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Impact of Make in India Domestic Manufacturing and Sustainability Initiative

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Abstract

The Make in India initiative launched by the Indian Government on 25 September 2014 is a major policy effort to transform India into a global manufacturing hub. It intends to strengthen local production capabilities, attract foreign direct investment (FDI), encourage technological developments, generate employment, boost exports and reduce dependence on imported manufactured goods. It aims at improving competitiveness of Indian industries through better infrastructure, investment promotion, skill development and ease of doing business. The present study explores the impact of Make in India on local manufacturing and its contribution to environmental sustainability and equitable economic growth. It focuses on important manufacturing sectors such as automobiles, electronics, pharmaceuticals, textiles, defense production, renewable energy apparatus and food processing. The study also investigates the relationship between industrial growth, job creation, resource use, energy consumption and environmental protection. The study is based on descriptive and analytical approach with the help of secondary data collected from government reports, economic surveys, publications of Ministry of Commerce and Industry, RBI documents, Annual Survey of Industries and international development organizations. Statistical indicators such as production growth, FDI inflows, export levels, industrial employment rates, renewable energy development and carbon intensity are taken into account. The study claims that Make in India has improved India's manufacturing framework, particularly in electronics, mobile phone production, automotive and defense sectors. However, the issues regarding the contribution of manufacturing to GDP, dependence on technology, infrastructure weaknesses, lack of skilled labor, regional disparities and environmental degradation continue to be significant. The document says that the next phase of industrial policy must include eco-friendly manufacturing, principles of circular economy, renewable energy sources, sustainable industrial frameworks and technological advances.

Keywords: *Make in India; Domestic Manufacturing; Sustainable Development; Green Manufacturing; Foreign Direct Investment; Industrial Growth; Employment Generation; Circular Economy.*

Introduction

Manufacturing is a key engine for economic growth, helping to build capital, create jobs, spur technology, raise productivity, and foster world trade. Countries with strong manufacturing sectors tend to have better chances for economic diversification and industrial competitiveness. Agriculture and services have traditionally constituted a large share of economic activity in India. While the services sector has expanded rapidly, the manufacturing sector has encountered structural bottlenecks such as poor infrastructure, technological shortcomings, high logistics costs, shortage of skilled labor and dependence on imported industrial components. To address these challenges, the Government of India introduced the Make in India initiative in September 2014. Its primary objective was to

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encourage domestic and international companies to manufacture products in India and establish the country as a competitive global production centre.

The initiative initially identified 25 sectors for manufacturing promotion, including:

1. Automobiles and automobile components.
2. Electronics and electrical machinery.
3. Pharmaceuticals and biotechnology.
4. Textiles and garments.
5. Chemicals and petrochemicals.
6. Defence manufacturing.
7. Food processing.
8. Renewable energy equipment.
9. Aviation and aerospace.
10. Construction and infrastructure.

Make in India also complements several other policy initiatives, including Production Linked Incentive (PLI) schemes, Skill India, Digital India, Startup India, PM Gati Shakti and the National Logistics Policy.

Make in India and sustainable development

Industrial development should not be measured exclusively through increases in production, investment and exports. Modern industrial development must also consider environmental sustainability, social inclusion and efficient resource utilisation. The relationship between manufacturing and sustainability can be understood through three dimensions:

- Economic sustainability: Higher productivity, industrial investment, technological development and competitiveness.
- Environmental sustainability: Lower carbon emissions, renewable energy, waste reduction, recycling and efficient resource utilisation.
- Social sustainability: Employment generation, workers' welfare, gender inclusion, skill development and balanced regional development.

Therefore, the effectiveness of Make in India should be evaluated not only in terms of industrial expansion but also in terms of its contribution to sustainable economic transformation.

Statement of the problem

Despite various industrial development programmes, India's manufacturing sector continues to face several challenges. Manufacturing's contribution to GDP has not reached the long-standing policy aspiration of 25 per cent. Many industries depend on imported machinery, semiconductors, advanced components and production technologies. Furthermore, industrial expansion can increase energy consumption, water utilisation, industrial waste and greenhouse gas emissions if environmental safeguards are inadequate. The central research problem is therefore to examine whether Make in India has successfully promoted domestic manufacturing while supporting environmental sustainability and inclusive economic development.

Review of Literature

The relationship between manufacturing, economic growth and sustainable development has been widely examined by economists, policymakers and international organisations.

Adam Smith (1776) highlighted the importance of division of labour and specialisation in increasing productivity. His theory provides an important foundation for understanding the role of industrial production in economic development.

David Ricardo (1817) explained comparative advantage and international specialisation. His approach is relevant to India's efforts to improve manufacturing competitiveness and expand exports.

Nicholas Kaldor (1966) emphasised manufacturing as an engine of economic growth. According to Kaldor's approach, manufacturing expansion can generate productivity improvements, technological progress and positive spillover effects across other sectors.

Arthur Lewis (1954) explained the structural transformation of developing economies through the movement of surplus labour from traditional agriculture towards modern industrial activities. This framework is relevant to India's objective of generating non-agricultural employment through manufacturing.

Brundtland Commission (1987) introduced the widely accepted concept of sustainable development, emphasising the need to meet present needs without compromising the ability of future generations to meet their own needs.

United Nations (2015) established Sustainable Development Goal 9, which focuses on industry, innovation and infrastructure. SDG 12 promotes responsible consumption and production, while SDG 13 addresses climate action.

Ellen MacArthur Foundation (2013) highlighted the importance of circular economic systems based on reducing waste, reusing materials and regenerating natural resources.

UNIDO (2022) emphasised resource-efficient and cleaner production as important strategies for promoting sustainable industrial development.

Government of India policy documents, particularly the Economic Survey, Ministry of Commerce and Industry reports and Annual Survey of Industries, provide evidence of India's industrial transformation.

The implementation of Make in India, Production Linked Incentive schemes, electronics manufacturing programmes and renewable energy policies has contributed to the development of domestic production capabilities.

Research gap

Existing studies frequently examine manufacturing expansion, foreign investment and employment separately. There is a need for a comprehensive assessment connecting Make in India with:

- Domestic manufacturing performance.
- Employment and skill development.
- Domestic value addition and import substitution.
- Renewable energy-based industrial production.
- Industrial pollution and resource efficiency.
- Circular economy and sustainable industrial development.

The present study attempts to address this gap by examining economic and environmental dimensions together.

Objectives of the Study

The major objectives are:

1. To examine the role of Make in India in promoting domestic manufacturing.
2. To analyse the growth of manufacturing output and industrial investment.
3. To evaluate the contribution of FDI and PLI schemes to industrial development.
4. To study employment generation and skill development in manufacturing.

5. To examine the relationship between domestic manufacturing and export performance.
6. To analyse the contribution of green manufacturing and renewable energy to sustainability.
7. To identify challenges affecting sustainable industrial development in India.
8. To suggest policy measures for strengthening domestic manufacturing and environmental sustainability.

Research Methodology

The study is descriptive and analytical in nature. It examines the economic and environmental implications of the Make in India initiative. The study primarily considers the period 2014–15 to 2025–26, depending on the availability of comparable official statistics. Some indicators refer to earlier years where the latest comparable annual observations are not available.

Analysis of Data and Statistical Interpretation

Growth of India's manufacturing sector

Manufacturing is a significant contributor to India's Gross Value Added (GVA). However, the sector's share in national economic output remains below the long-term policy aspiration of 25 per cent of GDP.

According to provisional National Accounts Statistics reported in the Department of Public Enterprises' 2024–25 Public Enterprises Survey, manufacturing GVA at current prices reached approximately ₹41.69 lakh crore in FY 2024–25, representing 13.89 per cent of total GVA. It recorded an increase of 6.3 per cent over FY 2023–24.

Manufacturing sector performance in India

Indicator	**FY 2024–25**
Manufacturing GVA	₹41.69 lakh crore
Share in total GVA	13.89%
Annual GVA growth	6.3%
Long-term manufacturing GDP aspiration	25%

Source: Department of Public Enterprises, Public Enterprises Survey 2024–25; Government of India.

The manufacturing sector has expanded in absolute terms, but its contribution to total GVA indicates that India still has considerable scope to increase manufacturing's relative importance in the economy.

Industrial output and employment generation

The Annual Survey of Industries provides important evidence of the performance of registered manufacturing establishments.

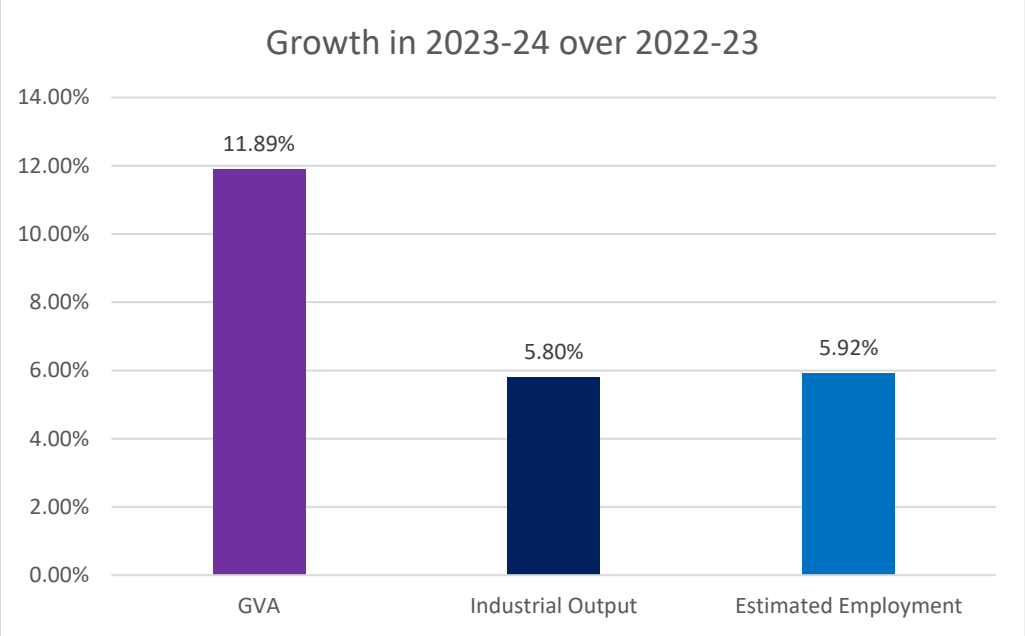
Performance of registered manufacturing industries

Indicator	**Growth in 2023–24 over 2022–23**
Gross Value Added (GVA)	11.89%
Industrial output	5.80%
Estimated employment	5.92%
Jobs added over 2014–15 to 2023–24	57 lakh

Source: MoSPI, Annual Survey of Industries 2023–24, released 27 August 2025.

Growth of registered manufacturing industries, 2023–24

Year-on-year percentage growth. Employment added over the decade is reported separately.



The growth in GVA, industrial output and employment indicates an expansion of registered manufacturing activities. The addition of approximately 57 lakh jobs over the decade demonstrates the employment contribution of organised manufacturing. However, employment quality, wages, job security and the participation of women require further attention.

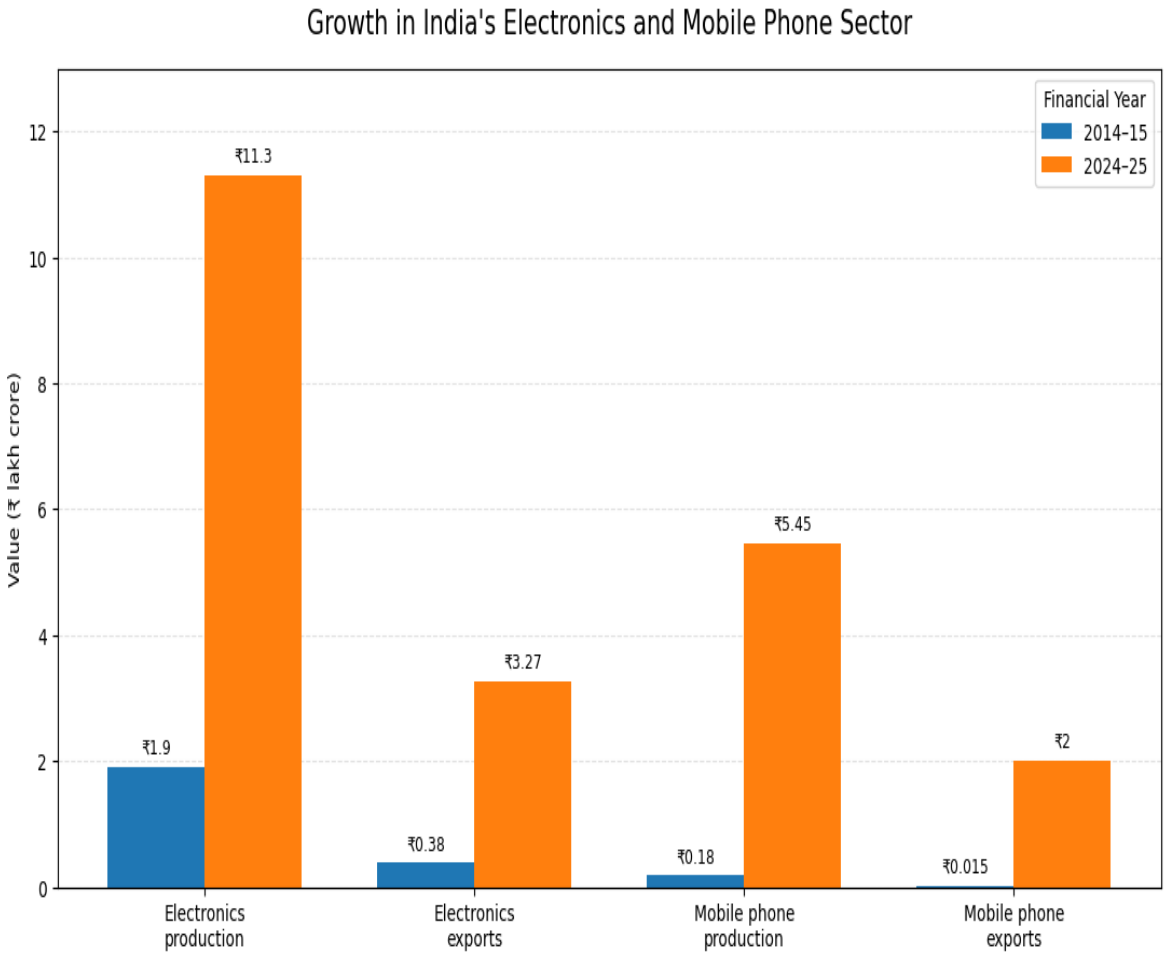
Growth of electronics manufacturing

Electronics manufacturing is one of the most visible achievements associated with India's manufacturing promotion strategy.

Electronics manufacturing in India

Indicator	**2014–15**	**2024–25**
Electronics production	₹1.9 lakh crore	₹11.3 lakh crore
Electronics exports	₹38,000 crore	₹3.27 lakh crore
Mobile phone production	₹18,000 crore	₹5.45 lakh crore
Mobile phone exports	₹1,500 crore	₹2 lakh crore

Source: Ministry of Electronics and Information Technology and PIB, 2025–26 publications.



Electronics production increased nearly six times, while exports increased approximately eight times between 2014–15 and 2024–25. Mobile phone production and exports also experienced substantial expansion. These developments indicate that India has become an increasingly important location for electronics assembly and manufacturing. However, domestic value addition remains an important challenge. The Ministry of Electronics and IT reported domestic value addition of approximately 18–20 per cent in electronics manufacturing in April 2026. This indicates the need to strengthen semiconductor production, components, precision engineering and indigenous technology.

Production Linked Incentive (PLI) schemes and domestic investment

The Production Linked Incentive scheme is an important supporting mechanism for Make in India. It provides incentives to eligible manufacturers based on incremental production and other sector-specific conditions.

The scheme covers 14 major sectors, including:

- Large-scale electronics manufacturing.
- Pharmaceuticals.
- Medical devices.
- Automobiles and auto components.
- Advanced chemistry cell batteries.
- Solar photovoltaic modules.

- Telecom and networking products.
- Food processing.
- Textiles.
- Specialty steel.

Performance of PLI schemes

Indicator	**Position as of 31 March 2026**
Approved government outlay	₹1.91 lakh crore
Actual investment attracted	Over ₹2.40 lakh crore
Employment generated	Over 14.15 lakh
Exports associated with schemes	Over ₹15.2 lakh crore

Source: DPIIT and Ministry of Commerce and Industry, Government of India, July 2026.

PLI schemes have helped attract investment and improve manufacturing capacity in selected sectors. They can also encourage technology transfer and integrate Indian industries into international supply chains. Nevertheless, the effectiveness of these incentives should be assessed through additional indicators such as domestic value addition, productivity, technology development, long-term employment and environmental performance.

Foreign Direct Investment and industrial development

FDI is an important source of industrial capital, technology, management practices and international market access. Make in India has sought to improve the investment environment through simplified procedures, sectoral reforms and infrastructure development.

Foreign investment can contribute to:

1. Expansion of industrial capacity.
2. Introduction of advanced production technologies.
3. Development of global supply chains.
4. Improvement in product quality.
5. Creation of direct and indirect employment.
6. Expansion of manufactured exports.

However, investment attraction alone does not guarantee sustainable industrial development. Policies must encourage domestic research and development, local supplier development, technology transfer and greater value addition within India.

Contribution of manufacturing to renewable energy and sustainability

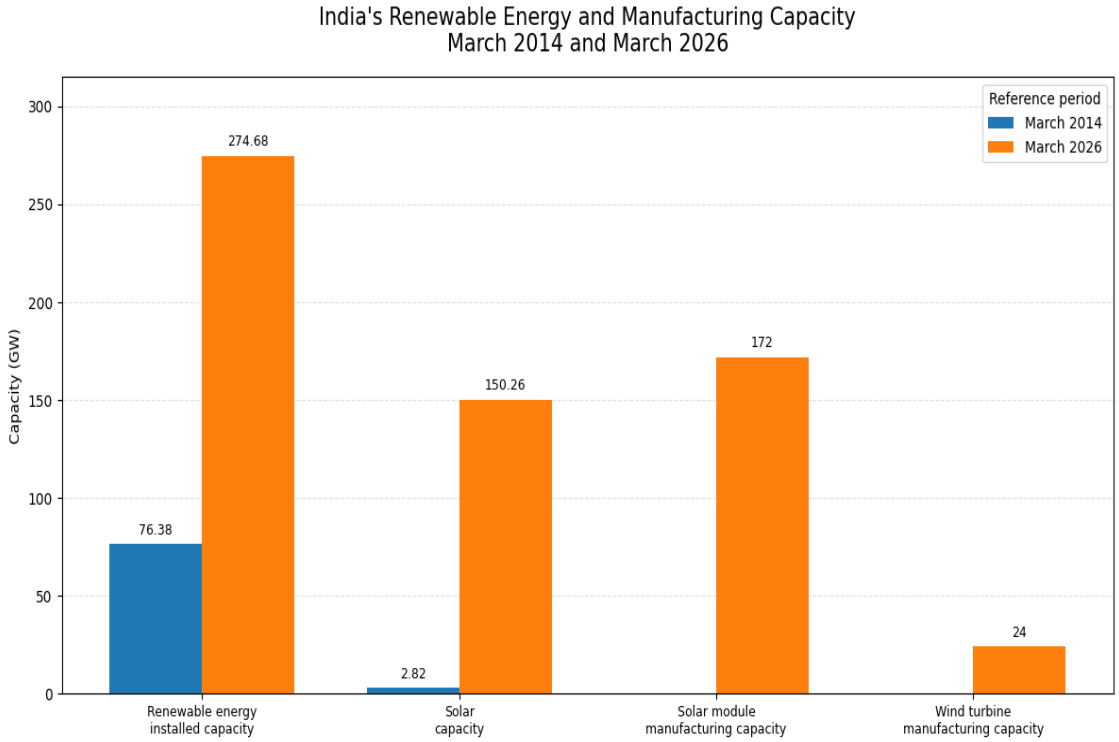
Sustainable manufacturing requires industries to reduce their dependence on fossil fuels and adopt renewable electricity, energy-efficient technologies and low-carbon production processes. India's renewable energy expansion creates opportunities for domestic production of solar modules, wind turbines, batteries, electric vehicle components and energy storage systems.

Renewable energy development in India

Indicator	**Capacity**
Renewable energy installed capacity, March 2014	76.38 GW
Renewable energy installed capacity, March 2026	274.68 GW
Solar capacity, March 2014	2.82 GW
Solar capacity, March 2026	150.26 GW
Solar module manufacturing capacity, March 2026	Approximately 172 GW
Wind turbine manufacturing capacity, March 2026	Approximately 24 GW

Source: Ministry of New and Renewable Energy, Government of India, 2025–26.

Growth of renewable energy installed capacity



Renewable energy capacity increased approximately 3.59 times between March 2014 and March 2026. The expansion of domestic solar module and wind turbine manufacturing capacity demonstrates the potential for linking industrial development with environmental sustainability. However, the environmental performance of manufacturing also depends on electricity sources, water consumption, raw materials, transport emissions and the disposal or recycling of industrial waste.

Sector-wise impact of Make in India

The initiative has influenced several manufacturing industries through investment promotion, domestic production incentives, infrastructure development and technological modernisation.

Sector-wise manufacturing development and sustainability implications

Sector	Major developments	Sustainability implications
Automobiles	Domestic vehicle and component production	Electric mobility and fuel efficiency
Electronics	Mobile phones and electronic equipment	E-waste management and component recycling
Pharmaceuticals	Domestic medicine production	Cleaner chemical processes and waste treatment
Textiles	Garments and technical textiles	Water conservation and sustainable fibres
Defence	Indigenous defence equipment	Domestic technology and resource efficiency
Solar energy	Solar module manufacturing	Clean energy and lower lifecycle emissions
Food processing	Agro-based industrial production	Food waste reduction and cold-chain efficiency
Steel	Expansion of domestic production	Green steel and energy efficiency

The manufacturing initiative has the potential to generate positive spillover effects across industrial sectors. Nevertheless, each industry requires a different sustainability strategy. For example, textile industries need water conservation, steel industries require low-carbon technologies, and electronics industries need effective e-waste management.

Industrial growth and environmental sustainability

The expansion of manufacturing creates economic opportunities but also increases pressure on natural resources. Industrial growth plays a significant role in promoting economic development through increased production, employment generation, technological advancement, exports and income creation. Industries such as manufacturing, steel, cement, pharmaceuticals, automobiles and information technology contribute substantially to national income and infrastructure development. However, rapid industrialisation also creates environmental challenges, including air and water pollution, greenhouse gas emissions, industrial waste, deforestation and depletion of natural resources. Therefore, achieving a balance between industrial expansion and environmental protection is essential for sustainable economic development. Environmental sustainability in industrial development refers to adopting production methods that minimise environmental damage while ensuring efficient utilisation of natural resources. Green technologies, renewable energy, energy-efficient machinery, waste recycling, cleaner production processes and circular economy practices can reduce the environmental impact of industrial activities. In India, initiatives such as Make in India, National Green Hydrogen Mission, Perform, Achieve and Trade (PAT) Scheme and National Action Plan on Climate Change support industrial development alongside environmental objectives. Therefore, the success of Make in India must be evaluated alongside environmental regulations, cleaner production technologies and sustainable industrial infrastructure.

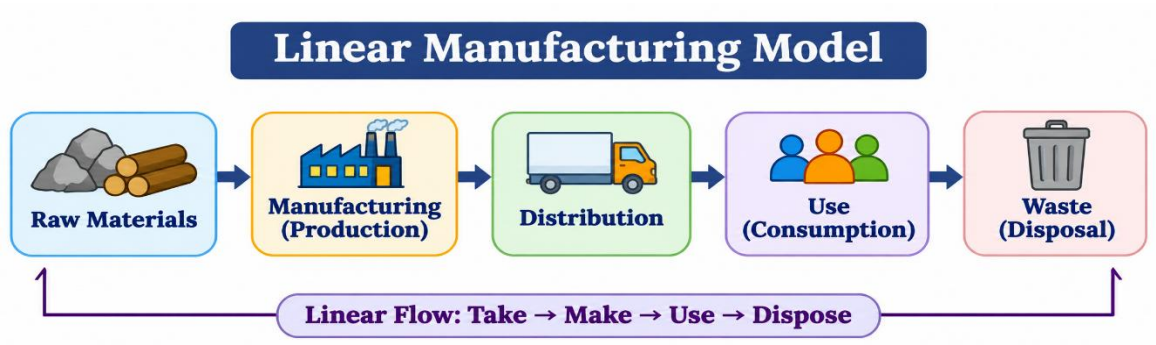
Sustainability indicators for Indian manufacturing

Indicator	Sustainable industrial requirement
Energy consumption	Energy-efficient machinery
Electricity usage	Renewable electricity
Water consumption	Recycling and zero-liquid-discharge systems where appropriate
Industrial waste	Reuse, recycling and recovery
Carbon emissions	Low-carbon production
Raw materials	Resource efficiency and circular sourcing
Industrial pollution	Effective monitoring and treatment

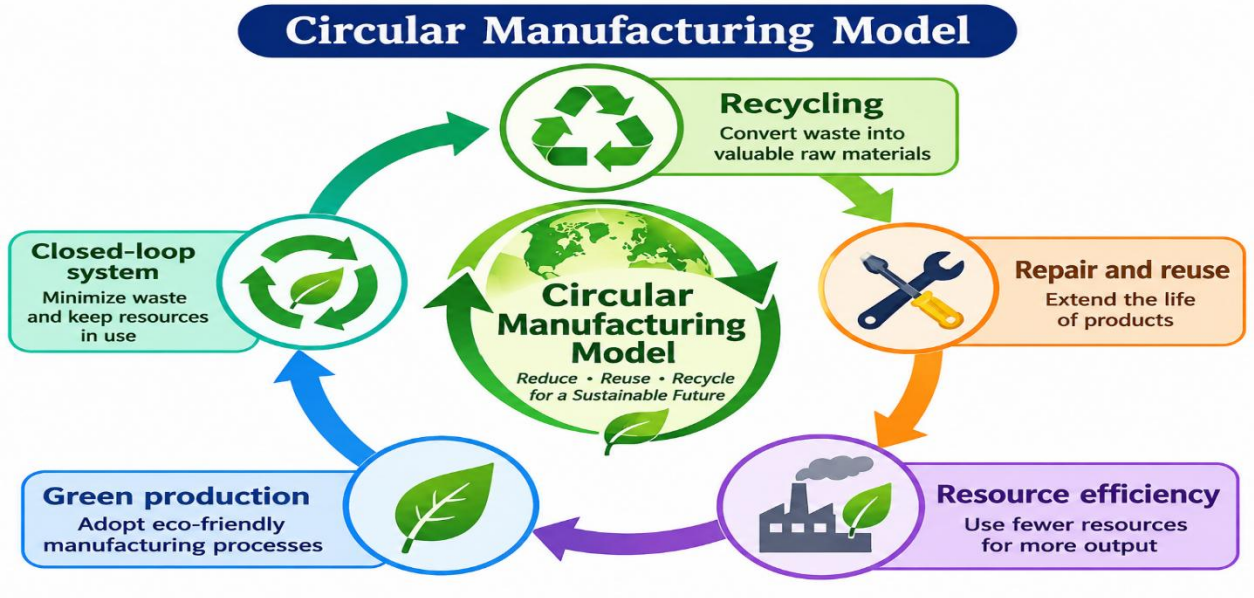
Product lifecycle	Repair, reuse and recycling

Relationship between Make in India and the circular economy

The circular economy is an important approach to reducing industrial resource consumption and environmental degradation. Traditional manufacturing generally follows a linear model: Linear manufacturing model



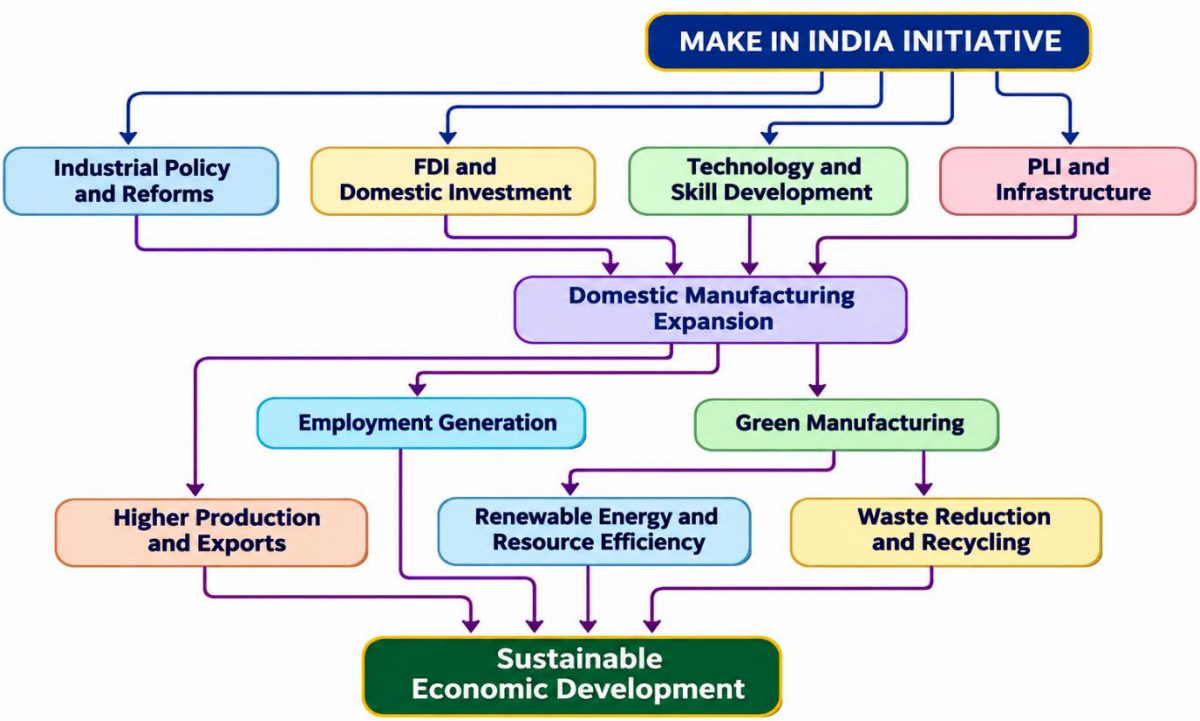
In contrast, circular manufacturing emphasises resource recovery and continuous material utilisation. The model illustrates five interconnected stages: recycling, repair and reuse, resource efficiency, green production, and a closed-loop industrial system. Central concept of this model will be towards a sustainable, resource-efficient and zero-waste industrial economy.



The adoption of circular economy principles can help Indian manufacturers reduce production costs, minimise waste, improve resource productivity and create new employment opportunities in recycling and repair industries.

Conceptual diagram: Make in India and sustainable industrial development

The following framework illustrates the expected relationship between the initiative's policy instruments and economic and environmental outcomes.



Challenges affecting Make in India and sustainability

Despite considerable progress, several challenges continue to affect India's manufacturing competitiveness.

- Low manufacturing contribution to GDP: Manufacturing's share in total GVA remains below the 25 per cent policy aspiration.
- Import dependence: Several industries continue to depend on imported semiconductors, specialised machinery, electronic components and advanced technologies.
- Infrastructure constraints: Inadequate logistics facilities, industrial infrastructure and reliable energy supply can increase production costs.
- Skill shortages: Modern manufacturing requires workers trained in robotics, artificial intelligence, automation, electronics and advanced engineering.
- Environmental degradation: Industrial expansion can increase pollution, waste generation and resource consumption without appropriate environmental management.
- Limited domestic research and development: Insufficient investment in indigenous innovation can restrict domestic technological capabilities.
- Uneven regional development: Manufacturing investment is concentrated in certain industrially developed states, creating regional disparities.
- MSME competitiveness: Small and medium enterprises often face difficulties in obtaining affordable credit, adopting advanced technologies and meeting international quality standards.
- Global competition: Indian manufacturers compete with established production centres in China, Vietnam, South Korea and other countries.
- Domestic value addition: Growth in final-product assembly does not automatically translate into substantial domestic technological capabilities or local component production.

Major Findings of the Study

Based on the statistical and analytical examination, the following findings emerge:

1. Expansion of manufacturing: Make in India has supported the development of domestic manufacturing capabilities and strengthened the industrial ecosystem.
2. Electronics manufacturing growth: Electronics production increased from ₹1.9 lakh crore in 2014–15 to ₹11.3 lakh crore in 2024–25, demonstrating substantial industrial expansion.
3. Export promotion: Electronics exports increased from ₹38,000 crore to ₹3.27 lakh crore during the same period, indicating stronger international market integration.
4. Employment generation: The Annual Survey of Industries reported that registered manufacturing added approximately 57 lakh jobs between 2014–15 and 2023–24.
5. PLI investment: PLI schemes attracted over ₹2.40 lakh crore in actual investment as of March 2026, supporting manufacturing expansion in 14 sectors.
6. Renewable energy development: Renewable energy installed capacity increased from 76.38 GW in March 2014 to 274.68 GW in March 2026.
7. Technology development: Electronics, automobiles, pharmaceuticals and renewable energy equipment have emerged as important areas for domestic technological development.
8. Import substitution: Domestic manufacturing of mobile phones has significantly reduced India's dependence on imported finished mobile phones.
9. Sustainability challenges: Industrial growth continues to create challenges relating to energy consumption, water usage, pollution and waste management.
10. Need for domestic value addition: Greater emphasis is required on indigenous components, semiconductor manufacturing, industrial research and technological innovation.
11. MSME participation: Small and medium enterprises require stronger financial, technological and institutional support to participate in domestic and global supply chains.
12. Inclusive industrialisation: Employment opportunities, regional industrial development and women's participation must be strengthened to ensure equitable economic benefits.

Suggestions and Policy Recommendations

To strengthen the contribution of Make in India to domestic manufacturing and sustainability, the following policy measures are recommended.

- **Strengthening domestic manufacturing:** The government should promote indigenous manufacturing of machinery, industrial equipment, electronic components, semiconductors and advanced materials. Greater domestic value addition should become a major performance indicator of industrial policy.
- **Promoting green manufacturing:** Industries should adopt environmentally responsible production methods, energy-efficient machinery, cleaner technologies and renewable energy sources. Green manufacturing standards should be encouraged across major industrial sectors.
- **Strengthening MSMEs:** Micro, Small and Medium Enterprises should receive affordable credit, technology support, infrastructure facilities and market access. Special incentives should encourage MSMEs to adopt sustainable production technologies.
- **Expanding renewable energy-based industries:** Domestic production of solar panels, wind turbines, electric vehicle batteries and energy storage systems should be encouraged. Industrial parks should progressively increase their utilisation of renewable electricity.
- **Promoting circular economy practices:** Manufacturing industries should implement recycling, material recovery, product redesign, industrial waste management and extended producer responsibility. Industrial symbiosis should be encouraged to enable waste from one industry to become an input for another.
- **Improving skill development**

  Skill development programmes should focus on:

  - Artificial intelligence and automation.
  - Robotics and advanced manufacturing.

- Semiconductor technology.
- Electric vehicle production.
- Renewable energy engineering.
- Industrial waste management.
- Green technology and environmental management.

- **Encouraging research and development:** Universities, technical institutions, research centres and manufacturing companies should collaborate to develop indigenous technologies. Greater investment in industrial research and innovation will improve India's global competitiveness.
- **Strengthening environmental regulations:** Environmental monitoring should be strengthened through digital technologies, pollution-control systems and regular industrial environmental audits. Industries should be encouraged to adopt measurable carbon-reduction targets.
- **Promoting balanced regional industrialization:** Industrial investment should be expanded to less-developed states and backward districts through industrial corridors, logistics facilities, industrial clusters and suitable investment incentives.
- **Promoting women's employment:** Manufacturing policies should encourage women's participation through skill training, workplace safety, equal opportunities, childcare facilities and access to technical occupations.
- **Developing sustainable industrial parks**

  New industrial parks should incorporate:
  - Renewable energy infrastructure.
  - Common effluent treatment plants.
  - Water recycling facilities.
  - Scientific waste disposal.
  - Green buildings.
  - Efficient transportation systems.
  - Common testing and research facilities.
- **Introducing sustainability-linked industrial incentives:** Government incentives should increasingly consider not only production and investment but also energy efficiency, water conservation, recycling, domestic value addition and employment quality.

Conclusion

Make in India is a major step forward in making India a competitive manufacturing economy on the world stage. Launched in 2014, the initiative has spurred domestic industrial growth, investment, job creation, exports and technology advancement. The growing electronics output is strong evidence of India's growing manufacturing power. Electronics manufacturing grew from ₹1.9 lakh crore in 2014-15 to ₹11.3 lakh crore in 2024-25 and electronics exports increased from ₹38,000 crore to ₹3.27 lakh crore. The Annual Survey of Industries also showed creation of about 57 lakh jobs in registered manufacturing from 2014-15 to 2023-24. The rising count of PLI initiatives and renewable energy infrastructure suggests the potential for enhancing the industrial framework in India. These developments suggest that local production can contribute to economic diversification, export competitiveness, technological advancement and job creation. Still, growth in manufacturing alone does not ensure continued economic advancement. There is a need for a methodical attention to policy for issues such as import dependence, limited domestic value addition, technological deficiencies, industrial pollution, utilization of resources, and regional imbalances. The potential success of Make in India should be measured not merely in terms of production, investment and exports, but also in terms of productivity improvements, technological self-sufficiency, environmental sustainability, employment quality and social inclusiveness. Eco-friendly manufacturing, renewable energy, circular economy concepts and sustainable industrial infrastructure of Make in India can help India evolve a stronger and environmentally conscious industrial economy. In the end, Make in India should evolve from a program for manufacturing growth to an all-

encompassing paradigm for sustainable industrial metamorphosis, technological autonomy and inclusive economic advancement.

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