

## 4. Manufacturing Hubs – Economy

India's manufacturing strategy has increasingly focused on developing integrated manufacturing hubs to support scale, reduce transaction costs, and anchor long-term manufacturing activity.

### 1. Background

For decades, India's manufacturing sector operated through fragmented small-scale units scattered across states with limited coordination, outdated technology, and poor infrastructure connectivity. This dispersed model resulted in high logistics costs, supply chain inefficiencies, and inability to compete with integrated manufacturing powerhouses like China, Vietnam, and Bangladesh. The fragmentation prevented economies of scale, discouraged anchor investors, and limited technology transfer opportunities.

Recognizing these structural weaknesses, India embarked on a strategic transformation toward integrated manufacturing hubs—master-planned industrial zones combining production facilities, supplier ecosystems, testing infrastructure, logistics networks, and skilled labor within coordinated geographic clusters. This hub-based approach draws inspiration from successful global models including China's Special Economic Zones, South Korea's industrial complexes, and Thailand's Eastern Economic Corridor. The shift represents recognition that countries providing stable production environments supported by comprehensive infrastructure, streamlined logistics, institutional coordination, and skilled workforces are better positioned to attract multinational corporations, retain long-term production mandates, and build globally competitive manufacturing sectors capable of driving India toward its \$30–35 trillion economy vision by 2047.

### 2. Current State of India's Manufacturing Sector

#### Economic Contribution and Employment

1. Manufacturing contributes approximately 16–17% to India's Gross Domestic Product, representing a significant but underutilized economic pillar.
2. The sector employs over 27 million workers directly, with millions more dependent on manufacturing-related services and supply chains.
3. As India works toward transforming from a \$3.7 trillion economy to a \$30–35 trillion economy by 2047, manufacturing must play a central role.
4. The government targets raising manufacturing's GDP share to at least 25%, requiring massive expansion in production capacity and competitiveness.

#### Sectoral Focus Areas

1. India focuses on 14 identified sunrise sectors including semiconductors, renewable energy components, medical devices, and advanced batteries.
2. Labor-intensive industries including leather goods, textiles, and apparel receive renewed emphasis for employment generation.
3. These sectors combine high-growth potential with job creation capacity, aligning economic growth with social development objectives.

### 3. Challenges Confronting Indian Manufacturing

#### Infrastructure Deficiencies

1. High logistics costs driven by poor road networks, inadequate port connectivity, and unreliable power supply constrain manufacturing competitiveness.
2. Transportation bottlenecks increase delivery times and costs, making Indian products less competitive in global markets.
3. Power shortages and voltage fluctuations disrupt production processes, increasing wastage and equipment maintenance costs.

#### Innovation and Technology Gaps

1. India invests less than 1% of GDP in research and development, far below global leaders investing 2–4% of GDP.

2. Low R&D spending limits India's ability to develop high-technology manufacturing capabilities and indigenous innovations.
3. Dependence on imported technology prevents India from capturing high-value segments of manufacturing value chains.

#### **Import Dependence Vulnerabilities**

1. Heavy reliance on imports for critical components including semiconductors, electronics parts, and defence equipment creates strategic vulnerabilities.
2. Import dependence exposes Indian manufacturers to supply chain disruptions, price volatility, and geopolitical pressures.
3. Foreign exchange outflows for imports reduce India's trade competitiveness and increase current account deficits.

#### **Skill Development Inadequacies**

1. Major mismatch exists between workforce skills and evolving industry requirements, particularly in advanced manufacturing technologies.
2. The education system produces graduates lacking practical skills needed for modern manufacturing environments.
3. Insufficient vocational training infrastructure limits the supply of skilled technicians, operators, and specialized workers.

#### **Productivity Constraints**

1. Outdated machinery, small-scale fragmented production units, and limited automation keep productivity levels low compared to global competitors.
2. Many manufacturing units operate with decades-old equipment lacking modern efficiency and quality control capabilities.
3. Fragmented operations prevent economies of scale and make technology upgrades financially unviable for individual units.

#### **Global Competitive Pressures**

1. Countries like Vietnam, Bangladesh, and China offer cheaper production costs and better-developed manufacturing ecosystems.
2. These competitors provide superior infrastructure, streamlined regulations, and established supplier networks attracting global manufacturers.
3. Indian products struggle to compete on price and delivery timelines in international markets.

#### **Environmental Compliance Costs**

1. Rising pressure for sustainable and green manufacturing practices increases compliance costs for manufacturers.
2. Environmental regulations, while necessary, add financial burdens particularly for small and medium enterprises lacking resources for upgrades.
3. Balancing environmental sustainability with manufacturing competitiveness remains an ongoing challenge.

### **4. Rationale for Manufacturing Hub Development**

#### **Global Production Environment Competition**

1. Countries providing stable production environments supported by comprehensive infrastructure attract and retain long-term manufacturing investments.
2. Integrated ecosystems combining logistics networks, skilled labor pools, and institutional coordination create competitive advantages.
3. Manufacturers prefer locations offering predictability, efficiency, and minimal transaction costs for sustained operations.

#### **Economies of Scale and Clustering Benefits**

1. Geographic concentration of related industries enables sharing of infrastructure, knowledge spillovers, and specialized labor pools.

2. Proximity between suppliers and manufacturers reduces transportation costs, inventory requirements, and production lead times.
3. Clustering facilitates technology transfer, innovation diffusion, and collaborative problem-solving among industry participants.

#### **Long-term Production Mandate Retention**

1. Well-developed manufacturing hubs create switching costs for companies, reducing the likelihood of production relocation.
2. Established supplier relationships, trained workforces, and sunk infrastructure investments anchor manufacturing activity long-term.
3. Countries with mature industrial ecosystems maintain competitive advantages even when labor costs increase over time.

### **5.Types of Manufacturing Hubs in India**

#### **Large Integrated Manufacturing Hubs**

1. These represent master-planned industrial zones offering plug-and-play infrastructure for immediate production commencement.
2. Hubs host anchor manufacturers—typically large multinational or domestic corporations—alongside their complete supplier ecosystems.
3. Infrastructure includes ready factories, reliable power supply, water systems, waste treatment, and digital connectivity within single locations.
4. Integration reduces setup time, lowers initial investment requirements, and ensures coordinated operations across value chains.

#### **Sector-Specific Manufacturing Ecosystems**

1. These hubs integrate production units with comprehensive supplier networks, testing facilities, regulatory services, and skilling infrastructure.
2. The Bulk Drug Park Scheme establishes three specialized parks in Gujarat, Himachal Pradesh, and Andhra Pradesh reducing bulk pharmaceutical manufacturing costs.
3. Semiconductor and electronics ecosystems receive support under Semicon India Programme and Electronics Components Manufacturing Scheme 2.0.
4. These programs cover complete value chains from fabrication and assembly to packaging, testing, and component manufacturing.

#### **MSME Manufacturing Clusters**

1. The Micro & Small Enterprises Cluster Development Programme supports infrastructure creation specifically for small manufacturing units.
2. Common Facility Centers provide shared access to expensive machinery, testing equipment, and technology otherwise unaffordable for individual MSMEs.
3. Technology upgradation programs help traditional clusters adopt modern production methods, quality standards, and environmental practices.
4. The India Industrial Land Bank digitally maps industrial estates, clusters, parks, and zones nationwide for transparency.
5. State Industrial Development Corporations develop and manage industrial estates providing affordable space and basic infrastructure for MSMEs.

#### **Corridor-Linked Industrial Nodes**

1. Industrial corridors provide trunk infrastructure including high-capacity freight connectivity and multimodal logistics networks.
2. These corridors enable industrial concentration at scale by ensuring reliable, cost-effective movement of raw materials and finished goods.
3. The Delhi-Mumbai Industrial Corridor, Chennai-Bengaluru Industrial Corridor, Amritsar-Kolkata Industrial Corridor, and Vizag-Chennai Industrial Corridor create strategic manufacturing zones.



4. Corridor development integrates transport infrastructure, industrial land, power supply, and urban amenities supporting manufacturing growth.

## 6. Major Government Policy Initiatives

### National Industrial Corridor Development Programme

1. NICDP aims to establish Greenfield Industrial Smart Cities across India, positioning the country as a global manufacturing hub.
2. Twenty industrial smart cities have received government approval spanning seven industrial corridors and thirteen states.
3. These cities combine manufacturing zones with residential areas, commercial districts, and comprehensive urban infrastructure.

### PM MITRA for Textile Manufacturing

1. Pradhan Mantri Mega Integrated Textile Region and Apparel represent large integrated hubs tailored specifically for textile value chains.
2. These parks combine textile processing, garment manufacturing, logistics facilities, and common infrastructure within single frameworks.
3. Seven PM MITRA parks have been announced across Tamil Nadu, Telangana, Gujarat, Karnataka, Madhya Pradesh, Uttar Pradesh, and Maharashtra.
4. The initiative aims to create globally competitive textile manufacturing clusters reducing India's fragmentation in this labour-intensive sector.

### PM Gati Shakti National Master Plan

1. This integrated digital platform consolidates infrastructure-related data and projects from 44 central ministries and 36 states/Union Territories.
2. The initiative enables coordinated planning of transport, logistics, and utility infrastructure eliminating departmental silos.
3. Focus areas include multimodal connectivity, last-mile linkages to manufacturing zones, and time-bound project execution.
4. The platform prevents duplication, identifies infrastructure gaps, and ensures manufacturing hubs receive comprehensive connectivity support.

### Biopharma SHAKTI Initiative

1. This program carries a ₹10,000 crore outlay over five years building a biopharma-focused manufacturing ecosystem.
2. The initiative includes establishing three new National Institutes of Pharmaceutical Education and Research for skilled workforce development.
3. A nationwide network of over 1,000 accredited clinical trial sites supports pharmaceutical research and development.
4. The program aims to position India as a global biopharma manufacturing hub reducing import dependence.

### National Manufacturing Mission

1. Announced in Union Budget 2025-26, this mission provides a long-term strategic roadmap integrating policy, execution, and governance.
2. The mission coordinates various manufacturing initiatives under unified vision ensuring consistency and reducing policy fragmentation.
3. It establishes clear targets, monitoring mechanisms, and accountability frameworks for manufacturing sector transformation.

### Public Capital Expenditure Push

1. Government capital outlay has grown dramatically from ₹2 lakh crore in FY2014-15 to ₹12.2 lakh crore budgeted for 2026-27.
2. Massive infrastructure investment creates enabling environment for private manufacturing investments through improved connectivity and utilities.

3. Capital expenditure focuses on roads, ports, railways, power infrastructure, and digital connectivity directly benefiting manufacturing competitiveness.

## 7.Way Forward

### **Accelerate Infrastructure Development**

1. Fast-track completion of industrial corridor projects, port modernization programs, and dedicated freight corridors to reduce logistics costs and improve manufacturing competitiveness, while ensuring last-mile connectivity between manufacturing hubs and transport networks through coordinated central-state execution mechanisms.

### **Strengthen R&D and Innovation Ecosystems**

1. Increase research and development spending toward 2% of GDP through public investment and private sector incentives, while establishing technology innovation centers within manufacturing hubs facilitating collaboration between industry, academia, and research institutions for indigenous technology development and reducing import dependence.

### **Scale Skill Development Programs**

1. Expand Industrial Training Institutes and vocational training centres aligned with manufacturing hub requirements, creating industry-specific curricula developed collaboratively with manufacturers to ensure graduates possess immediately deployable skills, while implementing apprenticeship programs connecting students directly with manufacturing employers for practical experience.

## Conclusion

India's manufacturing sector transformation through integrated hubs represents strategic recognition that fragmented operations cannot compete globally. With manufacturing contributing only 16-17% of GDP despite employing 27 million workers, the hub-based approach combining infrastructure, supplier ecosystems, and policy coordination offers pathways to achieving the 25% GDP target. Despite challenges including infrastructure gaps, low R&D investment, and global competition, initiatives like NICDP, PM MITRA, and massive capital expenditure increases demonstrate commitment to building world-class manufacturing capabilities.