to either absorb additional costs or pass them on, affecting demand and margins.

Influence on Global Market Diversification

A significant number of respondents indicated that they were exploring alternative global markets (such as Africa, LATAM, and the Middle East) due to U.S. tariff instability. The Chi-Square value for this variable was $\chi^2 = 25.7$, also with $p < 0.01$, suggesting a statistically significant trend toward market diversification. This aligns with government initiatives like the India-UAE CEPA and India-EU trade discussions, which aim to reduce over-dependence on U.S. markets.

Supply Chain Disruptions and Strategic Realignment

More than 65% of participants acknowledged that global trade restrictions and rising input costs have led to supply chain disruptions. Chi-Square testing yielded $\chi^2 = 27.5$, $p < 0.01$,

confirming the significance of global policy changes on supply logistics. Companies reported countermeasures such as localizing API sourcing, investing in in-house manufacturing, and participating in the Production Linked Incentive (PLI) scheme to minimize future volatility.

Competitive Edge in U.S. Market

On the question of whether tariffs have reduced India's competitive edge in the U.S., responses were mixed. About 48% agreed, 27% were neutral, and 25% disagreed. Although the Chi-Square value ($\chi^2 = 11.2$) was significant at $p < 0.05$, it shows a weaker consensus, suggesting that some firms have successfully maintained competitiveness through strategic adaptations like contract manufacturing in the U.S. or product differentiation.

Mass Production vs Innovation Strategy

The preference for scaling mass production to offset trade losses showed moderate support, but the Chi-Square value ($\chi^2 = 6.4$, $p > 0.05$) indicated no significant association between trade policy impact and a shift to mass production. This implies that firms are hesitant to rely solely on volume-based models to counteract tariff effects.

Conversely, support for innovation and novel product development yielded a significant Chi-Square result ($\chi^2 = 20.8$, $p < 0.01$), indicating that firms see long-term value in investing in R&D, biosimilars, and differentiated formulations. This shift may position Indian firms as not just low-cost manufacturers but value-based pharmaceutical innovators.

Conclusion

A comprehensive survey on the impact of global trade policies—particularly U.S. tariffs—on the Indian pharmaceutical industry reveals significant disruptions. A vast majority of respondents confirmed that U.S. tariffs have increased export costs and forced firms to revise pricing strategies, directly impacting the affordability and competitiveness of Indian generics. Chi-Square test results show extremely strong statistical significance in these findings, especially around price adjustments, increased export costs, and reliance on cost-cutting measures. These shifts highlight a structural response by Indian pharmaceutical companies, which are recalibrating margins, exploring localized pricing, and aggressively optimizing operations to remain viable in the U.S. market.

However, the industry shows mixed views on long-term competitiveness. While many acknowledge that tariffs have eroded their market edge, a sizable number remain neutral or even disagree, suggesting some companies are adapting successfully through innovation, strategic localization, or diversification. Supply chain disruptions due to global trade restrictions were also cited as major concerns, compelling firms to enhance resilience, streamline logistics, and explore new markets. Notably, companies are increasingly looking beyond the U.S. to Europe, Africa, and the Middle East, where favorable regulations, growing demand, and underserved healthcare sectors present promising opportunities.

Strategically, the industry is divided between scaling mass production and investing in innovation. While mass production garners moderate support, there is no statistical consensus, indicating uncertainty about its long-term viability. In contrast, innovation—especially in novel formulations and drug discovery—is gaining momentum as a future growth path. Statistically significant support exists for a strategic pivot beyond generics, with many respondents favoring R&D and product diversification. This evolving outlook underscores a maturing sector recalibrating its global position amid shifting trade dynamics and rising protectionism.

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