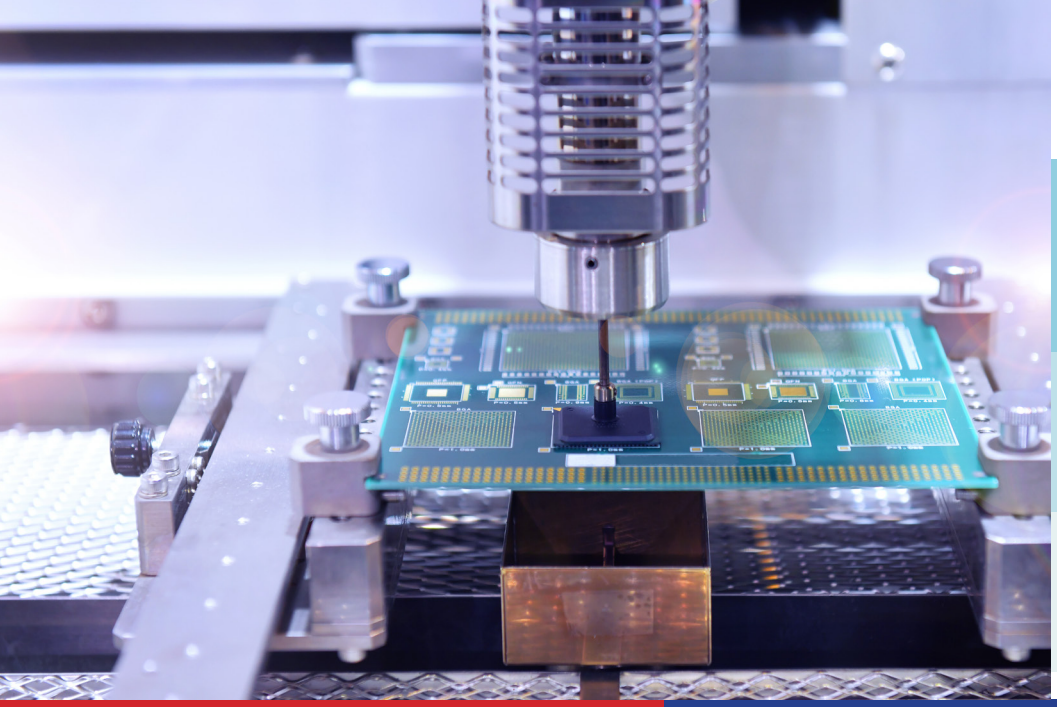

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Rubix Industry Insights

ELECTRONICS MANUFACTURING

The Indian Government's strategic initiatives, including the Production-Linked Incentive (PLI) Scheme, EMC 2.0, and the Semiconductor Mission, serve as the primary drivers propelling the growth of electronics manufacturing in India. These policies have not only attracted substantial foreign investments but have also set ambitious targets, with an aim to position India as global hub for electronics manufacturing and semiconductor innovation by 2030.

Snapshot

- The Electronics Manufacturing Industry in India has emerged as a pivotal driver of economic growth, with substantial policy support. Initiatives like Make in India, the Production-Linked Incentive (PLI) schemes, and the India Semiconductor Mission (ISM) have attracted global giants such as Foxconn, Samsung, and Apple to establish manufacturing operations in the country.

- In FY2023-24, India imported electronic components worth over USD 12 billion from China and USD 6 billion from Hong Kong, collectively accounting for more than half of its total electronic imports.

- Mobile phone exports surged by over 40%, rising from USD 11.1 billion in FY2023 to USD 15.6 billion in FY2024. India accounted for 15.5% of global smartphone shipments in Q3 of 2024, second only to China and ahead of the US.

- Government initiatives like the PLI Scheme, EMC 2.0, and the Design Linked Incentive (DLI) Scheme have significantly boosted manufacturing capabilities.

- The semiconductor industry, a cornerstone of India's growth strategy, is projected to grow from USD 38 billion in 2023 to USD 109 billion by 2030. Government projections indicate that India's demand for electronic components and sub-assemblies is expected to surge from USD 45.5 billion in 2023 to USD 240 billion by 2030.

- Key industry drivers include the China Plus One strategy, rising mobile penetration in rural India, increasing demand for automotive electronics, and growing adoption of advanced technologies like 5G, AI, and IoT.

- Despite these strengths, the industry faces critical challenges, including high import tariffs, inadequate infrastructure, limited access to global markets, and insufficient R&D investment. High import tariffs contribute to a 10%–14% cost disadvantage for assembly and 14%–18% for component manufacturing in India.

- Looking ahead, India aims to achieve USD 500 billion in electronics production and USD 200–225 billion in exports by 2030. Achieving this vision will require scaling high-value manufacturing, increasing domestic value addition, and fostering innovation. With the timely execution of policy measures and sustained industry-government collaboration, India is poised to become a global hub for electronics manufacturing and semiconductor innovation.

USD 115 bn	15.23%	USD 500 bn
Industy size, FY2024	*CAGR FY2016–FY2024*	*Target Industry Size, FY2030*

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KEY METRICS FOR THE INDIAN ELECTRONICS MANUFACTURING INDUSTRY			
Segment	**Metric**	**Size/Growth**	**Trend**
Overall Electronics Manufacturing	Industry Size, FY2016[1]	USD 37 Billion	↑
	Industry Size, FY2024	USD 115 Billion	↑
	CAGR, FY2016–FY2024	15.23%	↑
	Target Industry Size, FY2030	USD 500 Billion	↑
	Target CAGR, FY2024–FY2030	27.76%	↑
	Imports, FY2024	USD 83.91 Billion	↑
	Exports, FY2024	USD 28.22 Billion	↑
Semiconductors	Industry Size, FY2023[2]	USD 38 Billion	↑
	Target Industry Size, FY2030	USD 109 Billion	↑
	Target CAGR FY2023– FY2030	16.69%	↑

Note: All figures are rounded. Source: Industry estimates; Rubix analysis

Industry Scenario: Overall Electronics Industry

The Electronics System Design and Manufacturing (ESDM) industry in India has emerged as a critical pillar of the nation's economic growth over the past three decades. Initially dominated by Public Sector Undertakings (PSUs), the sector witnessed a transformative shift post-economic liberalisation, with increased participation from multinational corporations (MNCs) and private Indian enterprises. Early investments from global giants like Jabil Circuits and Nokia between 2005-2007 marked a turning point, setting the stage for sustained growth and attracting further investments. Despite setbacks, such as Nokia's exit in 2014, the industry rebounded swiftly, driven by renewed global interest and policy support. Today, with major mobile phone manufacturers and their supply chain partners establishing manufacturing bases in India, the ESDM industry is on a robust upward trajectory and is being supported by favourable Government initiatives like Make in India and Production-Linked Incentive (PLI) schemes.

Key Components of the ESDM Industry in India

1. **Electronic Products Manufacturing:** Products manufactured for various industries including consumer electronics, IT hardware, and industrial electronics

2. **Electronic Components Manufacturing:** Critical components such as semiconductors, circuit boards, and connectors that form the backbone of electronic products

3. **Semiconductor Design:** Focuses on the design of semiconductor chips and related technologies, which is a high-growth area in India

4. **Electronics Manufacturing Services (EMS):** Services that include manufacturing, assembly, and testing of electronic products for OEMs, both domestically and for export markets

Types of Participants in the Electronics Value Chain

The electronics value chain is a complex ecosystem comprising distinct categories of participants, each contributing uniquely to the production, innovation, and delivery of electronic products. Broadly, these participants can be categorised into four key groups based on their roles in production:

a. **Design Players/Original Design Manufacturers (ODM):** ODMs focus on designing and prototyping electronic products, leveraging their expertise to develop innovative solutions. They often create designs that can be sold to multiple clients, enabling product deployment under various brand names. Their strength lies in advanced design capabilities and efficient prototype development, which accelerates time-to-market for new products.

b. **Component Makers:** This group is further divided into two sub-categories:

[1] *Niti Aayog*
[2] *Press Information Bureau, Government of India*

- Build to Print (B2P): These manufacturers produce components strictly according to the specifications provided by an Original Equipment Manufacturer (OEM).

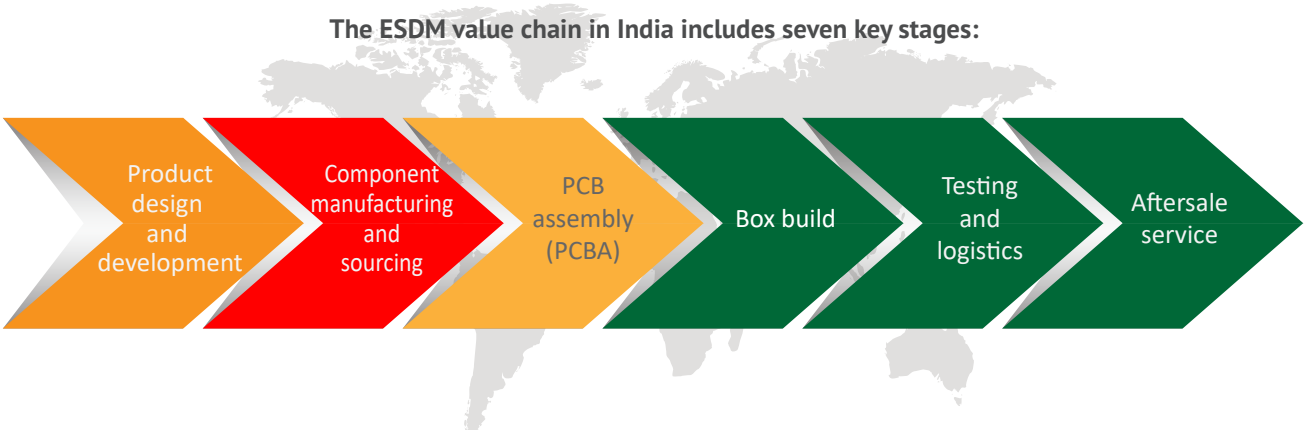
- Build to Specification (B2S): These participants collaborate closely with ODMs, co-creating component designs before proceeding with manufacturing, allowing for more integrated and customised solutions.

c. **Assemblers/Electronics Manufacturing Services (EMS):** EMS providers specialise in contract manufacturing services for OEMs and ODMs. Their operations typically include assembly, testing, and packaging of electronic products, ensuring quality control and cost efficiency.

d. **Brand Owner/Original Equipment Manufacturers (OEMs):** OEMs are responsible for product innovation, sales, and marketing. They often own the intellectual property (IP) of the products and maintain control over the final output. These companies play a strategic role in defining market trends, building customer relationships, and driving demand for end products.

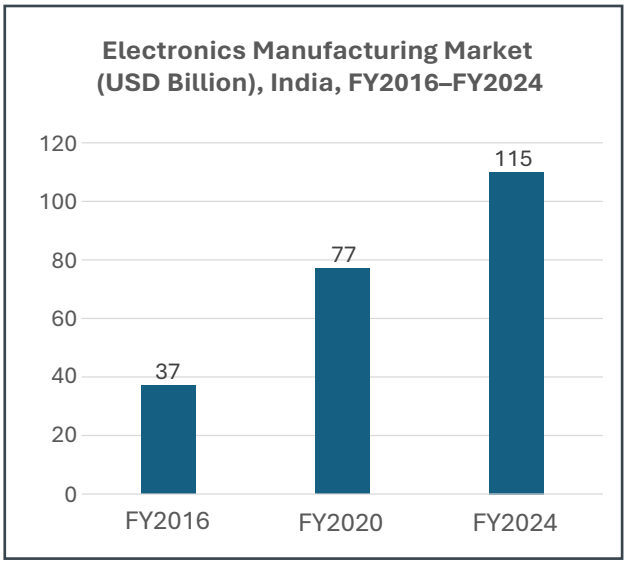
Each of these participants plays a critical role in ensuring the seamless functioning of the electronics value chain, from conceptualisation and design to manufacturing and market deployment. Together, they form an interdependent ecosystem in the electronics industry.

The ESDM value chain in India includes seven key stages:

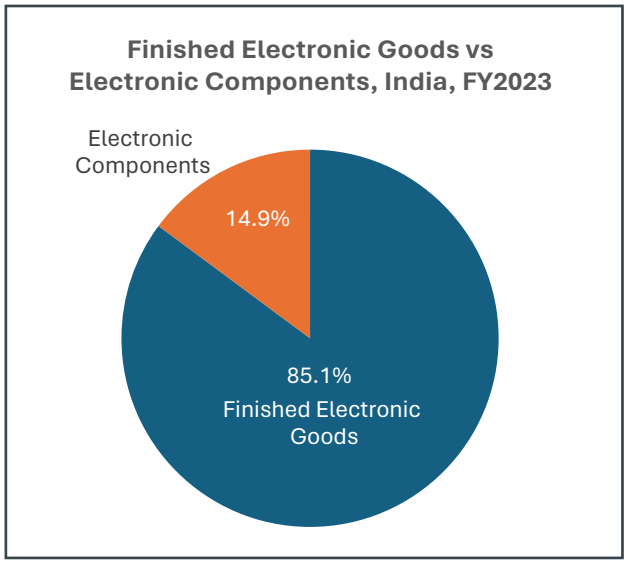


Note: The colour of the box indicates the current maturity of the stage in the Indian market. Red: Low; Amber: Moderate; Green: High

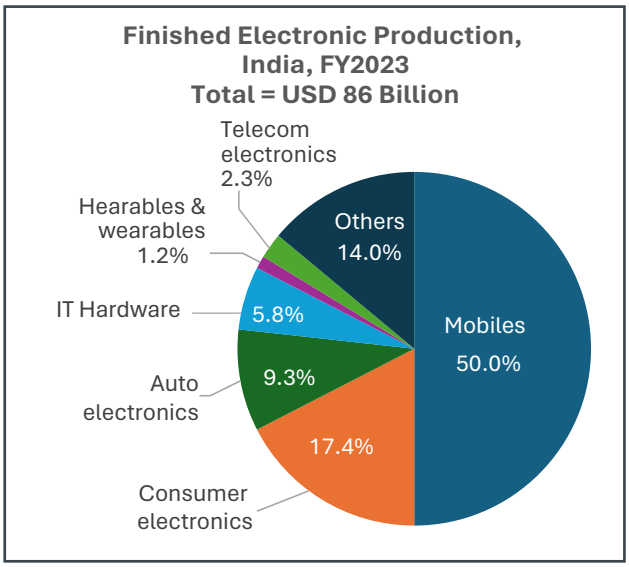
India's participation in the global electronics value chain is currently characterised by significant strengths in the Assembly (EMS) and Original Equipment Manufacturing (OEM) segments. Global players like FOXCONN, Pegatron, and domestic giants such as Dixon Technologies India Limited and Amber Enterprises India Limited have established strong assembly and manufacturing operations in the country. Leading OEM brands, including Samsung, Apple, Boat, and Atomberg, have further cemented India's position as a key hub for final product manufacturing and assembly.

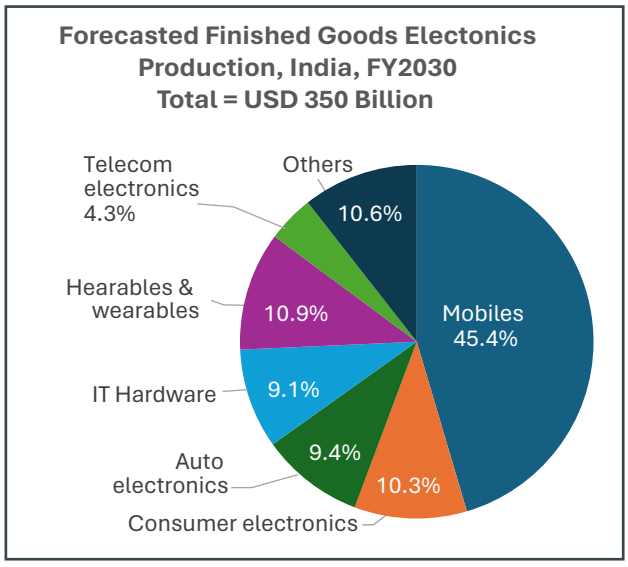


Source: Niti Aayog, July 2024, India Cellular and Electronics Association (ICEA)



Source: Press Information Bureau, Government of India, July 2024





Note: All figures are rounded. Source: Niti Aayog, July 2024

However, the country lags significantly in Component Manufacturing, particularly in the high-tech segment. Domestic production is primarily limited to low-complexity components such as cables, connectors, and electro-mechanical parts, while advanced and high-value components like semiconductors and chipsets are largely imported.

India's electronics sector is poised for remarkable growth, driven by Prime Minister Narendra Modi's ambitious target of achieving USD 500 billion in electronics manufacturing by FY2030. According to a report by the Confederation of Indian Industry (CII), the demand for electronic components and sub-assemblies is expected to surge from USD 45.5 billion in 2023—supporting production worth USD ~101 billion—to USD 240 billion by 2030, underpinning the ambitious production goal. Critical components such as Printed Circuit Board Assemblies (PCBAs) are projected to grow at a CAGR of 30%, reaching USD 139 billion by 2030. There is increasing focus on domestic value addition, backward integration, and reducing import dependency. Strategic initiatives such as the Production-Linked Incentive (PLI) scheme and investments in semiconductor manufacturing are expected to play a pivotal role in achieving these targets, positioning India as a global hub for electronics manufacturing and innovation.

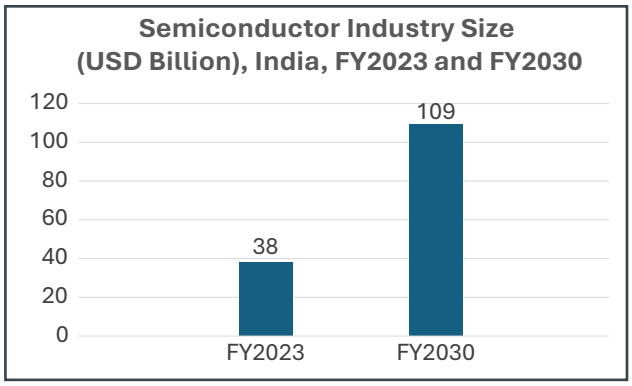
Industry Scenario: Semiconductors

In the last two years, India's semiconductor industry has surged with Government-backed initiatives and major investments. This rapid growth is fuelling innovation, setting the stage for India to become a key supplier in the global tech ecosystem.

Overview of the Semiconductor Market

The semiconductor market is divided into four key segments based on functionality:

1. **Discrete Semiconductors:** Basic semiconductors, typically used alongside others in applications
2. **Integrated Circuits (ICs):** The largest segment, with subcategories like Analog, Logic, Memory, and Micro ICs
3. **Optoelectronics:** Semiconductors related to light functionality
4. **Sensors and Actuators:** Semiconductors that sense environmental factors or control devices



India's semiconductor industry has experienced significant growth, with its market size increasing from USD 22.7 billion in 2019[3] to approximately USD 38 billion in 2023. Government projections indicate that this growth trajectory will continue, with the market expected to reach USD 109 billion by 2030.

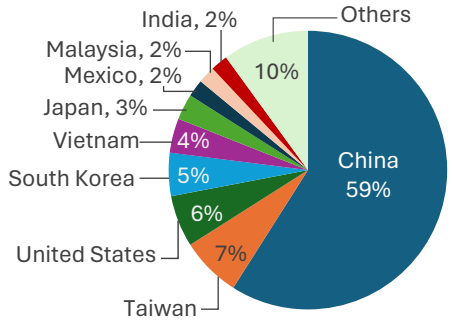
[3] *Counterpoint Research and India Electronics & Semiconductor Association (IESA)*

This expansion is driven by Government initiatives, such as the USD 10 billion Semiconductor Mission and the Production-Linked Incentive (PLI) scheme, which aim to bolster domestic manufacturing capabilities. The rising demand for electronics, advancements in 5G, AI, and Industry 4.0, and strategic partnerships with global tech firms further fuel this growth. Recent Industry investments include NXP Semiconductors' plan to invest over USD 1 billion to double its R&D efforts in India, and a USD 10 billion semiconductor manufacturing project in Maharashtra by Israel's Tower Semiconductor and the Adani Group. Despite challenges like high capital costs and the need for a skilled workforce, India's semiconductor sector is on track to become a significant player in the global market by 2030.

Cross-Border Trade Dynamics

The global electronics industry production, valued at USD 4.3 trillion in CY2022, serves as the backbone for diverse sectors, ranging from smartphones and consumer electronics to automobiles and telecommunications. Dominated by a select group of nations, the industry reflects a highly concentrated value chain, with China alone accounting for nearly 60% of global production. Established players such as Taiwan, the US, and South Korea maintain a steady presence, each contributing 5%–7%, while emerging hubs like Vietnam, Mexico, Malaysia, and India are gaining prominence. The market is primarily driven by finished goods, which account for approximately USD 2.5 trillion, with segments like smartphones (USD 470 billion), consumer electronics (USD 340 billion), and PCs/laptops (USD 300 billion) leading the charge. As demand continues to surge, particularly in auto electronics, telecom, and IoT devices, the industry is expected to grow to USD 3.5 trillion by 2030.

Global Electronics Production (End-devices and Components), CY2022
Total Market Size: ~ USD 4.3 Trillion



Note: All figures are rounded. Source: Niti Aayog, July 2024

TOP EXPORTERS OF ELECTRONICS

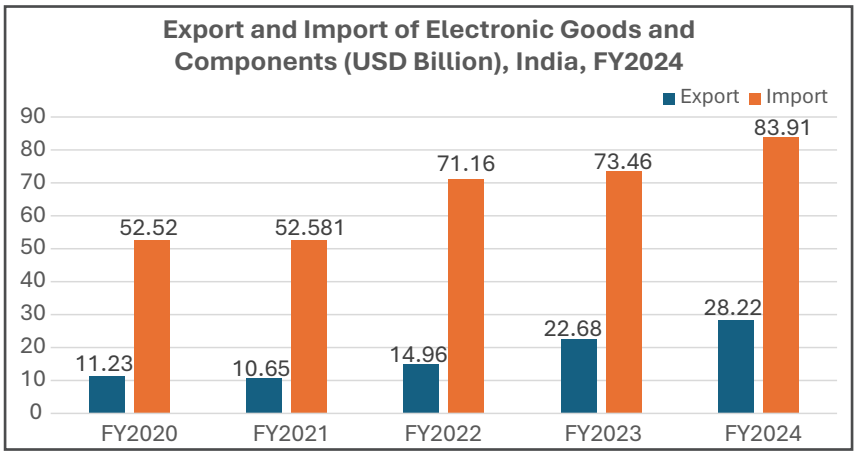
Country	Export Value	Export Share
China	USD 886 Bn	30%
Taiwan	USD 267 Bn	9%
US	USD 210 Bn	7%
South Korea	USD 189 Bn	6%
Singapore	USD 168 Bn	6%
Germany	USD 157 Bn	5%
Vietnam	USD 130 Bn	4%
Malaysia	USD 105 Bn	4%
Japan	USD 87 Bn	3%
Mexico	USD 82 Bn	3%
Netherlands	USD 62 Bn	2%
India	USD 24 Bn	1%

TOP IMPORTERS OF ELECTRONICS

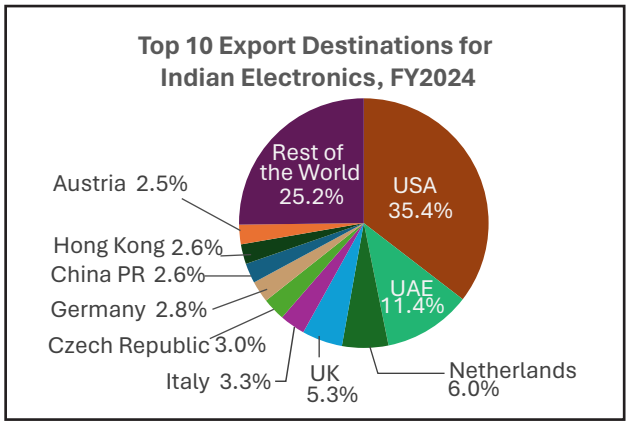
Country	Import Value	Import Share
China	USD 512 Bn	17%
US	USD 482 Bn	16%
Germany	USD 180 Bn	6%
Singapore	USD 147 Bn	5%
Taiwan	USD 126 Bn	4%
South Korea	USD 124 Bn	4%
Mexico	USD 118 Bn	4%
Vietnam	USD 116 Bn	4%
Japan	USD 109 Bn	4%
India	USD 78 Bn	2%
Netherlands	USD 75 Bn	3%
Malaysia	USD 69 Bn	2%

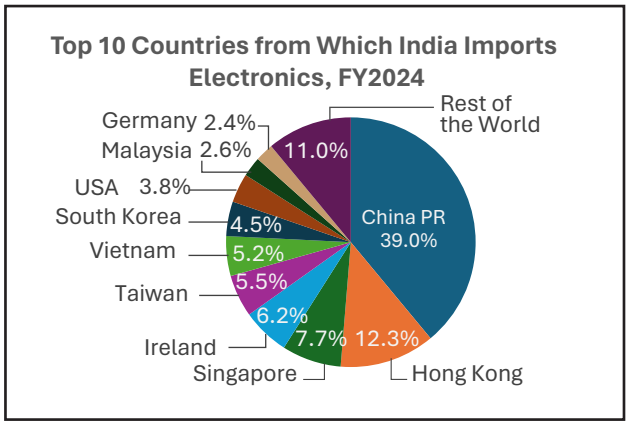
Note: All figures are rounded. Source: Niti Aayog, July 2024

The global electronics trade, valued at approximately USD 3 trillion[4], is heavily dominated by China, which holds a commanding 30% share of global exports. Following China, Taiwan and the USA contribute 9% and 7%, respectively, while emerging players like Vietnam and Malaysia account for 4% each, solidifying their growing presence in the market. In contrast, India's role in the global electronics value chain remains limited, with a share of less than 1% and annual exports valued at around USD 25 billion.



Note: All figures are rounded. Source: Ministry of Commerce and Industry, Government of India.





Note: All figures are rounded. Source: Ministry of Commerce and Industry, Government of India

India's electronics trade tells a story of rapid growth intertwined with significant import dependency. In FY2023-24, India imported electronic components worth over USD 12 billion from China and USD 6 billion from Hong Kong, collectively accounting for more than half of its total electronic imports[5]. Despite India's push towards domestic electronics manufacturing, these figures highlight a persistent reliance on Chinese supply chains. Over the last five years, imports from China and Hong Kong have consistently outpaced those from other regions like South Korea, Japan, and ASEAN countries combined. This is even as electronic components have become India's fifth-largest import category. While smartphone assembly in India has surged, with 65% coming from iPhones—this growth has deepened reliance on imported components such as printed circuit boards and integrated circuits. The dominance of China and Hong Kong in India's electronics supply chain underscores the challenge of building a robust domestic component ecosystem, even as global players expand their manufacturing footprint in the country.

[4] *Niti Aayog, July 2024*
[5] *Indian Express, August 2024*

"We have taken a lot of steps to increase semiconductor manufacturing, including 50 per cent support from the Centre and also from the states. It's because of India's policies. Around Rs 1.5 trillion worth of projects have been approved in India and many more are in the pipeline."

Shri. Narendra Modi
Hon'ble Prime Minister, Government of India

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Industry Drivers

DRIVER	IMPACT		
	1–2 years	3–5 years	6–10 years
China Plus One strategy drives EMS outsourcing shift to India	High	High	High
Government schemes reducing manufacturing costs to boost electronics and semiconductor production in India	High	High	High
Increasing affordability and growing mobile penetration in rural India drive the smartphone market	High	High	High
Shifting focus from traditional contract manufacturing to ODMs	High	High	High
The automotive industry leads in semiconductor growth as cars become "computers on wheels"	High	High	High
Rising domestic demand and digitisation fuelling growth in electronics and semiconductor manufacturing in India	High	High	Medium
Technological advancements driving India's next-gen electronics manufacturing	High	High	Medium

China Plus One Strategy Drives EMS Outsourcing Shift to India

The China Plus One strategy has emerged as a pivotal driver for India's electronics industry, as global companies increasingly seek to diversify their supply chains. Historically, China dominated the global ESDM industry, thanks to its cost-effective manufacturing, advanced infrastructure, skilled workforce, and logistical advantages. However, rising labour costs, stringent environmental regulations, and geopolitical uncertainties have prompted global manufacturers to look for alternative manufacturing hubs.

According to International Trade Centre (ITC) data, China's mobile phone exports declined by 2.8%, falling from USD 136.3 billion in FY2023 to USD 132.5 billion in FY2024, amounting to a USD 3.8 billion reduction. Similarly, Vietnam experienced a sharp 17.6% drop in mobile exports, decreasing from USD 31.9 billion in FY2023 to USD 26.27 billion in FY2024, a loss of USD 5.6 billion. In contrast, India's mobile phone exports surged by over 40%, rising from USD 11.1 billion in FY2023 to USD 15.6 billion in FY2024, a significant increase of USD 4.5 billion.

Global electronics giants such as Apple and Samsung have actively embraced the China Plus One strategy, with India becoming a key beneficiary. Apple now produces approximately 14% of its global iPhone output in India, valued at USD 14 billion in FY2024. In CY2024, its exports from India crossed the INR 1 lakh crore mark (INR 1,000 billion). Samsung has also shifted significant manufacturing operations to its Noida facility, one of the world's largest mobile manufacturing plants.

The state of Tamil Nadu has been at the forefront of attracting investments under this strategy, with significant contributions from companies like Foxconn, Jabil, and

Cisco. Tamil Nadu's electronics exports have grown exponentially, increasing from USD 1.66 billion in FY2021 to USD 9.56 billion in FY2024[6]. The state is actively developing industrial clusters, improving the ease of doing business, and building sector-specific policies to capitalise on this trend.

The shift of global supply chains to India is not limited to mobile phone manufacturing. The policy focus on localising higher-value activities, such as Printed Circuit Board Assembly (PCBA) and box-build solutions, is driving the creation of a robust electronics ecosystem. As India continues to scale its manufacturing capabilities and develop its component ecosystem, it aims to become a global alternative to China for electronics manufacturing.

The China Plus One strategy not only enhances India's export potential but also positions it as a reliable partner in global supply chains, attracting further investments and fostering long-term growth in the electronics sector.

Government Schemes Reducing Manufacturing Costs to Boost Electronics and Semiconductor Production in India

The Indian Government is actively enhancing manufacturing competitiveness by implementing several strategic schemes to address high production costs.

[6] *Government of India Niryat, National Import-Export Record for Yearly Analysis of Trade*

GOVERNMENT INITIATIVES TO ENCOURAGE ELECTRONICS AND SEMICONDUCTOR MANUFACTURING	
INITIATIVE	**BRIEF DESCRIPTION**
Modified Electronics Manufacturing Clusters (EMC) and EMC 2.0 Schemes	Launched in October 2012, the Electronics Manufacturing Clusters (EMC) Scheme aimed to develop world-class infrastructure and shared facilities to attract investments in India's electronics sector. By its closure in October 2017, the scheme approved 19 Greenfield EMCs and 3 Common Facility Centres (CFCs) across 15 states, fostering nationwide growth in electronics manufacturing. To address evolving industry needs, MeitY introduced the Modified EMC (EMC 2.0) Scheme on April 1, 2020. This initiative focuses on strengthening infrastructure and positioning India as an electronics manufacturing hub. EMC 2.0 offers financial assistance of up to 50% (capped at INR 70 crore/INR 700 million per 100 acres) for clusters and 75% (capped at INR 75 crore/INR 750 million) for CFCs, encouraging large manufacturers and supply chains to invest. The scheme remained open for applications until March 2024, with fund disbursement scheduled until March 2028, ensuring sustained support for the sector's growth.
Production Linked Incentive Scheme (PLI) for Large Scale Electronics Manufacturing	The PLI Scheme, launched in April 2020, offers a 4%–6% financial incentive to companies on incremental sales of mobile phones and electronics over the base year (2019-20) for five years (2020-2026). Aimed at boosting domestic electronics manufacturing, especially in mobile phones, the scheme expects INR 8.12 lakh crore (INR 8.12 trillion) in production and INR 4.87 lakh crore (INR 4.87 trillion) in exports. After initial success, a second round was introduced in March 2021, extending benefits to electronic component manufacturers.
PLI Scheme for IT Hardware and PLI Scheme 2.0 for IT Hardware	The PLI Scheme for IT Hardware offers 4%, 2%, or 1% incentives on incremental sales of India-manufactured goods like laptops, tablets, All-in-One PCs, and servers over four years. Initially, 14 companies committed INR 2,517 crore (INR 25.17 billion) investments and INR 1.61 lakh crore (INR 1.61 trillion) production. PLI 2.0 extends average incentives of 5% over six years, adding ultra-small form factor devices. With 27 approved firms pledging INR 2,955 crore (INR 29.55 billion) in investments and INR 3.52 lakh crore (INR 3.52 trillion) production, 13 earlier applicants migrated to PLI 2.0. The aim of this scheme is to boost domestic manufacturing and reduce the reliance on imports.
National Policy on Electronics (NPE) 2019	The Ministry of Electronics and Information Technology (MeitY) is planning to revamp the National Policy on Electronics 2019 (NPE 2019) to enhance electronics manufacturing and exports. A working group has been established to develop the new policy's framework, aiming to achieve a turnover of USD 400 billion in the electronics system design and manufacturing (ESDM) sector by 2025. The revised policy will focus on revitalising the electronics manufacturing industry and boosting exports.
Modified Special Incentive Package Scheme (M-SIPS)	The Modified Special Incentive Package Scheme (M-SIPS) offers capital subsidies for electronics manufacturing—20% for investments in SEZs and 25% in non-SEZs—covering 44 categories of electronic products and components. Launched in 2012 and amended in 2015 and 2017, it aims to offset manufacturing disabilities and attract investments. By March 2024, 316 projects with INR 83,247 crore (INR 832.47 billion) investments were approved, generating INR 10.63 lakh crore (INR 10,630 billion) in revenue, INR 2.08 lakh crore (INR 2.08 trillion) exports, 4.25 lakh jobs, and INR 1.44 lakh crore (INR 1.440 trillion) in government revenue.
Electronics Development Fund (EDF)	The Electronics Development Fund (EDF) fosters R&D and innovation in electronics, IT, and nano-electronics by acting as a "Fund of Funds." Managed by CANBANK Venture Capital Funds Ltd., it invests in "Daughter Funds" to provide risk capital for technology development, enriching intellectual property and supporting entrepreneurial growth in these sectors.
Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS)	The Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS), launched in April 2020, aims to strengthen India's electronics manufacturing ecosystem. It offers a 25% financial incentive on capital expenditure for investments in new units or expansions in electronic components, semiconductor fabrication, ATMP units, and related sub-assemblies. The scheme supports R&D and modernisation, is open for three years, and provides incentives for investments made within five years. It is implemented through a nodal agency designated by MeitY.

The **India Semiconductor Mission (ISM)** serves as an umbrella initiative encompassing multiple schemes aimed at developing a robust semiconductor and display manufacturing ecosystem in India. Launched by the Government of India with a total outlay of INR 76,000 crore (over USD 10 billion), ISM is structured to provide financial support and incentives across various segments of the semiconductor value chain. The key schemes under this mission are:	
Scheme for Setting Up of Semiconductor Fabs in India	This scheme aims to attract substantial investments to establish semiconductor wafer fabrication facilities within the country. It offers fiscal support covering up to 50% of the project cost, with the exact percentage determined by the technology node. Specifically, projects involving technology nodes of 28nm or lower are eligible for up to 50% support, those above 28nm to 45nm can receive up to 40%, and nodes above 45nm to 65nm are entitled to up to 30% of the project cost.
Scheme for Setting Up of Display Fabs in India	This scheme is designed to promote the establishment of display fabrication units, such as TFT LCD or AMOLED display fabs. It offers fiscal support covering up to 50% of the project cost, with the exact percentage determined by the Expenditure Finance Committee.
Scheme for Setting Up of Compound Semiconductors / Silicon Photonics / Sensors Fab and Semiconductor Assembly, Testing, Marking, and Packaging (ATMP)/ Outsourced Semiconductor Assembly and Test (OSAT) Facilities in India	This scheme aims to encourage the establishment of facilities in specialised areas such as compound semiconductors, silicon photonics, sensors, and semiconductor ATMP/OSAT units. It offers fiscal support covering 30% of the capital expenditure for eligible applicants. Up to 2.5% of the scheme's outlay is earmarked for research and development, skill development, and training to foster the growth of the compound semiconductors and ATMP ecosystem in India. However, beneficiaries under this scheme are not eligible for incentives under the Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) for the same category.
Design Linked Incentive (DLI) Scheme	The Design Linked Incentive (DLI) Scheme, launched by the Ministry of Electronics and Information Technology, aims to boost India's semiconductor design ecosystem. It offers financial incentives and infrastructure support to domestic companies, start-up, and MSMEs involved in semiconductor design. The scheme targets import substitution, strengthens local design capabilities, and supports the growth of semiconductor Intellectual Property (IP), Integrated Circuits (ICs), and System on Chips (SoCs). It is managed by Centre for Development of Advanced Computing (CDAC) and is available for three years starting from January 2022.

Note: Selected initiatives available in the public domain have been considered. Initiatives are arranged in chronological order, with the most recent appearing first.

The Indian Government's strategic manufacturing initiatives, particularly the PLI schemes, have significantly transformed the electronics industry. Since the launch of the PLI scheme in 2020, India has attracted over USD 17 billion in investments across 14 sectors, including electronics, pharmaceuticals, and textiles[7]. Notably, Apple's iPhone exports exceeded INR 1 lakh crore (INR 1,000 billion) in CY2024 underscoring the success of these incentives. The PLI schemes have generated production worth INR 11 trillion (~USD 131.6 billion) and nearly 1 million jobs over four years.

India has also reduced its dependency on mobile imports from China by attracting global players like Apple, Dell, and HP to manufacture locally. The Government is now focusing on expanding domestic production of laptops, tablets, and servers. In March 2024, Prime Minister Narendra Modi inaugurated the foundation for three semiconductor plants, marking a significant step towards making India a global hub for semiconductor manufacturing, with a combined investment exceeding INR 1.25 lakh crore (INR 1.25 trillion).

The PLI scheme has proven effective in mitigating high capital costs and encouraging large-scale electronics and mobile phone manufacturing. Hence, while India's import tariffs on certain electronic goods remain relatively high, they serve a dual purpose: protecting domestic industries from cheap imports and encouraging foreign manufacturers to set up production facilities within India. These tariffs, combined with targeted incentives, are fostering self-reliance and strengthening the electronics manufacturing ecosystem.

Increasing Affordability and Growing Mobile Penetration in Rural India Drive the Smartphone Market

Increased mobile penetration in rural India is revolutionising the electronics industry. According to TRAI, rural India had over 524 million wireless subscribers as of October 2024 who made up 45.62%, of the total wireless subscribers in the country. They are a significant contributor to the growing demand for affordable smartphones and supporting electronics. The surge in internet penetration, driven by affordable data plans and Government initiatives like Digital India, has made mobile devices essential for education, e-commerce, and financial inclusion even in rural areas.

This demand is fostering a robust domestic electronics manufacturing ecosystem, with initiatives like PLI (Production Linked Incentive) schemes encouraging local

[7] *Thomson Reuters, September 2024*

production. In fact, India accounted for 15.5% of global smartphone shipments in Q3 of 2024, second only to China and ahead of the US. By value, India accounted for 12.3% of the global market. A substantial share of this is from the rural markets. The push for digital literacy and mobile-enabled services in rural areas is driving innovation in durable, cost-effective electronic devices, making rural India a pivotal growth engine for the electronics industry.

Shifting Focus from Traditional Contract Manufacturing to ODMs

The Indian electronics industry is experiencing a notable shift towards the Original Design Manufacturer (ODM) model, where companies handle both the design and manufacturing of products. This transition is driven by the evolving needs of Original Equipment Manufacturers (OEMs) for product innovation and cost efficiency.

Historically, contract manufacturing dominated the EMS space. In this model, EMS providers source components, manufacture, assemble, and deliver finished products based on OEM specifications. In contrast, the ODM model offers a more comprehensive service, as ODMs not only handle manufacturing but also design products per OEM requirements, including conceptualisation, prototyping, and iterative design. ODMs further support OEMs with logistics and after-sales services, delivering a complete solution.

Large multinational corporations and Indian companies are increasingly preferring ODMs due to their capacity for greater product innovation, customisation, and end-to-end support. ODMs facilitate faster market entry with unique products that leverage the latest technological trends. Government initiatives discussed above are fostering a conducive environment for ODMs, enabling them to contribute significantly to the industry's expansion, enhance India's self-reliance, and reduce dependence on imports.

There have been substantial investments from both domestic and international companies. For instance, Tata Electronics has initiated the construction of India's first semiconductor fabrication facility in Dholera, Gujarat, with an investment of INR 91,000 crore (INR 910 billion), aiming to commence operations by mid-2025. Additionally, the company is developing a semiconductor assembly and testing facility in Jagiroad, Assam, with an investment of INR 27,000 crore (INR 270 billion), also scheduled to begin operations by mid-2025. NXP Semiconductors has announced a USD 1 billion investment to enhance research and development in India, projecting that the country could contribute 8% to 10% of its revenue within the next three to five years. Leading Indian electronics manufacturing services provider, Dixon Technologies India Limited has expanded its operations to include ODM services, designing and manufacturing products such as LED televisions, washing machines, and smartphones for brands like Samsung, Xiaomi, and Panasonic. Meanwhile, Larsen & Toubro has unveiled plans to invest USD 300 million in a fabless chip company with the target to design 15 products by 2027.

Automotive Industry Leads in Electronics Growth as Cars Become "Computers on Wheels"

The automotive electronics industry in India is not just a growth driver but a transformative force for the broader electronics sector. With demand projected to surge from USD 10.6 billion in 2022 to over USD 70 billion by 2032[8], the sector offers immense potential for value creation, job generation, and technological advancement. India currently imports around 64% of its automotive electronics, but with a strategic focus on localising assembly operations and developing 20 high-potential products identified for domestic manufacturing, the country can significantly reduce dependency on imports. These products alone are expected to generate a market worth USD 56.4 billion by 2032[8].

India possesses the technology, infrastructure, and skilled workforce required to scale up manufacturing operations. By achieving an average value addition of 10%–20% through localised assembly, India could save between USD 1.2 billion to USD 3.7 billion by 2027 and USD 3.4 billion to USD 11.8 billion by 2032[8]. Furthermore, exports of automotive electronics could match the success of other auto components, reaching around 30% of production output. This strategic shift would not only strengthen India's domestic electronics ecosystem but also position the country as a globally competitive hub for automotive electronics manufacturing, enhancing economic resilience and global supply chain integration.

Rising Domestic Demand Due to Digitisation Fuelling Growth in Electronics and Semiconductors Manufacturing in India

India's electronics manufacturing sector is experiencing robust growth, driven by increasing domestic demand for electronic products. Key factors contributing to this demand surge include a rapidly growing middle class, widespread smartphone adoption, and an expanding appetite for digital devices. As income levels rise across India, more consumers are able to invest in a variety of electronic products, from smartphones and laptops to appliances and Internet of Things (IoT) devices.

The Government's push toward digitisation is also playing a pivotal role. Initiatives like Digital India and Startup India

[8] *Automotive Components Manufacturers Association of India (ACMA) and Grant Thornton*

aim to transform India into a digitally empowered society and knowledge economy. These programs encourage the use of digital services, spurring demand for digital devices that support online education, e-governance, and other digital activities. As a result, demand for electronics is projected to grow rapidly, presenting a substantial opportunity for local manufacturing to meet this rising need, reduce import dependency, and create a strong foundation for export.

The drive to build a robust digital infrastructure for "Viksit Bharat" (Developed India) is also a significant growth driver for India's semiconductor industry. As India advances its digital landscape with initiatives like BharatNet, aimed at providing broadband connectivity across the country, and expands high-speed data services to meet the demands of over a billion mobile users, the need for semiconductors is rapidly increasing. Semiconductors form the core of essential technologies such as cloud computing, AI, machine learning, and IoT, all of which are critical components of India's envisioned digital infrastructure.

With a strong focus on cybersecurity, smart city solutions, and next-gen technologies, India requires an ecosystem that fosters innovation, collaboration, and inclusivity to support the development and deployment of these technologies. This push for advanced digital services and connected infrastructure will demand a steady supply of semiconductors, fuelling local manufacturing and investment in the semiconductor sector. By building this foundational infrastructure, India aims to establish a digitally connected, secure, and technologically advanced society, thereby propelling semiconductor demand and growth within the country.

Technological Advancements Driving India's Next-Gen Electronics Manufacturing

India is actively working towards becoming a key player in the global electronics manufacturing space, driven by advancements in 6G, 5G, AI, and blockchain. AI accelerates product design and prototyping, optimising PCB layouts and reducing development cycles, while predictive maintenance ensures minimal downtime in production lines. The integration of blockchain enhances supply chain transparency, ensuring authenticity and reducing counterfeiting risks. Meanwhile, the rollout of 5G and the ambitious Bharat 6G Vision are setting the stage for ultra-fast, low-latency networks, facilitating innovations like remote-controlled factories and smart infrastructure.

Tech giants are playing a crucial role in this transformation. Nvidia is collaborating with India to develop AI chips tailored to national needs, with potential applications spanning security systems, Government initiatives, and start-up ecosystems under the National AI Mission. Similarly, Lenovo has begun manufacturing AI servers at its Puducherry facility, targeting an annual production of 50,000 AI rack servers and 2,400 GPU servers. These servers will cater to both domestic and international markets, positioning India as a growing contributor to the global AI hardware supply chain. Additionally, the establishment of the Centre of Excellence on Classical and Quantum Communications for 6G at IITM is driving research breakthroughs.

These developments are gradually improving production efficiency, enhancing technological capabilities, and helping India strengthen its position in the global electronics manufacturing landscape.

CHALLENGE	IMPACT		
	1–2 years	3–5 years	6–10 years
High import tariffs	High	High	Medium
Limited high-tech manufacturing capabilities, high capital costs, and dependence on foreign technology for complex components.	High	High	Medium
Limited access to global demand hinders India's electronics manufacturing growth	High	High	Medium
Inadequate infrastructure facilities hampering India's electronics manufacturing competitiveness	High	Medium	Medium
Insufficient R&D investment and innovation hindering India's electronics innovation	High	High	Medium
Skills shortage dampens the industry's potential	High	High	Medium
Huge demand for refurbished goods	Medium	Medium	Medium

High Import Tariffs

India has historically imposed high import tariffs on electronic components and finished goods to encourage domestic manufacturing, reduce dependency on imports, and promote self-reliance under initiatives like 'Make in India.' These tariffs, ranging from 0% to 27.5%, vary across 118 tariff lines, with a significant portion falling in the 10% to 15% bracket. While 47.2% of electronic imports enter duty-free, the remaining 52.8% face substantial tariffs[9], increasing the cost of inputs and finished products.

India's strategy of raising import duties has effectively boosted domestic production for finished electronics but has been less successful in developing a robust supply chain for sub-assemblies and components. Building a competitive supply chain requires large-scale production, which is challenging to achieve with domestic demand alone. As a result, Indian manufacturers rely heavily on imported electronic components. Moreover, local arms of global suppliers often set prices comparable to those of imported parts with tariffs included. This leads to higher costs for input materials, ultimately making Indian products less competitive in global markets.

In comparison, competing Asian economies such as China (4% average tariff), Vietnam (less than 5%), Malaysia (3.5%), and Mexico (2.7%) maintain significantly lower average tariffs. These nations also benefit from Free Trade Agreements (FTAs), ensuring duty-free access to essential components and sub-assemblies. India's 7.5% average tariff rate places its electronics manufacturing sector at a 5% to 6% cost disadvantage in assembly and a 4% to 5% disadvantage in component manufacturing compared to China[10].

India's tariff structure is not only high but also highly complex, spanning multiple rates (0%, 5%, 10%, 15%, and above 20%) along with additional surcharges[10]. This complexity often results in misinterpretations, disputes, and increased compliance costs. Frequent tariff adjustments further add unpredictability, creating an unstable environment for long-term investments and supply chain planning.

Add to this, financing costs in India range from 9% to 13% compared to 2% to 7% in China, Vietnam, and Taiwan. Despite the Indian Government offering many subsidies and schemes, companies still fall short of finance.

These cumulative factors contribute to a 10%–14% cost disability for assembly and 14%–18% for component manufacturing in India[10]. Logistics and finance costs add another 2%–3% and 1%–2.5% respectively, worsening the scenario. While initiatives like the Production Linked Incentive (PLI) program offer 4%–6% fiscal support, they remain inadequate in offsetting these structural inefficiencies.

To build a globally competitive electronics manufacturing ecosystem, India must re-evaluate its tariff policies, simplify its complex duty structures, and provide targeted fiscal support for sub-assemblies and component manufacturing. Creating a predictable and investment-friendly tariff regime, alongside long-term policy stability, is crucial for India to strengthen its position in global value chains and unlock the full potential of its electronics manufacturing industry.

Limited high-tech manufacturing capabilities, high capital costs, and dependence on foreign technology for complex components

India's electronics production expanded from approximately USD 37 billion in FY2016 to USD 101 billion in FY2023, achieving a compound annual growth rate (CAGR) of around 15.43%. However, electronics component production grew at a slower pace, reaching USD 15 billion in FY23 from USD 8 billion in FY2017. This growth is predominantly in low-complexity components like non-SMD grade passives and electromechanical parts, while high-complexity components such as SMD grade passives and semiconductors lack a developed ecosystem.

[9] *Confederation of Indian Industry (CII)*
[10] *NITI Aayog*

SEGMENT-WISE DEPTH OF INDIA'S STRENGTH ACROSS THE VALUE CHAIN OF THE ELECTRONICS SECTOR				
Depth of India's Presence:		**High**	**Medium**	**Low**
Segment	**Products**	**Final assembly/ sub-assembly**	**Component manufacturing**	**Design**
 **Mobile**	Smartphones	• Assembly for mobile has taken off; ~2 billion cumulative shipments between 2014 and 2022 • Sub-assembly: battery pack, charger largely localised; camera module, display assembly ~25% localisation	• Production of mechanical and composites (casing, cable and box content etc.) • E.g., Tata Electronics for iPhone casing (10%–15% Bill of Materials (BOM))	Minimal to no presence
 **Consumer electronics**	TV	• Multiple EMS (e.g., Dixon, Amber)/OEMs (e.g., Samsung) undertake finished product assembly/sub-assembly • Display is the largest component sub-assembled in India for TVs	Open cells (~60% BOM) are primarily imported	Limited design capabilities with players like Dixon
	Air conditioners		Through-hole components, electro-mechanical components are manufactured	Home-grown OEMs such as Blue Star, Godrej Appliances have established some design and engineering capabilities
	Refrigerators			
 **IT hardware**	Laptop	>80% of laptops consumed domestically are imported	Primarily import dependent	Minimal presence (VVDN Technologies, CDAC)
	Server			
Telecom 	4G/5G RAN: baseband unit (incl. CU, DU), Antenna/ RRU, XPON FTTH, others	>40% of total imports are from China	Primarily import dependent	Ongoing design efforts by a consortium led by TCS
Automotive 	Powertrain, body and convenience, connectivity	~65% import dependent, i.e., most OEMS import sub-assemblies	Low-tech components such as wire harnesses and connectors are manufactured (~10% BOM)	Leading home-grown OEMs such as Tata Motors and M&M have established product design and engineering capabilities, but have limited capabilities in electronics
 **Hearables and wearables** 	Smartwatch, headphones, wristband, glasses, ring,	Largely box assembly (No PCBA today) e.g., Dixon for boAt	Primarily import dependent	Minimal to no presence

Source: Niti Aayog

"Government and industry are closely working together to achieve our shared goal of USD 300 billion in the ESDM sector. We are committed to solving all issues and concerns that the industry brought up during today's extensive meeting,"

Shri. Ashwini Vaishnaw,
Hon'ble Union Minister for Electronics and Information Technology, Railways, and Information Broadcasting, Government of India

Despite Government incentives like the Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) and the Production Linked Incentive (PLI) scheme, component manufacturing faces challenges. These include high upfront capital expenditure, lower turnover-to-investment ratios, and gestation periods of 1-2 years before production commences.

Additionally, Indian manufacturers often lack access to the latest global technologies and machinery, necessitating knowledge and technology transfers from leading international component producers. While initial progress is observed with Electronics Manufacturing Services (EMS) players integrating backwards into mobile phone assembly components, comprehensive reforms are essential to establish a robust electronics components ecosystem in India.

Limited Access to Global Demand Hinders India's Electronics Manufacturing Growth

India's domestic electronics market, though substantial, is insufficient to achieve its ambitious manufacturing goals. Tapping into global demand is essential, as top global brands control about 80% of the electronics market and play a key role in establishing manufacturing prominence. For instance, Samsung's large-scale operations in Vietnam, supported by significant investment and local supplier integration, contribute around 50% of its global output and substantially boost Vietnam's exports. However, apart from Apple and Samsung, major electronics brands have yet to leverage India as a global manufacturing hub. To expand its manufacturing footprint, India must strategically attract one or two leading brands from each segment to establish large-scale facilities that cater to both domestic and international markets.

Inadequate Infrastructure Facilities Hampering India's Electronics Manufacturing Competitiveness

Despite initiatives like the Electronics Manufacturing Cluster (EMC) scheme and EMC 2.0, India's infrastructure remains underdeveloped compared to other Asian manufacturing hubs, limiting its appeal to SMEs and large investors. These clusters are intended to provide shared, low-cost facilities such as warehouses, wastewater treatment, and housing for workers, yet essential facilities for MSMEs to cut operational costs are lacking. Additionally, logistics and last-mile connectivity are constrained by inadequate road networks and lengthy customs processes, with export turnaround times reaching 7 to 10 days, making Indian exports less competitive. High land lease costs, particularly near ports and airports, further add to the financial barriers for setting up factories, slowing infrastructure development in the electronics manufacturing sector.

Insufficient R&D Investment Hindering India's Electronics Innovation

India's investment in Research and Development (R&D) remains significantly low, standing at just 0.64% of GDP, compared to 2.41% in China, 3.47% in the US, and an impressive 5.71% in Israel. Moreover, India's private sector contribution to R&D accounts for only 36.4% of the Gross Expenditure on R&D (GERD), while China and the US boast much higher contributions at 77% and 75%, respectively[11]. This highlights R&D as a critical gap, impacting India's ability to innovate and compete in the rapidly evolving electronics sector. Furthermore, a substantial portion of the Indian Government's R&D investment is funnelled into academic institutions. While academic research is vital, there is an urgent need to reallocate more funds towards industry. This shift would enable the development of commercially viable products and expedite the time to market.

Skills Shortage Dampens the Industry Potential

The Indian electronics industry, aiming for USD 500 billion in output by 2030, faces a critical challenge in the form of a widening skills gap, which could hinder its growth. As per a report from TeamLease, the sector is projected to create 12 million direct and indirect jobs over the next few years. However, a shortage of 10 million trained professionals threatens to stall this progress. Though initiatives like

[11] *Economic Survey 2023-24*

"There is a whole lot of ecosystem that you have to develop. It is just not the manufacturing. You need the raw materials, you need the gasses, you need the chemicals. All these need to be localised. And some of the foreign companies need to be attracted. There is a substrate manufacturing that we need to do. The government is doing all that."

Mr. Raghu Panicker,
CEO, Kaynes SemiCon

Make in India and Digital India have bolstered the electronics value chain, the industry's full potential can only be realised by addressing skill gaps, especially in emerging areas such as the Internet of Things (IoT) and 5G. Specialised talent is particularly needed in fields like communication electronics, consumer electronics, aerospace and defence electronics, semiconductor process engineering, and robotics.

The talent pool required to fill these roles is expected to predominantly come from electrical and electronics engineering streams, but the integration of AI, machine learning, and data science will also be crucial. To address these deficits, the industry will need to reskill 6 million workers and upskill 4 million new entrants by FY2028. Programs like Apprenticeship Embedded Degree Programs (AEDP), envisioned under the new education policy, can play a key role in bridging this gap by producing two million job-ready graduates annually. Without such targeted interventions, the industry risks higher training costs, lower workforce readiness, and limited innovation capacity, which will hinder global competitiveness. The urgent need to modernise training programs and invest in specialised institutes is crucial to ensure that the Indian electronics industry can meet its ambitious goals and remain competitive on the world stage.

Huge Demand for Refurbished Goods

With a rapidly expanding digital economy, the demand for refurbished goods has increased immensely in India. India has allowed the import of second-hand devices subject to the approval of the Bureau of Indian Standards (BIS) and the Directorate General of Foreign Trade (DGFT). Experts believe that with the boom of grey markets in metro cities like Delhi, Chennai, Mumbai and Bengaluru, India is at risk of becoming the dump yard of refurbished electronic goods of the World. This has the potential to damage the manufacturing ecosystem of the country[12].

Key Initiatives by Major Players

COMPANY AND INITIATIVE	BRIEF DESCRIPTION
Apple Inc.: Manufacturing Expansion in India Drives Export Growth	Between April and October 2024, Apple's iPhone production reached a Freight-on-Board (FOB) value of USD 10 billion[13]. Apple has recorded exports of over INR 1 lakh crore from India in CY2024. This growth is driven by Apple's efforts to diversify its supply chain away from China, with key suppliers like Foxconn and Tata Electronics contributing to the boost. The company is reportedly planning several initiatives, right from the manufacturing of iPads and iPhone Pro and Pro Max models, to sourcing camera modules locally. However, there have been no announcements yet.
Tata Electronics Pvt Ltd: Fabrication plants (fabs) in Dholera, Gujarat	Tata Electronics, in partnership with Taiwan's Powerchip Semiconductor Manufacturing Corporation (PSMC), is establishing India's first semiconductor fabrication plant in Dholera, Gujarat. The project, with an investment of approximately INR 91,000 crore (around USD 11 billion), aims to produce power management ICs, display drivers, microcontrollers, and high-performance computing chips for AI, automotive, computing, data storage, and wireless communication technologies. The facility is expected to commence operations by 2026, generating over 20,000 direct and indirect skilled jobs. In addition to the primary facility, Tata Electronics plans to build two additional fabrication plants in Dholera, further strengthening India's semiconductor manufacturing capabilities.
Tata Electronics Pvt Ltd: MoU with Tokyo Electron Limited	In September 2024, Tata Electronics and Tokyo Electron Limited (TEL) signed a memorandum of understanding to advance India's semiconductor manufacturing capabilities. This collaboration focuses on supplying semiconductor equipment and services for Tata Electronics' fabrication plant in Dholera, Gujarat, and its assembly and test facility in Jagiroad, Assam. The partnership also includes workforce training and joint research and development initiatives.
Micron Technology: New ATMP Facility in Gujarat	Micron Technology is constructing an Assembly, Testing, Marking, and Packaging (ATMP) facility in Sanand, Gujarat, India, with a USD 2.75 billion investment. The first phase, spanning 500,000 square feet, is set to become operational by early 2025, focusing on transforming wafers into integrated circuit packages, memory modules, and solid-state drives. This project is expected to create approximately 5,000 direct jobs and 15,000 indirect jobs over the next four to five years.

[12] *KPMG*
[13] *The Times of India, October 2024*

COMPANY AND INITIATIVE	BRIEF DESCRIPTION
Larsen & Toubro Semiconductors: To Invest USD 300 Million in Chip Design	In September 2024, Larsen & Toubro announced an investment of USD 300 million in a fabless chip company in India, aiming to design 15 products by 2027.
Adani Group: JV with Tower Semiconductor to establish a semiconductor manufacturing facility	In September 2024, Israel's Tower Semiconductor and India's Adani Group announced a USD 10 billion joint venture to establish a semiconductor manufacturing facility in Taloja, Maharashtra. The plant is set to commence with an initial capacity of 40,000 wafers per month, with plans to expand to 80,000 wafers per month in the subsequent phase.
Kaynes Technology: Semiconductor ATMP unit in Gujarat	In September 2024, the Indian Government approved Kaynes Technology's proposal to establish a semiconductor Assembly, Testing, Marking, and Packaging (ATMP) unit in Sanand, Gujarat, with an investment of INR 3,307 crore (INR 33.07 billion). The facility is designed to produce 6.3 million chips daily, catering to sectors like automotive, consumer electronics, telecommunications, industrial applications, electric vehicles, and the power industry.
CG Power and Industrial Solutions: Construction begins on the INR 7,000 crore JV OSAT facility in Gujarat	In March 2024, CG Power and Industrial Solutions Ltd, a Murugappa Group company, began construction on its INR 7,000 crore (INR 70 billion) Outsourced Semiconductor Assembly and Test (OSAT) facility in Gujarat. The foundation stone was virtually laid by Prime Minister Narendra Modi. This joint venture with Renesas Electronics and Stars Microelectronics will create 5,000 jobs. The facility, covering 28 acres, will produce a variety of semiconductor packages for industries like automotive, consumer, and 5G, with a capacity of 1.5 million units per day.
Lenovo Group: Commenced production of AI servers in Puducherry and achieved 50% local component fulfilment for select PCs	In September 2024, Lenovo commenced production of AI servers at its Puducherry facility, aiming to produce 50,000 AI rack servers and 2,400 GPU servers annually. These servers are intended for both domestic use and export. In November 2023, the company launched PMA-compliant PCs featuring locally manufactured motherboards, achieving over 50% local component fulfilment for select products.
AMD India: Partnership with IIT Bombay to support energy-efficient chip start-up	In July 2024, AMD India announced its partnership with the Society for Innovation and Entrepreneurship (SINE) at IIT Bombay to provide grants to start-up developing energy-efficient Spiking Neural Network (SNN) chips. Numelo Technologies received the first grant to develop SNN chips using ultralow power quantum tunnelling on SOI technology.
Lam Research India Pvt. Ltd: Investment in India's semiconductor workforce	In May 2024, Lam Research announced that it would train up to 60,000 Indian engineers via its Semiverse Solutions platform and invest USD 25 million in a new lab in Karnataka, supporting India's semiconductor industry growth.
Qualcomm India Private Limited's INR 177 crore investment to boost India's 5G and 6G Innovation	In March 2024, Qualcomm inaugurated its Chennai Design Center with an investment of over INR 177 crore (INR 1.77 billion). This centre focuses on wireless connectivity solutions, complementing Wi-Fi technologies, and contributes to Qualcomm's global 5G cellular technology research. It is expected to generate employment for approximately 1,600 skilled technology professionals. Additionally, Qualcomm introduced the Qualcomm 6G University Research India Program, aligning with India's Bharat 6G Vision. This program aims to foster academic research excellence and leadership in emerging 6G technologies. The inaugural cohort comprises 17 scholars from prestigious institutions like IITs and IISc, collectively receiving approximately USD 1.02 million in funding over three years.

Note: Selected initiatives available in the public domain have been considered for selected major players.

Source: Company press releases, news sources

"We will now as a nation have to accelerate in all sectors, not only in mobile manufacturing but also in IT hardware, laptops, desktops, servers, consumer electronics, auto electronics and all other verticals of electronics for India to become a global manufacturing destination for electronics,"

Mr. Pankaj Mohindroo,
Chairman, India Cellular and Electronics Association (ICEA)

Key Mergers/Acquisitions/JVs

COMPANY AND INITIATIVE	BRIEF DESCRIPTION
Dixon Technologies India Limited: Acquires Stake in Aditya Infotech	Dixon Technologies has acquired a 6.5% stake in Aditya Infotech Ltd. following the divestment of its 50% share in their joint venture, AIL Dixon Technologies. This move, approved by CCI, aims to streamline operations and boost market presence.
Foxconn to Invest INR 4.24 billion in Semiconductor JV with HCL	In October 2024, Foxconn announced its plans to invest up to INR 4.24 billion in its semiconductor Joint Venture (JV) with HCL for an OSAT plant in India. The total investment, including a potential additional USD 13.31 million, will not exceed USD 50.51 million. Previously, Foxconn invested INR 2.46 billion (INR 246 crores) through Big Innovation Holdings and increased it to INR 3.12 billion (INR 312 crores) via Foxconn Hon Hai Technology India, holding a 40% stake in the JV.
Bosch Group's Largest M&A in its history to Boost HVAC Market Presence	Bosch Group acquired Johnson Controls-Hitachi's HVAC business, expanding revenue, workforce, and global reach in eco-friendly HVAC solutions, aligning with its 2030 strategic vision.
Vedanta Ltd: Complete Acquisition of AvanStrate Inc	Vedanta Ltd has acquired an additional 46.57% stake in AvanStrate Inc for up to 12.2 billion yen, bringing its total ownership to 98.2%. AvanStrate, a leader in display glass substrates for electronics, has facilities in South Korea and Taiwan with over 700 patents.
Vedanta Ltd: Partnership with Innolux Corporation for display manufacturing in India	Vedanta Ltd, in partnership with Innolux Corporation, plans to invest USD 4 billion in a display manufacturing plant in India. This initiative aims to capture a share of the rapidly growing display panel market, projected to reach USD 15 billion by 2025, addressing India's current reliance on imports.
Dixon Technologies India Limited: Partners with Nokia to Manufacture Broadband Devices in India	In November 2024, Dixon Technologies announced its partnership with Nokia to manufacture fixed broadband devices in India, addressing the growing demand for Fiber to the Home (FTTH) and 5G Fixed Wireless Access (FWA) services. The Noida-based facility will produce up to 10 million devices annually, including GPON, 5G FWA, and Mesh Wi-Fi devices capable of delivering up to one gigabit per second per home.
Tata Electronics Pvt Ltd: Acquisition of Wistron's Indian operations	Tata Electronics Pvt Ltd acquired Wistron's operations in India for USD 125 million (~INR 1,000 crore) in 2022. This made it the first Indian company to manufacture Apple iPhones.

Note: Selected deals available in the public domain have been considered for selected major players.

Source: Company press releases, news sources

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Outlook

The electronics manufacturing industry is at a pivotal juncture, with India poised to seize a defining role in global supply chains. However, this opportunity is fleeting, with only a 1-to-2-year window to establish itself against formidable competitors like Vietnam, Mexico, and Malaysia. For India to achieve its ambitious target of securing a 4% to 5% share in global electronics exports by 2030, it must accelerate its transition from assembly-centric operations to a comprehensive, export-driven manufacturing ecosystem.

India's aspiration to reach USD 500 billion in electronics production and USD 200–225 billion in exports by 2030 underscores the urgency of scaling operations. Achieving this involves a dual focus: USD 350 billion from finished goods and USD 150 billion from components, supported by targeted incentives, tax reforms, trade policies, infrastructure development, and a robust R&D ecosystem. While the potential is immense, the journey demands rapid and strategic action.

Unlocking Growth in Finished Goods

To drive growth in finished goods, India aims to harness its existing strengths while venturing into high-potential emerging segments. Mobile devices and consumer electronics remain central, leveraging India's established infrastructure to scale both domestic and global market production. Simultaneously, expanding into newer categories—such as laptops, wearables, IoT devices, and telecom hardware—can diversify the portfolio and capture emerging demand.

Priority segments like IT hardware, mobile devices, and consumer electronics offer a mass-market advantage, while auto electronics and 5G telecom infrastructure represent transformative opportunities. For instance, the global adoption of electric vehicles and demand for sustainable transportation could catalyse a surge in auto electronics production. Similarly, India's indigenous 5G capabilities can fuel growth in advanced telecom and strategic electronics, tapping into expanding global markets.

Strengthening Component Manufacturing

Shifting focus from assembly to component manufacturing is vital for India to compete effectively on the global stage. By increasing domestic value addition and localising the production of high-priority components, India can significantly enhance its global competitiveness. Notably, the India Semiconductor Mission, with a USD 10 billion allocation, aims to generate USD 20 billion in semiconductor production by 2030.

India also has a promising opportunity to lead in compound semiconductors like silicon carbide and gallium nitride (GaN), essential for high-power and high-frequency applications in sustainability and electrification. The global market for GaN semiconductors is estimated at USD 5.28 billion in 2025 and is expected to reach USD 14.06 billion by 2030, at a CAGR of 21.64% during the forecast period (2025–2030)[14]. Indian start-ups are working on GaN semiconductors for 5G amplifiers, showcasing India's potential despite challenges in funding and infrastructure. Strategic collaborations, particularly with the US through initiatives like the US-India Semiconductor Supply Chain and Innovation Partnership, are vital for addressing these gaps.

The results of these initiatives are already visible, with local value addition in mobile manufacturing rising from less than 6% in 2017 to 16% in 2023. By addressing import dependence, reducing tariffs, and fostering downstream manufacturing, India could elevate local value addition in mobile manufacturing to 50% by 2030[15].

Building a Competitive Edge in Semiconductors

India's semiconductor ambitions are bolstered by multinational companies diversifying supply chains and seeking resilient hubs. The country's contributions to R&D and design in global semiconductor value chains are

[14] *Mordor Intelligence*
[15] *PwC*

"Although the industry has come a long way in the last one decade, some of the disruptions are still to be ironed out such as supply chain interruptions, rising operational costs and the challenges in keeping pace with rapid technological advancements. Additionally, there is the ongoing need for skilled talent and the pressure to adopt sustainable practices."

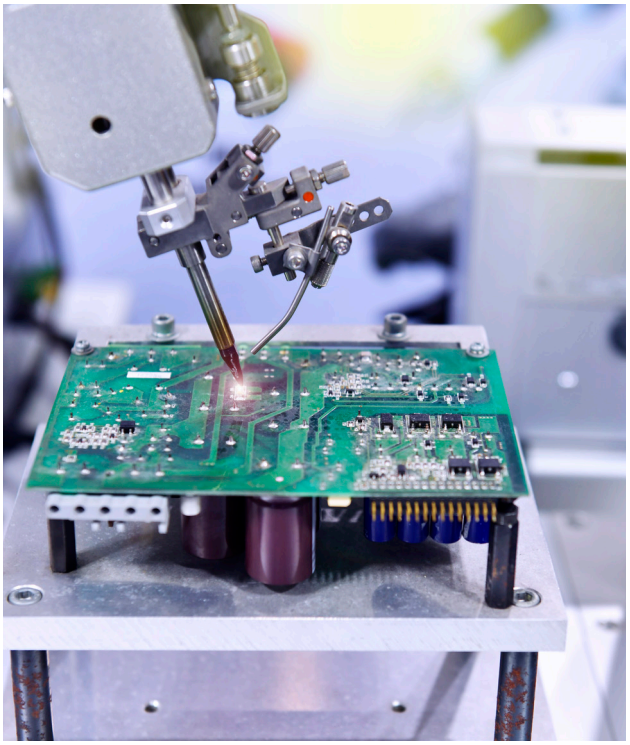
Mr. A Kulandai Vadivelu,
CFO, TVS Electronics

significant, but scaling up production will require concerted efforts in workforce development and maintaining a predictable regulatory environment. Key initiatives as highlighted earlier as well as proposals under evaluation, underline India's determination to establish itself as a global semiconductor hub.

The Road Ahead

For India to emerge as a preferred destination in global electronics value chains, a concerted effort is required to align fiscal policies, reduce tariffs, and enhance infrastructure. Strategic collaborations, especially in semiconductors, could unlock new horizons, making India not just a participant but a leader in high-value global supply chains.

However, in the race for global electronics supremacy, India must act with urgency and precision. With the right investments and partnerships, India is well-positioned to engineer the technologies of tomorrow. The next two years will determine whether the country becomes a cornerstone of global supply chains or merely an assembly line of missed opportunities.



ABOUT RUBIX

Rubix Data Sciences Pvt. Ltd. helps you to take prudent credit risks, build a robust supply chain and monitor compliance for your business partners in India and around the world. Rubix helps you collect payments in time from your debtors, helping generate predictable cash flows.

Set up by highly experienced Risk Professionals, the company has been recognised at the IMC Digital Technology Awards in 2020 for the Rubix ARMS™ platform, and in 2021 for the Rubix Early Warning System (EWS). Rubix has received the prestigious ET BFSI Exceller Award 2023 in recognition of its ground-breaking analytics initiative, 'SME Income Range Estimation and Financial Ratio Benchmarking.'

Rubix has been appointed as India's first Validation Agent for the Legal Entity Identifier (LEI) by Legal Entity Identifier India Ltd, the Local Operating Unit accredited by the Global Legal Entity Identifier Foundation (GLEIF), Switzerland.

The Rubix ARMS™ and Early Warning System (EWS) platforms and their suite of reports, products and services are based on Rubix's extensive database of structured and unstructured data aggregated from over 120+ sources, customised predictive analytics and proprietary technology.

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