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INDIA'S MANUFACTURING SECTOR

SYLLABUS:

GS 3 >> Economic Development > Indian Economy and Issues > Manufacturing Sector

REFERENCE NEWS:

- Recently, NITI Aayog's Frontier Tech Hub has launched its roadmap, "**Reimagining Manufacturing: India's Roadmap to Global Leadership in Advanced Manufacturing**", charting a path to transform India into a **top-three global manufacturing hub by 2035**.

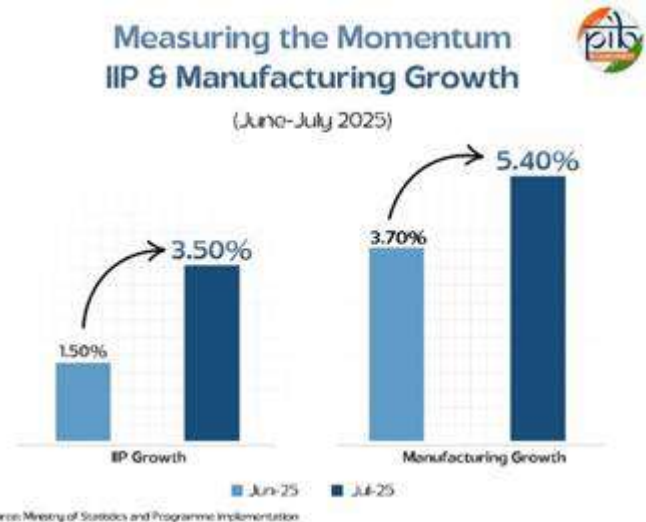
MORE ON NEWS:

- The roadmap lays out a **sector-focused path** to harness frontier technologies and **elevate India's manufacturing competitiveness**.
- It identifies **Artificial Intelligence & Machine Learning, Advanced Materials, Digital Twins and Robotics** as high-impact enablers and maps their implications across 13 priority manufacturing sectors.
- With targeted interventions, the roadmap envisions manufacturing contributing over **25% to India's GDP, creating more than 100 million jobs**, and positioning India **among the top three global hubs for advanced manufacturing by 2035—key milestones towards Viksit Bharat @ 2047**.
- To **address current barriers** limiting India's manufacturing competitiveness, it recommends coordinated **strengthening of R&D ecosystems, industrial infrastructure, workforce development, and scaled deployment of frontier technologies** in sector-specific ways through a 10-year strategic roadmap detailing out comprehensive interventions.
- The roadmap **cautions that India will risk a historic window of opportunity** if the country fails to adopt key frontier technologies in high impact sectors with a potential loss of US\$ 270 billion by 2035 and US\$ 1 trillion by 2047 in additional manufacturing GDP.

INDIA'S MANUFACTURING SECTOR:

- Manufacturing is emerging as a central pillar of India's economic growth, contributing **around 16-17% of GDP and employing over 27 million workers**. (Source: IBEF)
(The India Brand Equity Foundation (IBEF) is a Government of India initiative under the Ministry of Commerce that promotes and showcases India's business, investment, and sectoral strengths globally.)
- The sector's strength lies in the performance of **key industries such as automotive, engineering, chemicals, pharmaceuticals, consumer durables, electronics, and textiles**.

- Supported by government initiatives like **Make in India and production-linked incentive (PLI) schemes**, India is targeting manufacturing to account for 25% of GDP in the coming years.
- The **Index of Industrial Production (IIP)**, which tracks the volume of output across manufacturing, mining, and electricity, is a snapshot of how industry is performing and its contribution to GDP growth. In July 2025, **the IIP recorded a growth of 3.5%** year-on-year, rising significantly from **1.5% in June 2025**.
- Manufacturing Growth also grew **by 5.40% in July 2025 year-on-year, up from 3.7% of June 2025**.
- India’s growth story is increasingly powered by the hum of modern factory floors. From **Electronics Manufacturing Cluster (EMC) in Pune, to laptop assembly line in Chennai**, it reflects the spread of industrial activity across regions.



SIGNIFICANCE OF THE MANUFACTURING SECTOR FOR INDIA:

- **Core Driver of Economic Growth:**
 - Manufacturing is a **central pillar of India’s economic structure**, contributing **16–17% of GDP** and employing **over 27 million workers** (Source: IBEF, 2025).
 - It anchors industrial output through key industries such as **automotive, engineering, electronics, pharmaceuticals, and textiles**.
 - Government initiatives like **Make in India and PLI schemes** are propelling the sector toward a **25% GDP share by 2035**.
- **Employment and Inclusive Development:**
 - Manufacturing provides **broad-based employment**, particularly for semi-skilled and skilled youth.
 - For instance, **manufacturing employment** rose from **6% (2004–14)** to **15% (2014–24)** (Source: PIB, 2025).
 - The **PM MITRA textile parks** alone aim to generate **20 lakh jobs**, while the **Footwear & Leather Mission** targets **22 lakh jobs** and a **₹4 lakh crore turnover** (Source: IBEF, 2025).
 - This illustrates manufacturing’s inclusive reach—urban and rural, male and female.

THE SEVEN
PM
MITRA Parks



Source: Ministry of Textiles

The **PM MITRA (Mega Integrated Textile Region and Apparel) Parks** scheme aims to build world-class integrated textile and apparel hubs with modern infrastructure to boost investment, exports, and job creation in the sector.

- **Backbone of Export Competitiveness:**
 - Manufacturing sustains India's **export dynamism** by diversifying global trade. Exports in **Q1 FY26** reached **US\$210.3 billion**, a **6% YoY rise**, driven by **engineering goods, chemicals, and electronics**.
 - For instance, electronics exports alone rose from **US\$29.1 billion (FY24)** to **US\$38.6 billion (FY25)**, expected to hit **US\$50 billion (FY26)** (Source: IBEF, 2025).
 - Pharmaceuticals supply **50% of global vaccines**, consolidating India's image as the **Pharmacy of the World**.
- **Catalyst for Investment and Industrial Ecosystems:**
 - Manufacturing attracts the highest **foreign and domestic investment flows**. Between **2014–25**, India received **US\$748.8 billion FDI**, with **manufacturing FDI rising 69% in a decade** (Source: DPIIT).
 - The **PLI scheme** alone has disbursed **₹21,534 crore**, catalysing **₹1.76 lakh crore investments**.
 - Such inflows fuel local supply chains, infrastructure, and MSME growth—strengthening India's industrial backbone.
- **Technology-Enabled Productivity and Global Competence:**
 - Industry 4.0 technologies—**AI, robotics, and digital twins**—are redefining India's production systems.
 - The **HSBC India Manufacturing PMI** hit **59.1 (July 2025)**, its highest in 16 months, signalling robust factory activity (Source: PIB). These trends show how digitalisation and automation are transforming India into a **globally competitive manufacturing base**.
- **Linkages and Multiplier Effects:**
 - Manufacturing has **strong linkages** with logistics, power, and services.

- For example, **GST 2.0 reforms** lowered input costs in **textiles, leather, and logistics**, while **GatiShakti** and the **National Logistics Policy** improve connectivity and cost efficiency.
- This creates a **multiplier effect** across supply chains, enhancing growth resilience.
- **Foundation for Sustainable Growth:**
 - Through initiatives like the **National Manufacturing Mission**, India integrates **clean-tech production** in solar PV, EV batteries, and wind turbines, aligned with the **Net Zero 2070** goal.
 - Thus, manufacturing contributes not just to GDP, but to **environmentally sustainable, innovation-led development**.

OPPORTUNITIES AND POTENTIAL OF THE MANUFACTURING SECTOR IN INDIA:

- **Pathway to a \$1 Trillion Manufacturing Economy:**
 - India's manufacturing sector is projected to reach **US\$1 trillion by FY26** (Source: IBEF) and could contribute **US\$500 billion annually to the global economy by 2030**.
 - The **National Manufacturing Mission** provides a 10-year strategic roadmap for achieving this, ensuring **coordinated R&D, workforce training, and tech deployment**.
 - This makes manufacturing the **engine of India's \$35 trillion economy vision by 2047**.
- **Integration into Global Value Chains:**
 - India's export ecosystem is diversifying rapidly with **PLI-backed high-value manufacturing**.
 - For instance, **mobile phone exports** jumped from **₹1,500 crore (2014–15)** to **₹2 lakh crore (2024–25)**—a **127× increase** (Source: IBEF).
 - With **electronics value addition** rising to **70%**, and targets of **90% by FY27**, India is emerging as a **cost-effective China+1 alternative**. Sectors like **semiconductors, defence, and EVs** present new global integration pathways.

India is emerging as a **China+1 alternative**, offering global manufacturers a cost-efficient, large-scale, and policy-stable production base to **diversify supply chains beyond China**.

- **Technological Transformation and Industry 4.0 Potential:**
 - The adoption of **AI, robotics, advanced materials, and digital twins** could add **US\$1 trillion** to India's GDP by 2047 (Source: NITI Aayog, 2025).
 - Programs like **SAMARTH Udyog Bharat 4.0** and **Digital Manufacturing Hubs** are advancing automation and predictive analytics in production lines.
 - Such transformation can drive **precision, efficiency, and sustainability**, positioning India among the **top three global manufacturing powers by 2035**.
- **Clean-Tech and Green Industrialisation:**
 - Green manufacturing is India's next growth frontier.
 - Under the **Union Budget 2025–26**, ₹20,000 crore has been allocated for **renewable energy expansion**, and the **National Manufacturing Mission** promotes **solar PV modules, green hydrogen, wind turbines, and EV batteries**.
 - For instance, India aims to meet **10% of global wind energy component demand by 2030** (Source: IBEF, 2025).
 - This clean-tech shift opens vast investment potential in **climate-resilient supply chains**.
- **Expanding Domestic Market and E-Commerce Exports:**
 - India's large middle class and e-commerce ecosystem provide internal demand stability.

- By **2030**, the Indian middle class will form **17% of global consumption**, and **e-commerce exports** are expected to grow from **US\$1 billion to US\$400 billion annually** (IBEF, 2025).
- Such demand will reinforce domestic manufacturing and attract new entrants in consumer electronics, fashion, and processed goods.
- **Investment Confidence and Global Partnerships:**
 - With consistent reforms, India is emerging as a **preferred investment destination**.
 - In FY25, total FDI inflows stood at **US\$81.04 billion**, with **manufacturing FDI** rising to **US\$19.04 billion** (Source: DPIIT).
 - Global majors like **Google, Amazon, Micron, and Foxconn** are localising production in India.
 - For example, **Google's Pixel manufacturing in Tamil Nadu** and **Micron's ₹23,771 crore semiconductor plant in Gujarat** indicate a global vote of confidence.
- **MSME and Startup Synergy:**
 - MSMEs contribute nearly **30% of manufacturing output** and employ millions. The **Startup India initiative** has supported **1.91 lakh registered startups**, generating **17.7 lakh jobs** (Source:DPIIT).
 - Partnerships like **DPIIT–Samsung** and **DPIIT–Shree Cement** provide infrastructure and mentorship to scale manufacturing startups. This synergy offers vast potential for **innovation-driven industrial decentralisation**.
- **Infrastructure and Industrial Corridors:**
 - The **National Industrial Corridor Development Programme** and **PM GatiShakti** are transforming India's logistics and industrial base.
 - In FY25 alone, **₹28,602 crore** worth of new corridor projects were sanctioned. Improved multimodal connectivity can lower logistics costs to **8% of GDP** and elevate India's ranking in the **World Bank's Logistics Performance Index** to the top 25 by 2030.
 - Such infrastructure will anchor India's manufacturing expansion and export competitiveness.
- **Emerging Sectors of Strategic Opportunity:**
 - Several sunrise sectors present breakthrough potential:
 - **Semiconductors** (₹76,000 crore PLI) → India's first chip by Dec 2025.
 - **Defence manufacturing** → Exports targeted at ₹50,000 crore by 2029.
 - **Automobiles & EVs** → 4th largest global producer, with rising EV startup base.
 - **Textiles & Leather** → US\$350 billion target by 2030 with PM MITRA parks.
 - These are **future-ready sectors** with global scale and sustainability focus.
- **Strategic Window: 2025–2047:**
 - According to **NITI Aayog's Frontier Tech Roadmap (2025)**, India faces a **narrow 20-year opportunity window**.
 - Timely adoption of frontier technologies, clean-energy integration, and investment deepening could make India one of the **top three advanced manufacturing economies** by 2035.
 - Conversely, inaction could cost **US\$270 billion by 2035** and **US\$1 trillion by 2047** in potential GDP—making this period **decisive for India's industrial future**.

CHALLENGES FACING INDIA'S MANUFACTURING SECTOR:

- **Infrastructure & logistics deficits**
 - Poor connectivity, high freight/transport costs: for instance, it is **"almost twice as expensive"** to ship goods internally in India compared to China.

- **Power supply interruptions:** frequent outages hamper production lines, especially in heavy-industry or heat-intensive units
- **Warehousing, multimodal logistics, ports remain sub-optimal** which raises cost and reduces competitiveness.
- **Regulatory, land & policy bottlenecks**
 - Complex regulatory/licensing environment, slow land acquisition.
 - Labour laws, environmental clearances, multiple approvals still pose friction for manufacturing firms.
 - Implementation of flagship policies sometimes inconsistent: delays and coordination issues.
- **Skills, technology & productivity gap**
 - While India has a large workforce, there is a mismatch: **many workers lack skills for modern manufacturing (automation, robotics, etc.).**
 - Many manufacturing units suffer from **outdated machinery and lower productivity — e.g., long working hours but lower output per worker.**
 - Technology adoption remains uneven especially among MSMEs.
- **Competition and cost pressures**
 - **India competes with countries (e.g., China, Vietnam)** which often have lower costs, better infrastructure, or more mature manufacturing ecosystems.
 - Input costs (energy, logistics, raw materials) add up, hurting margins in global competition.
- **MSME & financing constraints**
 - A large share of manufacturing lies in **MSMEs — they often face difficulty accessing credit, technology, scaling up.**
 - Innovation, R&D investment are still low: updating to newer technologies is expensive.
- **Resource & environmental challenges**
 - **Manufacturing is resource-intensive (water, power, raw materials).** Scarcity or costs of these resources pose risk.
 - **Global regulatory shifts (e.g., carbon border adjustment mechanisms)** may penalise Indian manufacturing if energy/technology standards lag.

GOVERNMENT INITIATIVES FOR THE MANUFACTURING SECTOR:

○ **Production Linked Incentive (PLI) Scheme**

- Launched to incentivise incremental production & exports across key sectors (electronics, pharma, textiles, auto, etc.).
- The scheme addresses both scale-up and global competitiveness.



○ **National Manufacturing Mission (NMM)**

- Announced in Union Budget 2025-26: focuses on five areas → ease & cost of doing business, workforce, MSMEs, access to technology, quality manufacturing.

- Also emphasises clean-tech manufacturing (solar PV, EV batteries, wind turbines) and is aligned with India's net-zero 2070 goal (from your provided content).



- **Make in India Initiative**
 - A broader framework launched in 2014, to make India a manufacturing/design hub, invite investment, improve infrastructure.
 - While it has faced challenges, it sets the platform for manufacturing transformation.
- **Logistics & infrastructure reforms**
 - PM Gati Shakti National Master Plan (NMP) – launched for integrated multimodal infrastructure planning to reduce logistics cost.
 - Development of industrial corridors (e.g., National Industrial Corridor Development Programme) for plug-&-play infrastructure.
 - National Logistics Policy (2022) to bring logistics cost down and improve efficiency.
- **Skill development & human capital building**
 - Programmes like PM Kaushal Vikas Yojana, unified under Skill India to train workforce for modern manufacturing (from your provided content).
 - Aligns with technology adoption in manufacturing.
- **Focus on MSMEs & startup ecosystem**
 - Initiatives to integrate MSMEs into supply-chains, strengthen them with technology and finance (as per your content).
 - Startup India initiative also supports manufacturing-linked innovation and job creation.
- **Green and sustainable manufacturing push**
 - Clean-tech manufacturing incentives: solar PV, electrolyzers, wind turbines, EV batteries as part of NMM & Budget.
 - Helps India meet exports demand and global environmental standards.

WAY FORWARD:

- **Accelerate Technology Adoption:** Fast-track integration of **AI, robotics, and digital twins** across manufacturing clusters to achieve the Advanced Manufacturing Powerhouse 2035 target.
- **Strengthen MSMEs:** Facilitate easier credit access, R&D support, and digital upskilling to integrate MSMEs into global supply chains.
- **Enhance Infrastructure:** Implement **PM GatiShakti** and **National Logistics Policy** effectively to reduce logistics costs to below 8% of GDP.
- **Promote Green Manufacturing:** Expand clean-tech production under the **National Manufacturing Mission**—solar, EV batteries, wind components—aligned with India's **Net Zero 2070** goal.

- **Skill and Innovation Ecosystem:** Scale up the **Skill India Mission** with industry-linked training, apprenticeships, and university–industry collaboration.
- **Stable Policy & Ease of Doing Business:** Simplify land, labour, and environmental clearances through single-window systems and predictable regulation to attract global investors.

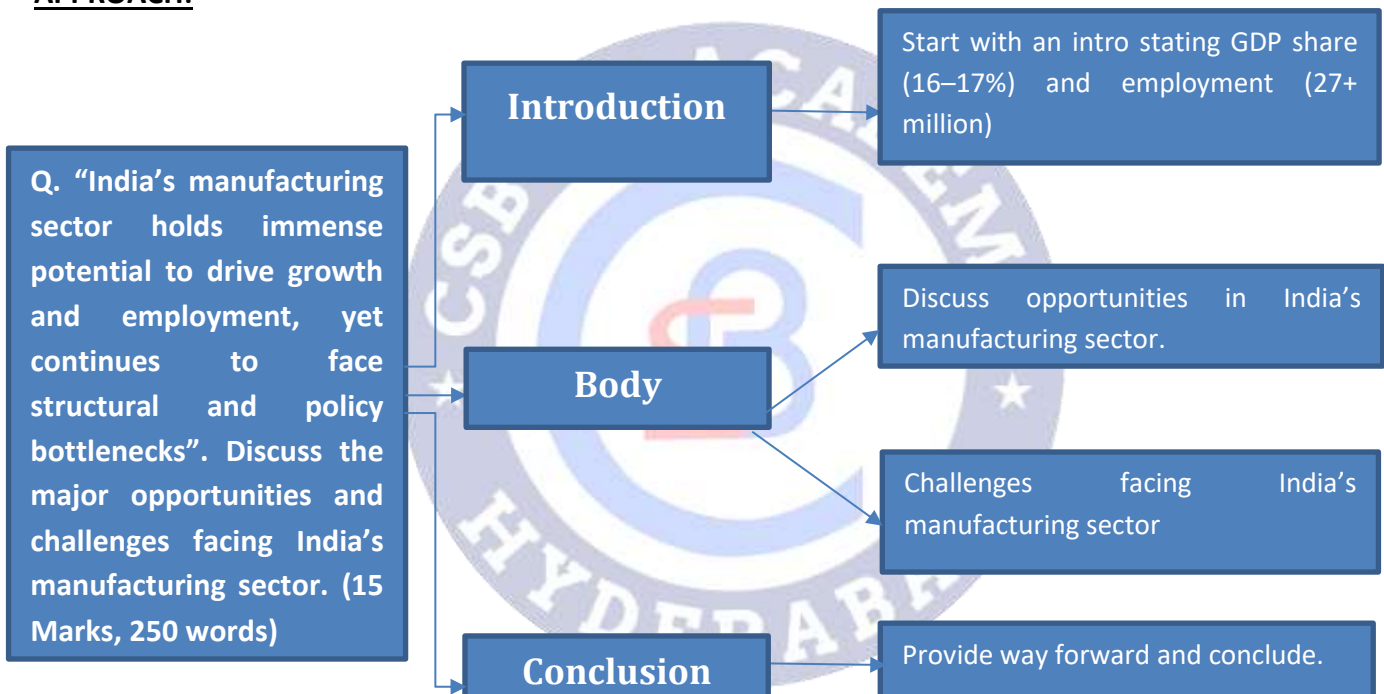
CONCLUSION:

- With strong policy support, a skilled workforce, and rapid technological transformation, India’s manufacturing sector can evolve from being a **factor-driven** to a **technology-driven** growth engine—anchoring the vision of a **\$1 trillion manufacturing economy** and a **Viksit Bharat by 2047**.

PRACTICE QUESTION:

Q. “India’s manufacturing sector holds immense potential to drive growth and employment, yet continues to face structural and policy bottlenecks”. Discuss the major opportunities and challenges facing India’s manufacturing sector. (15 Marks, 250 words)

APPROACH:



MODEL ANSWER:

Manufacturing contributes **16–17% to India’s GDP** and employs **over 27 million workers** (IBEF, 2025), serving as a core pillar of economic growth. It anchors industries such as **automotive, electronics, textiles, and pharmaceuticals**, yet despite this promise, the sector **continues to face structural and policy bottlenecks** that constrain competitiveness and job creation. Strengthening manufacturing is vital to achieve **Viksit Bharat @ 2047**.

Opportunities in India’s Manufacturing Sector:

- \$1 Trillion Manufacturing Vision:** Projected to reach **US \$1 trillion by FY26**, manufacturing can contribute **US \$500 billion annually** to global GDP by 2030 (IBEF).
- Integration into Global Value Chains:** India is emerging as a **China + 1 alternative**—mobile exports rose from ₹1,500 crore (2014–15) to ₹2 lakh crore (2024–25).

3. **Industry 4.0 Transformation:** Adoption of **AI, robotics, and digital twins** could add **US \$1 trillion to GDP by 2047** (NITI Aayog).
4. **Green Industrialisation:** Under the **National Manufacturing Mission**, ₹20,000 crore supports solar PV, EV batteries, and wind turbines to meet **10 % of global wind-component demand by 2030**.
5. **Demographic and Market Dividend:** A rising middle class—**17 % of global consumption by 2030**—and e-commerce exports worth **US \$400 billion annually** will sustain domestic demand.
6. **Global Investment Momentum:** **US \$81 billion FDI in FY25**, with major players like **Google, Amazon, and Micron** localising production, signals investor confidence.

Challenges Facing India's Manufacturing Sector:

1. **Infrastructure and Logistics Gaps:** Freight costs are **nearly twice China's**, with weak port and warehousing networks inflating input costs.
2. **Regulatory and Policy Frictions:** Cumbersome land, labour, and clearance procedures hinder ease of doing business despite reforms.
3. **Skill and Productivity Deficits:** Only a fraction of the workforce is trained for advanced manufacturing; MSMEs lag in automation and R&D.
4. **High Input and Energy Costs:** Elevated power and transport prices erode export competitiveness against Vietnam and Indonesia.
5. **MSME Financing and Technology Constraints:** MSMEs—**30 % of manufacturing output**—face limited credit access and outdated machinery.
6. **Environmental and Resource Pressures:** Rising carbon regulations (e.g., EU CBAM) and water-intensive production demand a shift toward sustainable manufacturing.

Way Forward:

- Accelerate **digital and clean-tech adoption** through *SAMARTH Udyog 4.0* and *Frontier Tech Hub*.
- Implement **PM Gati Shakti** and **National Logistics Policy** to reduce logistics cost < 8 % of GDP.
- Expand **Skill India Mission** with industry-aligned training.
- Strengthen **MSME credit, R&D**, and cluster-based innovation.
- Ensure **policy stability and single-window clearances** to attract global investors.

With strong reforms such as **Make in India, PLI Scheme, PM MITRA Parks**, and the **National Manufacturing Mission**, India can transform manufacturing from a **factor-driven** to a **technology-driven growth engine**—anchoring a **US \$1 trillion manufacturing economy** and the vision of a **Viksit Bharat by 2047**.