



“The Prescription of Dependency: Analyzing India’s Pharmaceutical Paradox, Supply-Chain Vulnerabilities, and the Direct Impact on Public Health Welfare”

By Dr M Bhaskar, assistant professor
Department of Business Administration (MBA)
Dr. K.V. Subba Reddy schools of Business Management

Abstract

This paper analyzes the structural paradox within the Indian pharmaceutical industry, evaluating how downstream manufacturing dominance contrasts with deep upstream supply-chain vulnerabilities, and assesses the subsequent socio-economic impacts on public health welfare. Recognized globally as the "Pharmacy of the World," India ranks third in pharmaceutical production volume and supplies over 20% of global generic medications. However, a vertical audit of the sector's value chain reveals a critical dependency: Indian formulation hubs rely on a single external market—primarily China—for 70% to 85% of their Active Pharmaceutical Ingredients (APIs) and Key Starting Materials (KSMs), leaving the industry exposed to external regulatory pauses, trade friction, and input price volatility.

This study examines the human and economic costs of this dependency, tracing how international input cost shocks pass directly to the domestic population. In an economic landscape where Out-of-Pocket Expenditure (OOPE) represents a significant portion of healthcare delivery, and where medicines constitute up to 70% of those individual expenses, supply-chain vulnerabilities create immediate financial strain for citizens managing chronic health conditions. Furthermore, the paper examines the fragmented nature of state and central regulatory enforcement and evaluates the defensive policy frameworks designed to reclaim health sovereignty. Specifically, the study audits the deployment of the state-backed Production Linked Incentive (PLI) schemes for bulk drugs, the infrastructure co-funding of Bulk Drug Mega Parks, and the retail price interventions enforced by the National Pharmaceutical Pricing Authority (NPPA) via the National List of Essential Medicines (NLEM). The paper concludes by presenting a strategic framework for shifting the industrial paradigm away from volatile, short-term cost optimization toward a resilient, vertically integrated model that secures long-term healthcare stability.

Keywords: Pharmaceutical Industry, Active Pharmaceutical Ingredients (APIs), Public Health Welfare, Out-of-Pocket Expenditure (OOPE), Production Linked Incentives (PLI), Price Regulation.



1. Introduction: The Global Powerhouse Built on Fragile Foundations The Indian pharmaceutical sector represents one of the most vital pillars of global public health infrastructure and a cornerstone of the nation's industrial economy. Often heralded as a triumph of domestic manufacturing capabilities, the industry operates at a critical intersection of global trade, national health security, and sovereign fiscal policy. However, as the global economy navigated severe supply-chain constraints and heightened geopolitical frictions in the lead-up to late 2023, the underlying structural architecture of this vital sector faced unprecedented scrutiny.

India's pharmaceutical ecosystem is defined by a striking operational dichotomy: it possesses world-class capabilities in final product formulation, yet faces a near-total systemic reliance on external foreign markets for foundational raw materials. This introductory chapter establishes the macroeconomic baseline of the industry, documents its extensive global footprint, and maps out the upstream bottlenecks that expose both national health security and individual household budgets to external economic shocks.

1.1. The Global Footprint: As of November 2023, the Indian pharmaceutical industry stands as a global powerhouse, characterized by high-volume manufacturing capabilities and an unmatched capacity to democratize healthcare across both developing and developed nations. Economically, the sector ranks third globally in terms of total production volume, contributing nearly 10% to global manufacturing output, and fourteenth in terms of absolute financial value.

1. The Scale of Generic Domination: The core competitive advantage of India's pharmaceutical sector lies in its generic formulation segment. The nation accounts for a massive 20% share of the global generic medicine supply by volume. This dominant market position is supported by a highly advanced network of manufacturing facilities. India hosts the largest number of US Food and Drug Administration (USFDA) compliant manufacturing plants outside of the United States, alongside hundreds of facilities certified by other stringent global regulators, including the UK MHRA, EU GMP, and Japan's PMDA.

2. A Crucial Supplier to Vulnerable Economies: This vast industrial base enables Indian multinational firms to mass-produce complex tablets, capsules, injectables, and vaccines at a fraction of the cost incurred by Western innovators. The socioeconomic impacts of this high-volume capacity are global in scope:

- Vaccines: India fulfills approximately 60% of the global vaccine demand, serving as the primary procurement source for international bodies such as UNICEF, the World Health Organization (WHO), and the GAVI Alliance.
- Critical Therapies: Over 80% of the antiretroviral (ARV) drugs utilized globally to combat HIV/AIDS are synthesized by Indian formulation clusters.
- Regulated Markets: Even within highly cost-conscious and stringently regulated Western economies, Indian generics maintain an extensive footprint, provisioning nearly 40% of all generic prescriptions dispensed within the United States and approximately 25% of all medicines utilized in the United Kingdom.



1.2. The Upstream Bottleneck: Despite these notable downstream achievements, a deep vertical audit of the value chain reveals an underlying operational vulnerability. India's status as a global formulation leader contrasts sharply with its heavy reliance on imported critical raw inputs, specifically Active Pharmaceutical Ingredients (APIs) and Key Starting Materials (KSMs). APIs are the active chemical compounds responsible for a drug's specific therapeutic effect, while KSMs are the foundational chemical substrates required to synthesize those active molecules.

Data tracking trade matrices indicates that for foundational antibiotics (such as penicillin, cephalosporins, and azithromycin), vital vitamins, and common analgesics (including paracetamol and ibuprofen), Indian formulation hubs rely on Chinese imports for 70% to 85% of their total bulk drug requirements.

This value-chain mismatch grew over decades as domestic manufacturing strategies focused primarily on high-margin generic formulation and advanced compounding. Meanwhile, primary chemical synthesis—which is capital-intensive, features low immediate margins, and requires significant environmental and waste management infrastructure—was steadily outsourced to foreign manufacturing clusters. Consequently, an industrial model developed where an expanding domestic formulation output inadvertently required an increasing volume of imported bulk chemical inputs.

1.3. Research Objectives: Given these structural conditions and the evolving global trade landscape of late 2023, this study examines the linkages between import dependence, national public health security, and domestic industrial policy. The research is organized around three primary objectives:

- Objective 1: To Quantify Sectoral Import Vulnerabilities: To conduct a detailed analysis of India's pharmaceutical dependencies, identifying specific therapeutic categories—such as antibiotics, vitamins, and cardiovascular drugs—where the reliance on a single external source for APIs exceeds critical levels.
- Objective 2: To Assess the Socioeconomic Shock Transmission to Citizens: To evaluate the transmission channels through which international API price volatility passes down to end consumers, specifically measuring the impact on Out-of-Pocket Expenditure (OOPE) for households managing chronic health conditions.
- Objective 3: To Audit the Performance of State Interventions: To review the design and early performance of India's defensive policy responses, including the Production Linked Incentive (PLI) schemes for bulk drugs, the co-funding of Bulk Drug Mega Parks, and the retail price regulations enforced by the National Pharmaceutical Pricing Authority (NPPA).

Scope and Limitations

The analytical scope of this study utilizes empirical trade data, national health expenditure surveys, and industrial policy updates up to November 2023. By examining these datasets, the paper provides a balanced assessment of how India can maintain its position as a major global exporter of generic medicines while building a resilient, vertically integrated domestic production base to protect national health security.



2. Theoretical Framework and Literature Review: To analyze how deep-seated dependency on imported raw materials affects a highly successful downstream manufacturing sector, this research uses international trade models and modern economic theories of structural vulnerability. This section reviews the literature on artificial comparative advantages, market-clearing distortions caused by state-subsidized production, and the direct transmission channels through which raw material imbalances impact public health security.

2.1. Trade Theories and Asymmetric Interdependence: Traditional international trade theories and modern economic models provide different explanations for how a persistent, single-source import reliance affects an emerging market's industrial sovereignty.

1. Classical Trade Models vs. Strategic Trade Policy: David Ricardo's classical Theory of Comparative Advantage suggests that international trade is inherently mutually beneficial, as nations specialize in fields where they possess natural efficiency. From this perspective, if an external producer can synthesize bulk chemical components at a lower cost, Indian firms act rationally by offshoring primary synthesis. This allows them to focus their capital on high-value secondary compounding and final dosage formulations.

However, modern Strategic Trade Policy frameworks challenge this assumption by showing how state-directed capitalism can artificially reshape international specialization. When a foreign government provides heavily subsidized land, state-directed credit, and centralized waste-treatment infrastructure to its chemical clusters, it creates an artificial cost advantage.

This structural distortion can displace natural market competitors in importing countries, leaving the downstream sector exposed to a single source of supply.

2. Predatory Pricing and Market-Clearing Distortions: In economic literature, international dumping is categorized by its intent and market duration. The historic inflow of cheap bulk chemicals often mirrors models of predatory dumping. In this scenario, an exporting country with large industrial overcapacity channels its excess raw inputs into foreign markets at prices close to or below marginal production costs. While this creates an immediate financial advantage for downstream formulation plants by lowering their raw material costs, it introduces long-term vulnerabilities. As domestic primary chemical units experience steady margin compression, they are eventually forced to stop production. This allows the external supplier to capture a high market share and gain significant influence over pricing and availability across the supply chain.

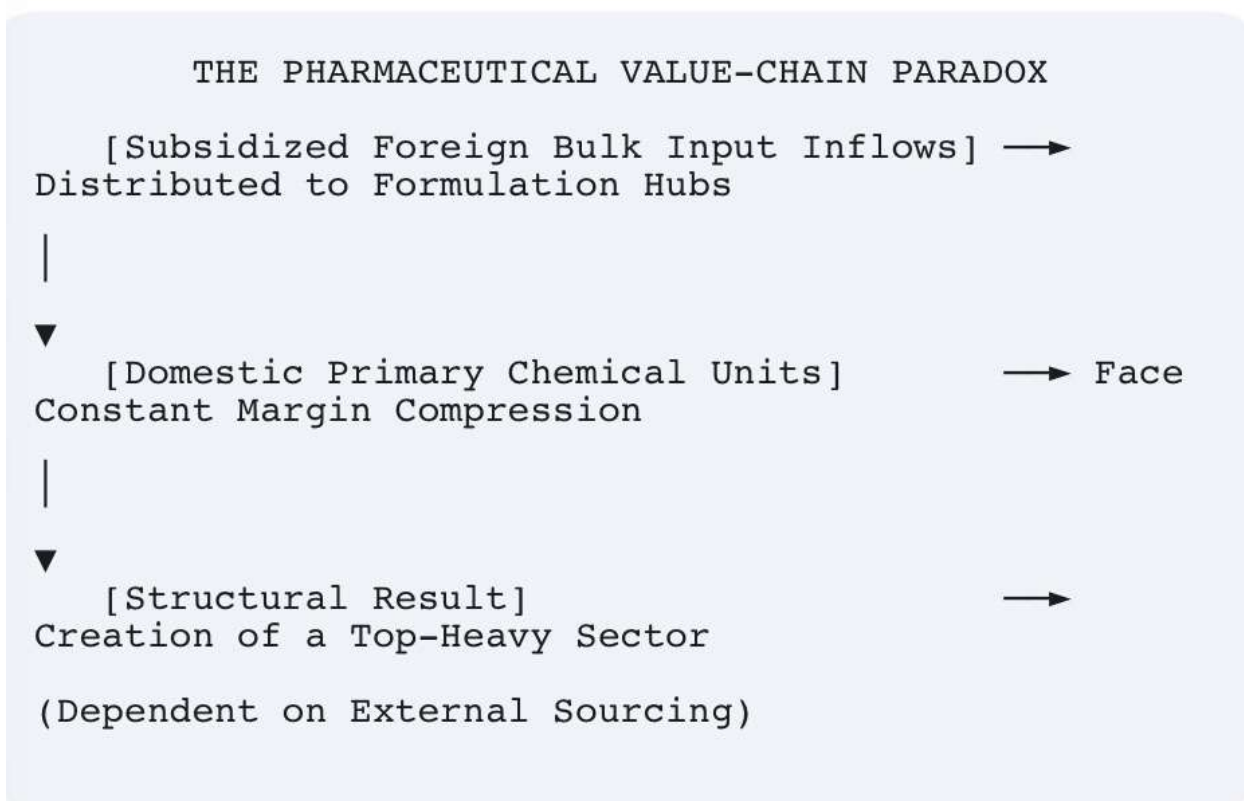
2.2. Impacts on Domestic Manufacturing and Public Health: A Literature Review

Economic literature regarding India's industrial performance and healthcare economics highlights the structural challenges that arise when a vital industry relies heavily on a single external source for its raw inputs.

1. The Growth of a Top-Heavy Value Chain: A major focus of emerging-market trade research is the structural imbalance that can occur when an industry develops strong final assembly capabilities without a self-sufficient domestic raw material base. Studies by Chaudhuri (2021) examine how India's pharmaceutical sector grew into a major global exporter of generic dosages while remaining deeply reliant on external sources for its foundational chemical blocks.



This top-heavy development means that even though the country shows high export volumes and strong revenue growth in final formulations, the domestic value-addition multiplier remains constrained. This reliance creates a dynamic where expanding national production requires an



increasing volume of imported bulk chemical inputs.

2. Sourcing Concentration and Healthcare Delivery Risks

Following global trade disruptions, economic research has focused closely on the vulnerabilities of concentrated supply chains. Textual analyses of public health security show that when an industry relies on a single geographic market for over 70% of its critical inputs—such as basic antibiotics, vitamins, and analgesics—its internal healthcare delivery system becomes exposed to external shocks. If raw material prices spike due to global logistics challenges or production updates in the exporting nation, the manufacturing costs for essential medicines rise immediately. This transmission channel links international trade balances directly to domestic health outcomes, as higher input costs can quickly pressure the retail pricing and availability of life-saving therapies.

3. Out-of-Pocket Expenditure and Economic Shock Absorption

In developing economies, the relationship between trade economics and household financial stability is mediated by healthcare financing structures. Because a substantial portion of healthcare delivery in India is funded through individual Out-of-Pocket Expenditure (OOPE)—with the purchase of medicines accounting for up to 70% of those costs—any volatility in raw input pricing



can create an immediate financial strain for consumers. Research by health economists highlights that vulnerable populations managing chronic diseases are highly sensitive to price shifts. When upstream trade disruptions lead to retail price adjustments, it can lead to medication non-adherence, where patients ration or skip daily doses to manage household expenses, illustrating how international trade dynamics can directly affect public health outcomes.

2.3. Macroeconomic and Social Transmission Channels The systemic effects of this structural value-chain imbalance travel through multiple layers of the domestic economy. The diagram below maps how localized raw material dependencies transition into broader fiscal pressures and public health challenges, prompting defensive state interventions

3. Sectoral Impact Analysis: The macroeconomic challenge of India's heavy import dependence is best understood by examining its concrete impact on specific industrial and social pillars. Rather than being distributed evenly across the economy, the vulnerabilities of this structural imbalance are concentrated within three critical areas: small-business manufacturing networks, heavy infrastructure supply chains, and strategic public health sectors. This section provides a detailed analysis of these sectors, mapping how localized dependencies create structural vulnerabilities that affect both industrial growth and citizen welfare.

3.1. MSME Vulnerabilities and the Employment Contraction: Micro, Small, and Medium Enterprises (MSMEs) form the backbone of the domestic industrial labor market, contributing significantly to manufacturing output and employment. However, because these clusters operate with limited capital reserves and thin margins, they are highly sensitive to sudden shifts in international trade dynamics.

1. Consumer Goods Penetration and Cluster Disruption: Over the decades leading up to late 2023, low-cost foreign consumer goods—ranging from electronics and lighting systems to textiles, toys, and plastics—consistently increased their share of domestic retail channels. This trend directly impacts traditional manufacturing hubs, such as the electronics clusters in Northern India or the toy and plastic manufacturers in Western and Southern states.

Unable to compete with the prices of highly automated, state-subsidized foreign mega-factories, many local units are forced to scale down their operations. This shift transitions these clusters from active product fabricators into basic distributors or assemblers of imported components, capping local technological development.

2. The Employment Elasticity Contraction: Because the MSME sector relies heavily on manual labor, any reduction in domestic manufacturing output impacts the job market. When an active manufacturing workshop closes or shifts to a distribution-only model, its demand for local semi-skilled and informal labor drops sharply. This creates an employment contraction: even as the total value of goods sold in the market grows, the domestic labor-absorption rate declines. This trend complicates the path toward inclusive, manufacturing-led employment growth in semi-urban areas, making it harder for the economy to absorb rural labor transitions.



3.2. Primary Core Infrastructure: Steel, Chemicals, and Solar: The impact of high import volumes extends well beyond retail consumer goods. It also affects heavy, capital-intensive infrastructure industries that are critical to long-term economic development.

1. Global Steel Overcapacity and Market Pressures: The global steel market regularly faces challenges from industrial overcapacity. When internal real estate and infrastructure demand in a major exporting nation experiences a temporary slowdown, its state-backed mills look to export their surplus production.

Channeled into India, this low-cost steel puts immediate downward pressure on domestic prices. As a result, major Indian steel producers face compressed margins, which can delay planned capital investments in new blast furnaces and green steel infrastructure, stalling the modernization of heavy industry.

2. Basic Chemicals and the Solar Infrastructure Squeeze: A similar trend occurs in the basic organic chemicals and polymer industries, where low-priced intermediate imports lead to the under-utilization of local synthesis plants. In the renewable energy sector, India's rapid expansion of solar power capacity relies heavily on imported components. While local solar module assembly has grown, the foundational stages of the supply chain—specifically the production of polysilicon, ingots, and solar cells—remain deeply reliant on imported components. This creates a structural paradox where India's green energy transition inadvertently deepens its trade dependence on an external supplier.

3.3. Strategic Single-Source Dependencies: The Pharma API Bottleneck

The most vivid example of supply chain concentration occurs within India's pharmaceutical industry. While India is known globally as a major producer of affordable generic formulations, its manufacturing model features a significant internal vulnerability.

1. The Core API Reliance: For critical antibiotics, cardiovascular medications, and basic analgesics like paracetamol, Indian formulation hubs rely on a single dominant foreign supplier for 70% to 85% of their Active Pharmaceutical Ingredients (APIs) and Key Starting Materials (KSMs).

This reliance grew over decades as foreign chemical parks, supported by low land costs and streamlined environmental compliance frameworks, produced bulk compounds at prices that domestic chemical units could not match.

2. The Macroeconomic and Public Health Risk: This high concentration of supply introduces operational vulnerabilities. Any sudden disruption along this trade corridor—whether due to regional environmental regulatory shifts inside the exporting nation, logistical bottlenecks, or geopolitical tensions—can rapidly escalate into material shortages and input price inflation within India.

Because pharmaceuticals are essential to public health and form a key part of India's export economy, this single-source dependence poses a clear economic risk. This challenge has driven ongoing policy efforts to encourage local bulk drug manufacturing and improve supply chain resilience to protect vulnerable populations from sudden stockouts.



4. Macroeconomic Implications for India: The structural trade imbalance caused by single-source input dependencies moves far beyond individual factory floors or specific corporate balance sheets. When an economy relies heavily on an external industrial base for its critical manufacturing inputs, the effects ripple across its entire macroeconomic architecture. This section analyzes the systemic pressures this trade dynamic exerts on India's external accounts, currency valuation, and the investment patterns of its domestic private sector as of the late 2023 baseline.

4.1. Current Account Deficit (CAD) and Forex Pressures: The most direct macroeconomic consequence of an asymmetric, import-dependent trade relationship is the ongoing structural pressure it exerts on India's Balance of Payments (BoP), particularly the Current Account Deficit (CAD).

1. **Structural Outflow of Sovereign Capital:** A massive merchandise trade deficit concentrated in essential industrial intermediate inputs requires a continuous, matching outflow of foreign exchange to clear international commercial transactions. While India successfully balances its overall global payments profile using strong software export earnings and stable inward worker remittances, the sheer scale of the raw material import bill leaves a major structural gap in the merchandise trade account. To settle these import obligations, domestic commercial banks must consistently clear massive volumes of US Dollars (USD), leading to a steady net transfer of liquid capital to foreign clearing networks.

2. **Strains on Foreign Exchange Buffer Management:** To maintain macroeconomic stability and absorb global financial shocks, the Reserve Bank of India (RBI) manages a substantial foreign exchange reserve buffer. However, a structural deficit of this magnitude means that a significant portion of newly acquired forex inflows—whether originating from Foreign Direct Investment (FDI) or Foreign Portfolio Investment (FPI)—must be immediately utilized for import clearance obligations rather than long-term national reserve accumulation. This constant draw reduces the economy's capacity to build up defensive liquid reserves during periods of global financial tightening, limiting its monetary insulation against global shocks.

4.2. Exchange Rate Volatility and Imported Inflation: The continuous commercial demand for foreign currency to settle bulk import bills directly impacts the open-market price discovery and long-term valuation of the Indian Rupee (INR).

1. **Downward Exchange Rate Pressure:** In international foreign exchange markets, a persistent trade deficit creates a natural supply-demand mismatch: it leads to a constant selling of the domestic currency (INR) and a simultaneous buying of the invoicing currency (USD). This transaction pattern exerts ongoing downward pressure on the rupee's exchange rate. While a depreciated currency can theoretically make a country's exports more competitive, India's export growth has not fully offset this trend. The resulting exchange rate volatility increases hedging costs and complicates forward financial planning for domestic corporate entities.

2. **The Imported Inflation Transmission Channel:** A weaker rupee impacts the broader economy by driving up the landing cost of other essential, dollar-denominated global commodities. Because India relies heavily on imports for its crude oil, natural gas, and specialized components, a



depreciating currency instantly increases local prices for these vital inputs. This transmission channel creates an imported inflation loop, raising domestic manufacturing and logistics costs across the country. This trend requires careful monitoring by the central bank to keep headline inflation within targeted monetary boundaries, often resulting in higher interest rates that increase borrowing costs for domestic industries.

4.3. 'Make in India' and the Private Investment Substitution Effect: The availability of low-cost, state-subsidized foreign industrial inputs alters the long-term capital expenditure (CapEx) choices of private domestic firms, creating an economic substitution effect that impacts national manufacturing strategies.

1. Capital Expenditure Substitution: The core objective of the national 'Make in India' initiative is to encourage private investment in deep, vertically integrated domestic production lines. However, when local project developers, infrastructure builders, and formulation plants can import cheaper intermediate components from abroad, their short-term financial incentive to build local fabrication plants decreases. This dynamic leads to a private investment substitution effect: rather than dedicating capital to high-risk, multi-year investments in foundational component manufacturing, private capital often flows toward low-risk, lower-value final-stage assembly and processing.

2. The Value-Addition Matrix Mismatch: This investment pattern can lead to an industrial structure that looks productive on the surface but has low domestic value addition. For example, while a domestic factory may show high output volumes in generic drug formulation, smartphone assembly, or solar module processing, a deep financial audit often reveals that a dominant portion of the component value consists of imported raw inputs. Consequently, the domestic value-addition multiplier remains low. This structural mismatch limits the long-term effectiveness of industrial policy, showing that true economic self-reliance requires shifting from final-stage assembly to foundational component fabrication.

5. Policy Interventions and Defensive Strategies: To address the macroeconomic strains caused by structural input dependencies, the Government of India has transitioned from a passive, open-market trade posture to an active, defensive industrial strategy. This policy shift combines protective trade barriers with targeted fiscal incentives designed to rebuild domestic manufacturing capacity. This section evaluates the effectiveness of these defensive trade tools and structural programs as India navigates shifting global supply chains up to the late 2023 baseline.

5.1. Tariff and Non-Tariff Barriers: Safeguarding the Domestic Floor: To protect domestic manufacturers from predatory dumping and artificial price compression, India has deployed a combination of tariff corrections and regulatory non-tariff barriers.

1. Active Deployment of Anti-Dumping Duties (ADD): The Ministry of Commerce and Industry, through the Directorate General of Trade Remedies (DGTR), has increased the frequency of anti-dumping and countervailing duty investigations. These targeted tariffs are applied to specific product categories—such as industrial steel alloys, specialized chemical intermediates, and basic bulk drug compounds—where external suppliers benefit from high foreign state subsidies. By adding these duties to the landing cost of imported goods, the policy aims to restore a level playing



field, ensuring that domestic Indian manufacturers are not pushed out of the market by below-cost pricing.

2. Quality Control Orders (QCOs) as Technical Barriers: Recognizing that purely tariff-based defenses can sometimes be bypassed through trade re-routing or invoice misdeclaration, India has expanded its use of non-tariff barriers, primarily through Quality Control Orders (QCOs) issued by the Bureau of Indian Standards (BIS). These regulations mandate that incoming industrial inputs—including chemical polymers, electrical machinery, and pharmaceutical sub-components—must meet strict quality benchmarks before entering domestic markets. While these orders protect consumer safety, they also serve an important trade-policy function. By requiring foreign factories to undergo rigorous quality certifications, QCOs slow down the unrestricted flow of low-quality, mass-produced items, giving domestic manufacturing clusters a vital window to stabilize and scale their operations.

5.2. Production Linked Incentive (PLI) Schemes: Boosting Capital Expenditure: While protective barriers help safeguard the domestic market from external price pressures, long-term industrial independence requires a proactive approach to boosting internal manufacturing capacity. The central pillar of this strategy is the Production Linked Incentive (PLI) scheme.

1. Direct Fiscal Incentives for Core Component Fabrication: The PLI framework marks a shift away from traditional, broad-based corporate subsidies toward performance-linked fiscal support. Under this program, the state offers direct cash incentives—typically ranging from 4% to 10% on incremental sales over a baseline year—to manufacturers who set up advanced production units within India. The program is strategically focused on critical sectors that have historically seen high import dependence, such as bulk drugs (APIs), advanced chemistry cell (ACC) batteries, solar PV modules, and telecommunications hardware.

2. Encouraging Deep Vertical Integration: The primary goal of the PLI framework is to encourage deep vertical integration within India's manufacturing ecosystem. For instance, in the electronics and chemical sectors, the program is designed to move operations past basic final-stage assembly toward high-value component manufacturing, such as the localization of printed circuit board (PCB) population or the primary synthesis of critical starting materials. By directly linking financial payouts to measurable, localized production milestones, the policy helps de-risk large-scale capital investments for domestic firms, accelerating the build-out of a comprehensive local supply chain.

5.3. Capitalizing on the 'China Plus One' (China+1) Wave: The structural realignment of global trade has created a unique opening for India to adjust its position within international supply chains. As multinational corporations seek to de-risk their manufacturing setups by diversifying away from a single dominant exporter, India has an opportunity to capture a larger share of global production.

1. Attracting High-Value Global Manufacturing: Through corporate tax adjustments and targeted ease-of-doing-business initiatives, India has successfully attracted several large-scale international manufacturers. The presence of these major production lines has led to a notable shift in specific export metrics, particularly in high-growth areas like consumer electronics and active pharmaceutical formulations. This momentum demonstrates that with the right combination of



infrastructure support and policy stability, emerging markets can become viable hubs for complex, global manufacturing operations.

2. Resolving Structural Bottlenecks to Maximize Growth: To fully capitalize on this global diversification trend, India must address its own internal structural bottlenecks. While the country offers an expanding domestic market and a large labor force, its long-term manufacturing competitiveness faces ongoing challenges from high logistics costs, multi-layered land acquisition processes, and varying power costs across different states. Programs like the PM Gati Shakti National Master Plan are aimed at resolving these friction points by integrating multi-modal transport networks and optimizing supply-chain connectivity. By aligning these domestic infrastructure upgrades with its defensive trade policies, India aims to build an agile, self-sustaining industrial core that can withstand external economic shocks while driving steady, long-term macroeconomic growth.

6. Strategic Frameworks and Conclusion: The structural vulnerabilities caused by single-source input dependencies require a comprehensive policy response that moves past simple protectionist measures. Sustaining long-term economic independence and protecting public health welfare requires a dual approach that pairs defensive trade tools with internal structural reforms. This final section outlines key policy frameworks for building supply-chain resilience, modernizing the industrial ecosystem, and maintaining a balanced approach to industrial sovereignty based on the late 2023 baseline.

6.1. Supply Chain Diversification and Reshoring Frameworks: Relying on a single external market for up to 85% of critical industrial inputs—such as active pharmaceutical ingredients (APIs) or solar components—exposes an economy to significant strategic risks. India must build a diversified, resilient sourcing model.

1. The Geopolitical Trade Corridor Strategy: To reduce concentration risk, the Ministry of Commerce and private industry groups should develop alternative trade corridors. This involves strengthening manufacturing and raw-material partnerships with alternative production hubs across Southeast Asia (such as Vietnam, Indonesia, and Malaysia), Latin America, and the Middle East. By diversifying the origin of intermediate goods, the domestic economy can protect its manufacturing supply chains from localized economic or political shifts in any single country.

2. Encouraging Targeted Reshoring and Nearshoring: For critical components that impact public health or national infrastructure, policy frameworks must incentivize partial reshoring. This can be achieved through coordinated zoning laws, public-private partnerships, and shared common-facility infrastructure in designated industrial parks. By lowering the initial capital requirements for setting up advanced chemical synthesis or component fabrication plants within India, the state can help ensure that critical industries maintain a reliable baseline of domestic production.

6.2. Technological Upgradation of the MSME Ecosystem: Because micro, small, and medium enterprises (MSMEs) are major employment drivers and critical downstream contributors, their long-term survival depends on upgrading their operational efficiency to compete effectively on both quality and price.



1. Establishing Common Engineering and Testing Facilities: Small-scale industrial clusters often lack the financial reserves to invest in advanced automation or specialized testing laboratories. To bridge this gap, the Ministry of MSME can partner with state governments to establish localized, publicly accessible technology centers. Equipped with modern machinery, industrial design tools, and quality-testing infrastructure, these centers allow small businesses to optimize their manufacturing processes, reduce material waste, and improve product consistency without taking on heavy capital debt.

2. Streamlining Access to Targeted Digital Credit: To help small businesses modernize, access to capital must be closely aligned with technological upgrades. Expanding digital lending platforms—such as trade receivables discounting systems (TReDS)—can provide MSMEs with faster access to working capital based on verified purchase orders. When these financing channels are linked to investments in plant modernization and digital inventory management, local supply units are better equipped to scale their output and compete in higher-value corporate supply chains.

6.3. Final Synthesis: The analysis of India's industrial and trade dynamics through late 2023 reveals that a high concentration of bilateral trade deficits in foundational inputs is a structural challenge that requires active, multi-layered management. While access to low-cost imports can provide short-term cost advantages for final-stage formulation plants and assemblers, an over-reliance on a single external manufacturer limits the development of a vertically integrated domestic industrial base.

1. Navigating the Interdependence Balancing Act: True economic self-reliance does not mean pursuing complete economic isolation. In an interconnected global economy, Indian industry must continue to access international intermediate inputs to remain cost-competitive in the global market. Therefore, the long-term policy goal is to maintain a strategic balance: safeguarding critical sectors—like public health, electronics, and core infrastructure—through targeted domestic capacity building, while allowing open-market mechanisms to optimize cost efficiencies in non-strategic consumer segments.

2. Outlook for Sustained Macroeconomic Growth: As India continues to upgrade its logistics infrastructure through multi-modal connectivity programs and expand its manufacturing base via performance-linked incentives, the structure of its trade relationships will continue to evolve. Addressing the root causes of industrial dependence requires a sustained, multi-year commitment to improving local productivity, expanding technical education, and fostering private research and development. By aligning defensive trade tools with internal structural reforms, India can build a resilient, competitive manufacturing ecosystem that supports long-term macroeconomic stability and sustainable employment growth.

References

- Bhattacharjea, A. (2022). Industrial policy in India since independence. *Indian Economic Review*, 57(2), 565–598. <https://doi.org/10.1007/s41775-022-00154-9>
- Chaudhuri, S. (2021). India's import dependence on China in pharmaceuticals: Status, issues and policy options. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3906479>



- Cited by: 19
- Deodhar, S. Y. (2021). Production Linked Incentive (PLI) scheme: Evaluation and the way forward (Policy Paper No. 33). Pune International Centre.
- Dimaranan, B., Ianchovichina, E., & Martin, W. J. (2007). China, India, and the future of the world economy: Fierce competition or shared growth? Policy Research Working Papers, Article 4304. <https://doi.org/10.1596/1813-9450-4304>
- Cited by: 68
- Kalirajan, K., & Paudel, R. (2015). India's trade deficit with China: Will Free Trade Agreement (FTA) work for India? Global Economy Journal, 15(4), 485–505. <https://doi.org/10.1515/gej-2015-0011>
- Cited by: 24
- Palit, A. (2021). COVID-19, supply chains and dependence on China: The Indian perspective. Korea Economic Institute of America.
- Cited by: 3
- Tripathy, A., & Dastrala, S. M. (2023). Make in India: So far and going ahead. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.4384039>
- Cited by: 13
- Vyas, N. (2020). Reduced pharma supply chain in COVID-19: Measures to reduce India's reliance for active pharmaceutical ingredients on China. Journal of Pharmaceutical Research International, 32(24), 104–112.
- Cited by: 16