INDUSTRY REPORT ON INDIA'S PCB, PCBA, ESDM AND ALLIED ELECTRONICS MANUFACTURING INDUSTRY

SUBMITTED TO

IL JIN ELECTRONICS (INDIA) LIMITED.

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ACRONYMS

Acronym	Meaning	Acronym	Meaning
ADAS	Advanced Driver Assistance Systems	**AI**	Artificial Intelligence
AOI	Automated Optical Inspection	**APAC**	Asia-Pacific
ATMP	Assembly, Testing, Marking and Packaging	**BFSI**	Banking, Financial Services and Insurance
BLDC	Brushless Direct Current	**BoM**	Bill of Materials
CAGR	Compound Annual Growth Rate	**CEA**	Consumer Electronics and Appliances
CPI	Consumer Price Index	**CY**	Calendar Year
DFM	Design for Manufacturability	**DFT**	Design for Testability
DVA	Domestic Value Addition	**EBITDA**	Earnings Before Interest, Taxes, Depreciation and Amortisation
ECMS	Electronics Component Manufacturing Scheme	**ECU**	Electronic Control Unit
EMC	Electronics Manufacturing Cluster	**EMEA**	Europe, Middle East and Africa
EMS	Electronics Manufacturing Services	**ESDM**	Electronic System Design and Manufacturing
EV	Electric Vehicle	**FDI**	Foreign Direct Investment
FY	Financial Year	**GDP**	Gross Domestic Product
GST	Goods and Services Tax	**GVA**	Gross Value Added
HDI	High-Density Interconnect	**HMI**	Human-Machine Interface
HVAC	Heating, Ventilation and Air Conditioning	**IC**	Integrated Circuit
IIP	Index of Industrial Production	**IIoT**	Industrial Internet of Things
IMF	International Monetary Fund	**INR**	Indian Rupee
IoT	Internet of Things	**IT**	Information Technology
MeitY	Ministry of Electronics and Information Technology	**MoSPI**	Ministry of Statistics and Programme Implementation
ODM	Original Design Manufacturer	**OEM**	Original Equipment Manufacturer
OSAT	Outsourced Semiconductor Assembly and Test	**PAT**	Profit After Tax
PCB	Printed Circuit Board	**PCBA**	Printed Circuit Board Assembly
PFCE	Private Final Consumption Expenditure	**PLC**	Programmable Logic Controller
PLI	Production Linked Incentive	**RAC**	Room Air Conditioner

Acronym	Meaning	Acronym	Meaning
RF	Radio Frequency	**ROCE**	Return on Capital Employed
ROE	Return on Equity	**SaaS**	Software as a Service
SGST	State Goods and Services Tax	**SMT**	Surface-Mount Technology
THT	Through-Hole Technology	**UPS**	Uninterruptible Power Supply
USD	United States Dollar	**VFD**	Variable Frequency Drive
UNCTAD	United Nations Conference on Trade and Development.	**LED**	Light Emitting Diode
VRF/VRV	Variable Refrigerant Flow / Variable Refrigerant Volume		

DEFINITIONS

Term	Definition
Bare PCB	An unpopulated printed circuit board containing conductive tracks, pads and interconnections before electronic components are mounted.
Bill of Materials (BoM)	The list and value of materials, components and sub-assemblies required to manufacture a product.
Box build	Outsourced integration of a PCBA with enclosures, wiring, power supplies and other sub-systems, including testing and final assembly.
Calendar Year (CY)	The period from 1 January to 31 December. For example, CY2025 refers to the year ended 31 December 2025.
Components	Electronic parts used in products and assemblies, including semiconductors, passive and electromechanical components, displays, connectors and bare PCBs.
Domestic Value Addition (DVA)	The share of a product's value created in India through locally sourced materials, components, manufacturing and services.
Electronic Manufacturing Services (EMS)	Third-party manufacturing services provided to ODMs, OEMs and brands, including component sourcing, PCBA, testing, box build and fulfilment.
Electronic System Design and Manufacturing (ESDM)	The third-party ecosystem supporting electronics design and manufacturing, including EMS and ODM providers, component manufacturers, PCB and PCBA companies, testing providers, box-build players and system integrators.
Electronics Market	The value of finished electronic products sold or consumed in a geography, including domestic production and imports.

Term	Definition
Electronics Production	The value of finished electronic products manufactured in a geography, including products sold domestically and exported.
Estimate (E)	A forward-looking value based on Frost & Sullivan analysis, industry inputs and available information.
Financial Year (FY)	In India, the period from 1 April to 31 March. For example, FY2025 refers to 1 April 2024 to 31 March 2025.
High-Density Interconnect (HDI) PCB	A PCB with fine lines, microvias and high connection density, used in compact and advanced electronic products.
In-house Manufacturing	Electronics manufacturing undertaken directly by an OEM or brand rather than by a third-party provider.
Original Design Manufacturer (ODM)	A company that designs and manufactures products that are sold by another company under its own brand.
Original Equipment Manufacturer (OEM)	A company that owns and markets the final branded product and may manufacture it in-house or outsource production.
Printed Circuit Board (PCB)/Bare PCB	A fabricated board that mechanically supports and electrically connects electronic components through conductive tracks and pads. Before electronic components are mounted, it is referred to as a bare PCB.
Printed Circuit Board Assembly (PCBA)	A functional electronic assembly created by mounting and soldering electronic components onto a bare PCB, followed by inspection and testing.
Provisional (P)	A latest available value that is not yet final and may be revised when complete information becomes available.
Semiconductor Package Substrate	A specialised interconnect layer that connects a semiconductor chip to a printed circuit board.
Surface-Mount Technology (SMT)	A process in which electronic components are mounted directly onto the surface of a PCB.
Through-Hole Technology (THT)	A process in which component leads are inserted through holes in a PCB and soldered on the opposite side.

ILLUSTRATIVE PRODUCT COVERAGE UNDER KEY END-USER INDUSTRIES

End User Industry	Illustrative products covered
Mobile phones	Smartphones, feature phones, chargers, accessories and related assemblies
Consumer electronics and appliances	Televisions, room air conditioners, refrigerators, washing machines, microwave ovens, smart appliances, display boards and control boards
Industrial electronics	PLCs, HMIs, VFDs, sensors, industrial control systems, automation panels and process control electronics
IT hardware	Laptops, tablets, servers, storage devices, all-in-one PCs and computing peripherals
Automotive electronics	EV power electronics, battery management systems, motor controllers, infotainment, telematics, sensors and control modules
Telecom equipment	Telecommunication network equipment, including 4G and 5G base-station electronics, routers, switches, optical network equipment and communication modules.
Medical electronics	Patient monitoring systems, diagnostic devices, imaging electronics and embedded medical systems
Aerospace & defence	Avionics, radar electronics, communication systems, control modules, defence electronic assemblies, lighting electronics and specialized embedded systems
Energy and power electronics	Solar inverters, UPS systems, energy storage systems, EV chargers, power converters and power control modules

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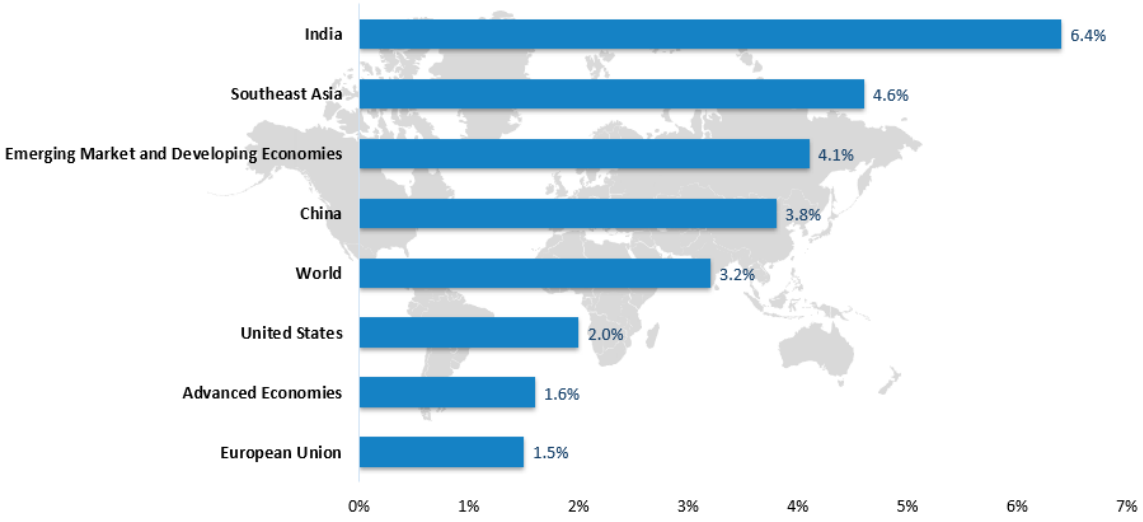
1. MACRO-ECONOMIC OUTLOOK (GLOBAL & INDIA)

1.1 Overview of Global Economy

The global economy is expected to remain in a moderate growth phase over the medium term, with growth across advanced economies expected to remain lower than emerging market and developing economies. While global growth continues to be influenced by interest rates, trade uncertainty, geopolitical developments and supply-chain reconfiguration, investment in infrastructure, digitalization, energy transition and manufacturing localization continues to support growth across key markets.

India is expected to remain the fastest-growing major economy, with IMF projecting real GDP growth of approximately 6.5% for 2026, ahead of global growth of around 3.1%–3.2%.. The country's outlook is supported by domestic consumption, public capital expenditure, infrastructure development, digital adoption, manufacturing-linked policy support and a large working-age population.

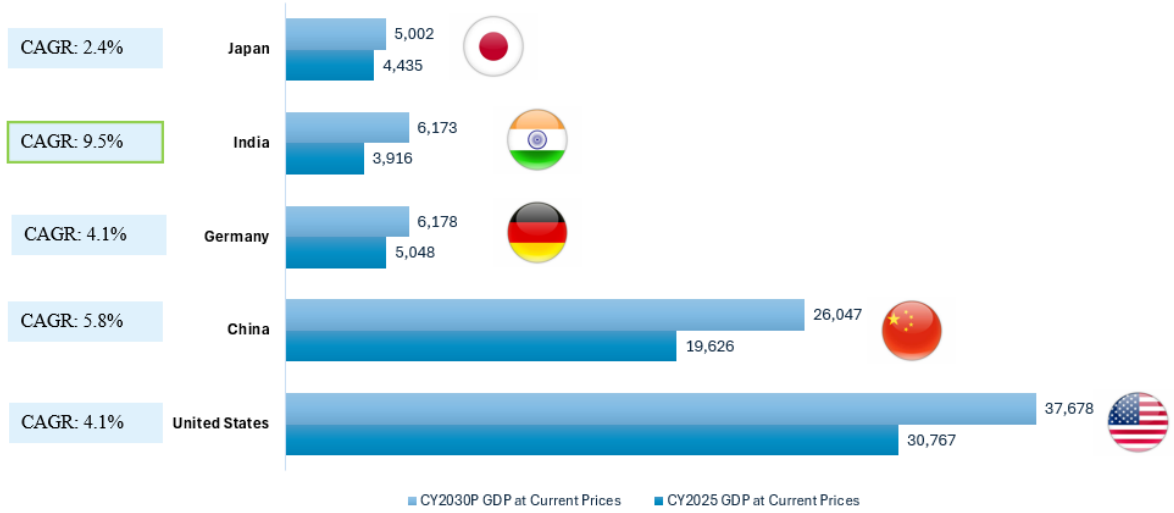
Exhibit 1.1: Average Annual Real GDP Growth (%), Select Regions and Countries, CY2026E-CY2030E



Source: IMF World Economic Outlook, Frost & Sullivan analysis.

India is expected to record higher average real GDP growth than the world average, advanced economies, the United States, the European Union and China over CY2026E-CY2030E. This reinforces India's relative growth advantage among large economies and provides a supportive macroeconomic backdrop for demand-led and manufacturing-led sectors.

Exhibit 1.2: GDP at Current Prices (US$ Billion), Select Major Economies, CY2025 and CY2030P



Source: IMF, Frost & Sullivan analysis.

In nominal terms, India's GDP at current prices is projected to increase from approximately US$3.9 trillion in CY2025 to approximately US$6.2 trillion by CY2030P, implying a CAGR of around 9.5%. This indicates a material expansion in India's economic scale and domestic market depth. For the electronics manufacturing ecosystem, this is relevant because larger economic output, rising incomes, higher consumption and manufacturing policy support expand the addressable opportunity across consumer electronics, appliances, industrial electronics, digital infrastructure, PCB, PCBA, box build and allied electronics products.

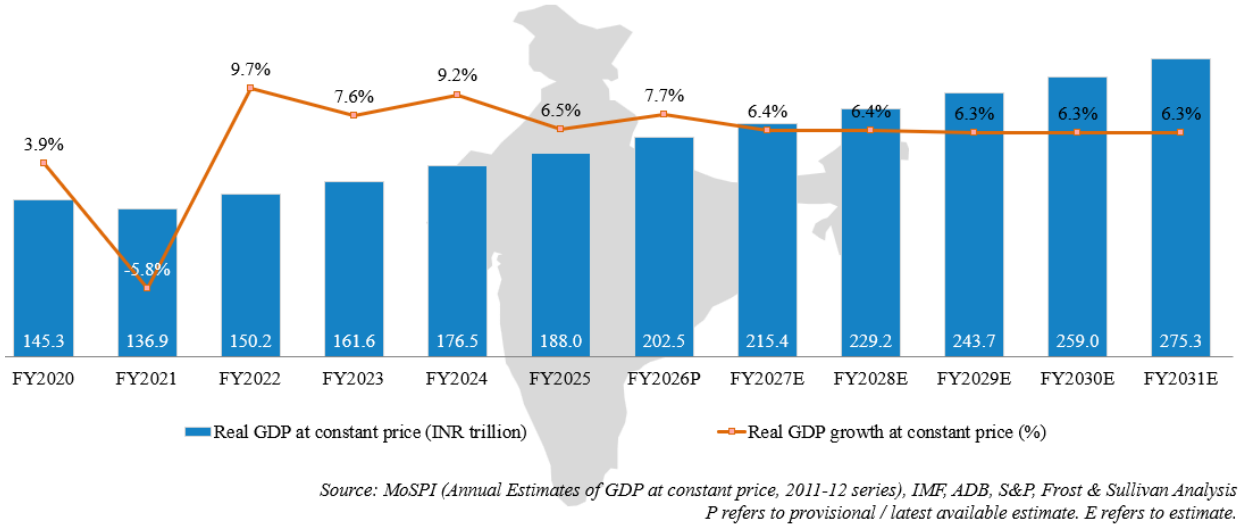
India's economic scale-up is also supported by a sustained policy focus on domestic manufacturing. Initiatives such as Make in India, production-linked incentives, electronics manufacturing clusters and component-localization measures have encouraged capacity expansion across electronics, IT hardware, components, semiconductors and allied manufacturing activities. Together with rising domestic demand, this strengthens India's position as both a consumption market and a manufacturing base.

1.2 India's GDP Growth Outlook

India's growth outlook remains supported by domestic demand, public capital expenditure, infrastructure development, services growth, digital adoption, and manufacturing-linked policy support. While global trade conditions and geopolitical risks remain external variables, India's medium-term growth is anchored by the scale of its domestic market and continued investment in physical and digital infrastructure.

Real GDP growth reflects the expansion of economic output after adjusting for price changes. India's real GDP has remained on a strong growth path, supported by consumption, investment activity, services growth, infrastructure development and policy continuity. Over the forecast period, growth is expected to normalize from the high rebound years but remain above 6.0% and well ahead of other emerging/developing markets and China, indicating continued economic momentum.

Exhibit 1.3: Annual Real GDP and growth, value in INR trillion, India, FY2020 - FY2031E

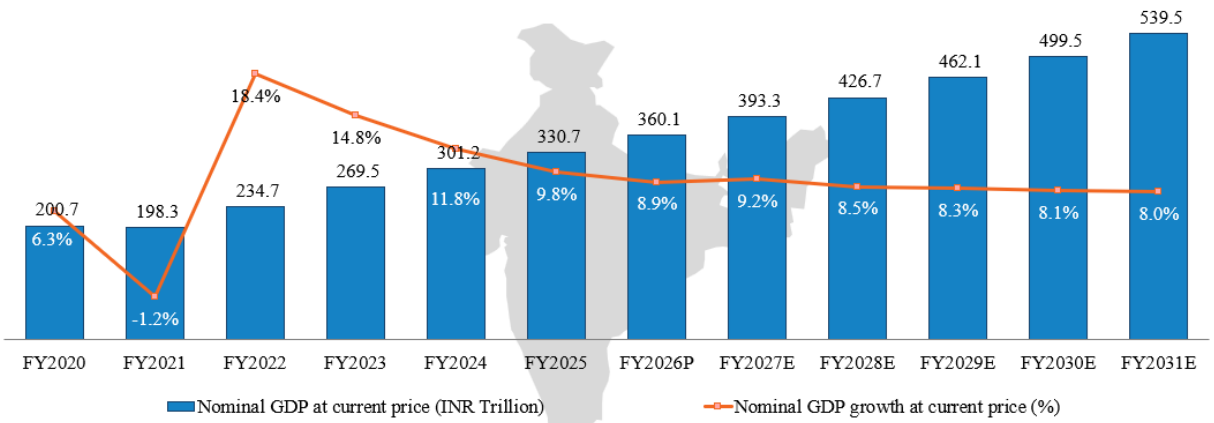


Source: MoSPI (Annual Estimates of GDP at constant price, 2011-12 series), IMF, ADB, S&P, Frost & Sullivan Analysis
P refers to provisional / latest available estimate. E refers to estimate.

India's real GDP is estimated to increase from approximately INR 145.3 trillion in FY2020 to approximately INR 275.3 trillion by FY2031E. Annual real GDP growth is expected to remain in the range of approximately 6.3% to 6.4% over the medium term. This provides a stable growth base for consumption-led sectors, infrastructure-linked sectors, industrial activity and manufacturing-led value chains.

India's nominal GDP is expected to continue expanding at a healthy pace over the medium term, supported by real growth, price-level changes, formalization, public investment, consumption growth and manufacturing activity.

Exhibit 1.4: Nominal GDP and nominal GDP growth (annual percentage change), value in INR trillion, growth in %, India, FY2020-FY2031E



Source: MoSPI (Annual Estimates of GDP at current prices), Worldometer; Frost & Sullivan Analysis
P refers to provisional / latest available estimate. E refers to estimate.

India's nominal GDP is expected to expand from approximately INR 200.7 trillion in FY2020 to approximately INR 539.5 trillion by FY2031E. This represents a significant increase in the scale of the domestic economy and provides a larger base for household spending, corporate investment, infrastructure development and manufacturing activity.

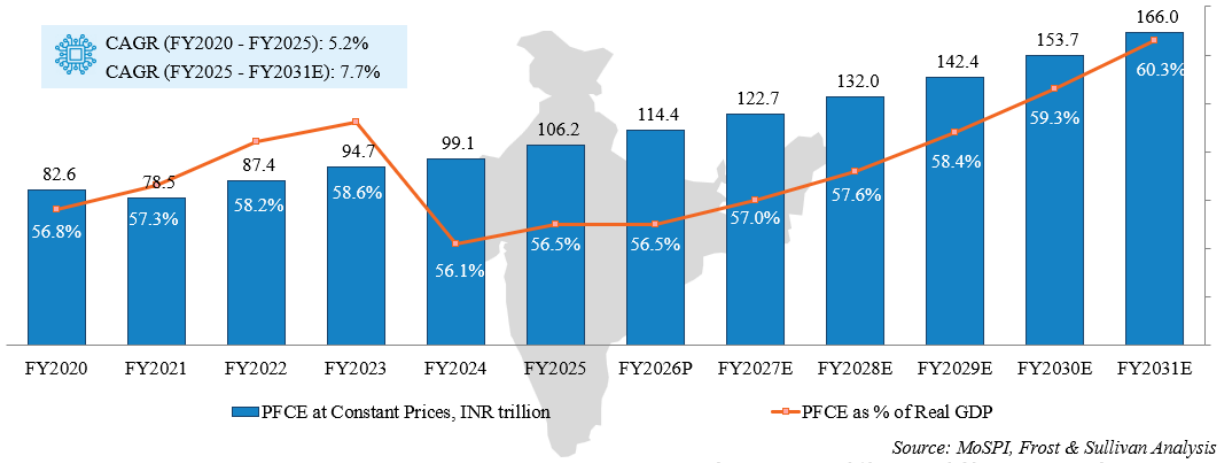
For the sectors covered in this report, India's GDP trajectory provides an important macroeconomic foundation. Sustained real growth and nominal expansion are expected to support demand across consumption-led, infrastructure-

led and manufacturing-led end-use sectors, including appliances, electronics, industrial products, digital infrastructure and allied electronics manufacturing.

1.3 Private Final Consumption Expenditure (PFCE)

In India, PFCE remains one of the main drivers of economic activity, supported by rising incomes, urbanization, access to finance, formalization and growth in discretionary spending.

Exhibit 1.5: Private Final Consumption Expenditure as % of Real GDP, India, FY2020-FY2031E



Source: MoSPI, Frost & Sullivan Analysis
P refers to provisional / latest available estimate. E refers to estimate.

As shown in Exhibit 1.5, India's PFCE is expected to increase from approximately INR 82.6 trillion in FY2020 to approximately INR 166.0 trillion by FY2031E. PFCE is also expected to remain a major component of real GDP, indicating that private consumption will continue to play a central role in India's medium-term growth.

The expansion of private consumption provides a supportive demand backdrop for several end-use sectors, including appliances, consumer electronics, mobility, housing-linked products and other technology-led categories. This is relevant for the broader electronics manufacturing ecosystem, as higher end-product demand supports the need for localized manufacturing, electronic assemblies, components and related value-chain activities.

Exhibit 1.6: Private Consumption as % of Nominal GDP, Select Economies, CY2025 / Latest Available

Country	Private consumption as % of nominal GDP
Mexico	71.5%
United States	68.5%
Brazil	64.2%
India	57.5%
Indonesia	55.0%
Vietnam	53.2%
China	39.9%

Source: CEIC, Frost & Sullivan analysis
Data represents private consumption/household and NPISH final consumption expenditure as % of nominal GDP. For countries with quarterly data, latest available CY2025 quarter has been used. China data is latest available CY2024.

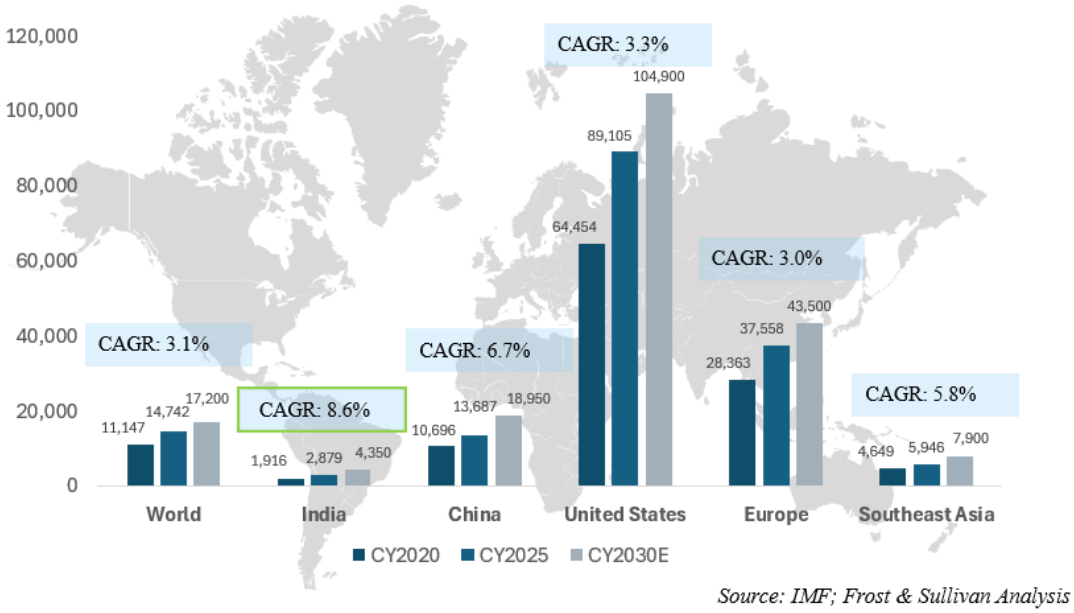
A cross-country comparison indicates that private consumption remains a meaningful component of India's economic structure. India's private consumption accounted for approximately 57.5% of nominal GDP in Dec 2025, lower than consumption-heavy economies such as the United States, Brazil and Mexico, but higher than China and broadly comparable with several Asian manufacturing economies. This supports the view that India's growth base is backed by a sizeable domestic consumption market, which is relevant for consumption-linked sectors such as appliances, consumer durables, electronics, mobility and household technology products.

1.4 Per Capita Income, Urbanization and Household Consumption

Rising income levels, urbanization, women's economic participation, formal employment and digital access are important structural drivers of household consumption in India. While Private Final Consumption Expenditure reflects the overall size of private consumption, these indicators help explain the underlying factors that are expected to support medium-term demand growth.

India's per capita income remains lower than advanced economies and China, but it is expected to increase at a faster pace from a lower base. Per capita income is projected to increase from US$2,879 in CY2025 to US$4,350 by CY2030E, implying a CAGR of 8.6%. This indicates significant headroom for discretionary consumption as household spending capacity improves.

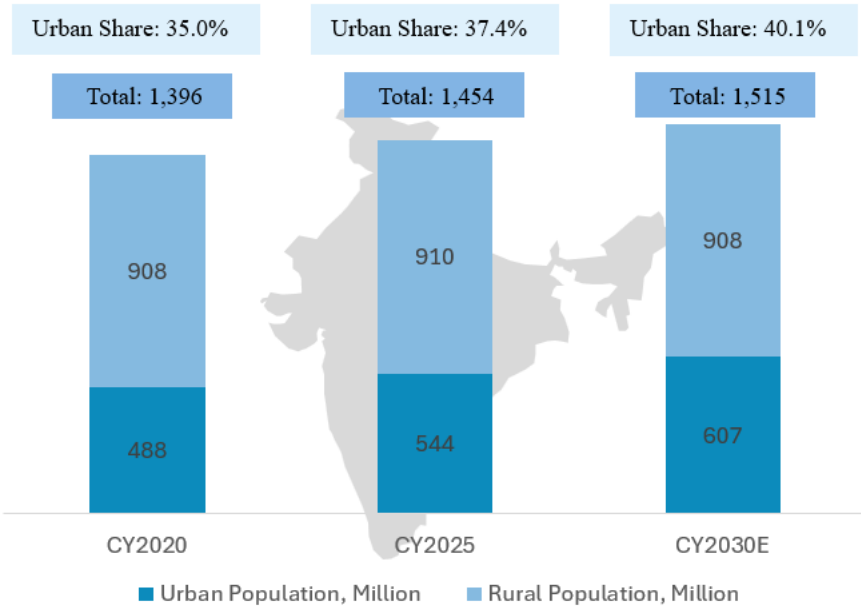
Exhibit 1.7: Per Capita Income of India vs Leading Economies (US$), CY2020, CY2025, CY2030E



Source: IMF; Frost & Sullivan Analysis

Urbanization is also expected to support changes in consumption patterns. India's urban population is expected to increase from 488 million in CY2020 to 607 million by CY2030E, while the urban share of population is expected to rise from 35.0% to 40.1% over the same period. Urban households typically have better access to organized retail, formal finance, digital services, stable power infrastructure, housing upgrades and replacement-led consumption.

Exhibit 1.8: Population and Urbanization Trend, India, CY2020, CY2025, CY2030E, Population in Million, Urban Share in %



Source: Statista, IMF, Frost & Sullivan Analysis

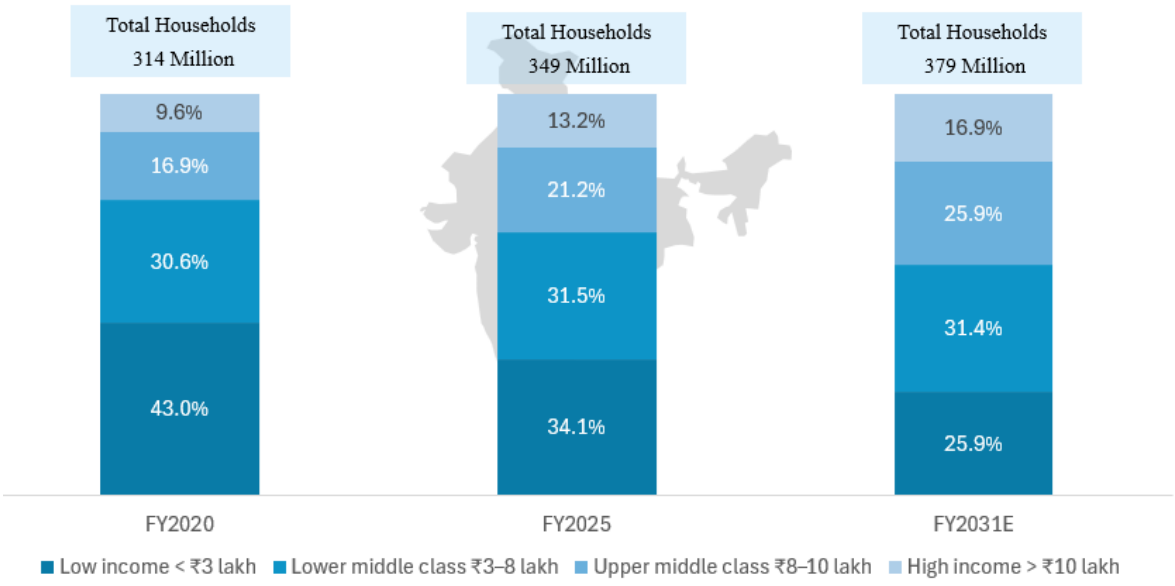
The increase in urban and semi-urban consumption is expected to influence the composition of household spending. Demand is likely to shift gradually toward convenience-led, comfort-led and discretionary categories such as appliances, consumer durables, connected devices, mobility services and housing-linked products. At the same time,

India's rural population base remains large, which means the country's consumption opportunity is likely to be supported by both urban depth and rural scale.

. Higher labour force participation and income contribution can support household spending capacity, while formal employment and digital payment infrastructure improve income visibility, transaction convenience and access to organized consumption channels.

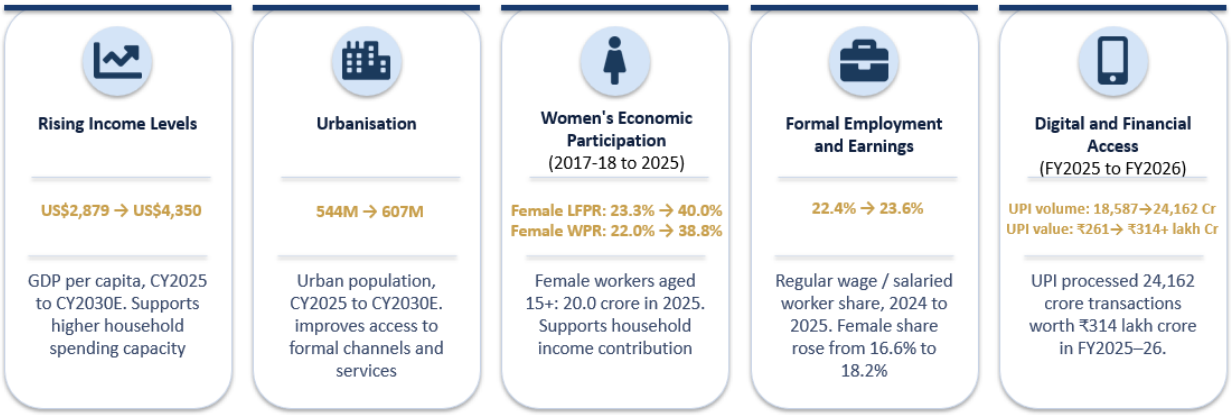
India's household income distribution is expected to shift meaningfully toward middle- and higher-income groups over the medium term. Households earning above ₹8 lakh annually are estimated to increase from approximately 34.4% of total households in FY2025P to 42.8% by FY2030E. This transition is expected to support discretionary consumption, premiumization and demand for appliances, consumer durables, connected devices, mobility products and household technology categories.

Exhibit 1.9: Household Income Distribution by Income Group, India, FY2020, FY2025 and FY2030E



Source: Industry reports, Frost & Sullivan analysis

Exhibit 1.10: Key Drivers of Household Consumption in India

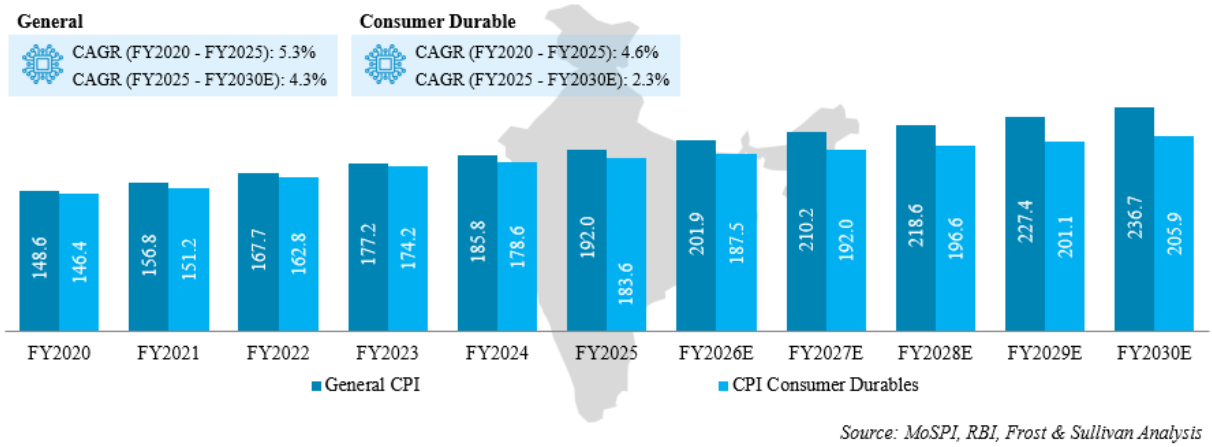


Source: IMF, United Nations Population Division, PLFS Annual Report 2025, NPCI / PIB, Frost & Sullivan analysis
**LFPR refers to Labour Force Participation Rate; WPR refers to Worker Population Ratio. PLFS 2025*

1.5 Consumer Price Index and Durable Goods Affordability

India's general CPI increased from 148.6 in FY2020 to 192.0 in FY2025, while consumer durables CPI increased from 146.4 to 183.6 over the same period. During FY2025-FY2030E, consumer durables CPI is expected to grow at a more moderate pace than general CPI, indicating relatively better price stability in durable goods compared with the broader consumption basket.

Exhibit 1.11: General CPI and Consumer Durables CPI, India, FY2020-FY2030E



Source: MoSPI, RBI, Frost & Sullivan Analysis

The trend indicates that consumer durables prices have increased at a slower pace than the broader consumer price basket and are expected to remain more moderate over the forecast period. This is relevant because demand for durable and discretionary products is influenced not only by income growth, but also by affordability, access to finance and replacement cycles.

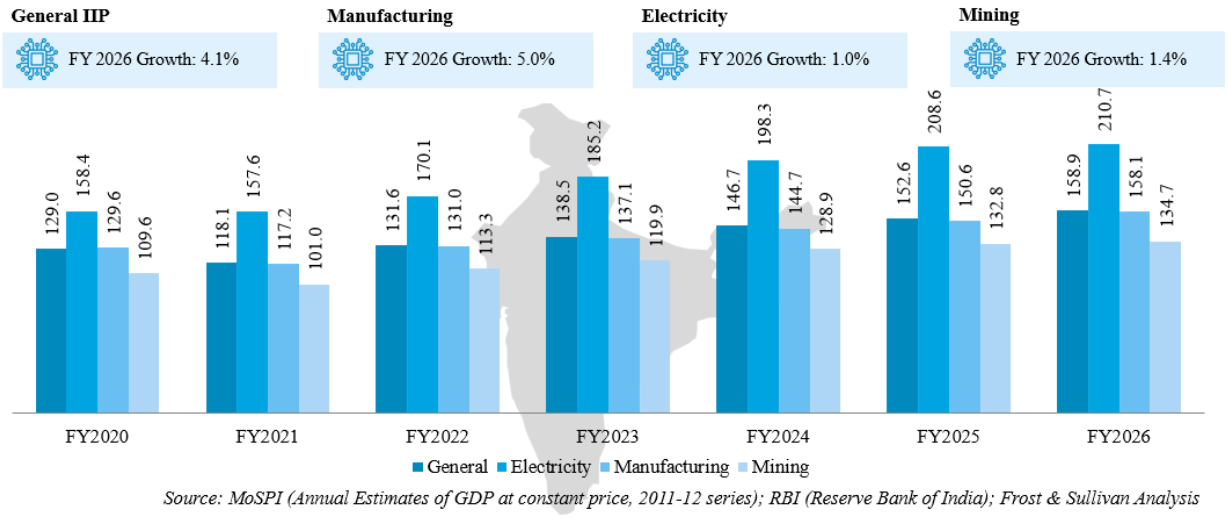
A relatively stable durable goods price environment, along with rising income levels and expanding household consumption, supports the demand for appliances, consumer durables and household technology products. This reinforces the broader consumption-led growth trends covered in the preceding sections.

1.6 Industrial Activity and Sectoral Growth

India's industrial indicators show continued expansion in production activity across manufacturing, electricity, mining and the overall industrial economy. This is important because a stronger industrial base supports factory activity, supplier ecosystems, utilities, logistics movement and capital investment. It also indicates that India's growth is not only consumption-led, but is supported by production-side activity as well.

The general IIP increased from 129.0 in FY2020 to 158.9 in FY2026, while the manufacturing index increased from 129.6 to 158.1 over the same period.

Exhibit 1.12: Index of Industrial Production by Sector, India, FY2020-FY2026

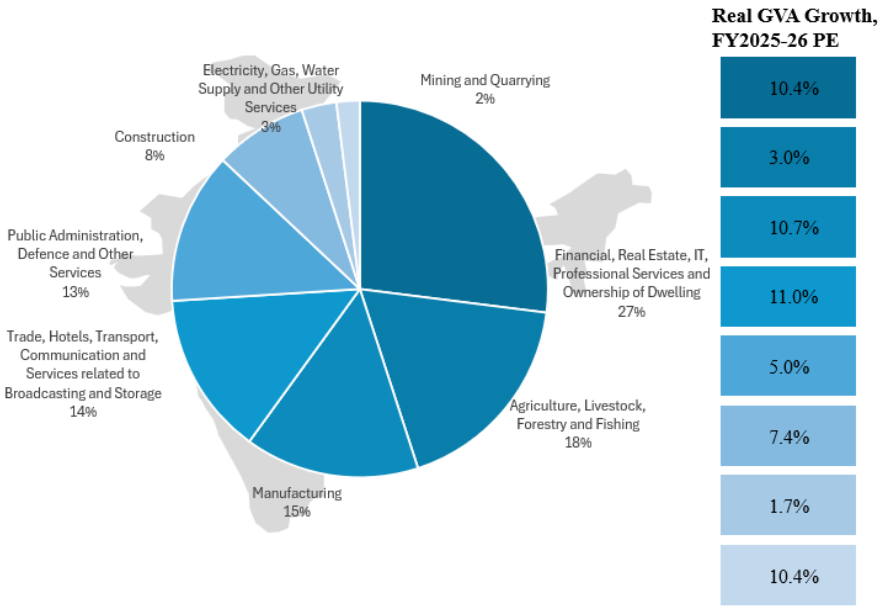


Source: MoSPI (Annual Estimates of GDP at constant price, 2011-12 series); RBI (Reserve Bank of India); Frost & Sullivan Analysis

The IIP trend shows continued expansion in India's industrial output. Manufacturing remained the largest component of industrial activity and grew 5.0% in FY2026, higher than overall IIP growth of 4.1%.

Sectoral GVA provides a broader view of the economy by showing both the composition of output and the sectors contributing to growth. As per MoSPI's FY2025-26 provisional estimates, real GVA was estimated at INR 294.91 lakh crore, registering growth of 7.9%, while nominal GVA was estimated at INR 314.87 lakh crore, growing 9.1%.

Exhibit 1.13: Sectoral Composition and Real GVA Growth by Sector, India, FY2025-26 PE



Source: MoSPI, Frost & Sullivan analysis

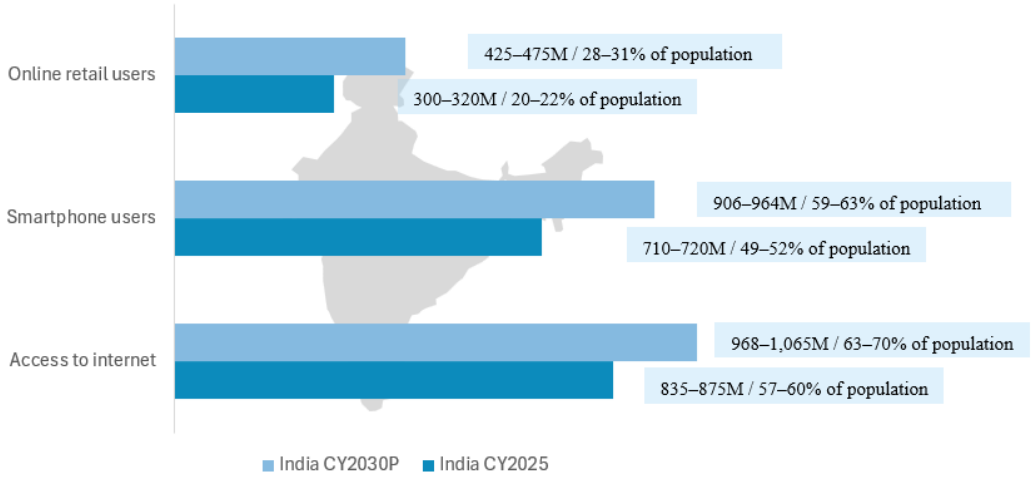
The sectoral data indicates broad-based growth across several parts of the economy. Manufacturing recorded 10.7% real GVA growth in FY2025-26 PE, while trade, hotels, transport, communication and related services grew 11.0%. Financial, real estate, IT and professional services grew 10.4%, and construction grew 7.4%. These sectors are relevant to the manufacturing environment because they support production, enterprise services, logistics, distribution, infrastructure development and investment activity.

Overall, the indicators suggest that India's growth base is supported by industrial activity as well as services and infrastructure-linked sectors. Continued growth in manufacturing, logistics-linked services, construction and enterprise services is positive for overall manufacturing in India, as it strengthens the ecosystem required for production scale-up, supplier development, movement of goods, power demand and capital investment.

1.7 Digital Infrastructure and Technology-led Demand Indicators

The expansion of India's digital consumer base is important because it deepens both demand-side and infrastructure-side electronics requirements. Higher internet and smartphone penetration increases the installed base for connected devices, digital payments, online commerce and app-based services. At the same time, growth in online retail users indicates a larger organized consumption channel for appliances, consumer electronics, mobility accessories and household technology products. This creates a reinforcing cycle where digital adoption supports higher electronics consumption, while rising data usage and digital transactions drive investment in telecom networks, data centers, power backup, cooling, networking equipment and related electronic assemblies.

Exhibit 1.14: India's Consumer Internet Access and Usage Base, CY2025 and CY2030P, million users and % of population

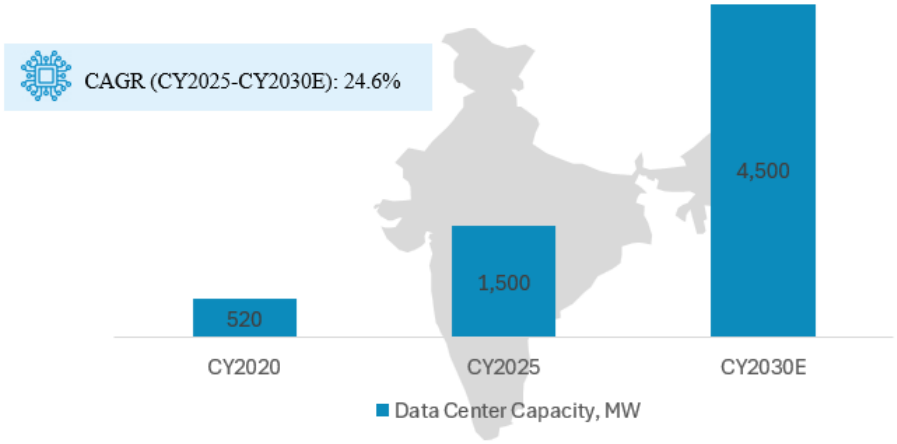


Source: Industry reports, Frost & Sullivan analysis
Values represent number of users / people with access, shown in million and as a share of total population. CY2030P refers to projected values.

India's digital infrastructure is expanding with the growth of cloud services, enterprise digitization, artificial intelligence workloads, data localization requirements, digital payments, e-commerce and connected services. Data centers are a useful indicator of this shift because they represent the physical infrastructure required to support digital activity across consumer, enterprise and public-sector use cases.

The growth of data center capacity is also relevant because it creates demand across adjacent infrastructure layers, including power supply, backup power, cooling systems, networking equipment, building management systems, monitoring systems and other technology infrastructure. This adds another layer to India's demand base beyond household consumption and traditional industrial activity.

Exhibit 1.15: Data Center Capacity, India, CY2020, CY2025, CY2030E, MW



Source: CEEW, CBRE, S&P Global, Frost & Sullivan analysis

India's data center capacity is estimated to have increased from approximately 520 MW in CY2020 to approximately 1,500 MW in CY2025, and is expected to reach at least 4,500 MW by CY2030E, implying a CY2025-CY2030E CAGR of 24.6%. This indicates a significant increase in digital infrastructure capacity over the decade

The growth is being supported by rising cloud adoption, artificial intelligence workloads, enterprise digitization, data localization, digital payments, e-commerce, 5G and connected services. For the broader economy, this expands investment in physical and digital infrastructure. This in turn creates demand for power systems, UPS, cooling equipment, networking infrastructure, control systems, electronic assemblies and other infrastructure-linked technology products.

Beyond data centers, technology-led demand in India is also being supported by electric mobility, defence manufacturing, telecom infrastructure and digital consumption. These areas are increasingly dependent on electronic systems, power electronics, embedded controls, communication equipment, network infrastructure and related manufacturing capabilities.

Exhibit 1.16: Key End-use Sectors Driving Electronics Content, India



Source: MoRTH, SMEV, Ministry of Defence (Annual Report FY2025-26), DoT/TRAI, Statista, Frost & Sullivan analysis
**Includes registered electric two-wheelers; passenger and cargo three-wheelers, including e-rickshaws and e-carts; four-wheelers, buses, goods carriers, and other registered EV categories. Excludes unregistered low-speed electric two-wheelers.*

The indicators above show that India's technology adoption is expanding across both consumer and industrial use cases. Electric mobility is increasing demand for automotive electronics, chargers, battery systems and power electronics. Defence manufacturing growth is supporting demand for embedded electronics and PCB-intensive systems. Telecom network expansion is increasing the base of communication infrastructure, while online retail growth reflects the continued shift toward organized, digital consumption.

Together, data center expansion and technology-led end-use growth add another layer to India's manufacturing demand base. These trends are relevant for electronics and allied manufacturing because they support demand across electronic assemblies, power systems, network equipment, embedded controls, consumer electronics and infrastructure-linked technology products.

1.8 Impact of Geopolitical Tensions on Global Supply Chains

Global supply chains continue to be affected by geopolitical tensions, trade uncertainty, energy security risks and disruption in key shipping routes. These developments have increased the importance of supply-chain resilience, diversified sourcing and manufacturing locations with strong domestic demand, infrastructure depth and policy continuity. UNCTAD has also highlighted that geopolitical tensions have become a major global risk, with implications for trade, investment, energy flows and maritime transport.

For India, the opportunity is not only linked to global companies reassessing supply chains. India's position is supported by its own macroeconomic fundamentals: a large and expanding domestic market, rising consumption, improving urbanization, positive industrial activity, growth in digital infrastructure and continued manufacturing-led policy support. These indicators provide a stronger base for manufacturing investment and supplier ecosystem development.

Exhibit 1.17: India's Macroeconomic Indicators Supporting Manufacturing Expansion



Source: IMF, MoSPI, RBI, CEEW, Frost & Sullivan analysis

The indicators above show that India's manufacturing outlook is supported by both demand-side and production-side drivers. Real GDP growth provides economic momentum, nominal GDP expansion increases the size of the addressable market, and PFCE growth supports domestic consumption-led manufacturing. Urbanization further strengthens demand for housing-linked products, appliances, consumer durables, mobility services and organized retail-led categories.

At the same time, industrial and digital infrastructure indicators strengthen the production-side case. Manufacturing GVA growth indicates continued factory and industrial activity, while the expected increase in data center capacity points to growing investment in power, cooling, UPS, networking and electronics infrastructure.

Overall, while geopolitical tensions may continue to create uncertainty for global trade and supply chains, India's macroeconomic fundamentals provide a positive foundation for manufacturing expansion. A large domestic market, improving consumption base, industrial momentum and digital infrastructure growth create a supportive environment for electronics, appliances, power electronics, industrial electronics and allied manufacturing sectors.

2. ELECTRONICS INDUSTRY OVERVIEW

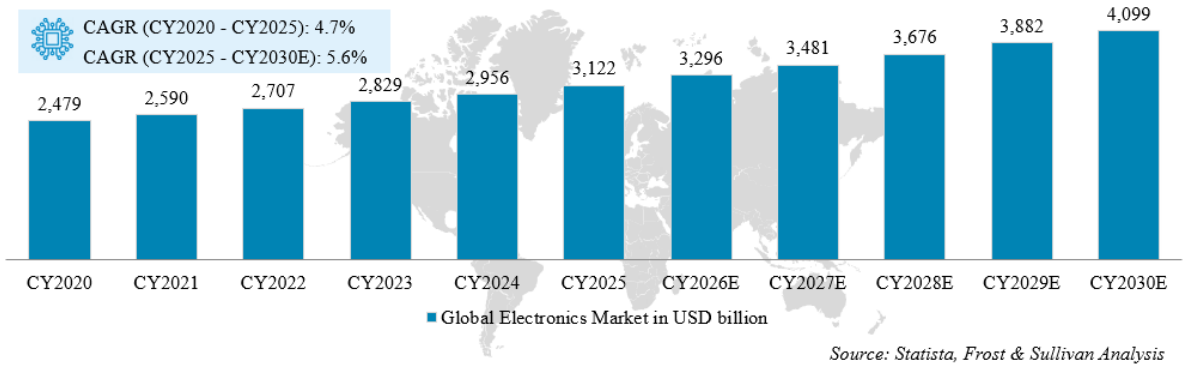
The global and Indian electronics industries are expanding beyond traditional finished-product categories such as mobile phones, televisions, appliances and IT hardware. Growth is increasingly being driven by higher electronic content across automotive, telecom, industrial automation, medical devices, renewable energy systems, data infrastructure, aerospace and defence applications. This shift is being driven by smarter, connected products with increasing AI integration, which require more sensors, semiconductors, memory, connectivity modules and power-management electronics, thereby increasing electronic content across end-use categories. This is broadening the manufacturing opportunity from finished-product assembly to a wider ecosystem covering components, printed circuit boards, PCB assemblies, modules, cables, power electronics, embedded controls, testing and system integration.

India's electronics opportunity is linked to the interaction between domestic demand and manufacturing scale-up. Rising electronics consumption provides a large addressable market, while policy support, exports, supply-chain diversification and supplier development are strengthening India's relevance as a manufacturing location. The next phase of growth is expected to depend on deeper localization across PCB, PCBA, EMS, components, modules, testing, box build, cable assemblies and allied electronics manufacturing capabilities.

2.1 Global Electronics Market Outlook

The global electronics industry remains a large and expanding market, supported by increasing electronic content across consumer, enterprise, industrial and infrastructure applications. The global electronics market was valued at approximately USD 3,122 billion in CY2025 and is estimated to reach approximately USD 4,099 billion by CY2030E, implying a CAGR of approximately 5.6% during CY2025-CY2030E.

Exhibit 2.1: Size of Electronics industry, USD billion, Global, CY2020 – CY2030E



Source: Statista, Frost & Sullivan Analysis

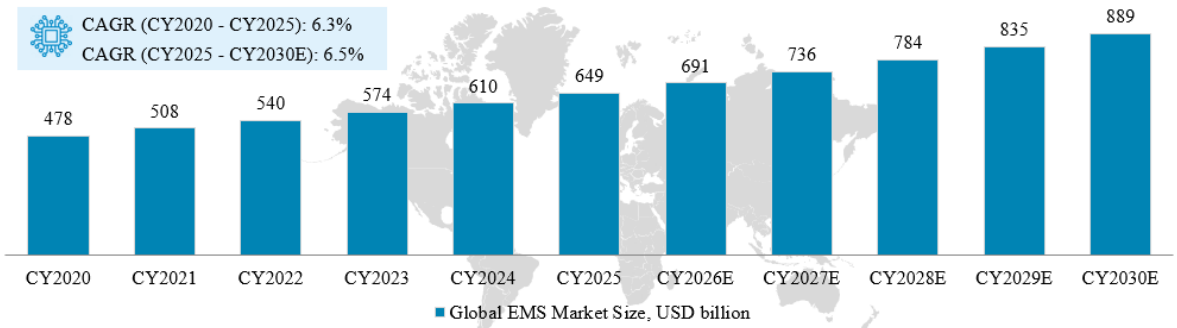
Electronics industry refers to the design, manufacture and sale of electronic products, equipment, components and systems.

Demand is becoming broader across end-use industries. Smartphones, laptops, televisions, wearables and consumer appliances remain large-volume categories, while incremental growth is increasingly supported by automotive electronics, electric mobility, telecom networks, data infrastructure, industrial automation, medical electronics, renewable energy systems, aerospace and defence platforms. Across these applications, electronics is increasingly enabling control, connectivity, safety, automation, energy efficiency and data capture.

The expansion of electronics demand is creating a larger addressable opportunity for EMS providers. OEMs and electronics brands are increasingly relying on EMS partners to support PCB assembly, control boards, inverter boards, display boards, power electronics, module integration, testing, box build, procurement support, supply-chain coordination and production scale-up. The global EMS market is estimated at approximately USD 648.5 billion in CY2025 and is projected to reach approximately USD 889.0 billion by CY2030E, implying a CAGR of approximately 6.5% during CY2025-CY2030E. Growth is expected to be supported by continued outsourcing by OEMs, higher

electronic content across products, supply-chain diversification and increasing demand for integrated manufacturing partners.

Exhibit 2.2: Size of EMS Market, USD billion, Global, CY2020 – CY2030E



Source: Frost & Sullivan Analysis

Note: EMS refers to outsourced electronics manufacturing services for OEMs and brands, including PCB assembly, control boards, inverter boards, display boards, power electronics, module integration, testing, box build and production scale-up.

Asia Pacific remains the largest EMS manufacturing region, supported by the depth of electronics manufacturing ecosystems across China, Taiwan, Southeast Asia, Japan, South Korea and India. Frost & Sullivan estimates that Asia Pacific accounted for approximately 56% of the global EMS market in CY2025, followed by North America at around 22%, Europe at around 15%, and Rest of World at around 7%. This reflects Asia Pacific's established role in high-volume electronics manufacturing, while North America and Europe remain important for regionalized, high-reliability, automotive, industrial, medical and aerospace-related EMS demand.

Exhibit 2.3: Key Regional Hubs in Global EMS Manufacturing, CY2025

Region	Role in global EMS landscape	Key strengths and limitations
China/Taiwan-linked supply chains	Core global EMS hub across mobile phones, computing devices, consumer electronics, networking equipment and components	Deep supplier ecosystem, large EMS players, component availability, tooling base and logistics depth. Diversification is increasing, but China remains central to global electronics manufacturing.
Southeast Asia	Major China+1 manufacturing base across consumer electronics, components, networking equipment, semiconductor-linked activity and industrial electronics	Benefits from proximity to China, export manufacturing experience and trade linkages. Vietnam, Malaysia and Thailand are important nodes, though ecosystem depth varies by product category.
Japan / South Korea	Specialized electronics manufacturing and component ecosystem	Strong in precision electronics, displays, memory-adjacent supply chains, automotive electronics and high-quality manufacturing systems. Higher cost structures limit their role in certain high-volume EMS categories.
Mexico / North America	Regional EMS base serving the US market	Supported by nearshoring, shorter lead times, USMCA-led supply-chain integration and tariff-risk management. More relevant for regional resilience than global low-cost scale.
Europe / Eastern Europe	Specialized EMS base for automotive, industrial, medical, aerospace and defence electronics	Strong in high-mix, lower-volume, high-reliability manufacturing where traceability, quality systems and proximity to customers matter.
India	Emerging EMS and electronics manufacturing base across mobile phones, consumer durables, IT hardware, telecom, automotive and industrial electronics	Supported by large domestic demand, policy incentives, labour availability and increasing OEM participation. Upstream component depth is still developing, making EMS, PCBA, testing, box build, modules and selected components the more immediate opportunity areas.

Source: Frost & Sullivan Analysis

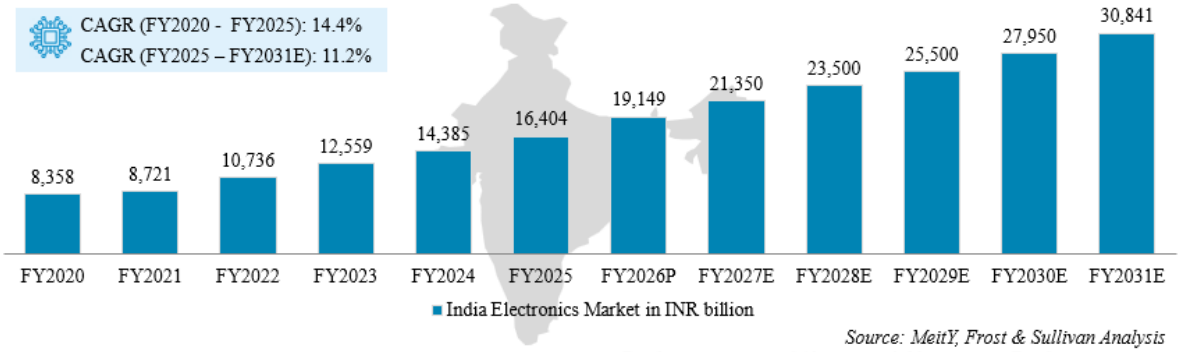
China remains central to the global electronics supply chain because of its scale, supplier depth, logistics infrastructure and component ecosystem. At the same time, India is emerging as an important complementary manufacturing base

as global OEMs diversify supply chains and evaluate additional locations for regional production, export support and customer localization. India's opportunity is supported by domestic demand, policy incentives, skilled workforce availability, supplier development, improving infrastructure and growing manufacturing capabilities across EMS, PCB assembly, electronic modules, control boards, testing, box build, power electronics and selected components.

2.2 Indian Electronics Market Outlook

The size of the Indian electronics industry increased from INR 8,358 billion in FY2020 to INR 16,404 billion in FY2025, implying a CAGR of 14.4% during the period. The market is expected to reach INR 30,841 billion by FY2031E, implying a CAGR of 11.2% during FY2025-FY2031E.

Exhibit 2.4: Size of Electronics industry, INR billion, India, FY2020 – FY2031E

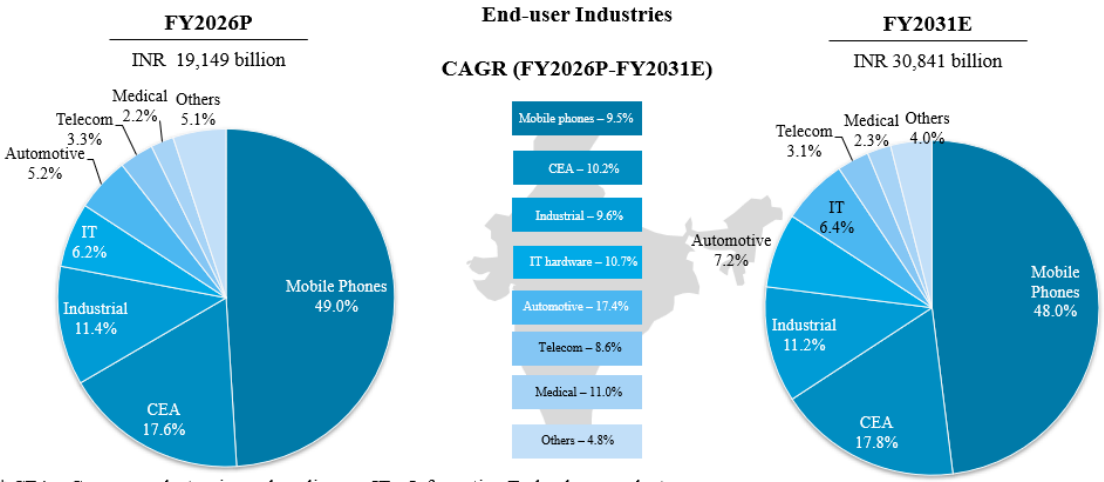


Source: MeitY, Frost & Sullivan Analysis
P refers to provisional / latest available estimate. E refers to estimate.

The outlook reflects both volume growth in large categories and increasing electronics content across end-use sectors. Mobile phones remain the largest category, supported by domestic demand, export-oriented production and established assembly scale. At the same time, growth is expected to broaden across consumer electronics and appliances, IT hardware, automotive electronics, industrial electronics, telecom equipment, medical electronics, clean energy, aerospace and defence applications.

The end-user mix indicates that India's electronics industry is expected to remain anchored by mobile phones and consumer electronics, while gradually broadening across IT hardware, automotive electronics, industrial electronics, telecom, medical and other specialized applications. Mobile phones are expected to remain the largest segment, with share broadly stable from 49.0% in FY2026P to 48.0% by FY2031E. Consumer electronics and appliances are also expected to remain a major demand category, with share increasing marginally from 17.6% to 17.8% over the same period, supported by rising penetration of room air conditioners, appliances, inverterization, smart controls, energy-efficiency requirements and localization of components and assemblies.

Exhibit 2.5: Indian electronics market split by end-user industry, INR billion, India, FY2026P and FY2031E



* CEA – Consumer electronics and appliances; IT – Information Technology products

* Others include Aerospace & defence, Clean energy, Lighting, etc.

Note: E refers to Estimate

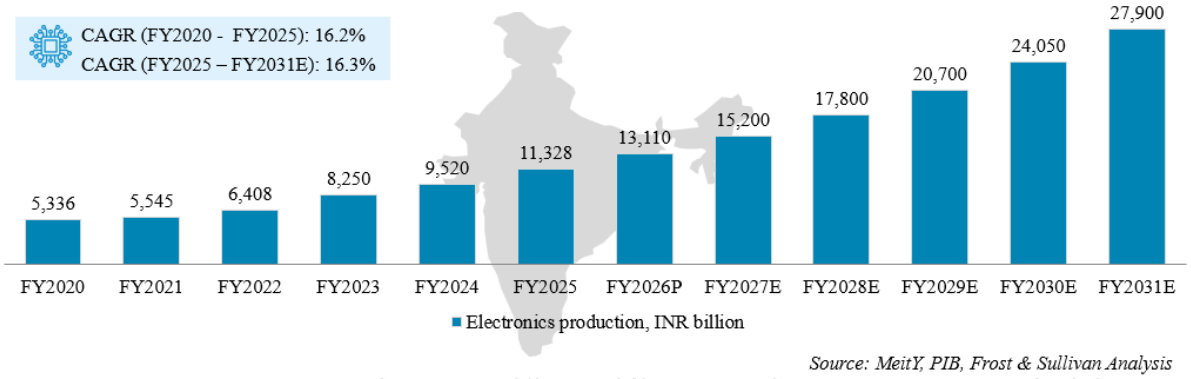
Source: MeitY, ELCINA, Frost & Sullivan Analysis

Consumer electronics and appliances are expected to remain a major demand category within India's electronics market. Growth is being supported by rising appliance penetration, replacement demand, premiumization, inverterization, energy-efficiency requirements, smart and connected features, easier consumer financing, organized retail / e-commerce expansion and improving household infrastructure. These drivers are particularly relevant for room air conditioners, refrigerators, washing machines, televisions and other electronics-rich consumer durable categories, where higher use of control boards, display boards, inverter electronics, sensors and power electronics can increase the addressable opportunity for domestic electronics manufacturing.

2.3 Domestic Electronics Production, Imports, Exports and Import Substitution

India's electronics market growth is increasingly being supported by domestic manufacturing scale-up. Electronics production increased from approximately INR 5,336 billion in FY2020 to approximately INR 13,110 billion in FY2026P. The sector is expected to scale further over the medium term, supported by domestic demand, export-oriented production, policy incentives and localization across finished products, components and sub-assemblies.

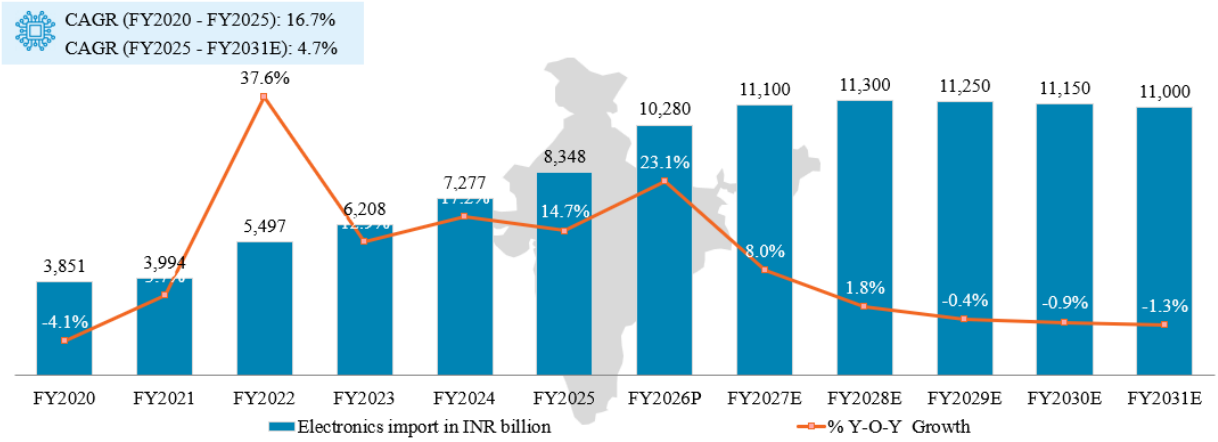
Exhibit 2.6: Size of Electronics production, INR billion, India, FY2020 – FY2031E



Source: MeitY, PIB, Frost & Sullivan Analysis
Note: P refers to provisional / latest available estimate. E refers to estimate. FY2025 is treated as the base year.

The growth in domestic production should be viewed alongside India's import profile. Imports remain important because several critical inputs, including integrated circuits, electronic components, display-related inputs, data-processing equipment and other upstream materials, continue to be sourced from outside India. This reflects the current stage of India's electronics value-chain development, where final assembly and selected manufacturing activities have scaled faster than upstream component depth.

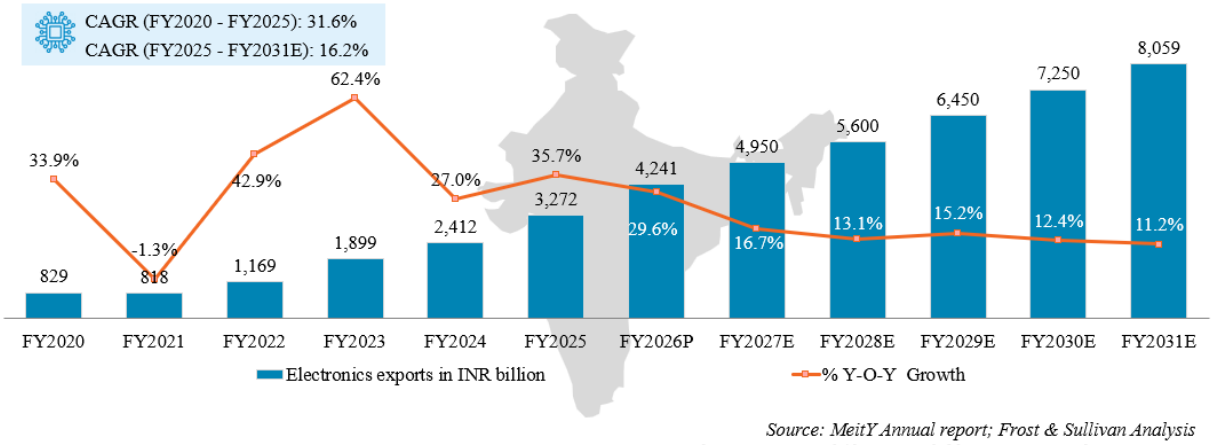
Exhibit 2.7: Import of Electronic products, INR billion, India, FY2020 – FY2031E



Source: MeitY Annual report; Frost & Sullivan Analysis
Note: P refers to provisional / latest available estimate. E refers to estimate.

India's electronic goods exports have also expanded sharply, led by mobile phones and supported by global supply-chain diversification, production-linked incentives and increasing participation by global and domestic manufacturers. Electronic goods exports increased from approximately INR 829 billion in FY2020 to approximately INR 4,241 billion in FY2026P. The increase in exports should not be read as a shift away from domestic demand. Instead, export growth helps improve manufacturing scale, process discipline, supplier development and global customer relevance.

Exhibit 2.8: Export of Electronic products, INR billion, India, FY2020 – FY2031E



Source: MeitY Annual report; Frost & Sullivan Analysis
P refers to provisional / latest available estimate. E refers to estimate

Import substitution in electronics is expected to be gradual and selective. The near- to medium-term opportunity is likely to be strongest in areas that sit between final assembly and deep upstream component manufacturing, including conventional bare PCBs, PCB assembly, chargers, connectors and cable assemblies, display assemblies, enclosures, electronic modules, power-electronics assemblies, testing and selected passive and electromechanical components. Deeper localisation of semiconductors, displays, advanced multilayer, HDI and flexible PCBs, advanced components and capital equipment will require larger investments, technology access, customer qualification and long-term volume visibility.

Within this localization opportunity, product areas relevant to electronics component and sub-assembly manufacturers include PCB assemblies, control boards, inverter boards, display boards, power electronics assemblies, electronic modules, connectors, enclosures, testing and box-build / system-integration activities. These product areas are used across consumer electronics and appliances, room air conditioners, industrial electronics, automotive electronics, telecom equipment, clean energy systems and other electronic product categories. As OEMs increase local manufacturing, demand is expected to rise for domestic suppliers that can support reliable electronics assembly, quality control, sourcing coordination and production ramp-up.

In FY2026P, India's electronic product imports are estimated at approximately INR 10,280 billion. Integrated circuits, mobile phones and data-processing machines together accounted for more than half of electronic product imports, highlighting the continued dependence on imported semiconductors, selected finished devices, IT hardware and upstream electronic inputs.

Exhibit 2.9: Major imported electronic product categories, INR billion and % share, India, FY2026P

Imported product category	Share of total imports (%)	Import value, INR billion	Implication for localisation
Integrated circuits	23.7%	2,436	Indicates that India's electronics manufacturing scale-up continues to depend on imported semiconductor inputs, making chip packaging, component ecosystem development and design-linked capabilities important for deeper value addition.
Mobile phones and telecom equipment	17.5%	1,799	Reflects continued import requirement in selected finished devices, premium models, components and product variants, despite India's strong progress in local mobile phone assembly and exports.
Data-processing machines	10.6%	1,090	Shows import dependence in IT hardware and computing products, where localization of servers, laptops, storage devices and related assemblies remains an important opportunity.
Others	48.2%	4,955	Includes a wide range of components, displays, telecom equipment, modules, parts and specialized electronics, highlighting that import substitution will be gradual and category-specific rather than uniform across the value chain.
Total	**100%**	**10,280**	

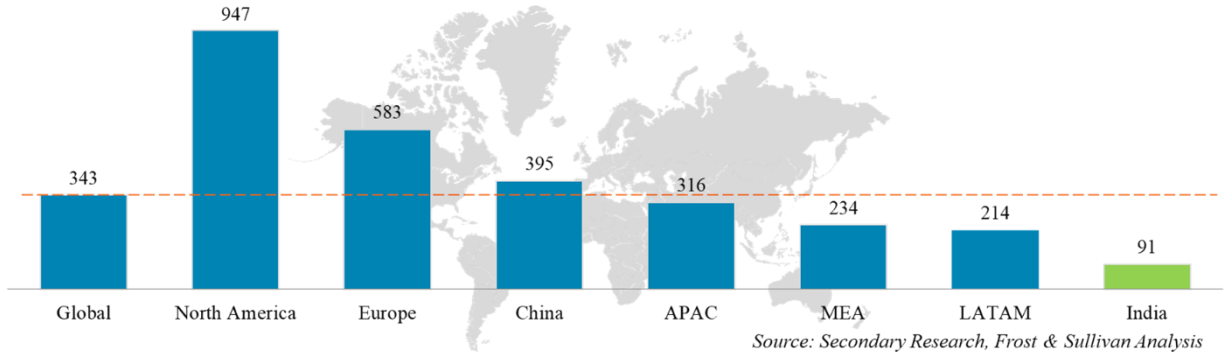
Note: FY2026P total electronic product imports are based on DGCI&S trade data and Frost & Sullivan analysis. The category split is indicative and based on India's CY2024 electronics import composition reported by NITI Aayog.
Source: NITI Aayog Trade Watch Quarterly, DGCI&S, Frost & Sullivan Analysis

The gradual shift from import dependence towards greater domestic manufacturing and value addition is expanding demand for locally manufactured PCBs, PCBAs, modules, testing and system-integration services.As electronics production scales, OEMs and global brands are likely to require domestic partners that can support assembly, testing, sourcing coordination, quality systems, product ramp-up and module-level integration. The opportunity is therefore not limited to replacing imports of finished products; it also includes increasing local value addition within the electronics manufacturing chain.

2.4 India as a Favourable Destination for Electronics Manufacturing

India's attractiveness as an electronics manufacturing destination is supported by three factors: demand headroom, investment momentum and a policy framework that is increasingly focused on deeper value addition. The country's electronics consumption remains materially lower than developed regions and China on a per-capita basis, while domestic production, exports and foreign investment have expanded steadily. This combination gives India both a large internal market and a manufacturing scale-up opportunity.

Exhibit 2.10: Per capita electronics consumption, in USD, Region-wise, CY2024

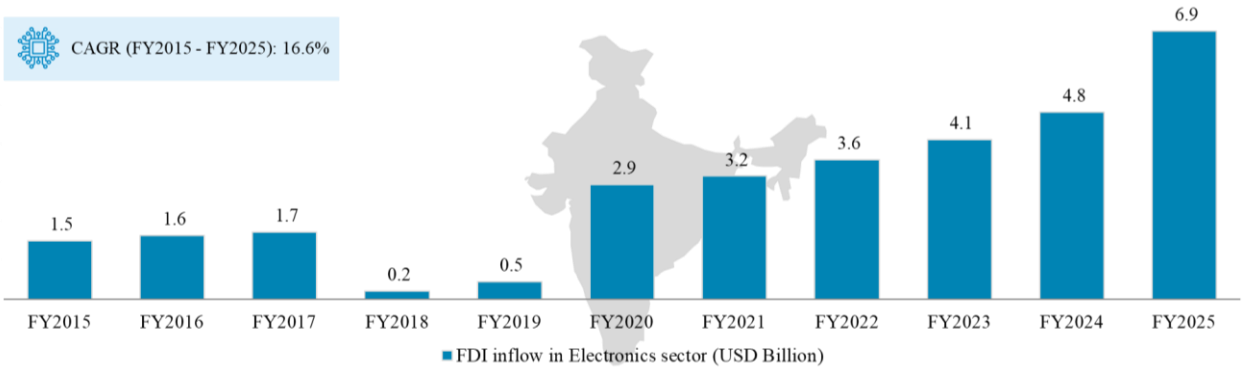


Source: Secondary Research, Frost & Sullivan Analysis

India's per capita electronics consumption was estimated at USD 91 in CY2024, compared with the global average of USD 343, China at USD 395, Europe at USD 583 and North America at USD 947. The gap indicates that India's electronics demand still has substantial room to expand as incomes rise, digital adoption deepens and electronic content increases across household, enterprise, industrial and infrastructure applications.

Foreign investment trends also indicate rising confidence in India's electronics manufacturing ecosystem. FDI inflows into India's electronics sector increased from USD 1.5 billion in FY2015 to USD 6.9 billion in FY2025, implying a CAGR of 16.6%. The increase has been supported by policy incentives, local demand, export opportunities and the need for global companies to build more diversified manufacturing footprints.

Exhibit 2.11: FDI inflow in Electronics sector, USD billion, India, FY2015 – FY2025



Source: Department for Promotion of Industry and Internal Trade (DPIIT), Frost & Sullivan analysis

Global and Indian companies have continued to expand electronics manufacturing activity in India across mobile phones, consumer appliances, IT hardware, room air conditioners, compressors and related electronic products. China remains central to the global electronics supply chain, but India is increasingly being evaluated as a complementary manufacturing and sourcing base. This is especially visible in product categories where India offers a combination of domestic demand, assembly scale, policy support and local supplier development.

Exhibit 2.12: Select global and Indian companies that have set up electronics manufacturing facilities in India

Company / ecosystem	Manufacturing presence / recent update	Products / categories
Apple ecosystem / Tata Electronics / Foxconn	Tata's Hosur plant started iPhone production in 2025. Foxconn's Bengaluru plant was also moving toward initial operations. Reuters reported that Foxconn and Tata together would operate five iPhone factories in India.	Mobile phones, iPhone assemblies, enclosures and related components
Samsung Electronics	Samsung has manufacturing facilities in Noida and Sriperumbudur; its Noida facility manufactures smartphones, tablets and refrigerators.	Mobile phones, tablets, televisions, refrigerators and appliances
LG Electronics India	LG operates plants in Greater Noida and Ranjangaon and began construction of a third manufacturing plant at Sri City in 2025 with an investment of around USD 600 million / INR 5,001 crore.	LED TVs, air conditioners, washing machines, refrigerators, microwave ovens and monitors
Daikin India	Daikin's Sri City plant is its third major manufacturing facility in India, in addition to Neemrana; the plant manufactures residential air conditioners and compressors.	Room air conditioners and compressors
Haier India	Haier expanded its Greater Noida plant in 2025 with new AC production and injection-moulding units, with an investment of INR 1,000 crore.	Refrigerators, air conditioners, washing machines, televisions and appliance components
Whirlpool India	Whirlpool has an established manufacturing base in India across Faridabad, Puducherry and Pune.	Refrigerators, washing machines and appliances

Source: Company websites, Frost & Sullivan Analysis

Government support has been an important enabler of India's electronics manufacturing scale-up. The policy direction has moved from broad manufacturing promotion under 'Make in India' and 'Atmanirbhar Bharat' toward more targeted support for large-scale electronics manufacturing, IT hardware, electronic components, semiconductors, design capabilities and electronics manufacturing clusters. Central schemes such as Production Linked Incentive ("PLI") Scheme, Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors ("SPECS"), Electronics Manufacturing Clusters 2.0 ("EMC 2.0"), the India Semiconductor Mission, the Design Linked Incentive Scheme and the Electronics Components Manufacturing Scheme are intended to improve investment viability, support domestic value addition, promote exports and reduce import dependence in selected parts of the electronics value chain.

India's electronics manufacturing industry is expected to benefit from increasing localisation, supply-chain diversification, domestic value addition and policy support. These factors are expected to increase India's participation in global electronics manufacturing. The policy direction is therefore moving from scale creation toward value-chain depth. The opportunity is expected to develop first in areas where India has demand scale and manufacturing readiness, followed by deeper component and semiconductor-linked localisation over time.

The Electronics Components Manufacturing Scheme ("ECMS") is an important policy intervention for the next stage of India's ESDM development. Unlike assembly-led incentives, ECMS is focused on deepening component manufacturing and improving domestic value addition. These initiatives are expected to deepen India's capabilities across semiconductor design, manufacturing, packaging, materials and equipment.

Exhibit 2.13: Key government schemes supporting electronics manufacturing, India, as of FY2026

Policy / scheme	Launch / notification	Outlay / support mechanism	Latest status
PLI Scheme for Large Scale Electronics Manufacturing	Apr-20	Incentives on incremental sales for mobile phones and specified electronic components; approved outlay of around INR 40,995 crore	MeitY reported that, till March 2026, LSEM PLI had supported cumulative production of INR 11,31,358 crore, cumulative investment of INR 20,972 crore and cumulative employment of 1,78,749.
PLI Scheme 2.0 for IT Hardware	May-23	Budgetary outlay of INR 17,000 crore	27 companies were approved with committed investment of INR 2,955 crore and committed production target of INR 3,51,647 crore; till May 2026, cumulative production reached INR 23,993 crore.
SPECS	Apr-20	Financial incentive of 25% of capital expenditure for eligible electronics components and semiconductor-linked items	Application window has closed; till May 2026, INR 1,210.38 crore had been disbursed to 31 applicants.
EMC 2.0	Apr-20	Financial assistance for electronics manufacturing clusters and common facility centres	As of Dec 2025, 11 EMC projects and 2 CFC projects had been approved across 10 states, covering 4,399.68 acres, with projected investment of INR 1,46,846 crore and estimated employment of about 1.80 lakh.
Semicon India Programme / India Semiconductor Mission	Dec-21	Incentive framework of INR 76,000 crore for semiconductor and display ecosystem	As of Apr 2026, government had approved 10 projects with investment commitments of about INR 1.6 lakh crore; commercial production had commenced from two plants, with two more expected to start commercial production during the year.
Design Linked Incentive Scheme	Dec-21	Financial incentive and design infrastructure support under the semiconductor programme	Government reported support to 24 chip design projects, with 16 tapeouts completed and 13 projects receiving VC funding.
Electronics Components Manufacturing Scheme	Apr-25	Original approved outlay of INR 22,919 crore, increased to INR 40,000 crore in Union Budget 2026-27	As of Apr 2026, 75 applications had been approved across 12 states. Earlier approved applications covered multi-layer PCBs, camera modules, connectors, optical transceivers and enclosures.
Mobile Phone Manufacturing Scheme (MPMS)	Jul-26	Budgetary outlay of INR 62,500 crore. Provides incentives of 2.25%–5.0% on eligible sales, up to 1.5% for domestic sourcing of components and sub-assemblies, and an additional 3% for design and R&D by Indian brands.	Cabinet approved in July 2026 for five years from FY2027 to FY2031. The scheme targets cumulative mobile-phone production of approximately INR 39 lakh crore and around 60,000 direct jobs.
Semicon 2.0 / India Semiconductor Mission 2.0	Announced Feb-26; approved Jul-26	Budgetary outlay of INR 1,27,500 crore covering chip design and Indian IP, semiconductor equipment and materials, fabs, ATMP/OSAT, R&D and talent development.	Cabinet approved in July 2026. It builds on ISM 1.0, under which 12 semiconductor manufacturing projects with cumulative investment exceeding INR 1.64 lakh crore had been approved.

Source: MeitY, PIB, DPIIT, IFCI, India Semiconductor Mission, Frost & Sullivan Analysis

State-level support is also becoming critical for electronics manufacturing investments, especially where projects require large capex, land, infrastructure, utilities and workforce development. Several states provide incentives such as capital subsidies, SGST reimbursement, stamp duty concessions, electricity duty / power tariff support, land and infrastructure support, employment-linked incentives, skilling support and single-window facilitation. These measures can support manufacturing scale-up across electronics assembly, components, PCBAs, modules, enclosures, testing infrastructure and supplier ecosystems.

2.5 China+1 and Supply-chain Diversification

Global electronics supply chains remain highly concentrated across established manufacturing hubs, with China continuing to play a central role because of its scale, supplier depth, component ecosystem and infrastructure. At the same time, global OEMs and electronics brands are increasingly building additional manufacturing locations to improve supply-chain resilience, diversify sourcing risk and serve regional markets more efficiently. India is emerging as one of the key beneficiaries of this shift, supported by a large domestic electronics market, expanding manufacturing

capacity, policy incentives, export momentum and increasing participation by global and domestic electronics manufacturers.

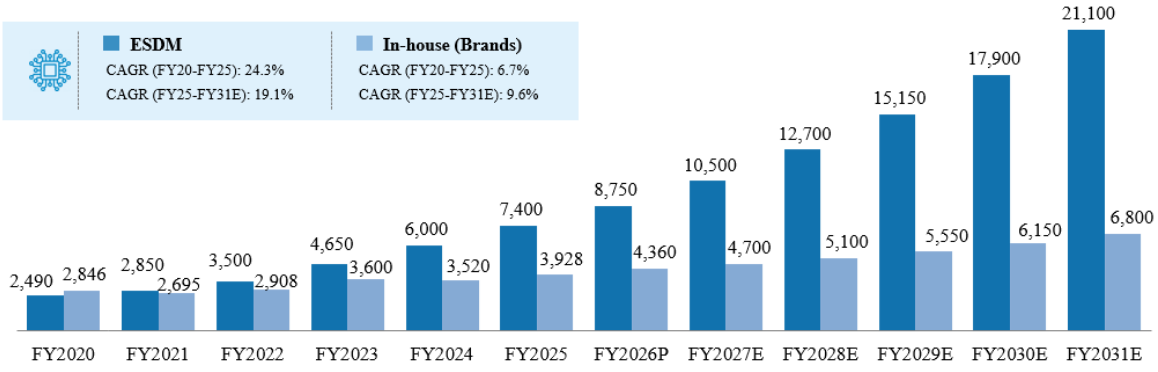
India's opportunity under China+1 is strongest in areas where domestic demand, manufacturing readiness and customer-localisation requirements are converging.These areas include EMS, PCB assembly, box build, testing, module integration, cable assemblies, power electronics and selected components. As global OEMs and electronics manufacturers seek to diversify their supply chains, these segments present a significant export opportunity for domestic EMS players.. As global customers seek credible local manufacturing partners, India's expanding supplier ecosystem can support a gradual increase in domestic value addition and strengthen the country's role as an important electronics manufacturing base over the medium term.

2.6 Role of ESDM Ecosystem in Domestic Electronics Production

India's electronics production is supported by both in-house manufacturing by brands and the wider Electronics System Design and Manufacturing (ESDM) ecosystem.

The role of ESDM is becoming more important as OEMs expand local manufacturing without necessarily building every capability internally. **This is relevant across high-volume categories such as mobile phones, consumer electronics and appliances, as well as more specialised segments such as automotive electronics, industrial electronics, telecom equipment, power electronics, medical devices, aerospace and defence electronics.**

Exhibit 2.14: Electronics production by ESDM and in-house manufacturing, INR billion, India, FY2020 – FY2031E



Source: MeitY, ELCINA, Frost & Sullivan Analysis
ESDM includes EMS and ODM players, PCB and PCBA companies, component suppliers, testing providers, design firms, box-build players and system integrators that support electronics manufacturing across end-use sectors.

ESDM-led manufacturing accounted for approximately INR 7,400 billion of India's electronics production in FY2025, compared with approximately INR 3,928 billion undertaken in-house by brands. By FY2031E, ESDM-led manufacturing is expected to reach approximately INR 21,100 billion, with its share of electronics production increasing gradually from approximately 65% in FY2025 to approximately 76% by FY2031E.

This indicates that the opportunity for local manufacturers is not limited to final product assembly. As product categories become more electronics-intensive, OEMs are likely to require domestic partners for PCB assembly, testing, connectors, cable assemblies, electronic modules, power electronics assemblies, enclosures, sourcing coordination, quality systems and production ramp-up. The depth of this supplier ecosystem will influence how much value India can retain locally as electronics production scales.

The opportunity will differ by capability, customer requirements and end-use application. High-volume categories such as mobile phones, consumer electronics and appliances require scale, cost efficiency, supply-chain coordination and consistent quality. Automotive, industrial, telecom, medical, power electronics and aerospace and defence applications require stronger reliability, traceability, testing discipline, engineering support and lifecycle continuity. ESDM players with capabilities across PCB assembly, testing, box build, module integration, sourcing support and

quality systems can therefore participate across both large-volume and higher-complexity applications as India's electronics manufacturing base expands. As product complexity increases, OEMs are increasingly relying on ESDM and EMS partners that combine advanced manufacturing, engineering and testing capabilities with economies of scale.

2.7 Impact of Increasing Electronic Content Across Product Categories

The addressable opportunity for India's electronics manufacturing ecosystem is expanding not only because end markets are growing, but also because products across sectors are becoming more electronics-intensive. In several industries, value addition is shifting toward control electronics, sensors, embedded systems, communication modules, displays, power electronics, battery management systems and software-enabled hardware.

This shift is visible across both consumer and industrial applications. In automobiles, the transition toward electric and connected vehicles has increased the role of battery management systems, motor controllers, infotainment, telematics, sensors and power electronics. In consumer durables and appliances, higher energy-efficiency standards and smart features are increasing the use of control boards, display boards, inverter drives and sensor-based systems. Similar trends are visible in railways, telecom infrastructure, medical devices, clean energy systems, industrial automation, aerospace and defence.

Exhibit 2.15: Indicative electronic content across key product categories, %, India, FY2025

Product category	Indicative electronic content / electronics intensity	Key electronic systems / applications
Electric vehicles and connected mobility	35-40% of vehicle value in EVs, lower in conventional ICE vehicles	Battery management systems, motor controllers, onboard chargers, DC-DC converters, infotainment, telematics, sensors, ADAS-related electronics
Conventional automotive	15-20% of vehicle value	Engine control units, infotainment, body control modules, sensors, telematics, lighting electronics and safety systems
Consumer durables and appliances	10-20% of product value, depending on product type and feature level	Control boards, inverter drives, display boards, motor-control electronics, sensors, connectivity modules and power boards
Room air conditioners and HVAC systems	15-25% of product value, higher in inverter and smart systems	Inverter drives, control boards, sensors, display units, power boards and connectivity modules
Industrial automation and equipment	20-35% of system value, varying by application	PLCs, HMIs, VFDs, sensors, controllers, drives, power supplies and communication modules
Telecom and digital infrastructure	30-45% of equipment value, depending on equipment type	Network cards, routers, switches, optical modules, base station electronics, power systems and communication modules
Railways and mass transportation	15-30% of system value, depending on rolling stock and signalling systems	Train control systems, signalling electronics, passenger information systems, traction drives, communication systems and safety electronics
Medical electronics	25-40% of device value, depending on equipment complexity	Diagnostic electronics, sensors, imaging electronics, patient monitoring systems, displays and embedded systems
Aerospace and defence electronics	30-50%+ of platform / subsystem value, depending on application	Avionics, radar electronics, communication systems, mission computers, control modules, navigation systems and ruggedized assemblies
Clean energy and power electronics	20-40% of system value, depending on system configuration	Solar inverters, UPS systems, energy storage systems, EV chargers, converters, power control modules and monitoring electronics

Source: Frost & Sullivan Analysis.

Note: *Electronic content ranges are indicative and vary by product design, technology level, application, performance requirements and degree of integration. Values should be read as directional benchmarks.*

The increase in electronic content broadens the opportunity for domestic manufacturing beyond finished-product assembly. As products become more electronics-led, OEMs require suppliers that can support PCB assembly, testing, wire harnessing, module integration, power electronics, quality systems and production ramp-up. This is particularly relevant in categories where reliability, traceability and customer qualification are important, such as automotive electronics, industrial equipment, medical devices, railways, aerospace and defence.

The opportunity will develop unevenly across sectors. High-volume categories such as mobile phones, consumer electronics and appliances support manufacturing scale, while sectors such as automotive, industrial, defence, telecom and medical electronics can create demand for more specialized capabilities. Over time, this can help deepen India's

electronics value chain by expanding demand for PCBAs, components, modules, testing infrastructure and allied manufacturing services.

3. ELECTRONIC SYSTEM DESIGN & MANUFACTURING (ESDM) MARKET

3.1 Global ESDM Market Definition and Scope

The ESDM market represents the electronics design and manufacturing ecosystem that supports the production of electronic products, components, modules and systems. The ecosystem includes companies involved in design support, manufacturing, assembly, testing, integration, sourcing and lifecycle support across multiple electronics applications. ESDM is the broader ecosystem covering electronics design and engineering, component and PCB manufacturing, PCBA, assembly, testing, box build and system integration. EMS forms part of this ecosystem and primarily refers to outsourced manufacturing and related services provided to OEMs. ESDM is therefore broader than EMS, although the two markets overlap.

ESDM companies support a wide range of industries, including consumer electronics and appliances, mobile phones, IT hardware, telecom equipment, industrial electronics, automotive electronics, medical electronics, aerospace and defence electronics, energy electronics and infrastructure-linked electronics. Relevant manufacturing activities and product areas include bare PCB fabrication, PCBA, control boards, electronic modules, power electronics, UPS systems, solar inverters, battery energy storage systems, EV chargers, PLCs, HMIs, VFDs, wire harnesses, box build and integrated electronic systems.

The role of ESDM companies is becoming significantly more important as electronic content increases across end-use industries and OEMs seek manufacturing partners that can support scale, quality, localization, supply-chain execution, testing and system-level integration. This is particularly relevant for India, where electronics manufacturing is expanding from high-volume assembly toward deeper participation across components, modules, control systems, power electronics and allied electronics manufacturing.

3.2 Evolution of the Global ESDM Industry

The global ESDM industry has evolved in response to changes in OEM manufacturing strategies, product complexity, cost structures and supply-chain priorities. The industry initially developed around contract manufacturing and assembly support, as OEMs outsourced production to improve cost efficiency and scale. Over time, ESDM players expanded their role across PCB assembly, testing, supply-chain management, box build, product integration, design support and lifecycle services.

Exhibit 3.1: Evolution of ESDM industry, Global

Period	Industry evolution	Implication for ESDM ecosystem
Pre-1980	Electronics manufacturing and PCB assembly were largely managed in-house by OEMs, with limited third-party manufacturing support.	Independent electronics manufacturing service providers had a limited role.
1980-1990	OEMs began outsourcing selected manufacturing activities to improve cost efficiency, production flexibility and scale.	The EMS model developed around assembly-led outsourcing.
1990-2000	Wider adoption of surface mount technology, automated assembly and board-level manufacturing improved throughput, quality and consistency.	PCBA became a core outsourced manufacturing activity within electronics value chains.
2000-2010	Growth in consumer electronics, computing, communication equipment and mobile devices supported globalized EMS and ODM manufacturing networks.	Scale, supplier access, geography and cost efficiency became key differentiators.
2010-2020	OEMs increasingly relied on manufacturing partners for prototyping, testing, supply-chain management, box build, system integration and selective design support.	ESDM shifted from assembly support to broader value-chain participation.
2020-2030E	Supply-chain resilience, China+1 strategies, EV adoption, industrial automation, energy electronics, cloud infrastructure, data centres and connected devices increased manufacturing complexity.	ESDM players with PCB, PCBA, testing, power electronics, system integration, quality and lifecycle capabilities became more strategically relevant.

Source: Frost & Sullivan Analysis

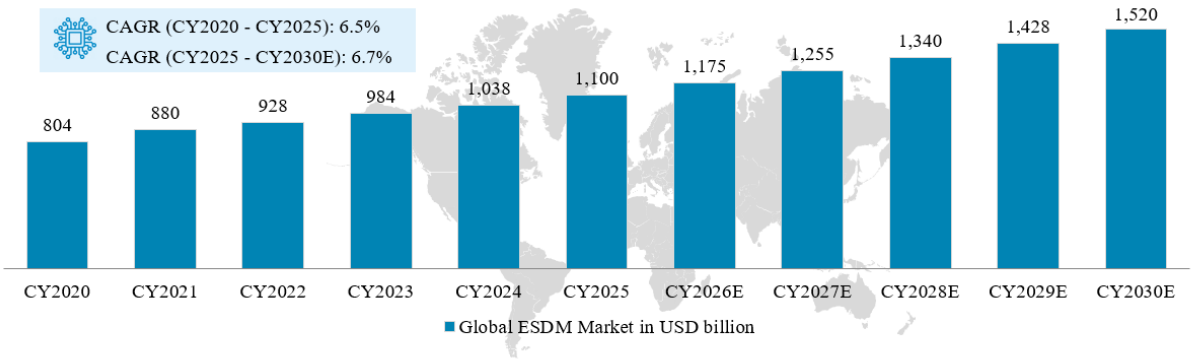
Note: ESDM refers to the electronics design and manufacturing ecosystem covering electronic products, components, modules and systems across consumer, industrial, automotive, telecom, energy and infrastructure applications..

The evolution of ESDM has increased the strategic importance of electronics manufacturing partners. OEMs now require suppliers that can support bare PCB fabrication, PCBA, electronic modules, control boards, power electronics, testing, traceability, quality systems, sourcing and system-level integration. This shift supports India's transition from high-volume assembly toward deeper participation across the value chain.

3.3 Global ESDM Market Size

The global ESDM marketwas estimated at USD 1,100 billion in CY2025 and is expected to reach USD 1,520 billion by CY2030E, growing at a CAGR of 6.7% during CY2025-CY2030E. Growth is expected to be supported by rising electronics content across consumer electronics, computing devices, communication equipment, automotive electronics, industrial automation, energy electronics, data infrastructure and connected devices. OEMs are also increasingly relying on electronics manufacturing partners for scale manufacturing, supply-chain management, quality control, testing, product integration and lifecycle support.

Exhibit 3.2: Size of ESDM industry, USD billion, Global, CY2020 – CY2030E



Source: Frost & Sullivan Analysis

ESDM covers the broader value chain, including electronics design and engineering, components, PCB, PCBA, EMS/ODM manufacturing, testing, box build and system integration. EMS is a subset of ESDM and primarily covers outsourced manufacturing services provided to OEMs.

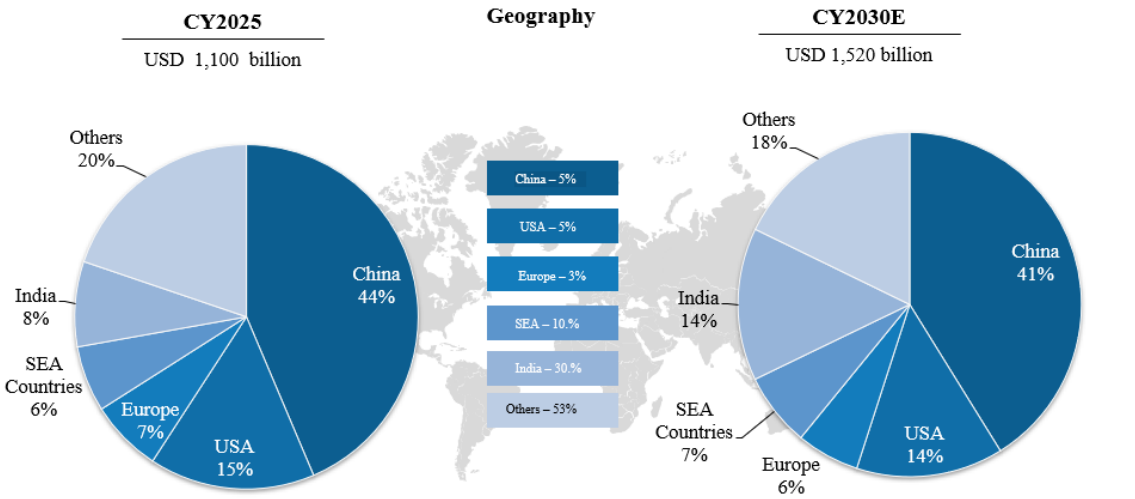
Global ESDM manufacturing is expected to remain concentrated in large electronics manufacturing hubs, with China continuing to be the largest base. At the same time, OEMs are expanding manufacturing footprints across multiple geographies to support customer proximity, supply-chain resilience, cost competitiveness and market access. This is

expected to support higher participation by India and other emerging manufacturing locations within the global electronics value chain.

India is expected to be one of the key beneficiaries of this shift. On an estimated ESDM manufacturing-value basis, India's share of the global ESDM market is expected to increase from approximately 8% in CY2025 to approximately 14.5% by CY2031. The Indian ESDM market is projected to increase from INR 7,400 billion in FY2025 to INR 21,100 billion by FY2031E, growing at a CAGR of 19.1%, compared with global ESDM market growth of 6.7% during CY2025–CY2030E.

The increase in India's share is expected to be supported by domestic electronics demand, mobile phone and consumer electronics manufacturing scale-up, export-oriented production, policy support, OEM outsourcing and gradual development of local electronics manufacturing capabilities Growth is expected to broaden across value-chain activities such as PCB fabrication, PCBA and box build, alongside product areas including control boards, electronic modules, power electronics, UPS systems, solar inverters, battery energy storage systems, EV chargers, PLCs, HMIs, VFDs and integrated electronic systems.. These product areas support India's shift from assembly-led electronics manufacturing toward deeper participation in components, modules, controls, power electronics, testing and system integration.

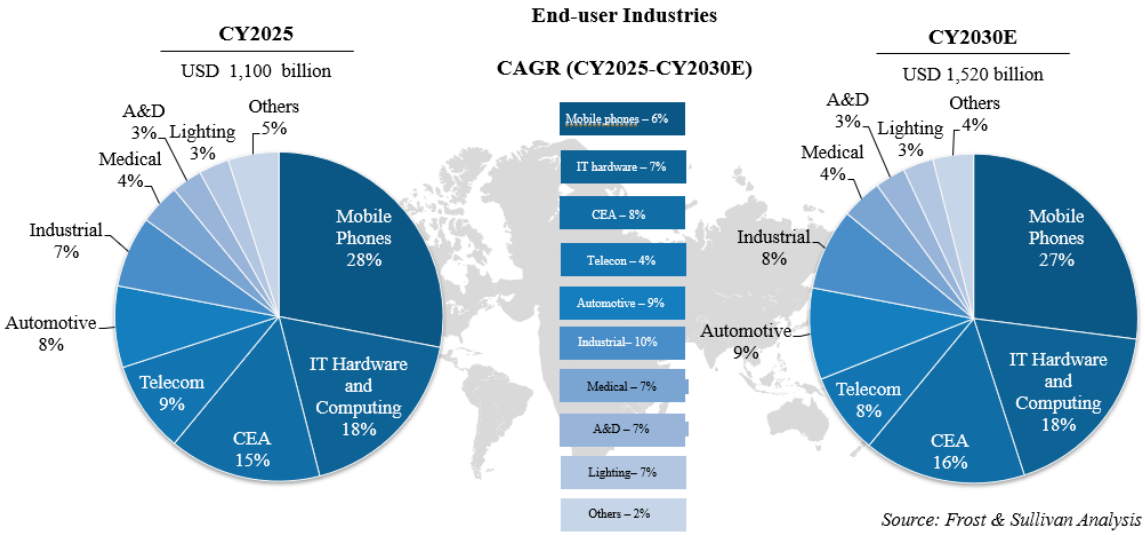
Exhibit 3.3: Size of ESDM industry, USD billion, Global, CY2025 and CY2030E, By Geography



Source: Frost & Sullivan Analysis

India's faster growth reflects its increasing role as a scaled electronics manufacturing base within a more diversified global supply chain. The country is expected to gain share as manufacturing expands across high-volume electronics, consumer electronics and appliances, industrial electronics, automotive electronics, energy electronics and infrastructure-linked applications.

Exhibit 3.4: Size of ESDM industry, USD billion, Global, CY2025 and CY2030E, By End Use Industry



** IT hardware refers to computing and digital infrastructure hardware, including laptops, tablets, desktops/PCs, servers, storage, networking equipment and data-centre hardware.*

** Consumer Electronics & Appliances refers to household electronics and appliance categories such as televisions, RACs, refrigerators, washing machines, microwaves, small appliances and kitchen appliances.*

** Others include energy, power electronics and other specialized electronics applications*

Global ESDM demand is expected to remain anchored by high-volume application industries such as mobile phones, IT hardware and computing, and consumer electronics and appliances. These categories are expected to continue accounting for a significant share of the market, supported by large production volumes, product refresh cycles, OEM outsourcing, export-oriented manufacturing and rising electronics content in consumer and computing devices.

The market mix is expected to diversify gradually over the forecast period. Automotive and industrial electronics are expected to grow faster than the overall market, supported by electric vehicles, connected vehicles, automation, industrial controls, sensors, drives, PLCs, HMIs, VFDs and power electronics. Consumer electronics and appliances are also expected to increase their share, supported by premiumization, smart features, inverterization and higher electronics content across appliances and household electronics.

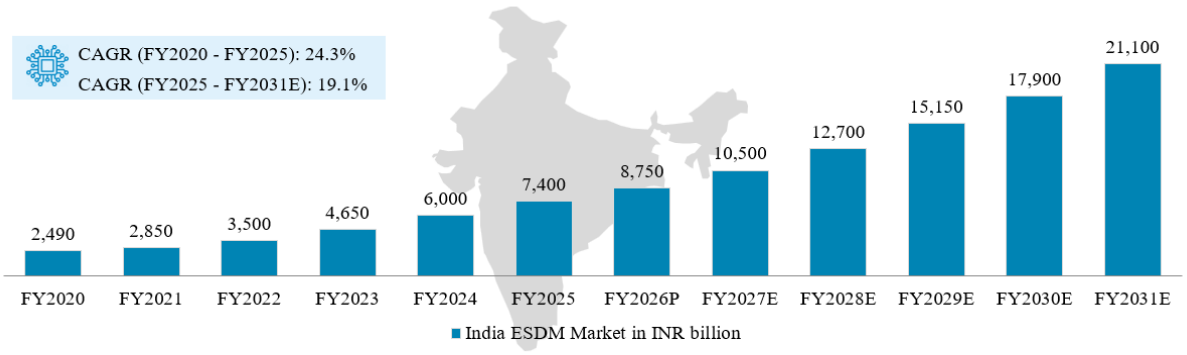
Across these application industries, ESDM players are expected to support a wider range of manufacturing activities, including PCB fabrication, PCBA, electronic modules, control boards, power electronics, sensors, wire harnesses, chargers, power supplies, enclosures, testing, box build and system integration. This broader activity base supports opportunities across both high-volume products and higher-complexity electronics applications.

3.4 Indian ESDM Market

India's ESDM market has scaled materially over the last five years and is expected to remain one of the faster-growing electronics manufacturing markets globally. On an estimated ESDM manufacturing-value basis, the Indian ESDM market was valued at INR 7,400 billion in FY2025 and is estimated to reach INR 8,750 billion in FY2026P. The market is forecast to reach INR 21,100 billion by FY2031E, growing at a CAGR of 19.1% during FY2025-FY2031E.

The growth outlook is supported by India's rising relevance in global electronics manufacturing. India's share of the global ESDM market is expected to increase from approximately 8% in CY2025 to approximately 14.5% by CY2031, reflecting faster growth than the global ESDM market. This growth is supported by domestic electronics consumption, export-oriented production, OEM outsourcing, China+1 supply-chain diversification, Make in India, Atmanirbhar Bharat, policy incentives and gradual deepening of local manufacturing capabilities.

Exhibit 3.5: Size of ESDM industry, INR billion, India, FY2020-FY2031E



Source: MeitY, PIB, Frost & Sullivan Analysis
Note: P refers to provisional / latest available estimate. E refers to estimate.

India's ESDM growth has been led by large-scale electronics manufacturing, particularly mobile phones and consumer electronics and appliances. Over the forecast period, the market is expected to broaden across automotive electronics, industrial electronics, telecom equipment, IT hardware, medical electronics, aerospace and defence electronics, energy electronics and infrastructure-linked electronics. Within these industries, growth is expected across electronic products, modules and sub-assemblies such as control boards, wire harnesses, power supplies, power electronics, UPS systems, solar inverters, battery energy storage systems, EV chargers, PLCs, HMIs, VFDs and integrated electronic systems. This supports a wider opportunity base for electronics manufacturing beyond final assembly.

Policy support is also helping broaden the manufacturing base. Production-linked incentives, Make in India, Atmanirbhar Bharat, the Electronics Components Manufacturing Scheme (ECMS), SPECS, EMC 2.0, semiconductor ecosystem initiatives and state-level incentives are supporting investment in electronics manufacturing, component localization and supply-chain development. India's electronics production reached approximately INR 11.3 trillion in FY2025, while mobile phone production reached approximately INR 5.45 trillion., indicating the scale achieved in domestic electronics manufacturing.

State-level policies and manufacturing clusters are also supporting the development of regional electronics ecosystems. States such as Tamil Nadu, Uttar Pradesh, Karnataka, Telangana, Maharashtra and Gujarat have attracted investments across electronics manufacturing, mobile phones, consumer electronics, components, semiconductor-linked activities, industrial electronics and allied manufacturing. These clusters can support supplier development, workforce availability, logistics access and proximity to OEMs and anchor customers.

The ESDM opportunity is expected to deepen as manufacturing expands into PCBAs, sub-assemblies, control boards, wire harnesses, power supplies, enclosures, sensors, industrial controls, UPS systems, solar inverters, battery energy storage systems, EV chargers, PLCs, HMIs and VFDs. India's ESDM growth is therefore expected to be driven by both scale and complexity.

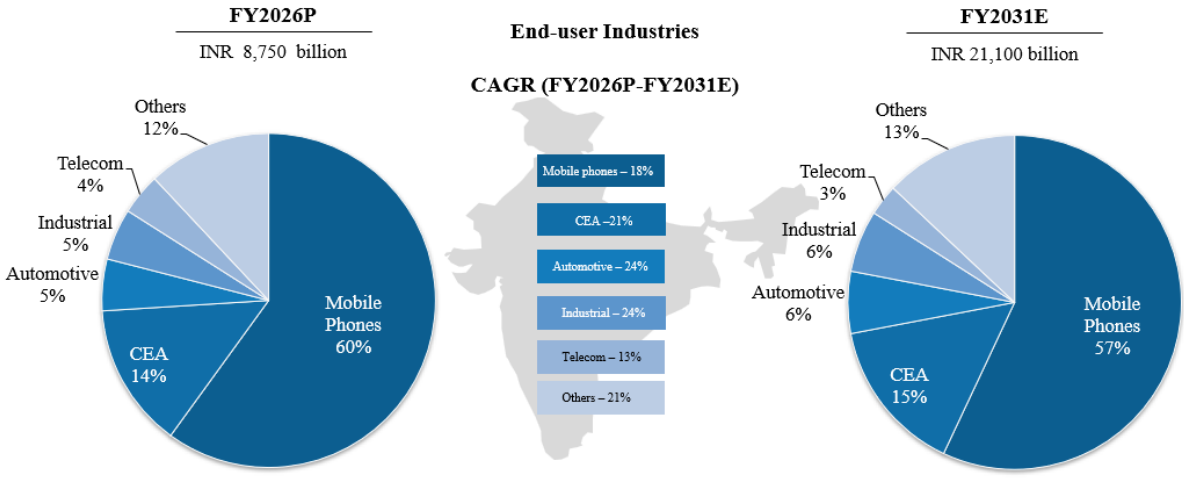
This combination is expected to support India's transition from an assembly-led electronics manufacturing base toward a broader ESDM ecosystem. The pace of this transition will depend on continued investment in components, PCBAs, tooling, testing infrastructure, supplier qualification, skilled labour and quality systems, but the direction of policy and market demand remains supportive of deeper domestic electronics manufacturing.

3.5 Indian ESDM Market Segmentation by Key End-user Industries

Mobile phones are expected to remain the largest end-user industry within the Indian ESDM market, supported by large-scale manufacturing, export orientation and continued localization of selected components and sub-assemblies. Consumer electronics and appliances are expected to remain a key growth segment, supported by rising household penetration, premiumization, inverterization, smart features, energy-efficiency requirements and domestic manufacturing scale-up across electronics-rich appliances.

CEA is expected to increase its share of India's ESDM market from 14% in FY2026P to 15% by FY2031E, reflecting the positive outlook for electronics-rich consumer durables and appliances. Growth is expected to be supported by rising penetration of room air conditioners, refrigerators, washing machines and other appliances, along with increasing adoption of inverter-based and smart products. This is expected to create demand for electronics manufacturing across appliance control systems, embedded electronics, power electronics, modules, testing and sub-assembly integration.

Exhibit 3.6: Size of ESDM industry, INR billion, India, FY2026P and FY2031E, by end-user industry



Source: MeitY, ELCINA, Frost & Sullivan Analysis

CEA – Consumer electronics and appliances

Others include: IT, Lighting, Aerospace & defense, Medical, Energy energy and power electronics, UPS systems, solar inverters, battery energy storage systems, EV chargers, PLCs, HMIs, VFDs and other allied electronics applications.

P refers to provisional/latest available estimate. E refers to estimate.

Domestic value addition is also expected to improve across key ESDM industries, although the pace of improvement will vary by segment. In mobile phones, India has achieved large-scale domestic manufacturing, but further DVA improvement will depend on deeper localization of components, modules and selected sub-assemblies. In consumer

electronics and appliances, DVA improvement is expected to be supported by localization of appliance control systems, inverter electronics, motors, power electronics, mechanical components and other sub-assemblies. In automotive electronics, growth is expected to be driven by both ICE vehicles and electric vehicles, with increasing electronic content across vehicle control, safety, infotainment, telematics and powertrain electronics.

Industrial and energy electronics are expected to become larger end-user industries within India's ESDM market. Demand in these areas is supported by automation, electrification, power management, renewable energy, energy storage and infrastructure-linked electronics. These industries create demand for electronics manufacturing across control systems, embedded electronics, power electronics, industrial modules, testing, thermal management, quality systems, traceability and system integration.

Policy support is expected to influence the market mix across sectors. Large-scale electronics manufacturing incentives have supported scale in mobile phones and IT hardware, while component-focused schemes and electronics manufacturing clusters are expected to support localization across PCBAs, sub-assemblies, components, power electronics and allied electronics manufacturing. Sector-specific growth in automotive electronics, energy electronics, industrial automation, medical devices and aerospace and defence is expected to further expand demand for qualified domestic manufacturing partners with testing, reliability, certification and system integration capabilities.

3.6 Key growth drivers and emerging trends shaping the Indian ESDM industry

India's ESDM market is being supported by a combination of domestic demand growth, export-oriented manufacturing, supply-chain diversification, increasing electronic content across end-use sectors and a more targeted policy framework.

Scale creation through electronics manufacturing incentives

Large-scale manufacturing incentives have supported scale across multiple end-use industries. The PLI scheme for large-scale electronics manufacturing supports mobile phones and specified electronic components, while PLI 2.0 supports laptops, tablets, all-in-one PCs and servers. The separate PLI scheme for White Goods supports components for air conditioners and LED lighting, including compressors, heat exchangers, control assemblies and motors. Together, these schemes are broadening domestic manufacturing beyond mobile phones and creating demand for PCBAs, components, testing and product integration.

Component localization and PCB manufacturing

The Electronics Components Manufacturing Scheme is an important policy intervention for the next stage of India's ESDM development. Unlike assembly-led incentives, ECMS is focused on deepening component manufacturing and improving domestic value addition. The scheme has an original approved outlay of INR 22,919 crore, increased to INR 40,000 crore in Union Budget 2026-27, and is scheduled to run for six years, with an optional one-year gestation period. As of April 2026, 75 applications had been approved across 12 states under ECMS.

ECMS is directly relevant for PCB manufacturing and allied electronics because the scheme supports localization across components and sub-assemblies used in mobile phones, IT hardware, consumer electronics, automotive electronics, telecom equipment, industrial electronics and energy electronics. ECMS approvals also include PCB and HDI PCB manufacturing projects. Under the third tranche of ECMS approvals announced in January 2026, PCB / HDI approvals were granted to applicants including India Circuits, Vital Electronics, Signum Electronics, Epitome Components, BPL, AT&S India, Ascent-K Circuit, CIPSA TEC India and Shogini Technoarts. These approvals are expected to strengthen domestic PCB manufacturing, reduce import dependence and support component localization across mobile phones, telecom, consumer electronics, automotive electronics and IT hardware. Separately, Ascent Circuits has received ECMS approval for its planned multilayer PCB manufacturing project in Tamil Nadu.

This is important because India's electronics manufacturing growth has so far been led largely by final assembly. The next stage of domestic value addition will depend on deeper localization of bare PCBs, PCBAs, connectors, optical transceivers, passive components, camera modules, enclosures, power electronics, wire harnesses and other inputs. A stronger component base can reduce import dependence and improve the depth of India's ESDM ecosystem over time.

Cluster-led manufacturing and state-level support

Electronics Manufacturing Clusters under EMC 2.0 and state-level incentives are supporting the infrastructure required for deeper electronics manufacturing. As of December 2025, 11 EMC and 2 common facility centre projects had been approved across 10 states, covering 4,399.68 acres, with project cost of INR 5,226.49 crore, projected investment of INR 1,46,846 crore and estimated employment of approximately 1.80 lakh people. Approved EMCs had also received investment commitments of INR 1,13,000 crore from 123 land allottees, with 9 units having started production. In Maharashtra, the Ranjangaon EMC had reached advanced implementation status by March 2026, with approximately 80% infrastructure completion and anchor units having started production.

State-level electronics policies in Tamil Nadu, Uttar Pradesh, Karnataka, Telangana, Maharashtra and Gujarat are also supporting investments through land, fiscal incentives, power support, skill development, infrastructure and cluster-led manufacturing ecosystems. Recent PCB and RAC-linked manufacturing investments around emerging clusters, including the Gautam Buddha Nagar/YEIDA region, indicate how electronics and appliance manufacturing ecosystems can benefit from supplier proximity, workforce availability and shared infrastructure.

Semiconductor ecosystem development

Semiconductor ecosystem development is a long-term structural driver for the ESDM industry. Semiconductors are critical inputs across mobile phones, consumer electronics, automotive electronics, telecom equipment, industrial systems, power electronics, data centres, AI infrastructure and defence electronics. Under Semicon 1.0, 12 semiconductor manufacturing units had been approved with cumulative investment exceeding INR 1.64 lakh crore as of July 2026, with Micron, Kaynes and CG Semi having commenced commercial production.

In July 2026, the Union Cabinet approved Semicon 2.0 with a total outlay of INR 1,27,500 crore. The programme focuses on semiconductor design and intellectual property, machines and materials, additional fabs, advanced ATMP/OSAT facilities, research and development, and talent development. It is expected to deepen India's capabilities across semiconductor design, manufacturing, packaging, materials and equipment.

Selective trade measures and domestic manufacturing support

India has also used selective trade-remedy measures to support domestic component manufacturing where import dependence remains high. For example, anti-dumping duty has been imposed on selected printed circuit boards imported from China PR and Hong Kong for a five-year period beginning March 2024, with exemptions for categories such as mobile phone PCBs, populated PCBs, HDI PCBs, rigid-flex PCBs, PCBs with more than six layers and IC packaging substrates.

These measures can support domestic PCB manufacturing where local capability exists. However, the impact needs to be assessed carefully because higher input costs can affect downstream electronics manufacturers if domestic supply is not available at the required scale, quality and price. The policy direction therefore needs to balance domestic supplier development with the cost competitiveness of downstream ESDM players.

Sector-level impact of policy support

The impact of these policies is expected to vary by sector. Mobile phones and IT hardware benefit most directly from scale-oriented manufacturing incentives and export-linked production. Consumer electronics, RACs and appliances benefit from domestic demand growth, GST rationalization and localization of appliance components, control electronics, inverter systems, motors and power electronics.

Automotive electronics growth is expected to be driven by both ICE vehicles and electric vehicles, with rising demand for infotainment systems, telematics, body control modules, sensors, battery management systems, motor controllers and power electronics. Industrial and energy electronics are expected to benefit from demand for PLCs, HMIs, VFDs, UPS systems, solar inverters, battery energy storage systems, EV chargers and other power conversion equipment.

Medical electronics, aerospace and defence electronics are expected to require higher-reliability manufacturing, certification, testing, traceability and lifecycle support.

Overall, India's policy framework is moving from scale creation toward manufacturing depth. Large-scale assembly has helped build volume, while ECMS, SPECS, EMC 2.0, semiconductor ecosystem initiatives, state-level incentives and selective trade measures are expected to support domestic value addition across components, PCBs, PCBAs, sub-assemblies, power electronics, testing and integrated systems. The opportunity remains positive, but execution will depend on supplier development, component availability, testing infrastructure, availability of skilled manpower, quality systems, customer qualification and global cost competitiveness.

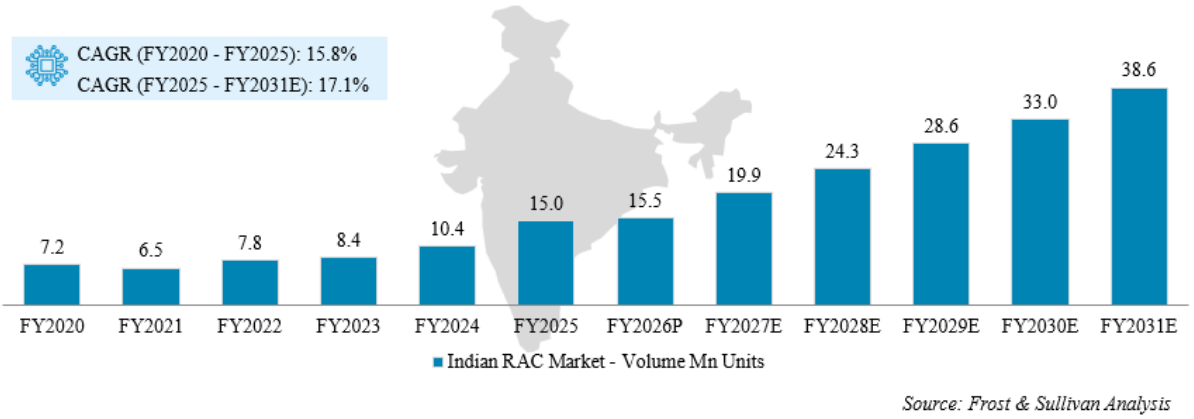
3.7 India Room Air Conditioners (RAC) market

The Indian Room Air Conditioner (RAC) market is one of the key downstream growth opportunities for the domestic ESDM and white goods manufacturing ecosystem. Growth is being supported by low household penetration, rising disposable income, urbanization, higher electricity access, increasing cooling needs, easy consumer financing and demand for energy-efficient products.

The India Cooling Action Plan had estimated RAC penetration at approximately 12% of households and projected penetration to increase materially over the long term. This low penetration, combined with rising temperatures, higher urban income levels, increasing affordability and replacement demand, creates a strong structural demand base for the industry.

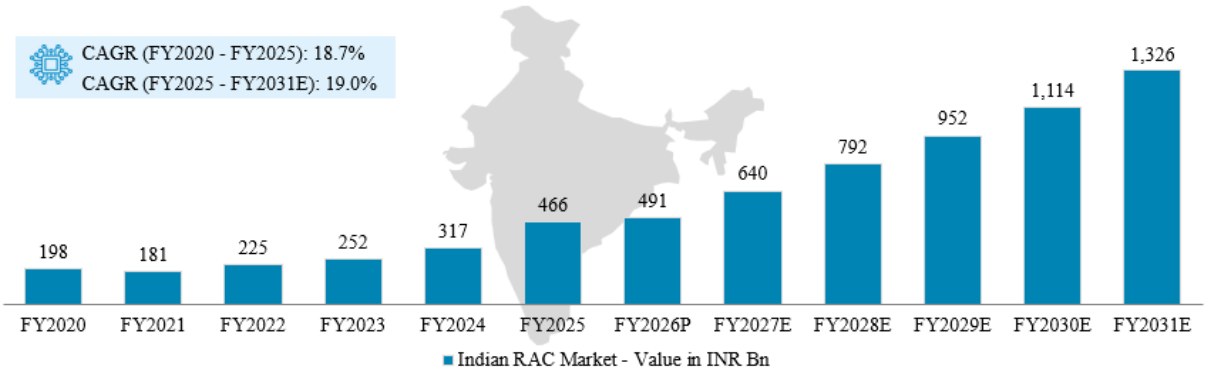
The Indian RAC market was estimated at 15.0 million units in FY2025 and is estimated to reach 15.5 million units in FY2026P. The market is forecast to reach 38.6 million units by FY2031E, growing at a CAGR of 17.1% during FY2025-FY2031E. In value terms, the market was estimated at INR 465.9 billion in FY2025 and is estimated to reach INR 490.7 billion in FY2026P. It is forecast to reach INR 1,325.5 billion by FY2031E, growing at a CAGR of 19.0% during FY2025-FY2031E.

Exhibit 3.7: Indian RAC market, volume in million units, FY2020 – FY2031E



Source: Frost & Sullivan Analysis

Exhibit 3.8: Indian RAC market, value in INR Bn, FY2020 – FY2031E



Source: Frost & Sullivan Analysis

The market has grown from a relatively low base, with demand supported by first-time buyers, replacement demand, rising adoption of inverter RACs and increasing preference for energy-efficient products. Growth in the RAC market is also relevant for India's ESDM ecosystem because the opportunity is not limited to finished RAC assembly. It also includes compressors, motors, heat exchangers, control assemblies, inverter boards, sensors, wire harnesses, remote-control systems, plastics, sheet metal, power electronics and other electronics-linked components.

Domestic value addition in RACs is expected to improve gradually as localization increases across both mechanical and electronics-linked components. India already has a growing base for RAC assembly and selected components, while further DVA improvement is expected to come from deeper localization of compressors, heat exchangers, motors, control boards, inverter electronics, sensors, harnesses and other sub-assemblies. The shift toward inverter and energy-efficient RACs is expected to increase the importance of PCBAs, power electronics, testing and quality systems within the domestic RAC manufacturing value chain.

Leading EMS and white goods manufacturing players operating in the Indian RAC ecosystem include Amber Enterprises, PG Electroplast, EPack Durables, Dixon Technologies, Blue Star, LG, Samsung, Voltas, Johnson Controls-Hitachi Air Conditioning India, Daikin, Havells / Lloyd and Virtuoso Optoelectronics. The market also has a growing base of component and sub-assembly suppliers supporting heat exchangers, motors, control assemblies, copper tubes, plastic parts, sheet metal, PCBA and final assembly requirements.

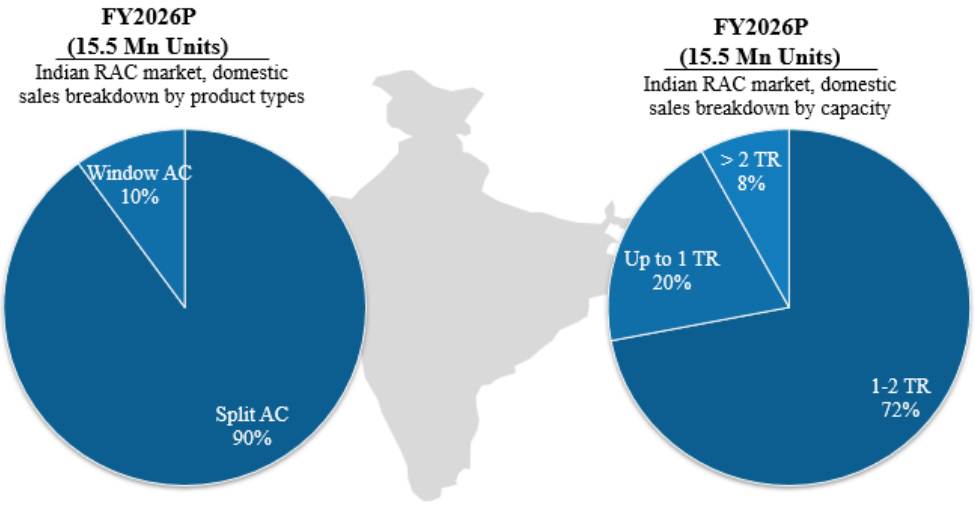
3.7.1. Market segmentation by product types

The Indian RAC market is dominated by split air conditioners, which accounted for an estimated 90.0% of domestic RAC volumes in FY2026P. Split RACs have gained share due to better aesthetics, lower operating noise, flexible installation, wider product range and increasing availability of inverter-based models. Their suitability for urban homes and apartments has also supported adoption, particularly in replacement and first-time purchase categories.

Window RACs accounted for an estimated 10.0% of domestic RAC volumes in FY2026P. These products remain relevant in select use cases due to lower upfront cost, simpler installation in suitable room layouts and relatively easier servicing.

The dominance of split RACs is relevant for the ESDM ecosystem because these products typically have higher electronics content compared with basic window units. Growth in split and inverter RACs supports demand for inverter control boards, motor-control electronics, sensors, display boards, remote-control systems, wire harnesses, PCBAs and testing services.

Exhibit 3.9: Indian RAC market, Market Segmentation by Product Type and Capacity, %, FY2026P



Source: Frost & Sullivan Analysis

3.7.2. Market segmentation by capacity

The 1-2 TR category is the largest RAC capacity segment in India, accounting for an estimated 72.0% of domestic RAC volumes in FY2026P. This reflects the typical cooling requirement of Indian households, where room sizes commonly fall in the range of 150-250 square feet. Within this category, 1.5 TR models are widely used across urban and semi-urban households due to their suitability for standard bedroom and living-room applications.

RACs with capacity up to 1 TR accounted for an estimated 20.0% of the market in FY2026P and are primarily used for smaller rooms, compact urban homes and cost-sensitive purchases. RACs above 2 TR accounted for an estimated 8.0% of volumes and are typically used in larger rooms, premium homes, offices, retail spaces and other higher cooling-load applications.

3.7.3. Market segmentation by star rating

Bureau of Energy Efficiency star ratings are an important purchase consideration in the RAC market because they indicate energy efficiency and influence operating cost. The 3-star segment accounted for an estimated 71.0% of domestic RAC volumes in FY2026P, while 4-star and 5-star products together accounted for an estimated 29.0%.

The 3-star category remains the mass-market segment because it offers a balance between upfront price and energy savings. This is especially relevant in India, where many households use RACs seasonally or for limited daily hours, making upfront affordability an important purchase factor. Higher star-rated products are more relevant for consumers with longer usage hours, higher electricity bills, stronger preference for lifecycle savings or premium product requirements.

Growth in inverter and higher-efficiency RACs is expected to increase the electronics intensity of the category. These products typically require more advanced control boards, inverter drives, sensors, motor-control electronics and testing requirements compared with basic fixed-speed models. This supports the long-term opportunity for domestic PCBA, power electronics, controls and component manufacturing within the RAC value chain.

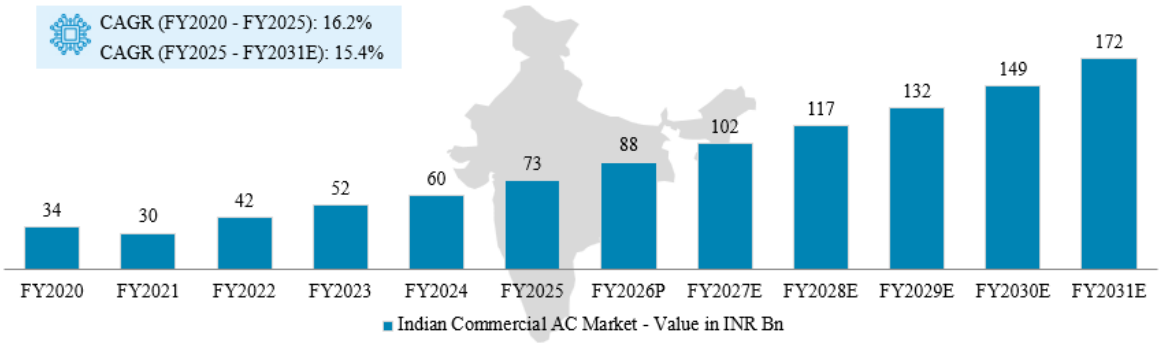
3.8 India Commercial Air Conditioning Systems Market

The Indian Commercial Air Conditioning Systems market is expected to remain on a steady growth trajectory, supported by expansion in commercial real estate, healthcare, hospitality, retail, institutional infrastructure, data centres and urban infrastructure. Demand is also being supported by replacement of older cooling systems, higher focus on energy efficiency, smart building adoption, and the need for better indoor air quality and reliability in commercial facilities.

For the purpose of this section, commercial air conditioning systems include building and infrastructure cooling systems such as chillers / central HVAC systems, VRF / VRV systems, cassette ACs, ducted systems and other specialized commercial cooling systems. Mobility AC systems are not included in this section unless separately specified, as they are typically linked to automotive and transport cooling applications rather than commercial building air conditioning.

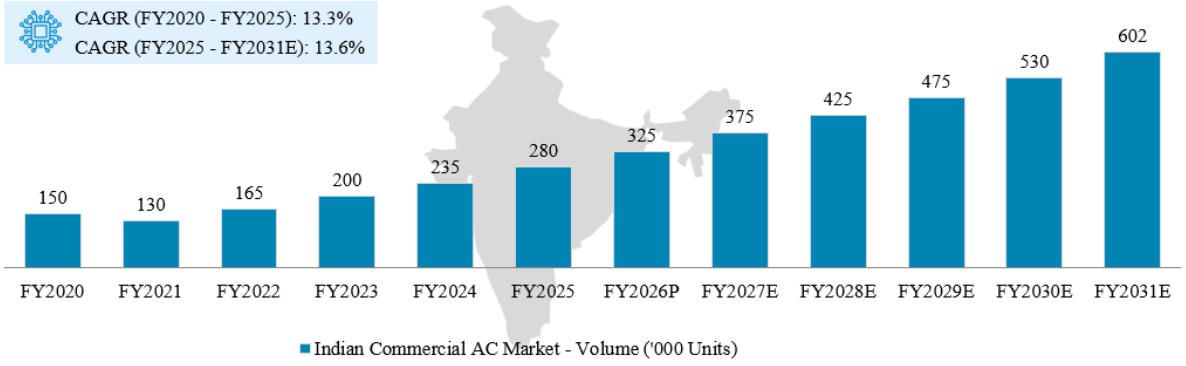
The Indian Commercial AC market was valued at INR 72.7 billion in FY2025 and is estimated to reach INR 87.5 billion in FY2026P. The market is forecast to reach INR 171.9 billion by FY2031E, growing at a CAGR of 15.4% during FY2025-FY2031E. In volume terms, the market was estimated at 280 thousand units in FY2025 and is estimated to reach 325 thousand units in FY2026P. It is forecast to reach 602 thousand units by FY2031E, growing at a CAGR of 13.6% during FY2025-FY2031E.

Exhibit 3.10: Indian Commercial AC market, value in INR Bn, FY2020 – FY2031E



Source: Frost & Sullivan Analysis

Exhibit 3.11: Indian Commercial AC market, volume in thousand units, FY2020 – FY2031E



Source Frost & Sullivan Analysis

**Volume is estimated based on market value, product mix and weighted average selling price assumptions*

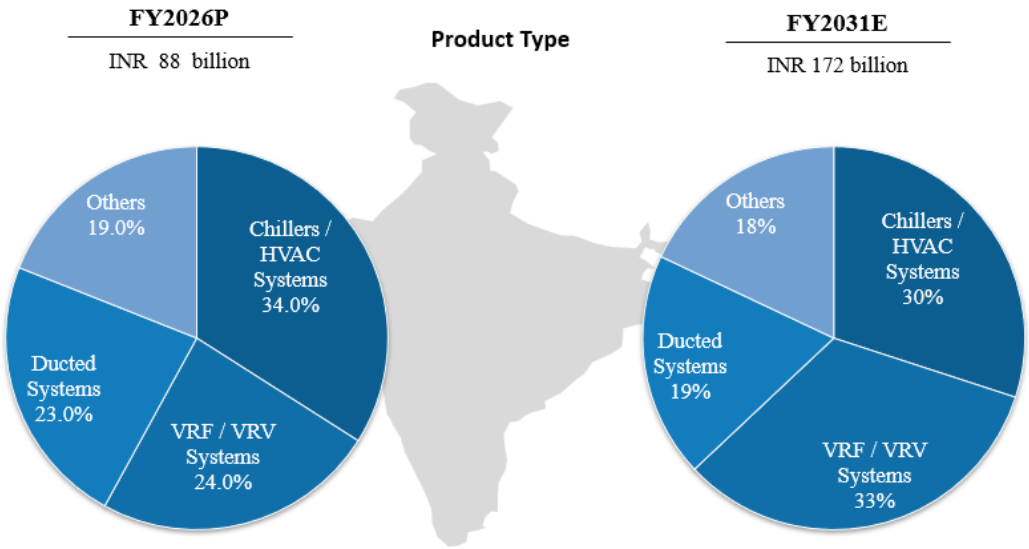
Commercial AC systems are relevant for the domestic ESDM and white goods manufacturing ecosystem because the opportunity is not limited to finished equipment assembly. These systems require control electronics, inverter drives, sensors, communication modules, wiring assemblies, power electronics, motors, compressors, heat exchangers, sheet metal, testing and installation-linked support. As smart and energy-efficient systems gain share, the role of electronics, controls and system integration is expected to increase within commercial cooling applications.

Commercial AC systems are more project-led than residential RACs. Demand is influenced by new construction, retrofit cycles, commercial building standards, energy-efficiency requirements, operating cost considerations and customer preference for reliable after-sales service. This creates opportunities not only for OEMs, but also for manufacturers and suppliers of control electronics, sensors, drives, power electronics, communication modules, wiring harnesses, heat exchangers, sheet metal parts, motors, compressors and testing services.

3.8.1. Market segmentation by product type

The Indian commercial AC market comprises chillers and central HVAC systems, VRF/VRV and cassette systems, ducted systems and other specialized cooling solutions. Chillers and central HVAC remain important for large facilities such as hospitals, hotels, malls, airports, offices and institutional buildings. Their share is expected to moderate gradually as modular and distributed systems gain adoption across offices, hotels, retail and mid-sized commercial buildings.

Exhibit 3.12: Indian Commercial AC market, by Product Type, FY2026P and FY2031E



Source: Frost & Sullivan Analysis

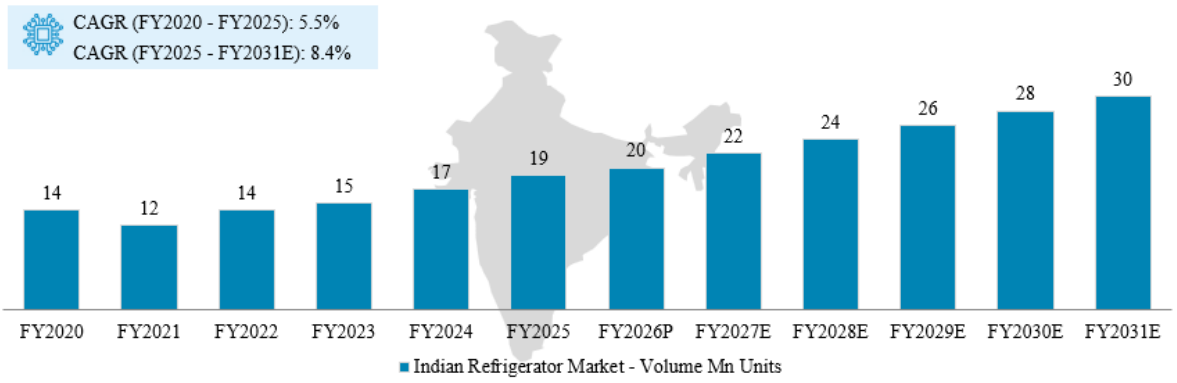
Note: Other specialized commercial cooling systems include packaged AC systems, precision cooling units, floor-standing commercial units and application-specific commercial cooling systems not classified under chillers / central HVAC systems, VRF / VRV systems or ducted systems.

3.9 India Refrigerator Market

The Indian refrigerator market is expected to grow steadily, supported by low household penetration, rising disposable incomes, urbanization, increasing electrification, higher food storage requirements, expansion of modern retail and e-commerce, and increasing consumer preference for larger and better-featured products. Refrigerator penetration in Indian households remains around one-third, indicating continued headroom for growth compared with more mature appliance markets.

The Indian refrigerator market was estimated at 18.6 million units in FY2025 and is estimated to reach 20.3 million units in FY2026P. The market is forecast to reach 30.1 million units by FY2031E, growing at a CAGR of 8.4% during FY2025-FY2031E. In value terms, the market was estimated at INR 340.0 billion in FY2025 and is estimated to reach INR 390.0 billion in FY2026P. It is forecast to reach INR 785.0 billion by FY2031E, growing at a CAGR of 15.0% during FY2025-FY2031E.

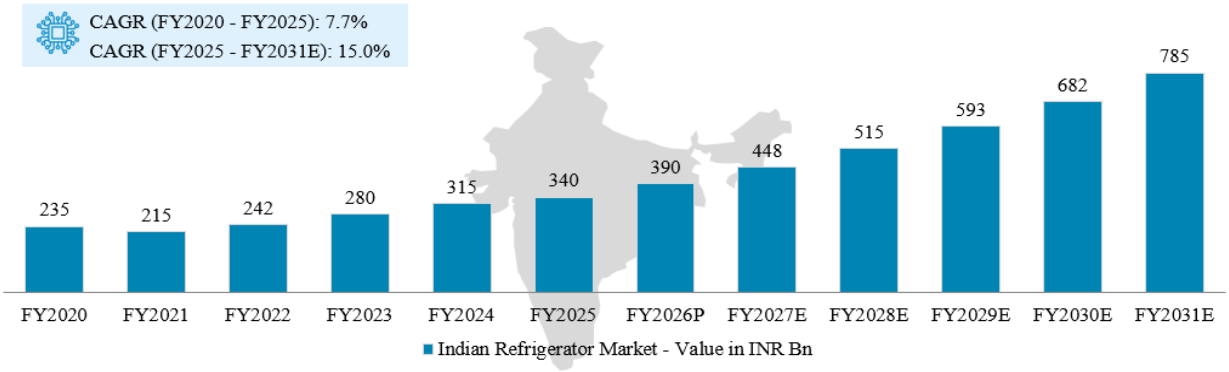
Exhibit 3.13: Indian Refrigerator market, volume in million units, FY2020 – FY2031E



Source: Frost & Sullivan Analysis

**Volume is estimated based on market value, product mix and weighted average selling price assumptions*

Exhibit 3.14: Indian Refrigerator market, value in INR Bn, FY2020 – FY2031E



Source: Industry publications, Frost & Sullivan Analysis

Growth in the refrigerator market is relevant for India's ESDM and white goods manufacturing ecosystem because the opportunity extends beyond finished-product assembly. Refrigerator manufacturing supports demand for compressors, motors, heat exchangers, sensors, wiring harnesses, control boards, inverter electronics, displays, sheet metal, plastics, insulation materials and testing services. As the market shifts toward energy-efficient and feature-rich products, electronic content is expected to increase through inverter controls, temperature sensors, display boards, connectivity modules and power electronics.

Domestic value addition is expected to improve gradually as localization deepens across mechanical, electrical and electronics-linked components. India already has meaningful localization in selected sheet metal, plastic parts, cabinet assemblies and wiring-related parts, while further opportunities remain in compressors, motors, control assemblies, PCBAs, sensors, inverter electronics, displays, heat exchangers and other sub-assemblies. The pace of DVA improvement will depend on supplier development, scale, technology capability, quality systems and OEM localization strategies.

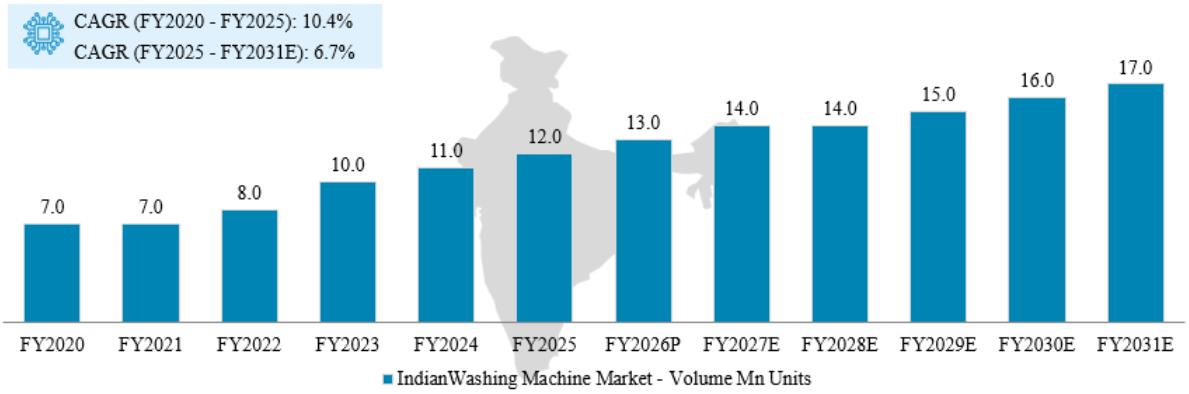
3.10 India Washing Machine Market

The Indian washing machine market is expected to grow steadily, supported by rising household incomes, urbanization, increasing participation of women in the workforce, rising preference for convenience-led appliances, lower availability of domestic help in urban areas, and increasing penetration in semi-urban and rural households.

Growth is also being supported by replacement demand and gradual consumer migration from semi-automatic models toward fully automatic top-load and front-load washing machines.

The Indian washing machine market was estimated at 12 million units in FY2025 and is estimated to reach 13 million units in FY2026P. The market is forecast to reach 17 million units by FY2031E, growing at a CAGR of 6.7% during FY2025-FY2031E. In value terms, the market was estimated at INR 270.0 billion in FY2025 and is estimated to reach INR 292.0 billion in FY2026P. It is forecast to reach INR 440.0 billion by FY2031E, growing at a CAGR of 8.5% during FY2025-FY2031E.

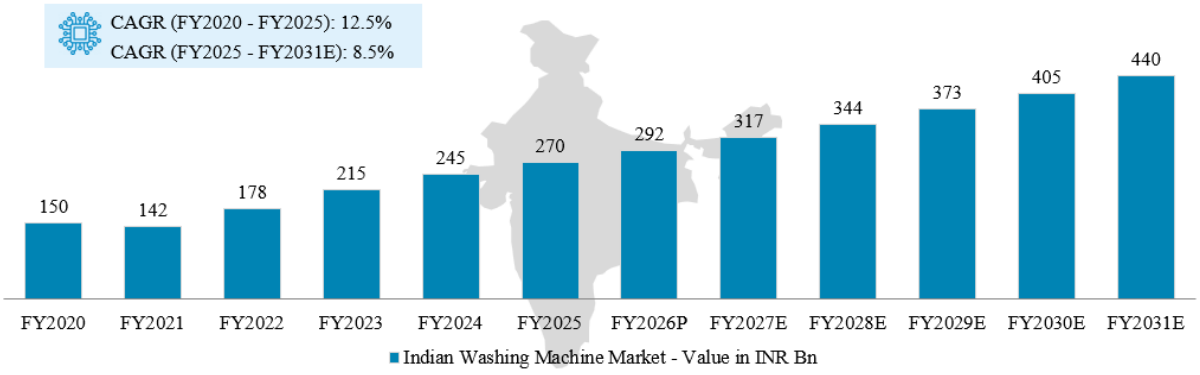
Exhibit 3.15: Indian Washing Machine market, volume in million units, FY2020 – FY2031E



Source: Frost & Sullivan Analysis

**Volume is estimated based on market value, product mix and weighted average selling price assumptions*

Exhibit 3.16: Indian Washing Machine market, value in INR Bn, FY2020 – FY2031E



Source: Industry publications, Frost & Sullivan Analysis

Growth in the washing machine market is relevant for India's ESDM and white goods manufacturing ecosystem because the opportunity extends beyond finished-product assembly. Washing machines require motors, pumps, valves, control boards, sensors, displays, wiring harnesses, sheet metal, plastic tubs, drums, power electronics, inverter drives and testing services.

Growth is expected to normalize from historical levels as the market expands from a larger base. Demand will continue to be supported by low household penetration, replacement purchases and rising adoption of fully automatic, inverter-based and smart washing machines. Premiumization is expected to keep value growth above volume growth.

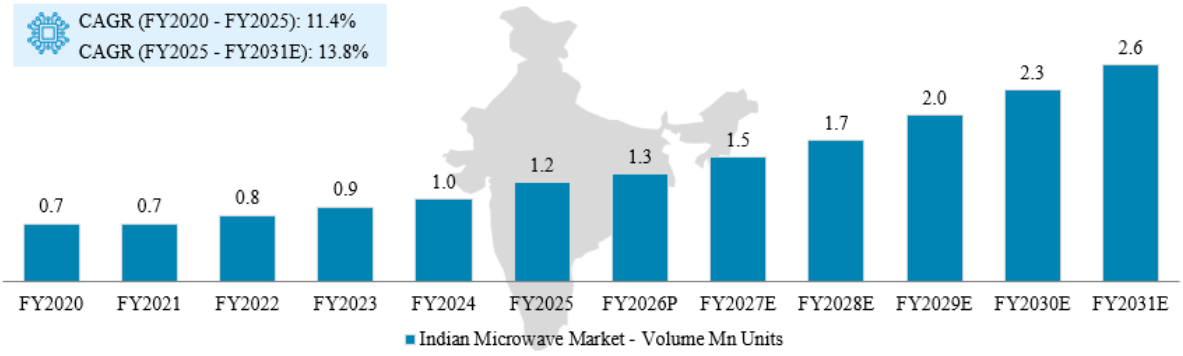
Domestic value addition is expected to improve gradually as localization deepens across mechanical, electrical and electronics-linked components. India already has a growing manufacturing base for washing machine assembly, sheet metal parts, plastic components and selected wiring assemblies. Further DVA improvement is expected to come from localization of motors, pumps, valves, control boards, PCBAs, inverter electronics, sensors, display modules, wire harnesses and other sub-assemblies. The pace of improvement will depend on scale, supplier capability, OEM sourcing strategies, quality systems and component-level manufacturing depth.

3.11 India Microwave Market

The Indian microwave market is a smaller category within major kitchen appliances, but it is expected to grow steadily over the medium term. Demand is being supported by rising urbanization, higher disposable income, nuclear households, increasing preference for convenience-led cooking appliances, growth in modular kitchens and gradual adoption of premium kitchen appliances in urban and semi-urban households.

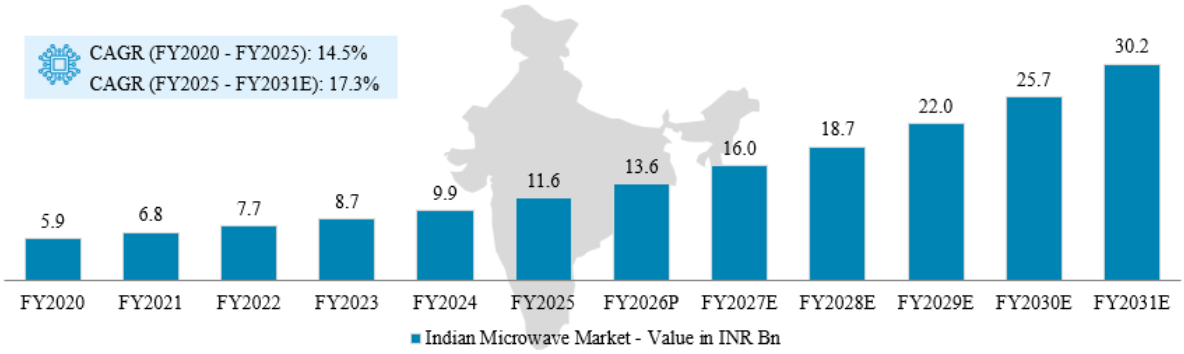
The Indian microwave market was estimated at 1.2 million units in FY2025 and is estimated to reach 1.3 million units in FY2026P. The market is forecast to reach 2.6 million units by FY2031E, growing at a CAGR of 13.8% during FY2025-FY2031E. In value terms, the market was estimated at INR 11.6 billion in FY2025 and is estimated to reach INR 13.6 billion in FY2026P. It is forecast to reach INR 30.2 billion by FY2031E, growing at a CAGR of 17.3% during FY2025-FY2031E.

Exhibit 3.17: Indian Microwave market, volume in million units, FY2020 – FY2031E



Source: Frost & Sullivan Analysis

Exhibit 3.18: Indian Microwave market, value in INR Bn, FY2020 – FY2031E



Source: Frost & Sullivan Analysis

Domestic value addition is expected to improve gradually as appliance manufacturers deepen localization across mechanical, electrical and electronics-linked components. India already has manufacturing capabilities in selected sheet metal, plastic parts, cabinets, wiring assemblies and final assembly. Further DVA improvement is expected to come from localization of control boards, display panels, sensors, switches, wiring harnesses, transformers, motors, electronic modules and other sub-assemblies. However, certain high-value components may continue to depend on imports until local scale, component capability and supplier qualification improve.

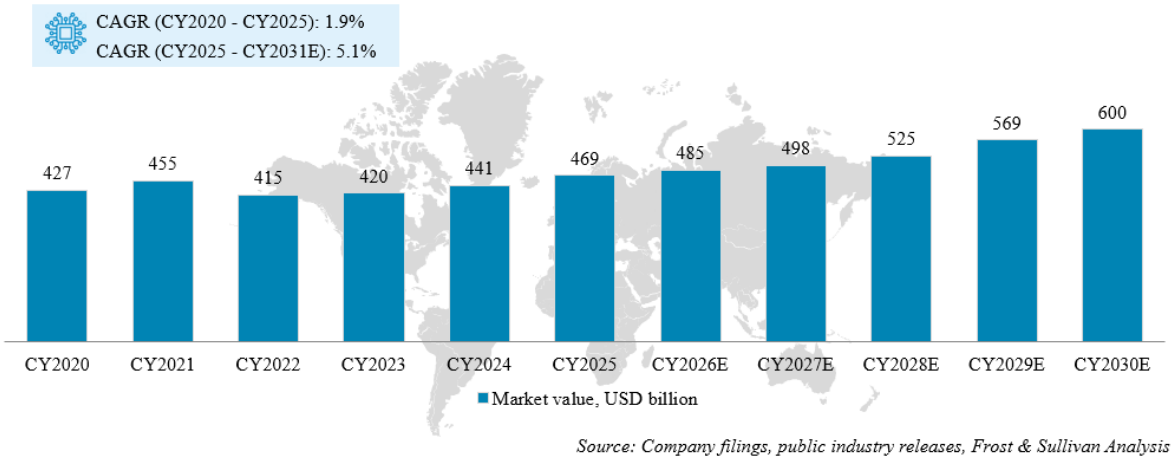
3.12 Global and Indian Mobile Phone Market

The mobile-phone market comprises smartphones and feature phones sold to end customers. Mobile phones represent one of the largest end-use categories within the global electronics industry and support demand across semiconductors, displays, camera modules, batteries, printed circuit boards, PCBAs, enclosures, testing and final product assembly.

Smartphones account for the majority of mobile-phone market value, while feature phones continue to contribute meaningful volumes in price-sensitive and emerging markets. The market is progressively shifting towards smartphones as consumers migrate from basic voice and messaging devices to internet-enabled devices. At the same time, mature smartphone markets are becoming increasingly replacement- and upgrade-driven.

The global mobile-phone market is expected to benefit from smartphone migration, 5G adoption, higher memory and storage configurations, improved camera and display specifications, increasing on-device AI capabilities and a growing contribution from premium and upper-mid-range devices.The global mobile-phone market is estimated at approximately USD469 billion in CY2025 and is expected to reach approximately USD600 billion by CY2030E, representing a CAGR of approximately 5.1%.

Exhibit 3.19: Size of mobile-phone market, USD billion, Global, CY2020–CY2030E



Source: Company filings, public industry releases, Frost & Sullivan Analysis

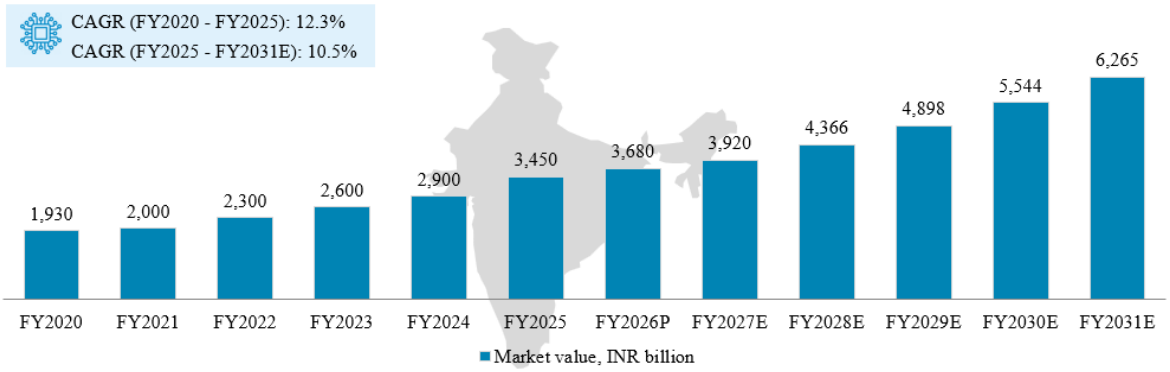
Indian Mobile Phone Market

India is among the world's largest mobile-phone markets, supported by a large subscriber base, increasing digital adoption, affordable mobile data and continuing migration from feature phones to smartphones. India had approximately 1.16 billion wireless subscribers at the end of March 2025.

India continues to have a sizeable feature-phone user base, particularly among price-sensitive, rural and elderly users and customers seeking longer battery life and basic voice connectivity. However, feature-phone shipments are expected to decline over the forecast period as affordable smartphones and 4G and 5G devices become more widely available.

India continues to have a sizeable feature-phone user base, particularly among price-sensitive, rural and elderly users. However, the market is progressively shifting towards smartphones as affordable 4G and 5G devices become more widely available. The Indian mobile-phone market is expected to benefit from smartphone migration, increasing 5G penetration, rising average selling prices, higher device specifications and a growing contribution from mid-range and premium smartphones.The Indian mobile-phone market is estimated at approximately INR3,450 billion in FY2025 and approximately INR3,680 billion in FY2026P. It is expected to reach approximately INR6,265 billion by FY2031E, representing a CAGR of approximately 10.5% between FY2025 and FY2031E.

Exhibit 3.20: Size of mobile-phone market, INR billion, India, FY2020–FY2031E



Source: MeitY, PIB, ICEA, TRAI, GSMA, company filings, Frost & Sullivan Analysis

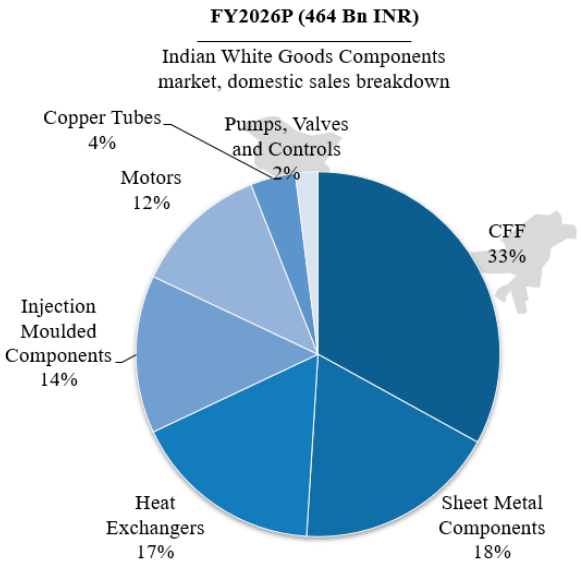
3.13 White Goods Components Market

India's white goods component ecosystem is becoming more important as appliance manufacturing shifts from finished-product assembly toward deeper localization. This is particularly relevant for room air conditioners, refrigerators, washing machines, microwave ovens and other consumer durable appliances, where component intensity is high and OEMs are increasingly focused on local sourcing, supply security, cost competitiveness and domestic value addition.

The India white goods components market increased from an estimated INR 224 billion in FY2020 to INR 428 billion in FY2025, growing at a CAGR of 13.8% during FY2020-FY2025. The market is estimated at INR 464 billion in FY2026P and is forecast to reach INR 1,060 billion by FY2031E, growing at a CAGR of 18.0% during FY2026P-FY2031E. The market includes major mechanical, electromechanical and control-linked components used across white goods and consumer durable appliances, including compressors, fans, fan motors, sheet metal components, heat exchangers, injection moulded components, motors, copper tubes, pumps, valves and control assemblies. Since the market covers components used across multiple appliance categories, it should be read as a cross-appliance component opportunity rather than as a component pool linked only to RACs.

Premium and smart white goods are expected to increase the value and technical complexity of the component ecosystem. Inverter RACs, frost-free and larger-capacity refrigerators, fully automatic washing machines and feature-rich kitchen appliances require higher-performance compressors, motors, heat exchangers, moulded parts, wiring assemblies and control-linked electromechanical systems. As appliances become more energy-efficient and feature-rich, component suppliers are expected to face stronger requirements on precision, reliability, noise reduction, thermal performance, energy efficiency and quality consistency.

Exhibit 3.21: Indian White Goods Components market, value in INR Bn, FY2026P



Source: Frost & Sullivan Analysis

Domestic value addition in white goods components is expected to improve gradually as OEMs and contract manufacturers localize more mechanical, electrical and electromechanical inputs. India already has a base across sheet metal, plastic moulding, selected motors, wiring-related assemblies and appliance assembly. Further localization opportunities are expected across compressors, fan motors, heat exchangers, copper tubes, pumps, valves, control assemblies and other sub-assemblies. This can reduce import dependence, improve supply-chain resilience and support deeper participation by domestic component manufacturers.

Policy support is also strengthening the component manufacturing base. The PLI Scheme for White Goods is focused on components and sub-assemblies for air conditioners and LED lights, including compressors, copper tubes, heat exchangers, BLDC motors, control assemblies, sheet metal and plastic moulding components. Component localization is expected to remain strategically relevant because imported components can materially affect product cost, supply security and domestic value addition.

The white goods components market therefore represents an important allied manufacturing opportunity alongside India's ESDM growth. While the ESDM sections of this report address PCB, PCBA and electronics manufacturing more directly, the white goods component ecosystem is relevant because appliance localization requires both electronics capability and a deeper base of mechanical and electromechanical component suppliers.

4. India Market Analysis

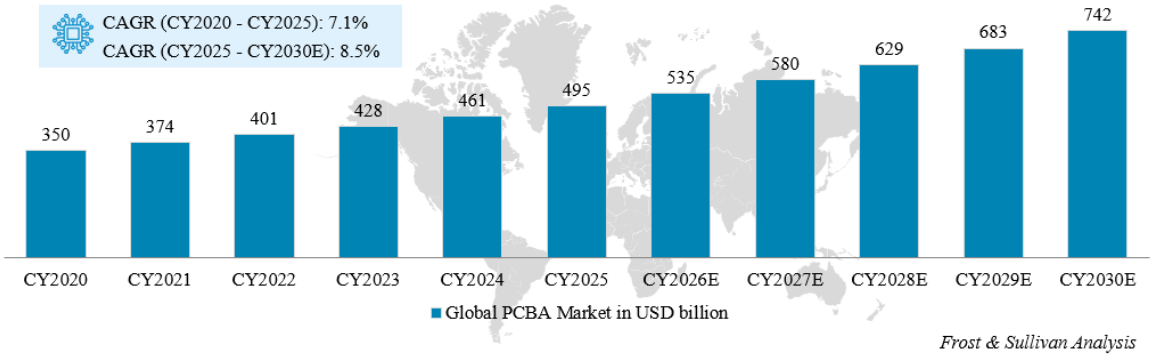
4.1 PCBA Market

Printed Circuit Board Assembly (PCBA) refers to populated printed circuit board assemblies used in electronic products. It includes bare PCB, mounted electronic components, assembly, soldering, inspection and board-level testing. The global PCBA market forms a critical layer within the electronics manufacturing value chain. PCBAs are used across consumer devices, IT hardware, data infrastructure, telecom equipment, automotive electronics, industrial systems, medical electronics, energy systems, defence & aerospace and other electronic products. As electronic content increases across these applications, demand is rising for populated boards with higher component density, stronger process control, improved testing and greater reliability.

4.1.1 Global PCBA Market

The global PCBA market has increased from USD 350 billion in CY2020 to USD 495 billion in CY2025, growing at a CAGR of 7.1%. The market is expected to reach USD 742 billion by CY2030E, growing at a CAGR of 8.5% during CY2025-CY2030E. Growth is expected to be supported by the expansion of electronics manufacturing, higher semiconductor and sensor content, growth in IT hardware and data infrastructure, electric and connected vehicles, industrial automation, energy electronics and the continued outsourcing of electronics manufacturing to EMS and PCBA specialists.

Exhibit 4.1: Size of PCBA industry, USD billion, Global, CY2020 – CY2030E



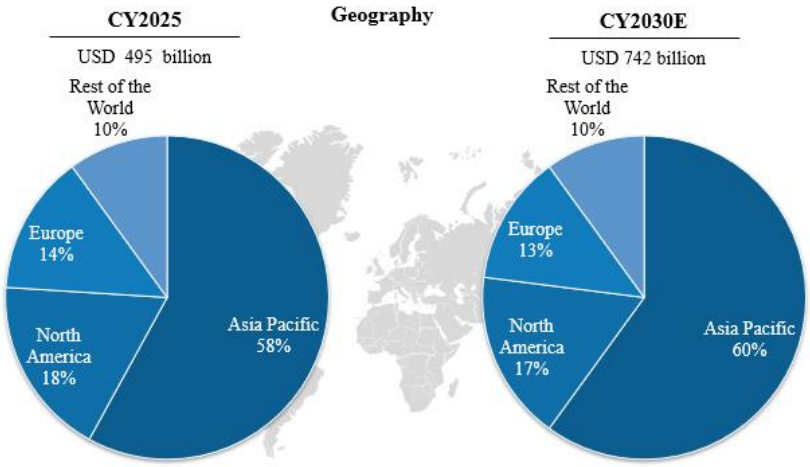
Frost & Sullivan Analysis

PCBA market refers to the value of populated printed circuit board assemblies, including bare PCBs, mounted electronic components, assembly, inspection and testing. It includes PCBAs manufactured in-house by OEMs and those outsourced to EMS and PCBA providers

Asia Pacific is expected to remain the largest PCBA manufacturing region globally. The region benefits from deep electronics manufacturing clusters, component supply chains, established EMS / ODM ecosystems and large-scale production capacity across China, Taiwan, South Korea, Japan, Southeast Asia and India. North America and Europe remain important for high-reliability and engineering-intensive PCBAs used in aerospace and defence, medical electronics, industrial systems, automotive electronics and advanced computing infrastructure.

Supply-chain diversification is expected to support a broader global manufacturing footprint. While China remains central to the global electronics manufacturing ecosystem, India, Vietnam, Mexico and other manufacturing locations are becoming more relevant as OEMs and EMS players seek greater supply-chain resilience, customer proximity and manufacturing redundancy.

Exhibit 4.2: Size of PCBA industry, USD billion, Global, CY2025 and CY2030E, By Geography



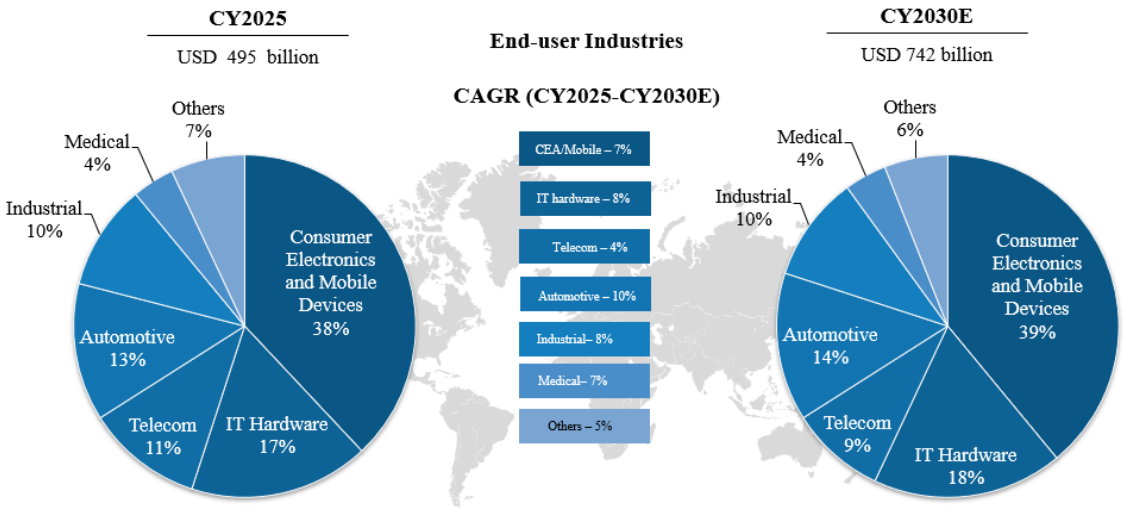
Note: E refers to Estimate

Source: Frost & Sullivan Analysis

Consumer electronics, mobile devices and appliances are expected to remain the largest end-user segment for global PCBA demand through CY2030E. Growth will be supported by the scale of mobile-device manufacturing as well as increasing electronic content across consumer durables and appliances, including control boards, inverter boards, displays, sensors, connectivity modules and power-management electronics. This reflects the scale of mobile phone manufacturing, consumer electronics production, smart appliances, connected home devices and frequent product refresh cycles. The segment is also expected to continue increasing in absolute value as products incorporate more control boards, display boards, connectivity modules, power management electronics, sensors and energy-efficiency-related electronics.

At the same time, the demand mix is broadening. IT hardware and data infrastructure are gaining importance with growth in servers, storage systems, networking equipment, AI computing hardware and cloud infrastructure. Automotive, industrial and energy electronics are also becoming more relevant as vehicles, factories, power systems and industrial equipment become more electronics-intensive. These segments create demand for higher-reliability PCBAs, mixed-technology assembly, testing, traceability and application-specific manufacturing capabilit

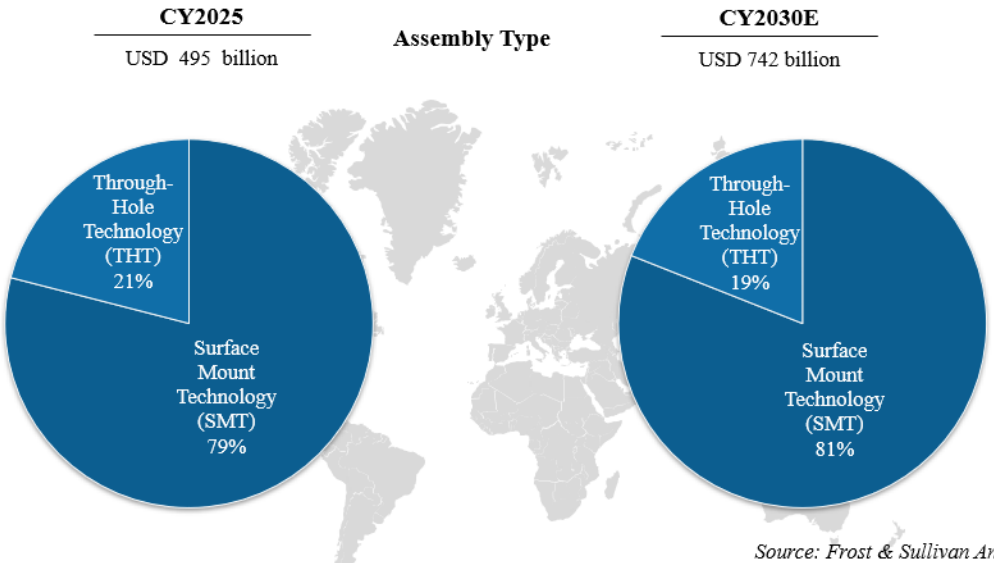
Exhibit 4.3: Size of PCBA industry, USD billion, Global, CY2025 and CY2030E, By End User Industry



Note: E refers to Estimate
Source: Frost & Sullivan Analysis
Others include energy, aerospace, power electronics, lighting electronics and other specialized electronic products.

By assembly type, SMT-led assembly remains the dominant segment of the global PCBA market. SMT supports compact product design, high component density, automated assembly and high-volume manufacturing, making it suitable for consumer electronics, mobile devices, computing hardware, telecom equipment, automotive electronics and several industrial control boards. THT-led and mixed-technology assemblies remain relevant in applications that require larger components, stronger mechanical anchoring, higher current handling or greater durability, including appliances, industrial systems, automotive electronics, UPS systems, solar inverters, energy storage systems and EV chargers.

Exhibit 4.4: Size of PCBA industry, USD billion, Global, CY2025 and CY2030E, By Assembly Type



Source: Frost & Sullivan Analysis
THT assembly includes through-hole-led and mixed-technology assemblies used in applications requiring larger components, stronger mechanical anchoring, higher current handling or greater durability

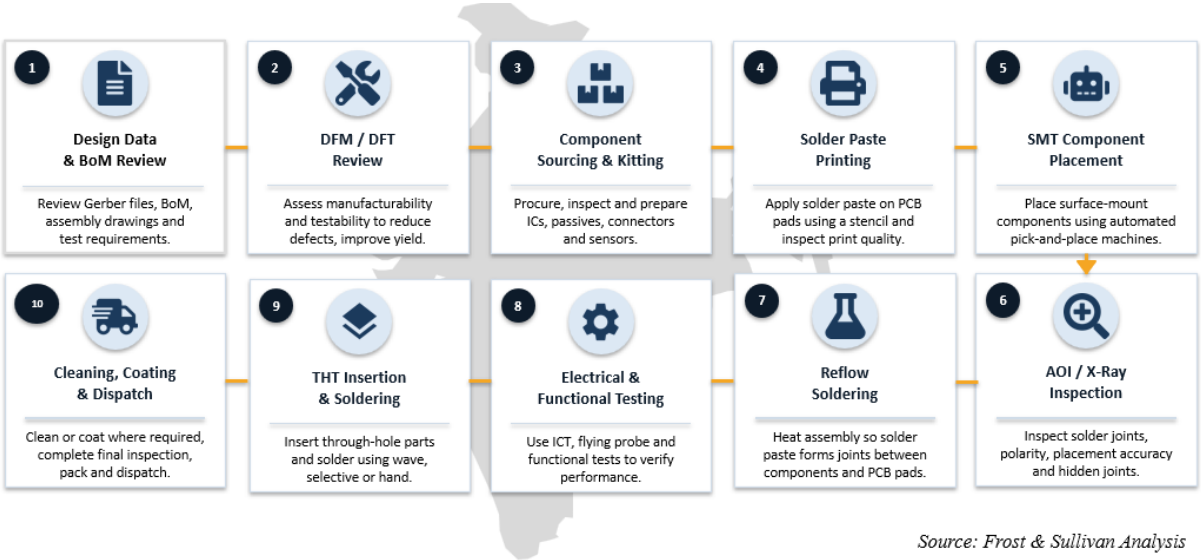
4.1.2 Overview of the PCBA Manufacturing Process

Printed Circuit Board Assembly (PCBA) manufacturing refers to the process of converting a bare printed circuit board into a populated and functional electronic assembly. A bare PCB provides the physical board, copper tracks, pads and interconnections. PCBA manufacturing begins after the bare PCB is fabricated and involves mounting electronic components on the board, soldering them, inspecting the assembly and testing the board for electrical and functional performance.

PCBA manufacturing is a critical value-addition stage within the electronics manufacturing value chain. It involves the assembly of components such as integrated circuits, resistors, capacitors, connectors, sensors, relays, power devices and communication modules onto the bare PCB. The complexity of the process depends on the component mix, board density, product category, production volume, testing requirements and reliability requirements.

SMT-led assembly remains the dominant process in PCBA manufacturing and is particularly relevant for high-volume and high-density electronics such as mobile phones, IT hardware, consumer electronics, telecom equipment and several appliance and industrial control boards. THT and mixed-technology processes remain relevant in selected applications requiring larger components, stronger mechanical anchoring, higher current handling or greater durability.

Exhibit 4.5: Key stages in PCBA manufacturing process



Source: Frost & Sullivan Analysis

Note: Process flow is indicative. Actual sequence varies by product design, component mix, production volume, reliability requirements and whether the board is SMT-led, THT-led or mixed technology assembly.
***Note:** DFM refers to Design for Manufacturability and DFT refers to Design for Testability.*

The PCBA manufacturing process is not uniform across all product categories. High-volume mobile phone and consumer electronics PCBAs are typically more SMT-led, with high automation and dense component placement. In contrast, industrial electronics, automotive electronics, appliances, UPS systems, solar inverters, EV chargers and other power-electronics-linked applications often require mixed technology assembly, stronger mechanical components, additional inspection and functional testing. Higher-reliability applications may also require traceability, conformal coating, X-ray inspection, programming, burn-in or application-specific validation.

PCBA cost structure is primarily driven by the value of electronic components mounted on the board. In most PCBAs, components account for the largest share of cost because semiconductor devices, passive components, connectors, sensors, relays, power devices and communication modules form the main functional value of the assembly. The bare PCB, assembly conversion, inspection, testing, process materials and manufacturing overheads account for the remaining share.

Exhibit 4.6: Indicative PCBA cost structure, by category

Category	Indicative Share of PCBA Cost	Description
Electronics and electrical components	60–75%	ICs, passives, connectors, sensors, relays, power devices and other mounted components. This is usually the largest cost head, especially in mobile phones, IT hardware and semiconductor-rich boards.
Bare PCB	5–18%	Cost of the fabricated PCB before assembly. The share varies by board size, layer count, material type, HDI requirements and application complexity, and may be higher for advanced multilayer, flexible and rigid-flex boards.
Consumables and process materials	2–5%	Solder paste, flux, adhesives, cleaning agents, conformal coating and other process inputs.
Manufacturing and assembly value add	6–12%	SMT placement, THT insertion, soldering, line time, labour and machine utilization.
Testing and inspection	3–8%	AOI, X-ray, ICT, flying probe, functional testing, programming and reliability checks, where applicable.
Manufacturing overheads	4–8%	Utilities, depreciation, rework, scrap, quality control, traceability systems and factory overheads.

Source: Frost & Sullivan Analysis

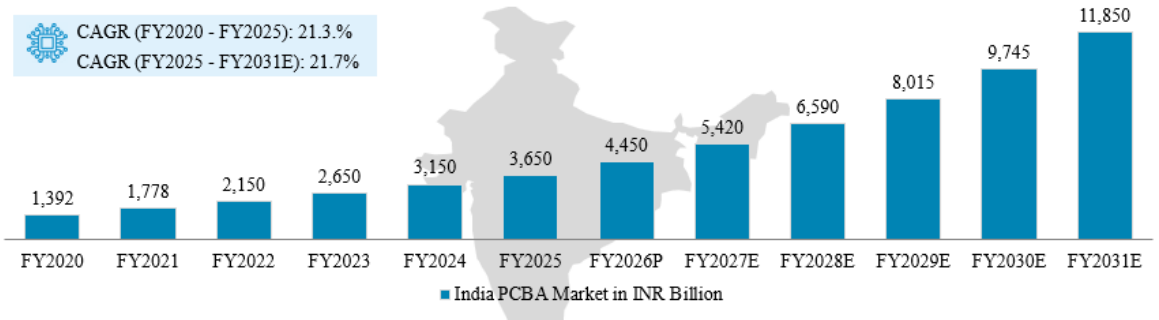
Note: The cost structure is indicative and varies by product and board architecture. Advanced multilayer, HDI, flexible and rigid-flex PCBAs may have a higher bare-PCB share than high-volume, component-intensive assemblies.

4.1.3 India PCBA Market

India's Printed Circuit Board Assembly (PCBA) market is expanding as electronics manufacturing scales across mobile phones, consumer electronics, appliances, IT hardware, telecom equipment, automotive electronics, industrial electronics, energy systems, defence & aerospace and other electronic products. PCBA is a core manufacturing layer within the electronics value chain because most electronic products require populated boards, control boards, power boards, communication boards or application-specific electronic assemblies.

India's PCBA market is valued at INR 4,450 billion in FY2026P and is expected to reach INR 11,850 billion by FY2031E. The market grew at a CAGR of 21.3% during FY2020-FY2025, supported by the rapid expansion of mobile phone manufacturing, scaling of consumer durables and smart electronics production, growth in industrial electronics, export-linked electronics production and localization of electronic sub-assemblies. During FY2025-FY2031E, the market is expected to grow at a CAGR of 21.7%, supported by continued scale-up in mobile phones, consumer electronics, appliances, IT hardware, automotive electronics, industrial electronics, telecom equipment and energy / power electronics.

Exhibit 4.7: Size of PCBA industry, INR billion, India, FY2020 – FY2031E



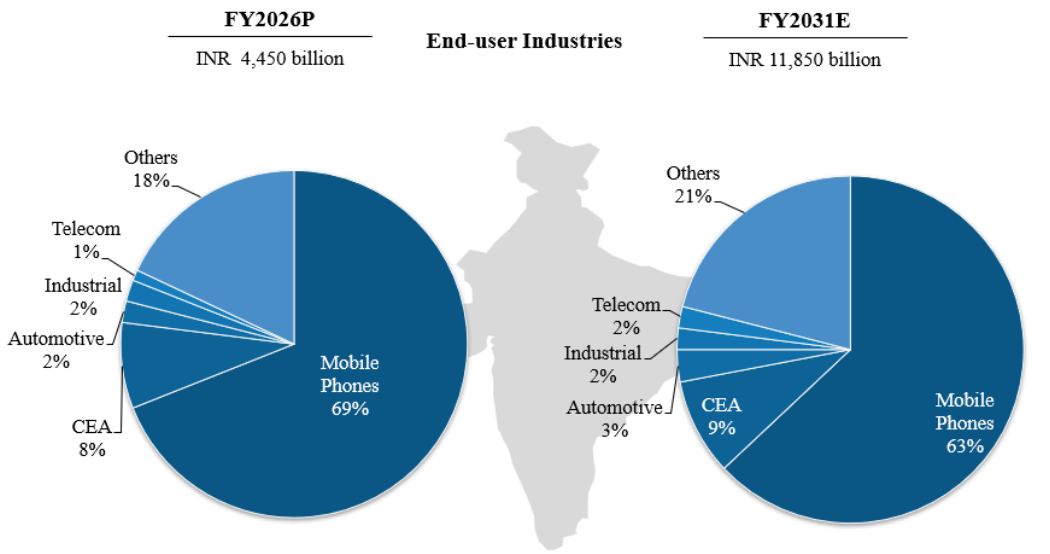
Source: MeitY, PIB, Frost & Sullivan Analysis

PCBA market refers to the estimated value of populated printed circuit board assemblies required for electronics products manufactured in India, including products manufactured for domestic sales and exports. It includes bare PCB, mounted electronic components, assembly, inspection and testing value. P refers to provisional / latest available estimate. E refers to estimate.

Mobile phones are expected to remain the largest end-user segment for India's PCBA market through FY2031E, supported by India's mobile phone manufacturing scale and the high PCBA content in mobile devices. CEA is also expected to increase in both value and share, supported by growth in room air conditioners, home appliances, displays, connected consumer products and energy-efficient appliances.

The market is expected to broaden over the forecast period as automotive, telecom, industrial and other electronics categories scale from smaller bases. These applications increase demand for application-specific PCBAs, testing, traceability and reliability control. This broadening is expected to support a more diversified PCBA ecosystem, while mobile phones and CEA continue to provide the scale base for India's PCBA market.

Exhibit 4.8: Size of PCBA industry, INR billion, India, FY2025 and FY2031E, By End User Industry



Source: MeitY, PIB, Frost & Sullivan Analysis

CEA – Consumer electronics and appliances

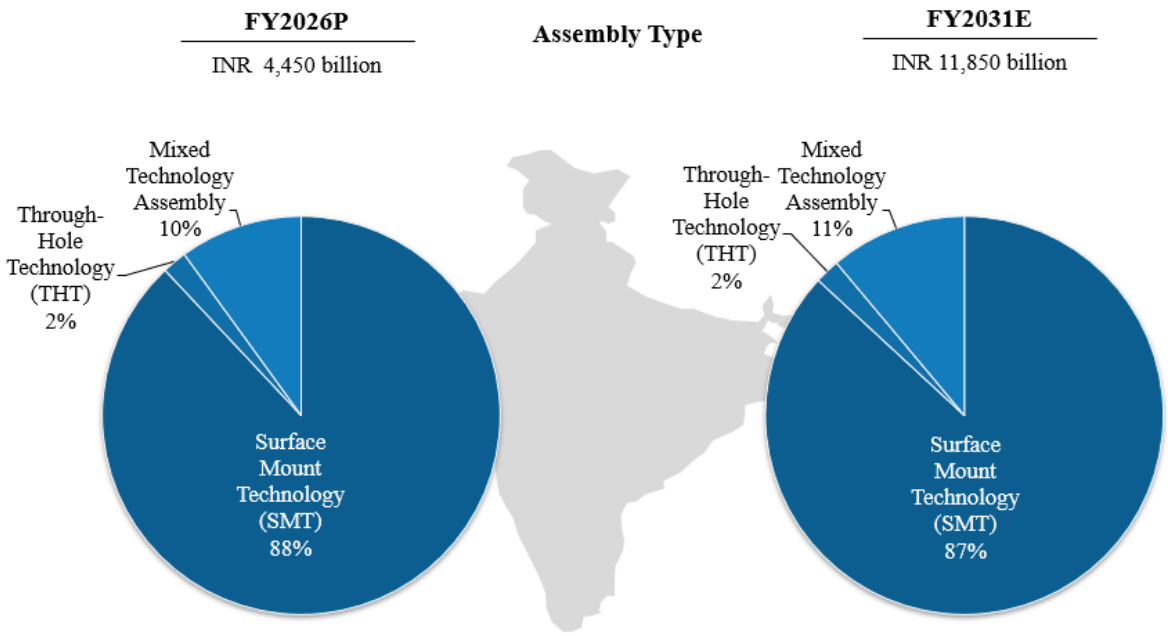
Others include: IT, Lighting, Aerospace & defense, Medical, Energy energy and power electronics

P refers to provisional/latest available estimate. E refers to estimate.

By assembly type, India's PCBA market is expected to remain dominated by SMT-led assembly. SMT supports compact, high-density and automated board assembly, making it relevant for mobile phones, IT hardware, consumer electronics, telecom equipment and several automotive and industrial electronics applications. India's mobile-phone-led electronics manufacturing base has therefore created a strong SMT-oriented PCBA market.

Mixed Technology Assembly is expected to remain important for appliances, automotive electronics, industrial systems, UPS, solar inverters, energy storage systems, EV chargers and other power-electronics-linked categories. These applications often use boards where SMT components are combined with relays, connectors, capacitors, power devices and other through-hole components.

Exhibit 4.9: Size of PCBA industry, INR billion, India, FY2026P and FY2031E, By Assembly Type



Source: Frost & Sullivan Analysis

4.1.4 Indicative Share Of PCBA in Bill Of Materials Across Key End-User Industries

PCBA share of Bill of Materials (BoM) refers to the indicative share of populated printed circuit board assemblies in the material cost of an electronic product, electronic equipment or electronic module. It includes the value of the bare PCB, mounted electronic components, assembly, inspection and testing-related value addition.

The share of PCBA in BoM varies across end-use industries because product categories differ in electronic content, semiconductor intensity, number of boards, board density, testing requirements and reliability requirements. Products such as mobile phones and IT hardware typically have a higher PCBA share due to dense component placement, processors, memory, RF components, power management electronics and other semiconductor content. Consumer electronics and appliances have a lower PCBA share as a percentage of total BoM because mechanical, electromechanical, thermal and structural components account for a larger part of product value. However, these categories remain important PCBA demand pools because of their large manufacturing scale and increasing use of control boards, display boards, inverter boards, sensors and connectivity modules.

For automotive, industrial, telecom, energy and medical applications, PCBA share should be interpreted at the level of the relevant electronic equipment, module or sub-system, rather than at the level of the full vehicle, plant, infrastructure asset or medical system. Within these applications, PCBA content can be significant in control boards, ECUs, drives, instrumentation modules, inverters, chargers, communication modules, power supplies and other electronic sub-assemblies.

Exhibit 4.10: Indicative share of PCBA in bill of materials by end user industry

Product Category	Indicative PCBA Share of BoM	Description
Mobile Phones	45–50%	High PCBA intensity due to dense boards, semiconductor content, memory, RF components, power management and compact assembly requirements.
IT Hardware	35–45%	High PCBA content across motherboards, processors, memory, storage interfaces, power management and peripheral boards.
Consumer Electronics	15–25%	Moderate PCBA share, depending on product type, display content, audio / video electronics, communication features and control boards.
Consumer Appliances / White Goods	8–12%	Lower PCBA share because compressors, motors, sheet metal, plastics, heat exchangers, wiring and other mechanical or electromechanical parts account for a larger share of BoM.
Telecom and Networking Equipment	8–12%	PCBA share varies significantly by equipment type. Compact active networking products and communication modules may have higher PCBA content, while infrastructure-heavy products include significant chassis, cabling, RF, power and enclosure content..
Automotive	10–15%	PCBA share depends on the type of module, including ECUs, body electronics, infotainment, lighting, sensors and power electronics.
Industrial	10–15%	PCBA intensity is higher in PLCs, HMIs and control modules, but lower in drives, instrumentation and equipment containing significant power and mechanical components.
Energy / Power Electronics	12–18%	PCBA intensity varies across UPS systems, inverters, EV chargers and energy-storage systems, depending on the relative value of batteries, power modules, magnetics, cooling systems and enclosures.
Medical	20–30%	Higher share in diagnostic, monitoring and portable medical devices due to sensing, signal processing, control and communication electronics.
Lighting and Other Electronics	5–10%	PCBA share varies depending on driver electronics, control features, connectivity and product complexity.

Source: Frost & Sullivan Analysis
Ranges are indicative and vary by product design, component content, board complexity, production volume, sourcing model, testing requirements, reliability requirements and customer specifications

4.1.5 Domestic PCBA Landscape, Key Player Positioning And Expansion Outlook

India's PCBA supplier landscape includes large-scale EMS platforms serving high-volume electronics categories and diversified ESDM companies serving application-specific markets. Mobile phones, IT hardware, consumer electronics and appliances typically require scale, automation, efficient sourcing and established OEM relationships. Automotive, industrial, medical, aerospace and defence, and energy electronics place greater emphasis on process capability, testing, traceability, engineering support and customer qualification.

Exhibit 4.11: Key PCBA players and positioning, India, By Application Area

Company / Group	Key Applications	Business Scope and Positioning
ILJIN Electronics	Consumer durables, industrial including energy, automotive, IT and telecom, aerospace and defence, and other electronics applications	Integrated electronics manufacturing platform with PCB-A, box-build and bare PCB capabilities. Amber / ILJIN is positioned with both assembly-side PCBA capability and upstream bare PCB exposure, supporting a more vertically integrated electronics manufacturing model.
Dixon Technologies	Mobile phones, IT hardware, telecom, consumer electronics, appliances, lighting, hearables / wearables	Large-scale EMS and product manufacturing platform focused on high-volume electronics manufacturing and large OEM programs.
Kaynes Technology	Automotive, industrial, EV, aerospace and strategic electronics, medical, railways, IoT / IT	Integrated ESDM player with PCBA, box-build, ODM, product engineering, IoT solutions and cable harness capabilities. Positioned as a diversified high-mix electronics manufacturing player.
Syrma SGS	Consumer, automotive, industrial, healthcare, railways, IT, telecom and defence electronics	Diversified EMS player with electronic assembly, PCBA, box-build, engineering and product realization capabilities across multiple end-use sectors.
PG Electroplast	Room air conditioners, washing machines, LED televisions, air coolers, consumer electronics and allied products	Consumer durables and electronics manufacturing player with PCB assembly capability as part of broader integrated appliance and product manufacturing.

Source: Company annual reports, Frost & Sullivan Analysis

The competitive structure varies by application. High-volume segments are primarily driven by manufacturing scale, automation, supply-chain execution and cost competitiveness. Application-specific segments require greater engineering support, process control, functional testing, quality documentation, traceability and customer-specific qualification.

Domestic PCBA capacity is expanding through both dedicated assembly-line additions and broader investments in EMS, electronics manufacturing, box-build, bare PCB and component capabilities. Since public disclosures frequently report investments at the business or facility level rather than as standalone PCBA capacity, the expansion plans below should be interpreted as indicative of broader ecosystem development.

Exhibit 4.12: Select PCBA Capacity Indicators and Expansion Plans, India

Company	Expansion Area	Details
ILJIN Electronics	PCBA manufacturing capacity expansion	Current consolidated PCBA capacity is not separately disclosed in comparable units. The company is expanding PCBA and box-build capabilities across consumer durables, automotive, industrial electronics and power-electronics applications.
Dixon Technologies	High-volume EMS, IT hardware and components	Standalone PCBA capacity is not separately disclosed. The company is expanding electronics and IT hardware manufacturing capacity in Tamil Nadu, including a new laptop and PC manufacturing facility. Product-level assembly capacities have not been used as a proxy for PCBA capacity.
Kaynes Technology	PCBA capability and electronics component ecosystem	Operated 24 SMT lines and 70 through-hole-device lines as of FY2025. The company has expanded PCBA capability through additional SMT and through-hole assembly lines across its manufacturing facilities.
Syrma SGS	EMS scale-up and backward integration	Operates 25 SMT lines based on its latest public capability disclosure. The company has also commissioned additional electronics manufacturing capacity supporting PCBA and broader EMS operations.
VVDN Technologies	SMT and design-led manufacturing	Has commissioned additional SMT capacity for high-complexity electronics, including networking equipment, servers and motherboards. Comparable consolidated PCBA capacity is not separately disclosed.

Source: Company annual reports, Frost & Sullivan Analysis

The domestic PCBA landscape is expected to evolve along two tracks. The first is scale-led manufacturing, driven by mobile phones, IT hardware, consumer electronics and appliances. This track requires high automation, large production capacity, efficient sourcing and cost competitiveness. The second is capability-led manufacturing, driven by automotive, industrial, telecom, energy, medical, aerospace and defence

applications. This track requires greater engineering support, testing, traceability, mixed-technology assembly and customer-specific process control.

The next phase of PCBA industry development in India is likely to be supported by broader EMS capacity expansion, higher localization of electronic sub-assemblies, growth in export-oriented electronics manufacturing and deeper participation in higher-complexity applications. While upstream investments in bare PCB and component manufacturing will improve ecosystem depth, the competitiveness of domestic PCBA players will continue to depend on SMT and THT assembly capability, component sourcing, inspection and testing infrastructure, box-build capability, customer qualification and consistency in quality and delivery.

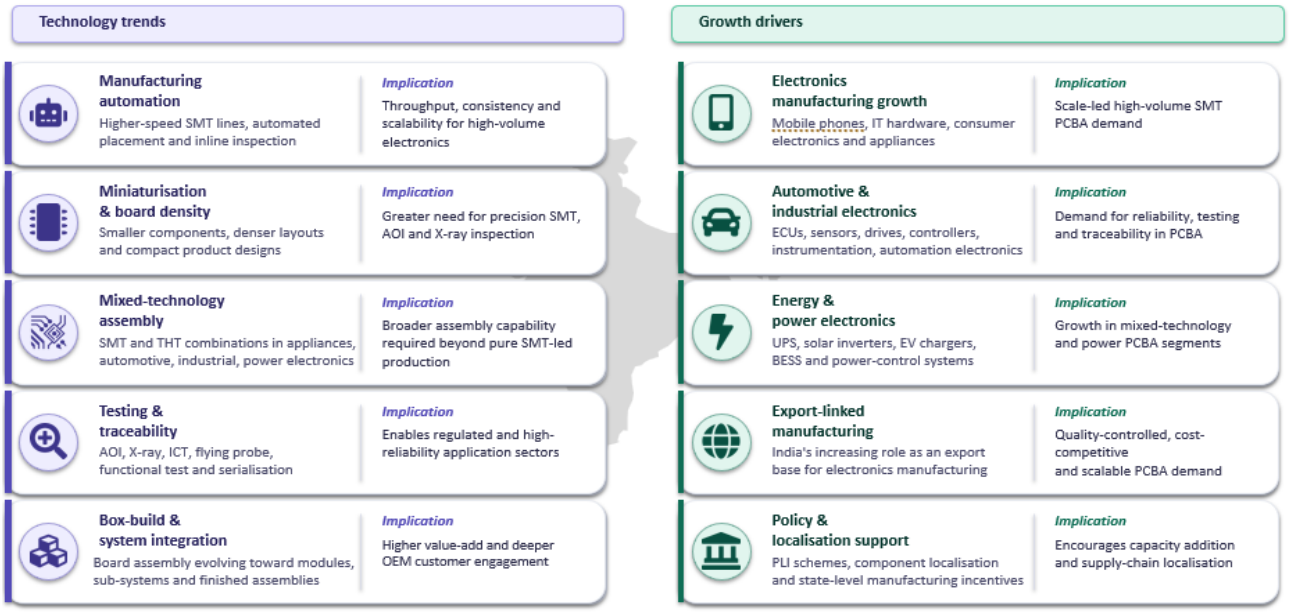
4.1.6 Strategic Relevance, Technology Trends And Growth Drivers For PCBA Manufacturing

PCBA manufacturing converts a bare PCB into a functional electronic assembly through component mounting, soldering, inspection and testing. As India's electronics manufacturing base expands, domestic PCBA capability is becoming increasingly important for localization, supply-chain responsiveness, quality control and higher-value manufacturing.

PCBA manufacturers must manage component sourcing, inventory and supply volatility, apply Design for Manufacturability and Design for Testability principles, and meet application-specific production and testing requirements. High-volume industries such as mobile phones, IT hardware and consumer electronics require scale, automation and cost efficiency, while automotive, industrial, telecom, energy, medical and defence applications require greater process control, reliability, traceability and customer qualification.

For EMS companies, capabilities across PCBA, testing and box build enable participation across a larger share of the customer value chain. Manufacturers combining scale, sourcing strength, quality systems, testing and system integration are therefore well positioned to benefit from India's expanding and diversifying electronics manufacturing base.

Exhibit 4.13: Key technology trends and growth drivers for PCBA manufacturing, India



Source: Frost & Sullivan Analysis

4.2 PCB Market

Printed Circuit Boards are a foundational part of the electronics manufacturing value chain, with demand shaped by both the scale of electronics production and the increasing complexity of electronic products.

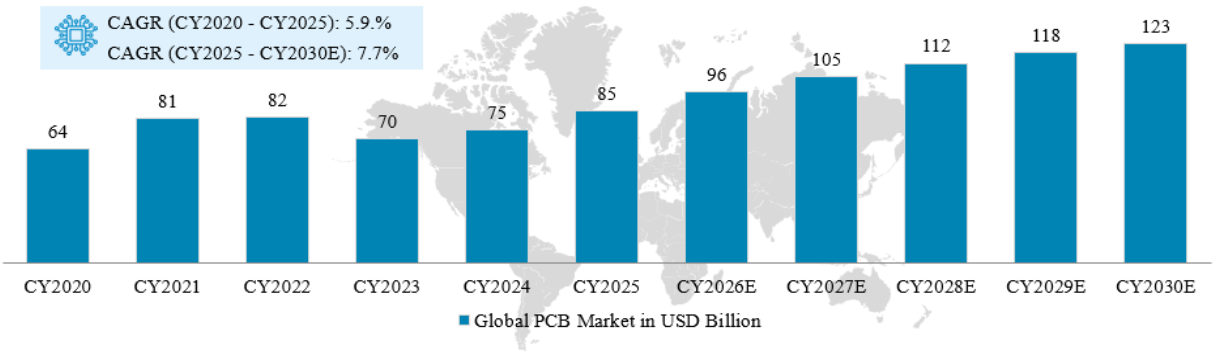
4.2.1 Global PCB Market

The global PCB industry is closely linked to the scale and technology mix of electronics manufacturing. Demand is driven by consumer electronics, smartphones, computing devices, telecom and networking equipment, automotive electronics, industrial electronics, medical devices, aerospace and defence systems, and data centre infrastructure. Over the last few years, the industry has moved from a broad volume-led growth model toward a more value-led model, where growth is increasingly driven by higher-layer-count boards, HDI PCBs, flexible PCBs, high-speed boards and package substrates.

The global PCB market grew from an estimated USD 64.0 billion in CY2020 to USD 85.2 billion in CY2025, representing a CAGR of 5.9%. The period was volatile. CY2021 and CY2022 benefited from strong electronics demand and supply-chain restocking, while CY2023 witnessed a correction due to weaker demand in smartphones, PCs and consumer electronics, along with inventory adjustments across the electronics supply chain. The market recovered in CY2024 and expanded strongly in CY2025, supported by AI infrastructure, data communications, high-speed networking, advanced computing and recovery in selected electronics categories.

The global PCB market is expected to reach approximately USD 123.3 billion by CY2030E, growing at a CAGR of 7.7% during CY2025-CY2030E. Forecast growth is expected to be supported by increasing demand for higher-layer-count boards, HDI PCBs, flexible and rigid-flex PCBs, high-speed and high-frequency boards and package substrates. AI servers and advanced computing systems require substantially higher-value boards than conventional electronic equipment, reflecting greater layer counts, advanced materials and tighter performance requirements.

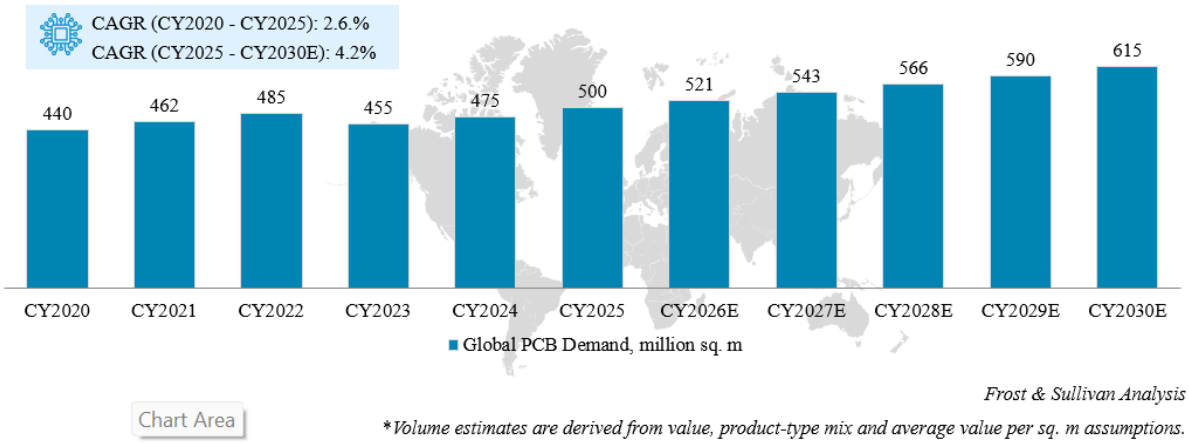
Exhibit 4.14: Size of PCB industry, USD billion, Global, CY2020 – CY2030E



Frost & Sullivan Analysis

Global PCB demand is expected to increase in both market value and board area. Market value is expected to grow faster than volume as the product mix shifts toward multilayer, HDI, flexible, rigid-flex and other specialized PCBs, which carry higher value per sq. m than simpler single-sided and double-sided boards.

Exhibit 4.15: Size of PCB market, million sq. m, Global, CY2020 – CY2030E



Frost & Sullivan Analysis

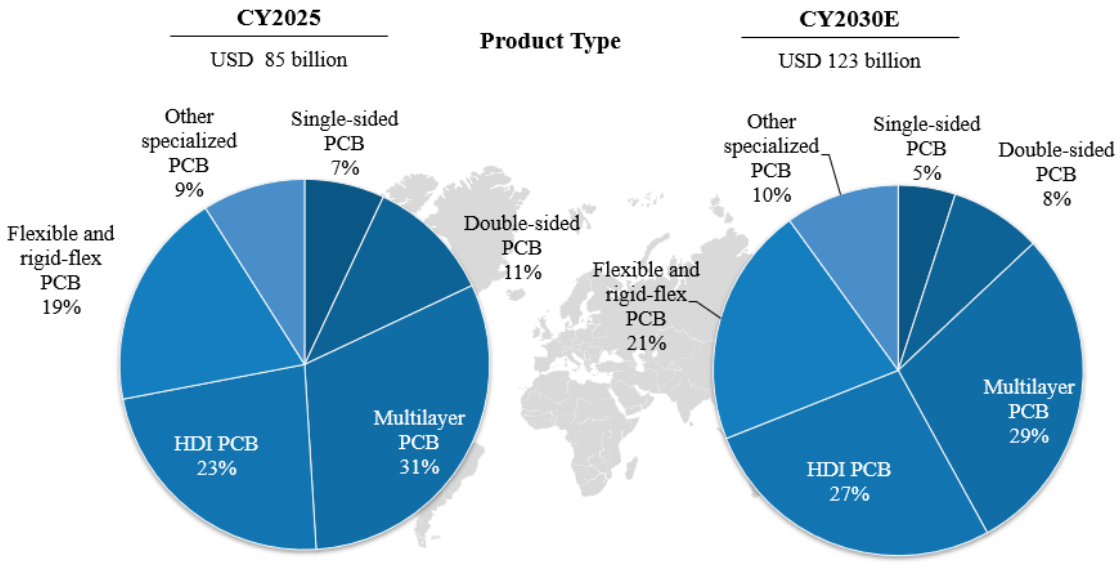
**Volume estimates are derived from value, product-type mix and average value per sq. m assumptions.*

By product type, standard multilayer PCBs account for the largest share of the global market due to their broad use across computing devices, telecom equipment, automotive electronics, industrial equipment and consumer electronics. HDI PCBs use finer lines, microvias and higher interconnection density, enabling smaller board size and greater functionality. These attributes make HDI particularly relevant for smartphones, wearables, advanced computing, automotive electronics and other compact, high-performance products.

Flexible and rigid-flex PCBs are also expected to grow as electronics become smaller, lighter and more form-factor constrained. Single-sided and double-sided PCBs remain relevant in cost-sensitive applications such as lighting, appliances, power supplies and basic control boards, although their share of overall market value is expected to moderate.

The product mix is therefore expected to shift gradually towards HDI, flexible and rigid-flex, high-layer-count multilayer and other specialized PCB categories. Published industry benchmarks indicate that HDI already represents a material portion of the global PCB market and is expected to grow faster than the overall industry.

Exhibit 4.16: Size of PCB industry, USD billion, Global, CY2025 and CY2030E, By Product Type



Note: E refers to Estimate

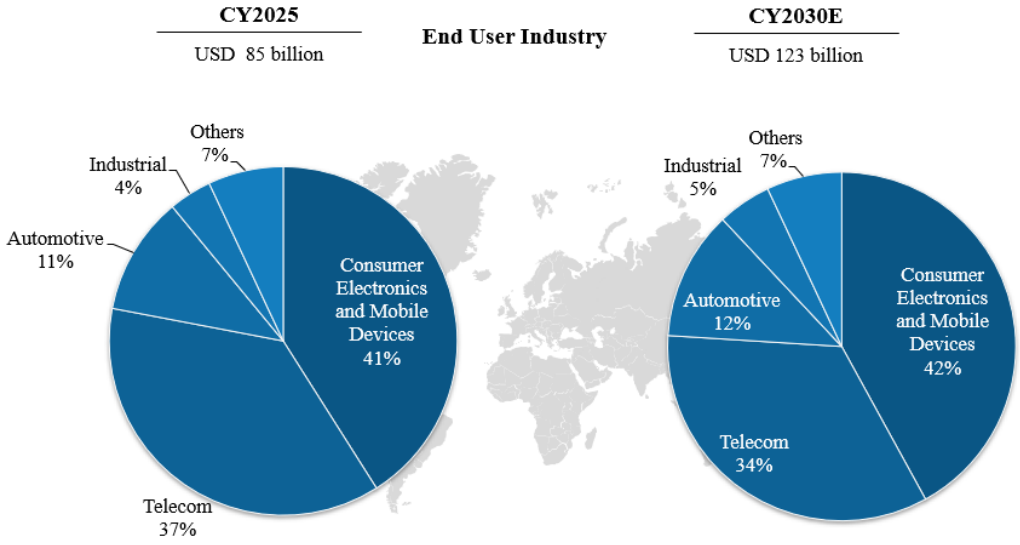
Source: Frost & Sullivan Analysis
Multilayer PCB excludes HDI PCB, which is presented separately

By end-use industry, consumer electronics and mobile devices remain the largest demand segment for the global PCB market due to the scale of smartphones, PCs, tablets, wearables, televisions and other consumer devices. However, the strongest incremental growth is expected from data infrastructure and telecom equipment, including AI servers, data centres, storage systems, high-speed networking equipment, cloud infrastructure and communication equipment. These end-use industries require higher-layer-count boards, advanced materials, HDI, improved signal integrity and tighter manufacturing tolerances.

Automotive electronics is also expected to remain an important growth segment as vehicles become more electrified, connected and software-enabled. Demand is supported by ECUs, ADAS, infotainment, battery management systems, lighting electronics, sensors, power electronics and charging systems. Industrial electronics represents a smaller but stable end-use segment, with demand linked to automation, instrumentation, control systems, drives and industrial power electronics.

Medical, aerospace and defence and other specialised end-use industries account for a smaller share of global PCB demand but are important from a value and capability perspective. These applications typically require higher reliability, stronger traceability, tighter quality control and longer customer qualification cycles.

Exhibit 4.17: Size of PCB industry, USD billion, Global, CY2025 and CY2030E, By End User Industry



Others include Aerospace & defense, Energy, Medical, etc.

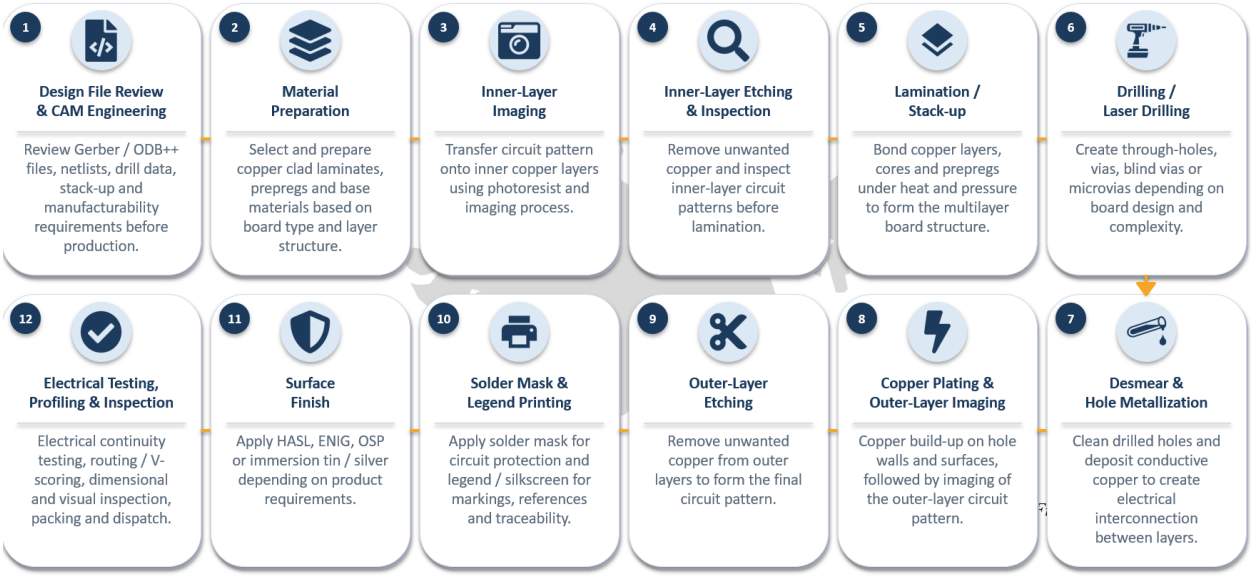
Source: Frost & Sullivan Analysis

4.2.2 Overview of the PCB Manufacturing Process

Printed Circuit Board (PCB) manufacturing refers to the fabrication of the bare board that provides the physical structure and electrical interconnection layer for electronic components. This is different from PCBA, where components are mounted and soldered onto the PCB. PCB manufacturing involves material preparation, circuit pattern formation, lamination, drilling, plating, solder mask application, surface finishing, electrical testing and final inspection.

The complexity of PCB manufacturing varies significantly by product type. Single-sided and double-sided PCBs require fewer process steps and are used in relatively simple electronic applications. Multilayer PCBs require layer alignment, lamination, drilling and interlayer connectivity. HDI PCBs require finer lines, microvias, laser drilling and tighter process control. Flexible and rigid-flex PCBs require different materials and handling processes due to bending, thickness and reliability requirements.

Exhibit 4.18: Key stages in the PCB manufacturing process



Source: Frost & Sullivan Analysis

Note: Process flow is indicative. The actual sequence varies by PCB type, layer count, material and whether the product is single-sided, double-sided, multilayer, HDI, flexible or rigid-flex.

PCB manufacturing cost structure is different from PCBA cost structure. In PCBA, the cost is usually dominated by electronic components mounted on the board. In PCB manufacturing, the cost is driven by base materials, copper, process chemicals, plating, utilities, environmental treatment, equipment intensity, yield and process complexity. The share of each cost category varies depending on layer count, board size, copper thickness, material type, via structure, surface finish, production volume and yield.

Base materials are typically one of the largest cost categories because copper clad laminates, prepregs and copper foil form the core physical structure of the PCB. Higher-layer-count boards, HDI boards, high-frequency boards and flexible / rigid-flex boards generally have higher material and process cost due to tighter specifications and more complex manufacturing requirements. Process chemicals, plating and surface finish materials also become more important as board complexity increases.

Exhibit 4.19: Indicative PCB manufacturing cost structure, by category

Category	Indicative Share of PCB Manufacturing Cost	Description
Base materials	18–30%	Copper clad laminates, prepregs, copper foil and other substrate materials. Share increases for multilayer, HDI, flexible, high-frequency and specialty material boards.
Imaging, etching, solder mask and legend	18–28%	Photo imaging, etching, solder mask, silkscreen / legend printing and related process steps used to define and protect circuit patterns.
Drilling, plating and surface finish	25–40%	Mechanical / laser drilling, hole preparation, copper plating, via formation and surface finish such as HASL, ENIG, OSP or immersion tin / silver.
Electrical testing, routing and final inspection	4–8%	Electrical continuity testing, routing / profiling, dimensional checks, visual inspection and final quality control.
Labour, utilities and environmental treatment	10–18%	Direct labour, power, water, compressed air, wastewater treatment and environmental compliance.
Factory overheads, maintenance, yield loss and rework	8–15%	Equipment maintenance, depreciation, scrap, rework, yield loss, traceability, quality systems and plant overheads.

Source: Frost & Sullivan Analysis

Note: Cost structure is indicative and varies by PCB type, layer count, material etc. For simple two-layer PCBs, plating / finishing, etching and solder mask can account for a significant share of cost. For advanced multilayer, HDI, flexible and high-frequency PCBs, base material, process control, yield loss and equipment intensity generally increase.

Cost structure becomes more demanding as manufacturers move from basic single-sided and double-sided PCBs toward multilayer, HDI and flexible / rigid-flex PCBs. Advanced PCB categories require tighter process control, higher equipment intensity, more complex materials, better yield management and stronger quality systems. This is why PCB manufacturing capability is not only a matter of capacity addition, but also of process know-how, material sourcing, environmental compliance and customer qualification.

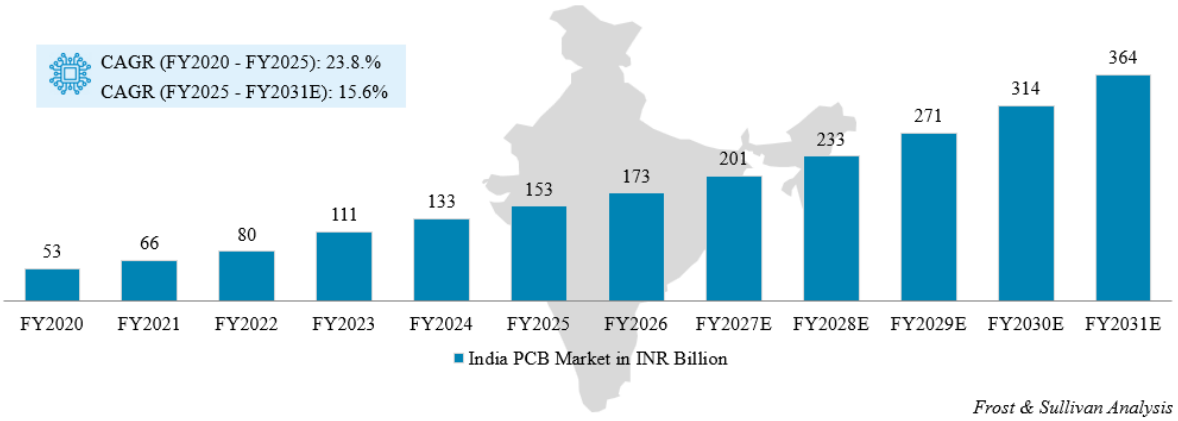
4.2.3 India PCB Market

India's bare PCB market is expanding with the growth of electronics manufacturing across mobile phones, consumer electronics and appliances, IT hardware, telecom equipment, automotive electronics, industrial systems and energy and power-electronics applications. Demand is increasing both for conventional single-sided and double-sided boards and for higher-value multilayer, HDI and flexible PCBs required in more compact and electronics-intensive products.

India's downstream electronics manufacturing base has expanded faster than domestic PCB fabrication capacity. Consequently, a substantial share of PCB demand continues to be met through imports, particularly for multilayer, HDI, flexible and other higher-performance boards. Domestic manufacturers have historically had a stronger presence in single-sided, double-sided and selected multilayer PCBs, although announced investments are expected to broaden domestic capability over the forecast period.

India's bare PCB market grew from INR 52.58 billion in FY2020 to INR 152.96 billion in FY2025, representing a CAGR of 23.8%. The market is estimated at INR 173.37 billion in FY2026 and is expected to reach approximately INR 364.14 billion by FY2031E, growing at a CAGR of 16.0% during FY2026–FY2031E. Growth is expected to be supported by the expansion of electronics manufacturing, higher electronic content across end-use industries, localisation of electronic components and increasing demand for higher-density and higher-reliability PCBs.

Exhibit 4.20: Size of bare PCB industry, INR billion, India, FY2020 – FY2031E



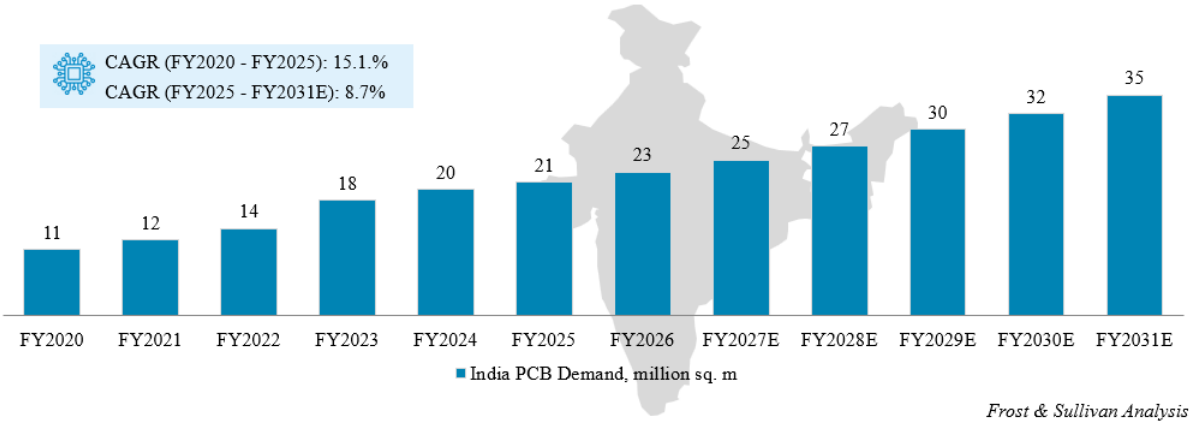
Frost & Sullivan Analysis

Note: The market size of bare PCBs considered in this report is limited to standalone bare PCB and excludes PCBs imported as part of component and as part of finished electronic products

In volume terms, India's bare PCB demand increased from an estimated 10.5 million sq. m in FY2020 to approximately 21.2 million sq. m in FY2025. Demand is expected to reach approximately 35.1 million sq. m by FY2031E, growing at a CAGR of 8.7% during FY2025–FY2031E.

Market value is expected to grow faster than physical board-area demand as the product mix gradually moves toward multilayer, HDI, flexible and rigid-flex PCBs, which have higher manufacturing complexity and value per sq. m than simpler single-sided and double-sided boards.

Exhibit 4.21: Size of bare PCB industry, million sq. m, India, FY2020 – FY2031E



Frost & Sullivan Analysis

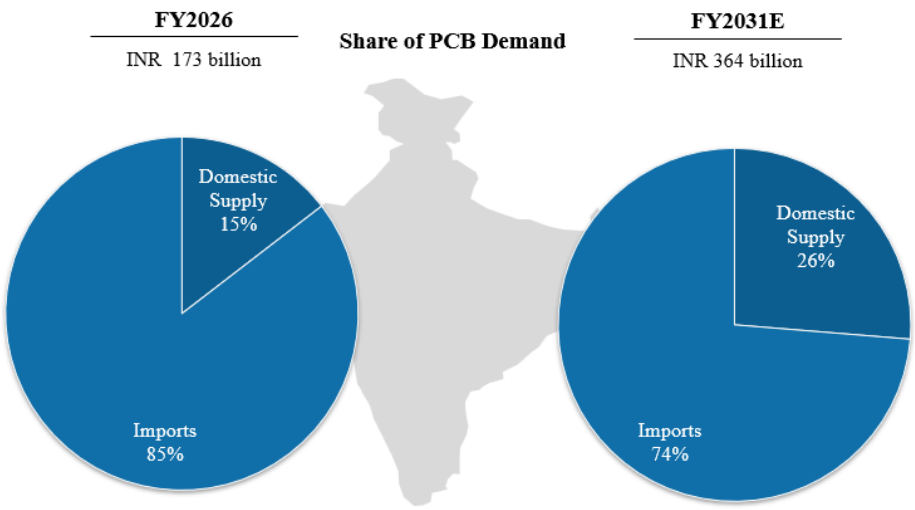
**Volume estimates are derived from value, product-type mix and average value per sq. m assumptions.*

India's PCB market remains heavily dependent on imports. Imports accounted for an estimated 83.0% of India's bare PCB demand in FY2020. Import dependence is expected to reduce gradually as new domestic capacities become operational.

Imports are estimated to account for approximately 85.5% of bare PCB demand in FY2026, reflecting the gap between downstream electronics manufacturing and domestic PCB fabrication capacity. This share is expected to decline to approximately 73.7% by FY2031E. Import dependence remains particularly high in advanced multilayer, HDI, flexible and other higher-performance PCBs.

Import dependence is expected to reduce as new domestic capacity becomes operational. However, localization is likely to be gradual because advanced PCB manufacturing requires process know-how, equipment and material capability, environmental compliance, yield maturity and customer qualification. Imports are therefore expected to continue meeting a significant share of Indian demand through FY2031E, even as domestic production grows faster.

Exhibit 4.22: Share of bare PCB demand served through imports, India, FY2026 and FY2031E



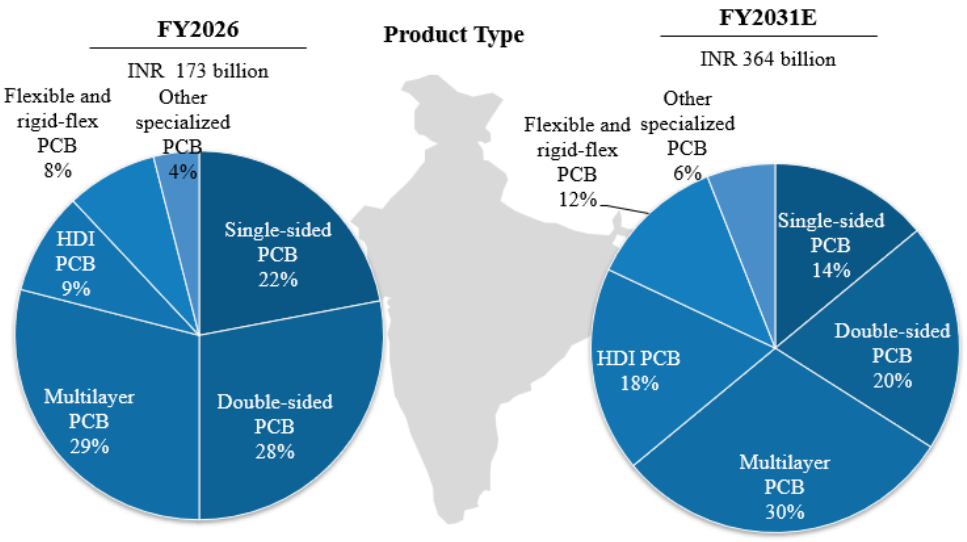
Source: Frost & Sullivan Analysis
**Import share is estimated using printed circuit imports under relevant trade classifications and Frost & Sullivan's estimate of total bare PCB demand*

India's PCB market continues to be led by single-sided, double-sided and standard multilayer PCBs, which are widely used across consumer appliances, lighting, power supplies, industrial controls, automotive electronics and other cost-sensitive applications. These categories are expected to continue growing in absolute value as domestic electronics production expands.

Demand for higher-value PCB categories is also expected to increase. Standard multilayer PCBs will benefit from growth in IT hardware, telecom equipment, automotive electronics, industrial systems and more complex consumer products. HDI PCBs are expected to record strong growth, supported by mobile phones, compact computing products, communication equipment and advanced automotive electronics, although domestic manufacturing capability remains at an early stage.

Flexible and rigid-flex PCBs are expected to gain share across displays, cameras, sensors, wearables, automotive electronics and medical devices. Demand for other specialized PCBs, including metal-core, high-frequency and high-speed boards, will be supported by lighting, telecom, industrial, energy and other application-specific electronics.

Exhibit 4.23: Size of bare PCB industry, India, FY2026 and FY2031E, By Product Type



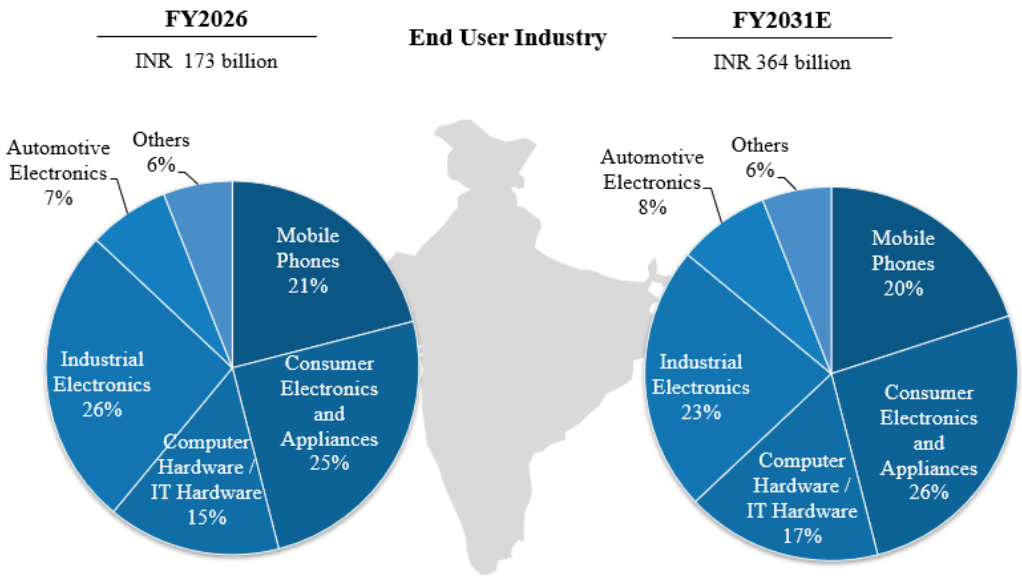
Note: E refers to Estimate

Source: Frost & Sullivan Analysis

By end-use industry, India's bare PCB demand has historically been supported by industrial electronics, consumer electronics, lighting, mobile phones and computer hardware. In FY2020, industrial electronics accounted for a significant share of India's bare PCB demand, reflecting the use of PCBs in meters, control systems, drives, power supplies, automation products and other industrial electronic equipment. Consumer electronics and appliances also represented a large demand base, supported by televisions, lighting, room air conditioners, washing machines, refrigerators and other consumer durables.

In FY2025, India's PCB demand has become more diversified due to the scale-up of mobile phone manufacturing, consumer electronics, appliances, IT hardware, telecom equipment, automotive electronics and industrial electronics. Industrial electronics continues to remain an important demand segment, but its share is expected to moderate over time as faster-growing categories such as computer hardware/IT hardware, mobile phones and automotive electronics expand.

Exhibit 4.24: Size of bare PCB industry, India, FY2026 and FY2031E, By End User Industry



Source: Frost & Sullivan Analysis

**Others include energy, medical electronics, aerospace & defence, strategic electronics and other specialized electronic applications.*

During FY2026–FY2031E, computer hardware/IT hardware and automotive electronics are expected to be among the fastest-growing end-user segments, growing at CAGRs of approximately 18.9% and 19.1%, respectively. Mobile phones are expected to remain a major demand segment, growing at a CAGR of approximately 14.9% over the same period.

4.2.4 Indicative Share Of PCB In Bill Of Materials Across Key End-User Industries

The share of bare PCB in the Bill of Materials (BoM) refers to the indicative value of fabricated printed circuit boards in the total material cost of an electronic product, electronic equipment or electronic module. It excludes electronic components, PCBA assembly value, testing, box-build and final product assembly. This distinction is important because the bare PCB is only one part of the broader PCBA value, while electronic components typically account for a much larger share of the assembled board cost.

PCB share of BoM varies significantly across end-use industries. The share is influenced by board size, layer count, material type, copper thickness, surface finish, use of flexible or rigid-flex boards, reliability requirements and product complexity. Products requiring compact, high-density, high-layer-count or flexible boards generally have higher PCB intensity. Products where mechanical, thermal, structural or electromechanical components dominate the BoM generally have lower PCB intensity.

Exhibit 4.25: Indicative share of bare PCB in bill of materials, by key end-user industry

Product Category	Indicative PCB Share of BoM	Description
Mobile Phones	3–6%	Higher PCB intensity due to compact multilayer / HDI-type boards, dense routing, miniaturized form factor and high electronics integration.
Consumer Electronics and Appliances	0.5–3%	Appliances generally have lower PCB share because compressors, motors, sheet metal, plastics, thermal systems and other electromechanical parts dominate the BoM. TVs, audio devices, lighting and connected consumer electronics have relatively higher PCB intensity.
Computer Hardware / IT Hardware	4–8%	Higher PCB share due to motherboards, server boards, networking boards, storage interfaces, high-layer-count boards and higher electronic content.
Industrial Electronics	2–5%	PCB share varies by product type. Meters, control boards, drives, power supplies, instrumentation and automation electronics require reliable single-sided, double-sided and multilayer boards.
Automotive Electronics	2–5%	Relevant at the electronic module level; PCB demand is supported by ECUs, lighting electronics, sensors, infotainment, BMS, motor controllers and power electronics.
Others	2–7%	Includes energy / power electronics, medical electronics, aerospace and defence, strategic electronics and other specialized applications. Share varies by board complexity, reliability requirements and product design.

Source: Frost & Sullivan Analysis
Note: The ranges represent bare PCB value only and exclude electronic components and PCBA assembly-related value

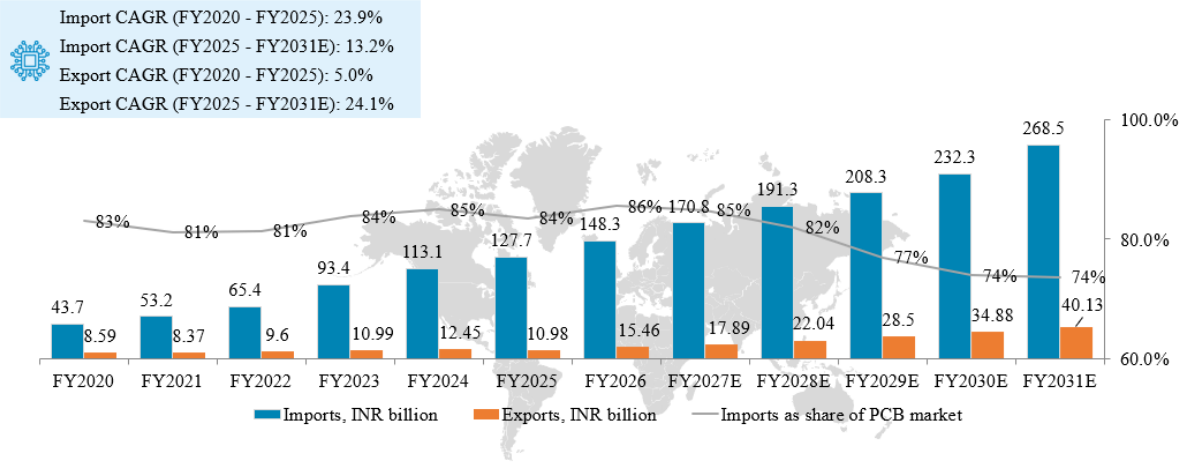
4.2.5 Import And Export Trends For PCBs

India remains structurally dependent on imported bare PCBs due to the gap between domestic PCB fabrication capacity and downstream electronics manufacturing demand. This dependence is higher in multilayer, flexible / rigid-flex, high-density and higher-performance boards, where domestic manufacturing capability is still developing. While India has an established domestic PCB manufacturing base, local supply remains limited relative to the scale of demand from mobile phones, consumer electronics, appliances, industrial electronics, telecom equipment, automotive electronics and IT hardware.

India's bare PCB imports increased from INR 43.66 billion in FY2020 to INR 127.70 billion in FY2025 and are estimated at INR 148.31 billion in FY2026. Imports are expected to reach INR 268.46 billion by FY2031E. However, imports as a share of India's bare PCB demand are expected to decline from approximately 85.5% in FY2026 to 73.7% by FY2031E as domestic manufacturing expands. Exports are estimated at INR 15.46 billion in FY2026 and are expected to reach INR 40.13 billion by FY2031E.

Exports are expected to remain much smaller than imports, but are likely to grow from a low base as domestic PCB manufacturers improve process capability, customer qualification and participation in export-oriented electronics supply chains. India is expected to remain a net importer of bare PCBs through FY2031E, although domestic supply is expected to grow faster than imports over the forecast period.

Exhibit 4.26: Import and export trends for bare PCBs, INR billion, India, FY2020 – FY2031E



Source: DGCI&S, Department of Commerce TradeStat; Frost & Sullivan analysis
Note: *Historical imports and exports are based on ITC-HS 85340000: Printed circuits. Forecast values are Frost & Sullivan estimates. Import shares are calculated using the India bare PCB demand estimates presented in Exhibit 4.20. Figures are rounded.*

The import-export trend highlights the scale of India's PCB localization opportunity. Imports are expected to remain material because advanced PCB manufacturing requires process know-how, yield maturity, environmental compliance, material availability, customer qualification and scale. At the same time, domestic production is expected to grow meaningfully as investments in multilayer PCBs, flexible PCBs, HDI-type boards, copper clad laminates and other upstream inputs begin to scale. This is expected to reduce import dependence gradually, even though India is likely to remain a net importer of bare PCBs over the medium term.

4.2.6 Domestic PCB Landscape, Key Player Positioning And Expansion Outlook

India's domestic PCB manufacturing base has historically been small relative to overall bare PCB demand. Domestic manufacturers have traditionally been concentrated in single-sided, double-sided and select multilayer PCBs, while a large share of India's requirement for higher-density, higher-layer-count, flexible, HDI and high-performance PCBs has been met through imports. This has resulted in a fragmented domestic supplier base, with a small set of established manufacturers and a broader long tail of regional and specialist PCB players.

The domestic landscape is beginning to shift as electronics manufacturing groups, EMS companies and component manufacturers expand into bare PCB fabrication through acquisitions, brownfield and greenfield capacity additions, technology partnerships and government-supported investments. IL JIN's PCB platform has been strengthened through the acquisitions of Ascent Circuits and Shogini Technoarts, expanding its presence across conventional and higher-value PCB categories.

ECMS is also supporting this transition. By March 2026, MeitY had approved 75 applications with expected investment of INR 616.71 billion and direct employment potential of approximately 65,040 persons across electronics component categories, including PCBs, HDI PCBs, flexible PCBs, laminates and other components relevant to electronics value-chain localization.

The competitive landscape can therefore be viewed in two parts: an established manufacturing base serving current demand across conventional and selected advanced PCB categories, and an emerging investment-led pipeline focused on expanding capability in multilayer, HDI, flexible and upstream PCB materials. The positioning of existing manufacturers and selected capacity-expansion plans is presented in the following exhibits.

Exhibit 4.27: Key PCB manufacturers, India, by capability

Company	Current PCB Capabilities	Key Applications
ILJIN Electronics, including its subsidiaries Ascent Circuits and Shogini Technoarts, and its joint venture Ascent-K Circuit	Single-sided, double-sided, multilayer, RF, aluminium, metal-clad, flexible and specialty PCBs; planned expansion through Ascent-K Circuit into HDI PCBs, flexible PCBs and semiconductor package substrates	Consumer electronics, automotive, telecom, industrial power electronics, lighting, aerospace, defence and EMS applications
AT&S India	High-end PCBs, HFI and HDI PCBs, high-speed and high-frequency boards	Automotive, industrial, medical, infrastructure and high-reliability applications
Epitome Components	Single-sided, double-sided, multilayer and RF PCBs	Consumer electronics, industrial electronics and other electronic applications
Genus Electrotech	Single-sided, double-sided, metal-core PCBs and broader electronics manufacturing capabilities	Consumer electronics, lighting, industrial electronics and energy or metering applications
Sahasra / Micropack / Vintek / Fine-Line / Hi-Q / Secure Circuits / Others	Niche and regional PCB manufacturing capabilities across selected product types	Industrial, automotive, aerospace, defence, electronics design and specialized applications

Source: Company annual reports, Frost & Sullivan Analysis

Amber's electronics division, through IL JIN, Ascent Circuits and Shogini Technoarts, is positioned across PCBA, box-build and bare PCB manufacturing, with capabilities spanning single-sided, double-sided, multilayer, RF, flexible, metal and specialty PCBs. AT&S India operates at the higher end of India's PCB landscape, with its Nanjangud facility manufacturing HFI and HDI PCBs for automotive, industrial and medical applications. Epitome Components manufactures single-sided, double-sided, multilayer and RF PCBs, while Genus Electrotech has manufacturing capability across single-sided, double-sided and metal-core PCBs.

Exhibit 4.28: Selected PCB capacity expansion plans and future positioning, India

Company / Group	Investment / Project	Location	Target Products
ILJIN Electronics	Shogini Technoarts received ECMS approval for multilayer PCB manufacturing, building on existing presence in Pune.	Maharashtra	Single-sided, double-sided, multilayer, metal-core, flexible and specialty PCBs
	Ascent Circuits received ECMS approval for PCB manufacturing at upcoming facility in Hosur.	Tamil Nadu	Multilayer PCBs and selected advanced PCB categories
	Ascent-K Circuit: Joint venture with Korea Circuit for advanced PCB manufacturing, project under development; groundbreaking completed in June 2026.	Uttar Pradesh	HDI PCBs, flexible PCBs and semiconductor package substrates
Epitome Components	Epitome Components Private Limited received approval under ECMS for manufacturing PCBs, including HDI PCBs, in Maharashtra.	Maharashtra	Single-sided, double-sided, multilayer and RF PCBs
Kaynes Circuits	ECMS-approved projects for multilayer PCBs, HDI PCBs and laminates; broader reported advanced components facility also includes flexible PCBs and camera modules. Capacity has not been separately disclosed.	Tamil Nadu	Multilayer PCBs, HDI PCBs, high-performance laminates, flexible PCBs and camera modules
Syrma Strategic Electronics	ECMS-approved multilayer PCB project and broader reported multilayer PCB and copper-clad laminate facility. Capacity has not been separately disclosed.	Andhra Pradesh	Multilayer PCBs and copper-clad laminates
ECMS Tranche 2 PCB applicants	Second-tranche approvals included multilayer PCB projects by Hi-Q Electronics, Secure Circuits, Zetfab India, Ehome IoT, Sierra Circuits India, Meena Electrotech, AT&S India, Micropack and Infopower Technologies.	Multiple states	Multilayer PCBs
ECMS Tranche 3 PCB / HDI applicants	Third-tranche approvals included PCB or HDI projects by India Circuits, Vital Electronics, Signum Electronics, Epitome Components, BPL, AT&S India, Ascent-K Circuit, CIPSA TEC India and Shogini Technoarts.	Multiple states	PCBs, including HDI PCBs

Source: PIB, MeitY, company filings, Frost & Sullivan Analysis

Exhibit 4.29: Indicative positioning of domestic PCB manufacturers, India, by product segment

Product Segment	Current Market Structure	Key Players	Assessment
Single-sided PCBs	Fragmented, relatively mature domestic capability	ILJIN subsidiaries: Ascent Circuits and Shogini Technoarts, Epitome Components, Genus Electrotech, PCB Power, Sahasra, and other regional players.	Domestic manufacturing capability exists, but the segment is cost-sensitive and exposed to pricing pressure.
Double-sided PCBs	Fragmented to moderately consolidated	ILJIN subsidiaries: Ascent Circuits and Shogini Technoarts, Epitome Components, Genus Electrotech, AT&S India, PCB Power, and others.	Broad domestic capability exists across consumer, industrial, automotive and lighting-related applications.
Multilayer PCBs	More concentrated, capability expanding rapidly	Ascent, Shogini, AT&S, Epitome, Kaynes, Syrma, Hi-Q, Secure Circuits, Micropack and other ECMS-approved players	Key localisation segment; expected to see strong investment-led growth driven by IT hardware, telecom, industrial and automotive electronics.
Flexible / Rigid-flex PCBs	Emerging domestic capability	Ascent Circuits, Shogini Technoarts, Ascent-K Circuit, select specialist players, and ECMS-approved flexible PCB projects.	High-growth segment linked to compact devices, wearables, cameras, sensors, automotive electronics, medical electronics and advanced consumer electronics.
HDI / High-frequency / Advanced PCBs	Limited current domestic capability, expansion underway	Ascent-K Circuit, AT&S India, Kaynes Circuits and other ECMS-approved players.	Strategic segment for mobile phones, IT hardware, telecom, automotive electronics, data infrastructure and higher-density electronic products.
Upstream PCB materials	Early-stage domestic localization	Kaynes laminates, ECMS-approved laminate projects and other emerging material suppliers	Important for reducing dependence on imported copper clad laminates, prepregs and other PCB inputs.

Source: PIB, MeitY, company filings, Frost & Sullivan Analysis

Indicative revenue shares have been estimated using the FY2026 bare PCB revenues of selected domestic manufacturers and India's estimated domestic bare PCB production value of approximately INR 4,052.83 crore. IL JIN's combined PCB business, comprising Ascent Circuits and Shogini Technoarts on a full year basis recorded bare PCB revenue of approximately INR 852.55 crore in Fiscal 2026, representing an indicative revenue share of approximately 21.0% of the overall PCB manufacturing market in India in Fiscal 2026. AT&S India and Epitome Components accounted for approximately 13.04% and 6.82%, respectively, of the same market. These percentages relate to the domestic manufacturing base and exclude imported supply.

Exhibit 4.30: Indicative revenue share of select domestic bare PCB manufacturers,% share, India, FY2026

Manufacturer	Indicative revenue share (%)
ILJIN (Ascent + Shogini)	21.0%
AT&S India	13.0%
Epitome Components	6.8%
Other Domestic Manufacturers	59.1%

Source: Company financial information, credit-rating reports and Frost & Sullivan analysis.
Note: Indicative shares use available FY2026 revenue information and estimates, including exports, divided by estimated domestic production value. ILJIN combines full-year revenues of Ascent Circuits and Shogini Technoarts, including Shogini's pre-acquisition period. Other domestic manufacturers is the balancing residual and excludes imports. Figures are rounded.

IL JIN, AT&S India and Epitome Components together accounted for approximately 40.90% of India's estimated domestic bare PCB production value in FY2026. The remaining 59.10% represented other domestic manufacturers, including established, regional and specialist PCB producers and companies for which comparable PCB-only revenues are not publicly available.

4.2.7 Strategic Relevance, Technology Trends And Growth Drivers For PCB Manufacturing

PCB manufacturing is a foundational layer of electronics value addition. Bare PCBs form the physical and electrical platform on which electronic components are mounted during PCBA, and therefore influence product reliability, miniaturization, thermal performance, signal integrity and manufacturability. While PCBA and final assembly create significant downstream value, domestic PCB fabrication capability is critical for increasing local value addition and reducing dependence on imported intermediate inputs.

For India, the strategic relevance of PCB manufacturing is linked to the next phase of electronics localization. India has scaled rapidly in mobile phones, consumer electronics, appliances, IT hardware and EMS-led manufacturing, but the upstream component base remains relatively underdeveloped. As a result, a large share of bare PCB demand, particularly for multilayer, HDI, flexible / rigid-flex and higher-performance PCBs, continues to be served through imports. Developing domestic PCB capability is therefore important not only for import substitution, but also for supply-chain resilience, faster product development cycles, improved design-manufacturing integration and deeper participation in electronics global value chains.

Government policy is also becoming more directly supportive of PCB localisation. The Electronics Component Manufacturing Scheme (ECMS), notified in April 2025 with an original outlay of INR 22,919 crore and subsequently increased to INR 40,000 crore in Union Budget 2026–27, is aimed at developing India's electronics component manufacturing ecosystem, promoting domestic value addition and integrating Indian manufacturers with global value

chains. The scheme is directly relevant to PCB manufacturing because approved product categories include multilayer PCBs, HDI PCBs, flexible PCBs, laminates and other electronics components.

Exhibit 4.31: Selected state-level incentives relevant to PCB manufacturing, India

State	PCB relevance	Key incentives
Andhra Pradesh	PCBs identified as a focus component under the Electronics Component Manufacturing Policy 2025–30	Capital subsidy of up to 50% of eligible investment for qualifying early projects, or state support matching the central ECMS incentive; land and electricity-duty concessions
Uttar Pradesh	Multi-layer PCBs explicitly covered under the Electronics Component Manufacturing Policy 2025	ECMS-linked state support or 20% capital subsidy for eligible non-ECMS projects; additional incentive for local sourcing of laminates; land, interest and electricity-duty support
Gujarat	PCB projects approved under the central ECMS are eligible under the Gujarat Electronics Component Manufacturing Policy 2025	State matching support linked to the central ECMS incentive; support for common infrastructure, laboratories and skill-development facilities
Tamil Nadu	PCB projects may qualify under the Semiconductor and Advanced Electronics Policy 2024	20% fixed-capital subsidy, turnover-linked incentive, interest support, land and electricity-related concessions, subject to project eligibility
Odisha	PCBs, laminates, prepregs and other PCB materials are explicitly covered under the state ESDM framework	Capital subsidy, interest subsidy, SGST reimbursement, electricity-duty exemption and turnover-linked support for eligible projects

Source: Government of Andhra Pradesh, U.P. Electronics Corporation Limited, Department of Science and Technology, Government of Gujarat, Guidance Tamil Nadu, Invest Odisha, MeitY, Frost & Sullivan analysis.

Note: For mega and ultra mega projects, the incentive scheme is curated for each company by the respective state governments.

Exhibit 4.32: Key technology trends and growth drivers for PCB manufacturing, India

Technology trends and growth drivers		Implication for PCB manufacturing
Shift toward multilayer and HDI PCBs	Compact form factors, smartphones, IT hardware, telecom and automotive electronics driving demand for higher-layer-count boards.	Raises need for advanced process capability, laser drilling, microvias, tighter tolerances and yield control.
Growth of flexible and rigid-flex PCBs	Wearables, cameras, sensors, medical electronics and automotive applications require flexible interconnects and compact board designs.	Creates opportunity for differentiated domestic capability beyond standard rigid board manufacturing.
Rising electronics content in vehicles	EVs, BMS, ADAS, lighting electronics, sensors, infotainment and motor controllers increasing PCB demand in vehicles.	Supports demand for automotive-grade PCBs with higher reliability, thermal performance and qualification requirements.
IT hardware, telecom and data infrastructure	Servers, storage, networking products, telecom equipment, 5G and data-centre growth increasing demand for high-performance hardware.	Supports demand for high-layer-count, high-speed, high-frequency and higher-reliability PCBs.
Industrial electronics and energy transition	Automation, drives, meters, renewables, inverters, UPS, EV charging infrastructure and power electronics expanding PCB demand.	Sustains demand for multilayer, metal-clad, high-current and thermal-management boards.
EMS platform backward integration	EMS companies and electronics platforms seeking better control over sourcing, lead times, quality and domestic value addition.	Encourages backward integration into PCB manufacturing and partnerships with technology providers.
ECMS and component localisation support	ECMS approvals supporting domestic capacity in multilayer PCBs, HDI PCBs, flexible PCBs, laminates and electronic components.	Improves the investment case for advanced PCB capacity and upstream material localisation.
Quality, traceability and compliance	Export-oriented and high-reliability applications require process control, certifications, traceability and environmental compliance.	Raises entry barriers and favours manufacturers with mature systems, high yields and customer qualification capability.
Upstream PCB material localisation	Domestic availability of CCL, prepregs, copper foil and process inputs remains important for deeper manufacturing localisation.	Reduces supply-chain dependency and supports cost, lead-time and qualification improvements for domestic PCB makers.

Source: Frost & Sullivan Analysis

The growth outlook for PCB manufacturing in India is therefore supported by both demand-side and supply-side factors. Demand is expanding because India's downstream electronics manufacturing base is scaling across mobile

phones, consumer electronics, appliances, IT hardware, telecom equipment, automotive electronics and industrial electronics. Supply is expected to strengthen as ECMS-backed investments, technology partnerships and backward integration by EMS / electronics platforms add capacity in multilayer, HDI, flexible and upstream PCB material categories.

4.2.8 Brief Overview of the Semiconductor Substrate Market in India

Semiconductor package substrates, also referred to as IC substrates, are advanced interconnect platforms used inside semiconductor packages. They connect the semiconductor die to the external package and ultimately allow the packaged chip to be mounted on a PCB. While they share some manufacturing concepts with advanced PCBs, such as layered structures, copper routing and insulation materials, they require much finer design rules, tighter tolerances, advanced materials, stronger process control and higher reliability standards. Therefore, semiconductor package substrates should be viewed as an adjacent high-value segment linked to semiconductor packaging, rather than as part of the conventional bare PCB market.

In FY2026P, India remained at an early stage in semiconductor package substrate manufacturing. India's semiconductor package substrate demand was indicatively estimated at approximately USD 1.0–1.2 billion in FY2026P and is expected to reach USD 2.8–3.4 billion by FY2031E, supported by growth in semiconductor consumption, domestic packaging capacity and advanced electronics manufacturing. The country is building capability in PCB manufacturing, HDI PCBs, flexible PCBs, OSAT / ATMP and advanced electronics manufacturing, but domestic capability in IC substrates remains limited. In the near term, most advanced substrate requirements are expected to continue being met through imports. However, as semiconductor packaging, mobile phones, automotive electronics, IT hardware, telecom equipment, data infrastructure and advanced consumer electronics scale in India, the need for domestic substrate-related capability is expected to increase.

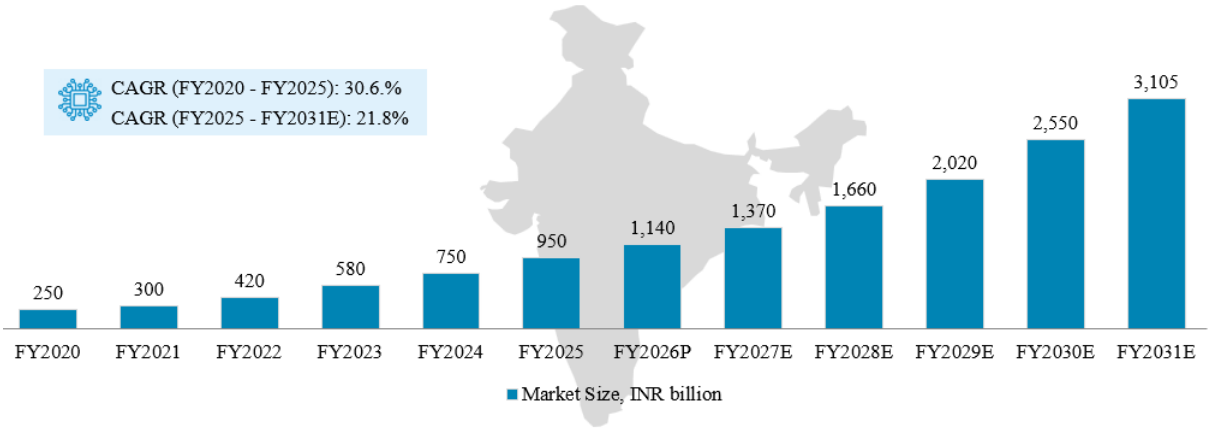
The growth opportunity is expected to be gradual and capability-led. India's immediate PCB localization opportunity remains in single-sided, double-sided, multilayer, HDI and flexible PCBs. Semiconductor package substrates represent a longer-term frontier that will require technology partnerships, advanced materials, precision manufacturing, yield maturity, customer qualification and alignment with India's semiconductor packaging ecosystem. Over time, progress in this area could support deeper electronics value addition and strengthen India's participation in semiconductor and advanced electronics supply chains.

4.3 Brief Overview of India Box-Build Industry

Box-build activities include the integration of PCBAs with enclosures, wiring harnesses, power supplies, displays, sensors and other sub-systems, together with firmware loading, functional testing, quality inspection, labelling, packaging and dispatch. These services are used across mobile phones, consumer electronics and smart devices, appliances, IT hardware, telecom equipment, industrial electronics, automotive electronics and energy and power-electronics applications.

India's box-build industry increased from an estimated INR 250 billion in FY2020 to INR 950 billion in FY2025, growing at a CAGR of 30.6%. The market is estimated at INR 1,140 billion in FY2026P and is expected to reach approximately INR 3,105 billion by FY2031E, growing at a CAGR of 21.8% during FY2025–FY2031E. Growth is expected to be supported by the expansion of outsourced electronics manufacturing and increasing OEM demand for integrated product assembly, testing and supply-chain support.

Exhibit 4.33: Size of box-build industry, INR billion, India, FY2020 – FY2031E

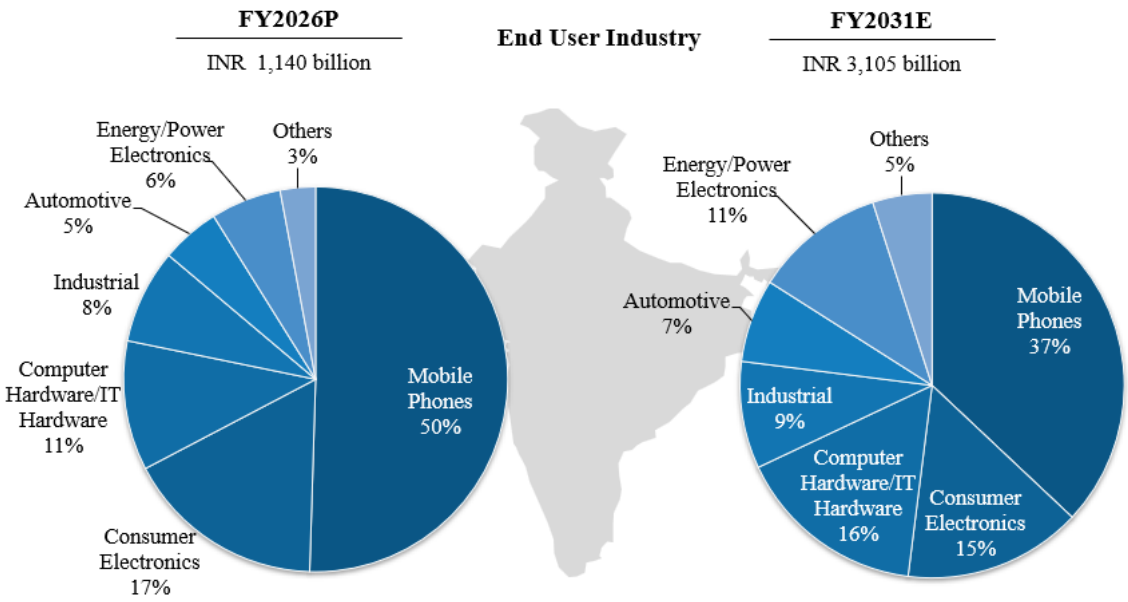


Frost & Sullivan Analysis

Note: For the purpose of this report, the box-build market refers to outsourced module-level, system-level or finished-product integration beyond board assembly. P refers to provisional / latest available estimate. E refers to estimate.

Mobile phones are expected to remain the largest application segment, while incremental growth is expected from IT hardware, consumer appliances, industrial and automotive electronics, telecom equipment and energy and power-electronics products as domestic manufacturing and outsourcing increase.

Exhibit 4.34: Size of box-build industry, INR billion, India, FY2026P and FY2031E, by end-user industry



Source: Frost & Sullivan Analysis

**Others include medical electronics, aerospace & defence etc.*

The share of box-build varies significantly by product category. In mobile phones and computer hardware, EMS providers are more likely to manufacture, test and dispatch complete products or finished systems. In lighting, consumer electronics and smart devices, including wearables and hearables, box-build penetration is also high due to

relatively standardized product assembly and high-volume manufacturing. In industrial and strategic electronics, PCBA-only outsourcing remains more common because products are often lower-volume, customized, qualification-intensive and more closely controlled by OEMs or system integrators.

4.4 Brief Overview of the Global and Indian Industrial Automation Market

Industrial automation refers to the use of control systems, sensors, drives, software and digital platforms to monitor, control and optimize industrial processes and manufacturing operations. The market includes products and systems such as programmable logic controllers (PLCs), human machine interfaces (HMIs), variable frequency drives (VFDs), industrial software, IIoT / SaaS platforms, sensors, instrumentation, control systems and related services.

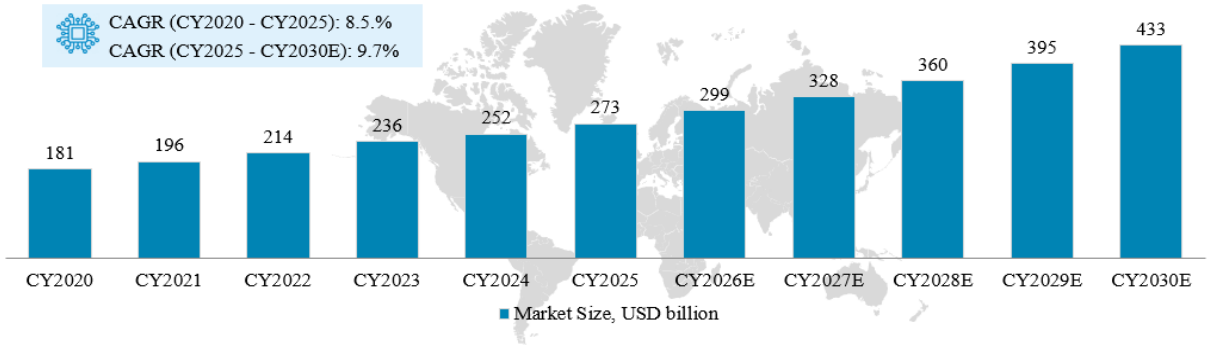
Exhibit 4.35: Key industrial automation products, uses and applications

Product category	Primary use	Typical applications
Programmable Logic Controllers (PLCs)	Automated control of machines, equipment and production processes	Assembly lines, packaging machinery, material handling, machine tools, utilities and process equipment
Human Machine Interfaces (HMIs)	Operator visualization, monitoring and control of machinery and industrial processes	Production lines, machine panels, process plants, utilities and building-management systems
Variable Frequency Drives (VFDs)	Control of motor speed, torque and energy consumption	Pumps, fans, compressors, conveyors, HVAC systems and industrial machinery
Industrial software / SaaS / IIoT platforms	Production monitoring, analytics, remote management and operational optimization	Predictive maintenance, production analytics, energy management, asset monitoring and connected factories
Sensors, instrumentation and control systems	Measurement, detection, process regulation and motion control	Temperature, pressure, flow and level measurement, quality inspection, process control, robotics and motion applications

Source: Frost & Sullivan Analysis

The global industrial automation market increased from an estimated USD 181 billion in CY2020 to USD 273 billion in CY2025, growing at a CAGR of 8.5%. The market is expected to reach approximately USD 433 billion by CY2030E, representing a CAGR of 9.7% during CY2025–CY2030E. Growth is expected to be supported by factory modernization, labour-productivity requirements, energy efficiency, quality control, supply-chain resilience and the increasing adoption of industrial software and connected automation systems.

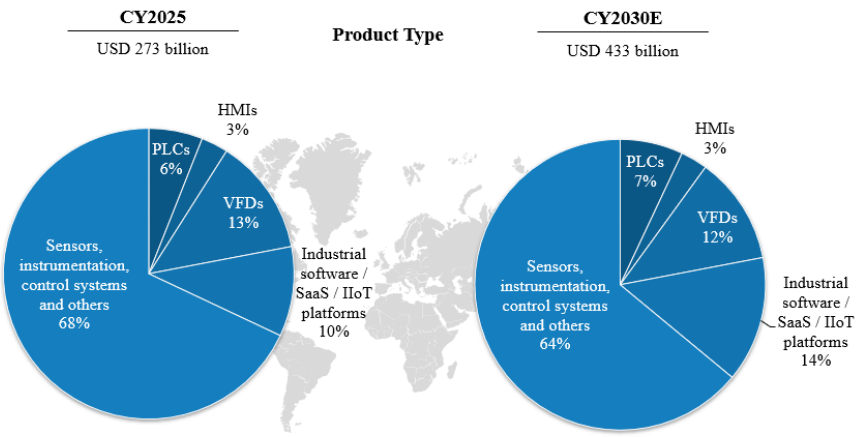
Exhibit 4.36: Size of industrial automation market, USD billion, Global, CY2020 – CY2030E



Frost & Sullivan Analysis

**Note: Market size includes industrial automation hardware, software and related systems/services.*

Exhibit 4.37: Industrial automation market by product category, USD billion and %, Global, CY2025 and CY2030E



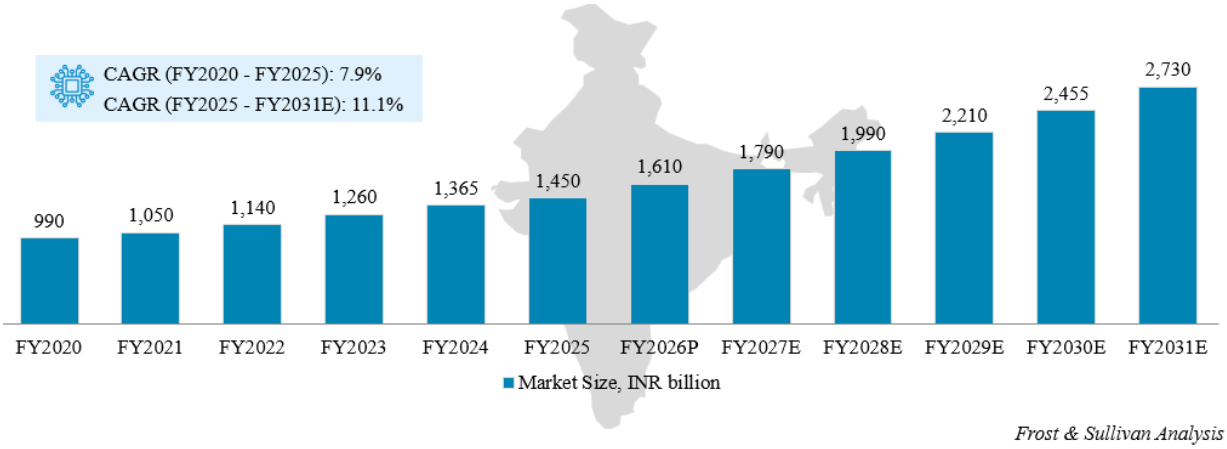
Source: Frost & Sullivan Analysis

**Others" includes sensors, instrumentation, DCS / SCADA systems, motion control, control panels, automation services and related systems..*

India's industrial automation market increased from an estimated INR 990 billion in FY2020 to INR 1,450 billion in FY2025, representing a CAGR of 7.9%. The market is estimated at INR 1,610 billion in FY2026P and is expected to reach approximately INR 2,730 billion by FY2031E, growing at a CAGR of 11.1% during FY2025–FY2031E.

Forecast growth is expected to exceed the global market as India expands its manufacturing base from a lower level of automation penetration. Investments in automotive and auto components, electronics, pharmaceuticals, food processing, metals, chemicals, energy and infrastructure are expected to increase demand for machine control, motor drives, instrumentation, industrial software and integrated automation systems. Greater focus on productivity, quality consistency, traceability, energy efficiency and worker safety will also support adoption.

Exhibit 4.38: Size of industrial automation market, INR billion, India, FY2020 – FY2031E



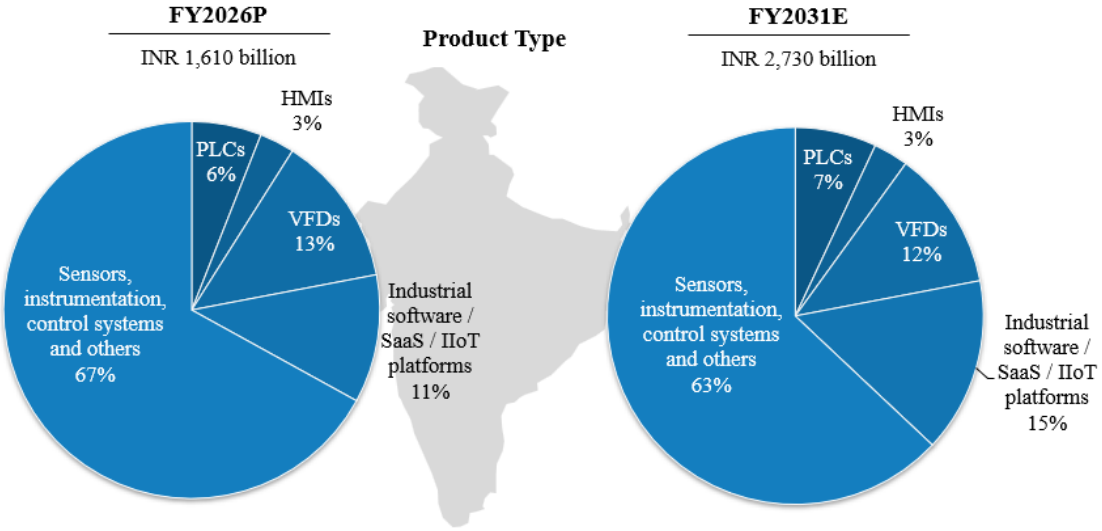
Frost & Sullivan Analysis

**Note: Market size includes industrial automation hardware, software and related systems/services.*

Within India, VFDs, PLCs, HMIs and industrial software / SaaS solutions form important product categories, but they are only part of the wider automation market. VFD demand is supported by energy efficiency, motor control and process optimization. PLCs and HMIs are core to machine and process control. Industrial software, IIoT and SaaS solutions are expected to grow faster as manufacturers adopt remote monitoring, predictive maintenance, production

analytics, energy management and connected factory platforms. Sensors, instrumentation, control systems and other automation equipment continue to account for the largest share of the overall market.

Exhibit 4.39: Size of industrial automation market, INR billion, India, FY2026P and FY2031E, By Product Category



Source: Frost & Sullivan Analysis

**Others" includes sensors, instrumentation, DCS / SCADA systems, motion control, control panels, automation services and related systems..*

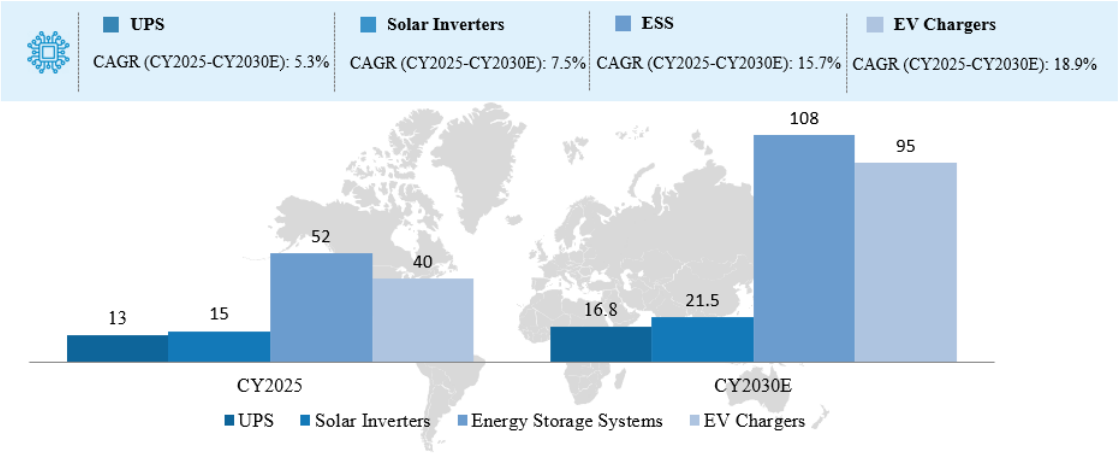
Industrial automation is relevant to India's electronics manufacturing opportunity because it expands demand for higher-value control electronics, embedded systems, power electronics and system integration. Unlike high-volume consumer electronics, industrial automation products are typically lower-volume but higher-complexity, with greater emphasis on reliability, traceability, customization and customer qualification. This makes the segment relevant for EMS companies with engineering, testing, box-build and high-mix manufacturing capabilities.

4.5 Brief Market Outlook for UPS, Solar Inverters, Energy Storage Systems and EV Chargers

UPS, solar inverters, energy storage systems and EV chargers are linked by their dependence on power electronics, control boards, embedded software, thermal management, enclosures, wiring, testing and system-level integration. These categories are relevant to the electronics manufacturing ecosystem because they require a combination of PCBA capability, power electronics manufacturing, box-build, quality control and supply-chain management.

Globally, UPS is a relatively mature market, while solar inverters continue to benefit from additions in solar-generation capacity. Energy storage systems and EV chargers are expected to record faster growth as power systems integrate greater renewable capacity and the global EV fleet expands. Global solar installations reached a record level in 2025, while battery-storage additions and public charging-point deployment also increased substantially

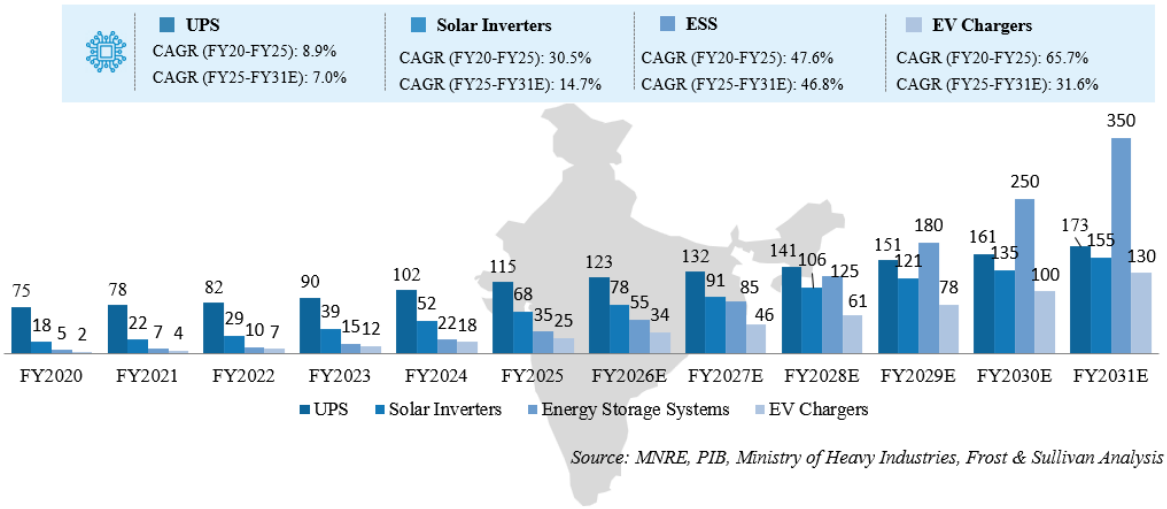
Exhibit 4.40: Size of UPS, solar inverter, energy storage system and EV charger markets, USD billion, Global, CY2025 and CY2030E



Source: IEA, SolarPower Europe,, Frost & Sullivan Analysis

India's combined market for UPS, solar inverters, energy storage systems and EV chargers increased from an estimated INR 100 billion in FY2020 to INR 243 billion in FY2025, representing a CAGR of 19.4%. The market is estimated at INR 290 billion in FY2026P and is expected to reach approximately INR 808 billion by FY2031E, growing at a CAGR of 22.2% during FY2025-FY2031E.

Exhibit 4.41: Size of UPS, solar inverter, energy storage system and EV charger markets, INR billion, India, FY2020–FY2031E



Source: MNRE, PIB, Ministry of Heavy Industries, Frost & Sullivan Analysis

UPS is expected to remain a steady-growth category, increasing from INR 115 billion in FY2025 to INR 173 billion by FY2031E. Demand will be supported by data centres, commercial infrastructure, healthcare, BFSI, industrial facilities, telecom networks and other applications requiring reliable backup power. Continued investment by critical-power suppliers reflects the structural growth in data-centre and digital infrastructure demand.

The solar inverter market is expected to increase from INR 68 billion in FY2025 to INR 155 billion by FY2031E. Growth will be supported by utility-scale, rooftop and commercial and industrial solar installations, along with growing demand for hybrid and storage-linked inverter systems. India added substantial solar capacity during 2025, providing a larger underlying base for inverter and power-conversion demand.

Energy storage systems are expected to be the fastest-growing category in India, increasing from INR 35 billion in FY2025 to INR 350 billion by FY2031E. Growth will be supported by renewable-energy integration, grid balancing, peak-power management, commercial and industrial storage, data-centre backup and hybrid renewable projects.

The EV charger market is expected to increase from INR 25 billion in FY2025 to INR 130 billion by FY2031E. Demand will be supported by electric two-wheelers, three-wheelers, buses, passenger vehicles, fleet electrification and public and depot charging. The PM E-DRIVE scheme has allocated INR 20 billion for public charging infrastructure, supporting the longer-term charging-equipment pipeline.

Exhibit 4.42: Market outlook for UPS, solar inverter, energy storage system and EV charger markets, India

Product Category	Market Outlook	Key Growth Drivers
UPS	Mature but steady-growth market	Data centers, commercial infrastructure, healthcare, BFSI, telecom, industrial backup and residential power reliability
Solar Inverters	Medium-to-high growth market	Utility-scale solar, rooftop solar, C&I solar, distributed energy and solarization of agriculture / off-grid applications
Energy Storage Systems	High-growth emerging market	Renewable integration, grid balancing, peak management, hybrid RE projects, data centers and battery cost decline
EV Chargers	High-growth emerging market	EV adoption, public charging infrastructure, fleet electrification, bus depots, highways and policy incentives

Source: MNRE, PIB, Ministry of Heavy Industries, Frost & Sullivan Analysis

As India scales renewable energy, storage, EV infrastructure, data centers and industrial power systems, these product categories are expected to create incremental opportunities for EMS, PCBA, PCB and box-build players with power-electronics and system-integration capability.

4.6 Threats and Challenges

India's electronics manufacturing industry faces challenges across sourcing, technology and commercial execution. These affect the cost and timing of expansion, as well as manufacturers' ability to meet customers' quality and delivery requirements.

Dependence on imported inputs

Domestic manufacturers continue to rely on overseas suppliers for semiconductors, selected electronic components, advanced PCB materials and production equipment. Shipping disruptions, trade restrictions or shortages of critical inputs can interrupt production and extend delivery schedules. Currency movements also affect procurement costs where purchases and sales are in different currencies. Developing alternative sources takes time because replacement components may require technical approval and customer validation.

Pricing pressure and working capital

Manufacturers compete on cost as well as quality and delivery, often serving large OEMs with substantial purchasing power. Increases in component, copper and other material prices can weigh on margins where selling-price adjustments lag procurement costs. Maintaining inventories to protect deliveries, funding production and allowing credit to customers also require working capital. Slower collections or unexpected order reductions can leave manufacturers holding stock that is difficult to redeploy to other programmes.

Investment and capacity utilisation

Expansion into advanced PCB fabrication and specialised electronics requires investment in machinery, process development and testing. Commercial production depends on equipment commissioning, stable manufacturing

processes and customer approvals. Lower initial utilisation, rework and material losses can increase unit costs during the ramp-up period. Delays in obtaining approvals or converting customer programmes into production orders can extend the time required to recover investments. Capacity additions therefore need to be matched by demand and access to funding.

Technology and quality requirements

Higher component density, smaller product formats and increasing power and performance requirements raise manufacturing complexity. Suppliers must keep pace with changes in design, assembly and testing, while managing component obsolescence over product lifecycles. Automotive, industrial, medical and aerospace applications place particular emphasis on reliability, traceability and certification. Customer audits and qualification processes can delay commercial orders, while quality failures may result in rework, warranty costs or the loss of future programmes.

Demand cycles and customer concentration

Production volumes depend on the sales and investment plans of end customers. Consumer electronics and appliances are exposed to seasonality, changes in household spending and inventory corrections, while industrial and infrastructure orders can be affected by project delays. Where a few OEMs or programmes contribute a substantial share of sales, changes in sourcing decisions or product launches can affect factory utilisation and cash flow. Product discontinuations can also require changes to production plans and inventory commitments.

Skills and operating infrastructure

Advanced manufacturing requires experienced process engineers, technicians and testing personnel. Developing these skills and retaining trained employees can become more difficult as new facilities compete for talent. Reliable power, suitable logistics and access to specialised suppliers also influence operating costs and delivery performance. PCB fabrication adds requirements for water availability, chemical handling and effluent treatment. Meeting environmental and product-safety requirements requires continuing investment, including as manufacturers enter new export markets.

5. FINANCIAL AND OPERATIONAL BENCHMARKING

5.1 Product Capability Benchmarking

Company	PCBA	Bare PCB Manufacturing	UPS Systems	Solar Products	EV Chargers	Energy Storage Systems	PLC Solutions	HMI Solutions	Motion Control
ILJIN Electronics	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dixon Technologies	✓	x	x	x	x	x	x	x	x
Kaynes Technology	✓	x	x	x	x	x	x	x	x
Syrma SGS Technology	✓	x	x	x	x	x	x	x	x
Avalon Technologies	✓	x	x	x	x	x	x	x	x
Cyient DLM	✓	x	x	x	x	x	x	x	x
Centum Electronics	✓	x	x	x	x	x	x	x	x
SFO Technologies	✓	x	x	x	x	x	x	x	x
VVDN Technologies	✓	x	x	x	x	x	x	x	x
AT&S India	x	✓	x	x	x	x	x	x	x
Epitome Components	x	✓	x	x	x	x	x	x	x
Genus Electrotech	✓	✓	x	x	x	x	x	x	x
Servotech Renewable Power System	x	x	✓	✓	✓	✓	x	x	x
Sungrow	x	x	x	✓	✓	✓			
Omron Industrial Automation	x	x	x	x	x	x	✓	✓	✓

Source: Company annual reports, investor presentations, regulatory disclosures and official company websites, Frost & Sullivan analysis

5.2 Financial Benchmarking

Revenue from Operations (INR Lakhs)

Company	FY24	FY25	FY26	Q1 FY27
IL JIN Electronics	1,24,040.71	2,19,373.34	3,26,846.83	98,484.76
Dixon Technologies	17,69,090.00	38,86,010.00	48,87,280.00	15,54,766.00
Kaynes Technology	1,80,461.90	2,12,175.20	3,62,635.40	94,601.70
Syrma SGS Technology	3,15,411.70	3,78,669.10	4,81,905.90	1,58,861.80
Avalon Technologies	86,716.80	1,09,812.80	1,60,320.50	48,441.40
Cyient DLM	1,19,187.10	1,51,962.60	1,26,148.50	37,380.00
Centum Electronics	1,09,082.00	74,052.90	95,274.90	20,346.60
Servotech	35,368.35	67,443.62	67,163.68	21,578.85
SFO Technologies	2,68,385.00	2,86,549.00	NA	NA
VVDN Technologies	2,14,297.60	3,83,415.80	NA	NA
AT&S India	64,037.50	39,149.30	50,972.20	NA

Epitome Components	20,435.00	25,565.30	NA	NA
Genus Electrotech	90,704.10	90,506.70	NA	NA
Sungrow	1,22,211.40	1,98,692.30	NA	NA
OmronAutomation	45,226.50	51,140.40	NA	NA

EBITDA (INR Lakhs)

Company	**FY24**	**FY25**	**FY26**	**Q1 FY27**
IL JIN Electronics	7,142.29	16,276.53	32,107.46	13,192.06
Dixon Technologies	72,000.00	1,52,780.00	2,57,960.00	99,100.00
Kaynes Technology	NA	NA	NA	14,760.00
Syrma SGS Technology	26,060.00	37,270.00	58,230.00	17,660.00
Avalon Technologies	6,300.00	11,500.00	17,300.00	5,800.00
Cyient DLM	11,100.00	13,720.00	12,680.00	3,920.00
Centum Electronics	8,580.00	9,890.00	13,540.00	2,360.00
Servotech	2,173.42	5,793.84	7,094.60	2,094.33
SFO Technologies	22,879.00	26,510.00	NA	NA
VVDN Technologies	18,375.10	21,813.70	NA	NA
AT&S India	7,408.30	-1,461.60	-1,768.30	NA
Epitome Components	2,745.20	3,826.10	NA	NA
Genus Electrotech	4,127.20	3,561.00	NA	NA
Sungrow	4,939.40	10,854.10	NA	NA
Omron Automation	5,492.60	8,487.80	NA	NA

EBITDA Margin (%)

Company	**FY24**	**FY25**	**FY26**	**Q1 FY27**
IL JIN Electronics	5.76%	7.42%	9.82%	13.40%
Dixon Technologies	4.10%	3.90%	5.30%	6.40%
Kaynes Technology	NA	NA	NA	15.60%
Syrma SGS Technology	8.10%	9.70%	12.00%	11.00%

Avalon Technologies	7.20%	10.50%	10.80%	12.00%
Cyient DLM	9.30%	9.60%	10.10%	10.50%
Centum Electronics	7.90%	13.40%	14.22%	11.56%
Servotech	7.00%	8.56%	10.50%	9.68%
SFO Technologies	8.52%	9.25%	NA	NA
VVDN Technologies	8.57%	5.69%	NA	NA
AT&S India	11.57%	-3.73%	-3.47%	NA
Epitome Components	13.43%	14.97%	NA	NA
Genus Electrotech	4.55%	3.93%	NA	NA
Sungrow	4.04%	5.46%	NA	NA
OmronAutomation	12.14%	16.60%	NA	NA

Operating EBITDA (INR Lakhs)

Company	**FY24**	**FY25**	**FY26**	**Q1 FY27**
IL JIN Electronics	6,876.08	15,186.06	29,123.93	10,615.74
Dixon Technologies	69,800.00	1,50,800.00	1,88,700.00	46,300.00
Kaynes Technology	25,420.00	41,070.00	57,410.00	NA
Syrma SGS Technology	21,540.00	32,380.00	54,450.00	16,160.00
Avalon Technologies	NA	NA	NA	NA
Cyient DLM	NA	NA	NA	NA
Centum Electronics	NA	NA	NA	NA
Servotech	NA	NA	NA	NA
SFO Technologies	20,527.00	23,762.00	NA	NA
VVDN Technologies	15,449.80	18,775.60	NA	NA
AT&S India	7,325.90	-3,214.40	-3,639.80	NA
Epitome Components	2,215.50	3,382.60	NA	NA
Genus Electrotech	3,720.80	3,446.40	NA	NA
Sungrow	4,928.30	10,846.50	NA	NA
Omron Automation	4,145.70	3,841.60	NA	NA

Operating EBITDA Margin (%)

Company	FY24	FY25	FY26	Q1 FY27
IL JIN Electronics	5.54%	6.92%	8.91%	10.78%
Dixon Technologies	3.90%	3.90%	3.90%	3.00%
Kaynes Technology	14.10%	15.10%	15.80%	NA
Syrma SGS Technology	6.9%	8.60%	11.30%	10.20%
Avalon Technologies	NA	NA	NA	NA
Cyient DLM	NA	NA	NA	NA
Centum Electronics	NA	NA	NA	NA
Servotech	NA	NA	NA	NA
SFO Technologies	7.65%	8.29%	NA	NA
VVDN Technologies	7.21%	4.90%	NA	NA
AT&S India	11.44%	-8.21%	-7.14%	NA
Epitome Components	10.83%	13.23%	NA	NA
Genus Electrotech	4.10%	3.81%	NA	NA
Sungrow	4.03%	5.46%	NA	NA
Omron Automation	9.17%	7.51%	NA	NA

PAT (INR Lakhs)

Company	FY24	FY25	FY26	Q1 FY27
IL JIN Electronics	2,151.85	6,627.13	12,816.49	5,569.07
Dixon Technologies	37,492.00	1,23,258.00	1,64,425.00	7,178.30
Kaynes Technology	18,328.90	29,343.30	36,389.00	5,642.60
Syrma SGS Technology	12,434.00	18,445.00	34,580.60	10,569.20
Avalon Technologies	2,798.50	6,343.90	11,294.60	3,486.90
Cyient DLM	6,119.60	6,807.60	7,328.20	1,628.50
Centum Electronics	-280.00	5040.00	10,070.00	1,120.00
Servotech	1,180.21	3,263.70	3,166.68	805.28
SFO Technologies	5,177.00	5,648.00	NA	NA
VVDN Technologies	3,829.10	3,860.40	NA	NA
AT&S India	15.80	-5,160.10	-8,706.60	NA

Epitome Components	1,060.70	1,731.30	NA	NA
Genus Electrotech	1,671.20	1,611.10	NA	NA
Sungrow	3,536.70	7,766.80	NA	NA
Omron Automation	5,500.30	7,722.60	NA	NA

Note:

1. *For Centum Electronics PAT have been taken on Continuing Operations*
2. *For Servotech PAT for FY2026 and Q1 FY2027 includes Share of Associates.*

PAT Margin (%)

Company	**FY24**	**FY25**	**FY26**	**Q1 FY27**
IL JIN Electronics	1.73%	3.02%	3.92%	5.65%
Dixon Technologies	2.10%	3.20%	3.40%	4.60%
Kaynes Technology	10.16%	10.78%	10.00%	6.00%
Syrma SGS Technology	3.90%	4.80%	7.10%	6.60%
Avalon Technologies	3.20%	5.79%	7.06%	7.20%
Cyient DLM	5.10%	4.50%	5.80%	4.40%
Centum Electronics	NA	NA	NA	NA
Servotech	3.32%	4.82%	4.69%	3.72%
SFO Technologies	1.93%	1.97%	NA	NA
VVDN Technologies	1.79%	1.01%	NA	NA
AT&S India	0.02%	-13.18%	-17.08%	NA
Epitome Components	5.19%	6.77%	NA	NA
Genus Electrotech	1.84%	1.78%	NA	NA
Sungrow	2.89%	3.91%	NA	NA
Omron Automation	12.16%	15.10%	NA	NA

Return on Equity (%)

Company	**FY24**	**FY25**	**FY26**	**Q1 FY27**
IL JIN Electronics	18.82%	21.09%	6.98%	1.76%*
Dixon Technologies	25.20%	47.50%	NA	NA

Kaynes Technology	10.63%	11.02%	9.62%	NA
Syrma SGS Technology	7.00%	9.70%	11.10%	NA
Avalon Technologies	5.16%	10.95%	16.94%	NA
Cyient DLM	11.00%	8.00%	6.00%	NA
Centum Electronics	12.00%	10.00%	-24.00%	NA
Servotech	10.80%	17.19%	14.74%	NA
SFO Technologies	7.23%	7.34%	NA	NA
VVDN Technologies	7.67%	7.11%	NA	NA
AT&S India	0.11%	-41.64%	-85.17%	NA
Epitome Components	6.73%	10.59%	NA	NA
Genus Electrotech	10.83%	10.18%	NA	NA
Sungrow	54.86%	64.21%	NA	NA
Omron Automation	46.78%	42.04%	NA	NA

Note:

1. **Ratio for IL JIN Electronics for Q1FY2027 is not annualised*
2. *For Centum Electronics and Cyient DLM ROE has been taken on Standalone basis.*
3. *For Servotech ROE for FY2026 has been taken on Standalone basis.*

Return on Capital Employed (%)

Company	**FY24**	**FY25**	**FY26**	**Q1 FY27**
IL JIN Electronics	14.11%	18.93%	10.42%	1.99%*
Dixon Technologies	NA	NA	NA	NA
Kaynes Technology	10.43%	14.21%	12.25%	NA
Syrma SGS Technology	9.90%	12.40%	16.90%	17.30%
Avalon Technologies	7.68%	15.68%	20.64%	23.40%
Cyient DLM	11.00%	11.00%	11.40%	NA
Centum Electronics	NA	NA	NA	NA
Servotech	9.00%	16.65%	12.82%	NA

SFO Technologies	12.32%	12.98%	NA	NA
VVDN Technologies	6.75%	6.39%	NA	NA
AT&S India	5.71%	-26.47%	-34.25%	NA
Epitome Components	7.25%	12.16%	NA	NA
Genus Electrotech	12.86%	13.77%	NA	NA
Sungrow	135.23%	196.99%	NA	NA
Omron Automation	35.50%	26.49%	NA	NA

Note:

1. **Ratio for IL JIN Electronics for Q1FY2027 is not annualised*
2. *For Servotech ROCE for FY2026 has been taken on Standalone basis.*

Return on Adjusted Capital Employed (%)

Company	**FY24**	**FY25**	**FY26**	**Q1 FY27**
IL JIN Electronics	23.12%	34.50%	24.01%	4.38%*
Dixon Technologies	38.00%	48.50%	44.80%	34.10%
Kaynes Technology	22.00%	19.20%	13.10%	11.60%
Syrma SGS Technology	15.20%	16.00%	20.10%	20.10%
Avalon Technologies	NA	NA	NA	NA
Cyient DLM	NA	NA	NA	NA
Centum Electronics	15.61%	18.43%	29.73%	NA
Servotech	NA	NA	NA	NA
SFO Technologies	13.71%	14.20%	NA	NA
VVDN Technologies	6.90%	6.73%	NA	NA
AT&S India	5.73%	-26.52%	-34.58%	NA
Epitome Components	7.25%	12.16%	NA	NA
Genus Electrotech	12.86%	13.77%	NA	NA
Sungrow	135.23%	196.99%	NA	NA
Omron Automation	35.50%	26.49%	NA	NA

Note:

1. **Ratio for IL JIN Electronics for Q1FY2027 is not annualised*

Net Debt/Equity (Times)

Company	FY24	FY25	FY26	Q1 FY27
IL JIN Electronics	2.90	0.32	-0.09	0.10
Dixon Technologies	-0.03	-0.01	-0.13	-0.04
Kaynes Technology	0.12	0.29	0.16	0.10
Syrma SGS Technology	0.30	0.18	0.02	NA
Avalon Technologies	NA	NA	NA	NA
Cyient DLM	0.02	0.11	0.00	NA
Centum Electronics	NA	NA	NA	NA
Servotech	NA	NA	0.71	NA
SFO Technologies	0.72	0.79	NA	NA
VVDN Technologies	1.46	1.16	NA	NA
AT&S India	1.00	2.26	0.72	NA
Epitome Components	0.07	0.40	NA	NA
Genus Electrotech	0.23	0.35	NA	NA
Sungrow	-0.50	-0.57	NA	NA
Omron Automation	-0.26	-0.38	NA	NA

Net Working Capital Days (Days)

Company	FY24	FY25	FY26	Q1 FY27
IL JIN Electronics	46	37	79	75
Dixon Technologies	-8	-5	-8	-5
Kaynes Technology	83	87	125	163
Syrma SGS Technology	70	69	63	71
Avalon Technologies	161	124	112	117

Cyient DLM	79	127	145	161
Centum Electronics	67	87	75	NA
Servotech	NA	NA	NA	NA
SFO Technologies	89	89	NA	NA
VVDN Technologies	102	58	NA	NA
AT&S India	14	36	21	NA
Epitome Components	143	126	NA	NA
Genus Electrotech	54	53	NA	NA
Sungrow	27	49	NA	NA
Omron Automation	45	40	NA	NA

*Note: For Financial benchmarking, all the numbers are considered on a consolidated basis, unless otherwise specified. Financial Benchmarking for listed peers based on reported numbers.

Formulas used for financial analysis:

1. Revenue from operations is calculated as the aggregate of revenue from contracts with customers for sale of products, services and other operating revenue.
2. EBITDA is calculated as profit for the period/year plus Tax expense, Depreciation and amortization expense, Finance costs.
3. EBITDA margin is calculated as EBITDA divided by Revenue from operations for the respective period/year.
4. Operating EBITDA is calculated as profit for the period/year plus Share of (loss) of joint venture and associate (net of tax), Exceptional items, Tax expense, Finance costs, Depreciation and amortization expense and non-operating expenses less Other income. Non operating expenses is calculated as sum of Share based compensation, Impairment of assets held for sale, Impairment of investments, Fair value loss on financials instruments at fair value through profit and loss, Loss on disposal of property, plant and equipment and consumption of inventory that had been fair valued at the time of Purchase Price Allocation (PPA) for the new acquisitions.
5. Operating EBITDA margin is calculated as Operating EBITDA divided by Revenue from operations for the respective period/year.
6. PAT means profit for the period/year.
7. PAT margin is calculated as PAT divided by Revenue from operations for the respective period/year.
8. Return on Equity is calculated as PAT divided by average of Total equity. Average of Total equity is calculated as sum of Total equity at the beginning and end of period/year divided by two, where Total equity is calculated as sum of Equity share capital, Instruments entirely equity in nature, Other equity and Non-controlling interests.
9. Return on Capital Employed is calculated as Operating EBIT divided by average of capital employed. Operating EBIT is calculated as Operating EBITDA less Depreciation and amortization. Capital employed is calculated as Total equity plus Net debt. Net debt is calculated as sum of Non-current borrowings and Current borrowings as reduced by Cash and cash equivalents, Other bank balances, Bank deposits with remaining maturity more than 12 months, Bank deposits with remaining maturity less than 12 months, Non-current and current investment in mutual funds and bonds.

10. Return on Adjusted Capital Employed is calculated as Operating EBIT divided by average of adjusted capital employed. Adjusted Capital employed is calculated as Adjusted Total Equity plus Net debt. Adjusted Total Equity is calculated as Total equity as reduced by Capital work-in-progress, Intangible assets under development and Goodwill.
11. Net working capital days is calculated as trade receivables days plus inventory days less trade payables days. Trade receivables days is calculated as Trade receivables as at the end of the period/ year divided by Revenue from operations for the respective period/year multiplied by 91 (for the three months period ended June 30, 2026) or 365 (for Fiscals). Inventory days are calculated as Inventory as at the end of the period/ year divided by Revenue from operations for the respective period/year multiplied by 91 (for the three months period ended June 30, 2026) or 365 (for Fiscals). Trade payables days are calculated as Trade payables plus Supplier finance arrangement as at the end of the period/ year divided by Revenue from operations for the respective period/year multiplied by 91 (for the three months period ended June 30, 2026) or 365 (for Fiscals).
12. Net debt to equity is calculated as net debt divided by Total equity. Net debt is calculated as sum of Non-current borrowings and Current borrowings as reduced by Cash and cash equivalents, Other bank balances, Bank deposits with remaining maturity more than 12 months, Bank deposits with remaining maturity less than 12 months, Non-current and current investment in mutual funds and bonds.

5.3 Operational Benchmarking

Revenue Segmentation is bifurcation of Revenue from Operations across Product, End User Industry and Geography

Operational Benchmarking Q1 FY2027			
Company	Revenue Segmentation		
	By Product	By End User Industry	By Geography
IL JIN Electronics	EMS - 53.99% Bare PCBs - 25.60% Industrial Automation - 12.73% Power Electronics - 7.06% Others - 0.62%	Consumer Electronics & Appliances - 42.01% Automotive - 28.72% Telecommunications - 3.02% Aerospace & Defence - 1.04% Energy & Power - 6.88% Industrial - 14.83% Others - 3.50%	India: 87% RoW: 13%
Dixon Technologies	Mobile & Other EMS: 92% Consumer Electronics & Appliances: 6% Home Appliances: 2%	NA	NA
Kaynes Technology	OEM - Turnkey PCBA - 51% ODM, Prod. Engg, IoT Solutions - 23% OEM - Turnkey - Boxbuild - 25%	Industrial (incl. EV) - 55% Automotive - 26% IT, IoT, Consumer & Others - 6% Railways - 9% Medical - 2% Aerospace, Outer Space & Strategic Electronics - 2%	NA
Syrma SGS Technology	NA	Auto - 25% Consumer - 34% Healthcare - 8% Industrials - 24% IT and Railways - 9%	NA

Avalon Technologies	Box Build: 60% Others: 40%	Mobility / Transportation: 25% Industrials: 32% Communication: 4% Clean Energy: 29% Medical & Others: 10%	India: 41% US: 59%
Cyient DLM	PCBA: 48% Box Build: 41% Cable: 1% Mech & Others: 10%	Aerospace - 42% Defence - 9% Industrial - 32% Med Tech - 16% Auto & Others - 1%	India: 6%, RoW: 94%
Centum Electronics	Electronic Manufacturing Services - 72% Build to Specification - 28%	Defence, Space & Aerospace - 45% Transportation & Automotive - 12% Industry & Energy - 12% Healthcare - 14% Semiconductor - 17%	India: 46%, Europe & UK: 23%, North America and ROW: 31%
Servotech	Solar Plants - 49.7% Solar Panels & BOS - 25.8% Solar Inverters - 19.3% Power - 2.7% EV Chargers - 2.5%	NA	NA

Source: Company Disclosures

Note:

1. *Revenue Segmentation is not directly comparable across peers due to difference in product segments and end user industries*
2. *Percentages may not add up to 100% due to rounding*
3. *Centum Electronics data is on standalone basis for FY 2026 and Q1 2027.*

Operational Benchmarking FY2026			
Company	Revenue Segmentation		
	By Product	By End User Industry	By Geography
IL JIN Electronics	EMS - 69.25% Bare PCBs - 17.34% Industrial Automation - 6.56% Power Electronics - 6.08% Others - 0.77%	Consumer Electronics & Appliances - 59.32% Automotive - 17.74% Telecommunications - 3.75% Aerospace & Defence - 0.34% Energy & Power - 7.77% Industrial - 7.80% Others - 3.28%	India: 93% RoW: 7%
Dixon Technologies	Mobile & Other EMS: 91% Consumer Electronics & Appliances: 6% Home Appliances: 3%	NA	NA

Kaynes Technology	OEM - Turnkey PCBA - 49% ODM, Prod. Engg, IoT Solutions - 28% OEM - Turnkey - Boxbuild - 22%	Industrial (incl. EV) - 55% Automotive - 25% IT, IoT, Consumer & Others - 10% Railways - 6% Medical - 2% Aerospace, Outer Space & Strategic Electronics - 2%	NA
Syrma SGS Technology	EMS: 98% Others: 2%	Auto - 24% Consumer - 30% Healthcare - 8% Industrials - 29% IT and Railways - 9%	India: 73%, Germany: 7%, USA: 8%, ROW: 12%
Avalon Technologies	Box Build: 54% Others: 46%	Mobility / Transportation: 28% Industrials: 34% Communication: 8% Clean Energy: 20% Medical & Others: 10%	India: 38% US: 62%
Cyient DLM	PCBA: 52% Box Build: 30% Cable: 2% Mech & Others: 16%	Aerospace: 43% Med Tech: 19% Industrial: 27% Defence: 9% Others: 2%	India: 10%, APAC (Exc. India): 4%, NAM: 54%, EMEA: 32%
Centum Electronics	Electronic Manufacturing Services - 72% Build to Specification - 28%	Defence, Space & Aerospace: 54% Industry & energy: 28% Transportation & Automotive: 11% Healthcare: 7%	India: 48%, Europe & UK: 32%, North America: 7%, ROW: 13%
Servotech	NA	NA	NA

Source: Company Disclosures

Note:

4. *Revenue Segmentation is not directly comparable across peers due to difference in product segments and end user industries*
5. *Percentages may not add up to 100% due to rounding*
6. *Centum Electronics data is on standalone basis for FY 2026 and Q1 2027.*

Operational Benchmarking FY2025			
Company	Revenue Segmentation		
	By Product	By End User Industry	By Geography
IL JIN Electronics	EMS - 84.85% Bare PCBs - 14.60% Others - 0.55%	Consumer Electronics & Appliances - 70.18% Automotive - 13.91% Telecommunications - 8.65% Aerospace & Defence - 0.01% Energy & Power - 4.42% Industrial - 0.55% Others - 2.28%	India: 99.8% RoW: 0.2%

Dixon Technologies	Mobile phones & other EMS: 85%; Consumer Electronics: 9%; Home Appliances: 4%; Lighting Solutions: 2%	NA	NA
Kaynes Technology	OEM - Turnkey PCBA - 43% ODM, Prod. Engg, IoT Solutions - 18% OEM - Turnkey - Boxbuild - 39%	Industrial (incl. EV) - 56% Automotive - 26% IT, IoT, Consumer & Others - 8% Railways - 7% Medical - 2% Aerospace, Outer Space & Strategic Electronics - 1%	India: 90% North America: 5% Europe: 3% SE Asia: 1% Others: 1%
Syrma SGS Technology	EMS: 99% Others: 1%	Consumer: 36% Industrials: 28% Automotive & Electric Mobility: 22% Healthcare & Medical Devices: 8% Railways & IT: 6%	India: 76%, Germany: 5%, USA: 2%, ROW: 17%
Avalon Technologies	Box Build: 49% Others: 51%	Mobility / Transportation: 27% Industrials: 30% Communication: 8% Clean Energy: 20% Medical & Others: 15%	India: 43% US: 57%
Cyient DLM	PCBA: 72% Box Build: 21% Cable: 2% Mech & Others: 5%	Aerospace: 25% Med Tech: 16% Industrial: 10% Defence: 48% Others: 1%	India: 48%, APAC (Exc. India): 2%, NAM: 25%, EMEA: 25%
Centum Electronics	EMS: 47% BTS: 32% ER&D: 21%	Defence, Space & Aerospace: 56% Transport & Automotive: 21% Industrial & Energy: 14% Healthcare: 9%	Europe: 59% India: 31% North America: 8% ROW: 2%
Servotech	DC EV Charger: 63.2% AC EV Charger: 20.2% Solar: 11.4% I&C and AMC: 3.5% Power & LED: 0.9% Spares: 0.7%	NA	India: 96% RoW: 4%

Source: Company Disclosures

Note:

7. *Revenue Segmentation is not directly comparable across peers due to difference in product segments and end user industries'*
8. *Percentages may not add up to 100% due to rounding*

Operational Benchmarking FY2024			
Company	Revenue Segmentation		
	By Product	By End User Industry	By Geography
IL JIN Electronics	EMS - 96.03% Bare PCBs - 3.47%	Consumer Electronics & Appliances - 88.73%	India: 99.96% RoW: 0.04%

	Others - 0.50%	Automotive - 3.61% Telecommunications - 4.69% Aerospace & Defence - 0.00% Energy & Power - 0.40% Industrial - 0.17% Others - 2.40%	
Dixon Technologies	Mobile phones & EMS: 62%; Consumer Electronics: 23%; Home Appliances: 7%; Lighting Products: 4%; Security Systems: 4%	NA	NA
Kaynes Technology	OEM - Turnkey PCBA - 55% ODM, Prod. Engg, IoT Solutions - 4% OEM - Turnkey - Boxbuild - 42%	Industrial incl. EV: 48% Automotive: 29% Aerospace, Outer-space & Strategic Electronics: 3% Medical: 3% Railways: 11% IoT/IT: 7%	India: 90% North America: 3% Europe: 5% SE Asia: 1% Others: 1%
Syrma SGS Technology	EMS: 99%, Other: 1%	Consumer: 40% Industrials: 26% Automotive: 21% Healthcare: 8% Railways & IT: 5%	India: 75% Others: 25%
Avalon Technologies	Box-Build: 50% Others: 50%	Mobility / Transportation: 26% Industrials: 28% Communication: 13% Clean Energy: 18% Medical & Others: 15%	India: 46% US: 54%
Cyient DLM	PCBA: 70% Box Build: 25% Cable: 2% Mech & Others: 3%	Aerospace: 24% Medtech: 8% Industrial: 16% Defence: 49% Rail: 2%	India: 53%, APAC (Exc. India): 3%, NAM: 22%, EMEA: 22%
Centum Electronics	EMS: 39% BTS: 30% ER&D: 31%	Defense, Space & Aerospace 48% Transport & Automotive 24% Industrial & Energy 27% Healthcare 2%	Europe 58% Asia 29% North America 13%
Servotech	EV Charger: 73.98% Solar: 14.52% Installation: 4.03% Medical Devices: 1.70% Power Backup: 3.20% Spares: 2.56%	NA	India: 90% RoW: 10%

Source: Company Disclosures

Note:

9. *Revenue Segmentation is not directly comparable across peers due to difference in product segments and end user industries'*
10. *Percentages may not add up to 100% due to rounding*

Product Categories

IL JIN Electronics: The company manufactures consumer electronics and appliance PCBAs, telecommunication products, smartwatches, TWS and audio products, automotive PCBAs, tactical optic electronics, energy meters, solar microinverters, solar pumps, EV chargers, HMIs, PLCs, VFDs, servo drives, cloud-based IoT platforms, and bare PCBs, including single-sided, multi-layer, aluminium, flexible and RF PCBs.

Dixon Technologies: The company manufactures feature and smartphones, IT hardware including laptops, desktops and tablets, telecom and networking products, LED TVs, refrigerators and washing machines.

Kaynes Technology: The company manufactures cluster PCBAs, LED headlamp/tail-lamp/position-lamp/DRL PCBAs, switches PCBAs, BCU master/slave PCBAs, engine control panels, street-light controllers, smart energy meters, precision bridges and strain gauges, railway electronics, medical equipment, controllers, clinical chemistry analysers, mission-critical products, cable assemblies, RFID gateways, PLC and asset-condition-monitoring gateways, sensors, industrial HMI readers and industrial tablets.

Syrma SGS Technology: The company manufactures PCBA, magnetics, box builds, fuel-injection systems and RFID products.

Avalon Technologies: The company's product categories include PCBA, box builds, cable assemblies and wire harnesses, sheet-metal fabrication and machining, magnetics and injection-moulded plastics.

Cyient DLM: The company manufactures PCBA, box builds, cable harness assemblies, and mechanical and other products.

Centum Electronics: The company's product portfolio includes earth observation satellite subsystems, electronic warfare payloads, small satellite and payload integration systems, missile control and guidance systems, radar subsystems, tank electronics, public address and intercom systems, passenger information systems, industrial measurement and control systems, control boards, communication equipment, digital X-ray systems, fertility kits, battery management systems, MK2 encoders, HV inverter PCBAs, air traffic management systems, infrared cameras, electronic systems and sonar subsystems.

Servotech: The company's product portfolio includes electric three-wheeler lithium-ion batteries and chargers, solar panels, solar inverters, solar batteries, onboard EV chargers, AC/DC modules, control cards, CCS2 and Type 2 charging cables, AC and DC chargers, BESS, and air-cooled and oil-cooled servo stabilizers.

5.4 ABOUT IL JIN Electronics

IL JIN Electronics (India) Limited is an integrated electronics manufacturer with capabilities spanning printed circuit board assembly (PCBA), box build and system integration, bare printed circuit board (PCB) manufacturing, power electronics and industrial automation. The business recorded revenue of ₹3,268 crore in Fiscal 2026, representing growth of approximately 49% over Fiscal 2025. **IL JIN is a subsidiary of Amber Enterprises India Limited ("Amber"), one of the leading players in the air-conditioning OEM and ODM industry in India and one of the largest B2B manufacturers in the room air-conditioning ("RAC") OEM and ODM industry in India in Fiscal 2026. Amber, together with its subsidiaries, associates and joint ventures (collectively, the "Amber Group"), is a diversified manufacturing player with capabilities spanning sheet-metal fabrication, plastic moulding, heat exchangers, motors, high-volume assembly of finished goods, PCBA and PCB manufacturing, railway subsystems,defence products, power electronics and industrial automation products.**

The Amber Group serves leading Indian and global brands across multiple geographies. IL JIN is one of the leading, vertically integrated, technology-driven electronics design and manufacturing players in India in terms of revenue in Fiscal 2026.

IL JIN is one of the leading, vertically integrated electronics design and manufacturing players in India in terms of revenue in Fiscal 2026, with capabilities spanning design, engineering and manufacturing across the entire product lifecycle, from concept and design to PCB fabrication, PCB assembly, box build, testing and quality control, across its EMS, bare PCB, power electronics and industrial automation verticals.

PCBA and box build form a core part of IL JIN's electronics manufacturing activities. Its capabilities include surface-mount technology, through-hole assembly, testing, final assembly and downstream box-build activities. Box build extends beyond board assembly to system-level integration, testing, packaging and final product delivery.

IL JIN is one of the leading manufacturers of PCBAs in India.

IL JIN has expanded its activities beyond its established base in electronics supplied to the consumer-durables industry. The acquisitions of Power-One Micro Systems, Unitronics and Shogini Technoarts broadened its capabilities and end-market exposure across automotive, smart electronics, industrial and power electronics, and other applications.

IL JIN's product mix has progressively shifted towards higher value-added industries and products. These industries and products are characterised by:

(i) Greater engineering complexity: Products supplied to these industries require advanced design capabilities, multilayer PCB architectures, specialised testing protocols and compliance with stringent technical specifications, necessitating significant investment in engineering resources and manufacturing infrastructure.

(ii) Longer customer qualification cycles: Approval timelines for new suppliers in these industries typically range from 12 to 18 weeks for industrial and power applications and from 24 to 40 weeks for automotive applications. These extended qualification processes create meaningful switching costs and foster deeper, longer-term customer relationships.

(iii) Significant barriers to entry: Participation in these industries requires industry-specific certifications, such as IATF 16949:2016 for automotive and AS9100 Rev.D for aerospace and defence, combined with rigorous quality management and end-to-end traceability requirements. These requirements limit the pool of qualified suppliers and provide a competitive advantage to established manufacturers that have invested in building the requisite capabilities.

EMS activities are generally high-volume and lower-margin, but can generate relatively higher ROCE. The PCB, industrial automation and power electronics verticals generally operate at lower volumes and higher margins. Together, these businesses help balance scale, margins and capital efficiency.

These characteristics support higher value realisation and stronger margins compared with volume-driven consumer applications.

A major area of expansion has been bare PCB manufacturing. Through Ascent Circuits, IL JIN has capabilities across single-sided, double-sided, multilayer, radio-frequency, aluminium, flexible and specialty PCBs.

IL JIN strengthened this business through the acquisition of an 80% stake in Shogini Technoarts in December 2025. Shogini added capabilities across single-sided, double-sided, multilayer, metal-clad and flexible PCBs and expanded IL JIN's exposure across automotive, medical, industrial, telecommunications, aerospace and defence, and other electronics applications.

IL JIN is one of the leading PCB manufacturers in India in terms of manufacturing capacity in Fiscal 2026. Pursuant to its joint venture with Korea Circuit Co., Limited, Korea ("KCC"), IL JIN intends to commence the manufacture of high-density interconnect ("HDI") PCBs on a mass-production level by calendar year 2028 and is among the few Indian companies that have initiated steps to establish HDI PCB manufacturing capabilities. IL JIN is the largest PCB manufacturer in India in terms of revenue in Fiscal 2026, with an indicative revenue share of approximately 21.0% of overall PCB manufacturing market in India.

Note: Market share calculations basis full year Fiscal 2026 revenue of IL JIN's combined PCB business, comprising Ascent Circuits and Shogini Technoarts.

IL JIN is continuing to expand its PCB manufacturing scale and higher-end multilayer capabilities. Ascent Circuits is developing a multilayer PCB manufacturing facility at Hosur, Tamil Nadu.

In **Fiscal 2026, IL JIN incorporated Ascent-K Circuit, its joint venture with KCC, marking its foray into establishing capabilities for the manufacture of advanced PCBs, including HDI PCBs.** The project has received ECMS approval for HDI PCBs, with 16 acres allotted at YEIDA in Uttar Pradesh and planned investment of approximately ₹3,200 crore over the scheme tenure.

IL JIN is one of the few domestic EMS companies to have committed significant capital to large-scale PCB manufacturing in India and entered into strategic technology partnerships to commence the manufacture of HDI PCBs on a mass production level by calendar year 2028.

Within its PCB vertical, IL JIN has, over the last three Fiscals, expanded its capabilities through strategic acquisitions and investments, enabling it to establish one of the most comprehensive and technologically advanced PCB portfolios among domestic manufacturers.Through its subsidiary, Ascent-K Circuit, established pursuant to its joint venture with Korea Circuit, Korea, IL JIN is expanding into advanced PCB technologies comprising high-end multilayer and HDI PCBs, positioning it to participate in higher-value and technology-intensive applications.

IL JIN is among the few Indian companies that have initiated steps to establish HDI PCB manufacturing capabilities.

HDI, flexible and semiconductor-substrate PCBs are relevant to applications requiring higher interconnection density, smaller form factors, higher data speeds and more advanced electronic architectures. They can broaden IL JIN's potential participation across telecommunications, electric mobility, industrial automation, computing hardware, medical electronics, aerospace and defence, and other technology-intensive applications.**IL JIN's PCB products support a broad range of end-use applications, including telecommunications infrastructure, electric vehicles, industrial automation systems, consumer electronics, energy storage systems, renewable energy equipment and defence electronics. Demand for advanced PCB technologies is expected to be supported by increasing adoption of 5G infrastructure, electric mobility, industrial automation and next-generation electronic products.**

IL JIN has also expanded into power electronics and industrial automation. Through Power-One Micro Systems, it has capabilities across solar inverters, uninterruptible power supply systems, EV chargers and battery energy-storage systems. Unitronics expands IL JIN's activities into industrial automation through programmable logic controllers, human-machine interfaces, variable-frequency drives, servo drives and related automation solutions. In the Industrial Automation vertical, they have developed control platform for data centre cooling and energy systems including Redfish embedded PLCs. Unitronics is positioned among few industrial automation manufacturers to offer an integrated PLC and HMI platform with native support for both Redfish and IPv6 protocols, enabling seamless and direct communication with data centre management infrastructure without the need for external protocol gateways.

Their name also got listed as the recommended Software/Controls supplier published by the Open Compute Project (OCP).

IL JIN's diversified business portfolio positions it favourably to benefit from increasing localisation of electronics manufacturing in India, growing demand for domestic value addition, the significant import-substitution opportunity in the domestic PCB market, the expansion of renewable-energy and electric-mobility infrastructure, and the increasing adoption of industrial automation across manufacturing sectors.

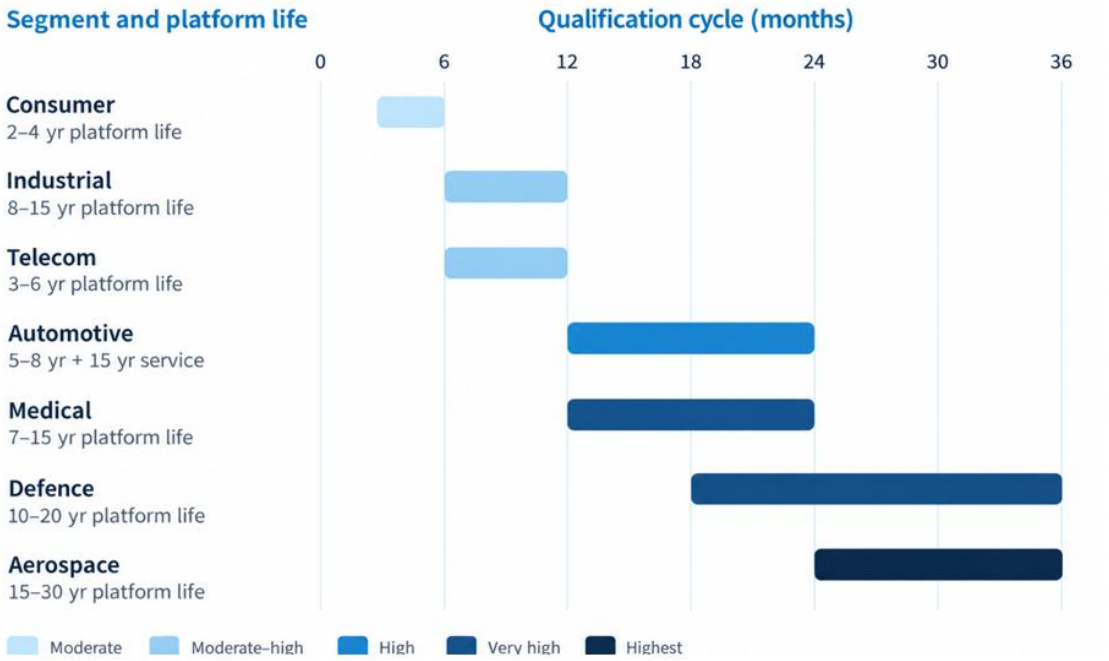
IL JIN's results of operations are affected by demand conditions and growth trends in each of these end-user industries. Demand across these end-user industries is influenced by various factors. In consumer electronics and appliances, growth is supported by rising appliance penetration, replacement demand, premiumization, inverterization, energy-efficiency requirements, smart and connected features, easier consumer financing, organized retail and e-commerce expansion and improving household infrastructure. In the automotive sector, growth is expected to be driven by both internal combustion engine and electric vehicles, with increasing electronic content across vehicle control, safety, infotainment, telematics, sensors, battery management systems, motor controllers and power electronics. Demand in telecommunications is supported by investments in telecom networks, data centres, high-speed networking equipment, cloud infrastructure, communication equipment, 5G infrastructure and connected services. Demand in energy and power applications is driven by renewable-energy integration, energy storage systems, EV chargers, solar inverters, UPS systems, grid balancing, peak-power management and power-conversion equipment. Demand in industrial applications is supported by automation, machine control, motor drives, instrumentation, industrial software, connected automation systems, productivity enhancement, quality consistency, traceability and energy-efficiency requirements. Further, in aerospace and defence applications, demand is supported by higher domestic defence production and increasing requirements for embedded electronics, communication systems, control systems, radar electronics, avionics, certification, testing, traceability and lifecycle support.

The manufacturing requirements of industrial, automotive, medical, telecommunications, aerospace and defence applications can create higher technical and operational barriers for suppliers. Qualification requirements can be particularly important for performance-sensitive and mission-critical products.

IL JIN benefits from high customer retention and supplier stickiness arising from extensive customer qualification and approval processes. Customers typically require suppliers to undergo audits, prototype development, testing, validation and production qualification before commercial approvals are granted. Qualification requirements are often more stringent in technology-intensive and critical applications, resulting in longer approval cycles and higher barriers to entry. Once approved, suppliers generally benefit from long-term customer relationships due to the costs, time and operational risks associated with supplier transitions.

The following illustration provides an indicative comparison of qualification-cycle timelines across key industry segments.

Exhibit 5.1: Indicative customer qualification timelines and platform life cycles across electronics end-user industries



Source: Industry inputs, Frost & Sullivan analysis

India's electronics manufacturing industry is expected to benefit from several structural growth drivers, including increasing localisation of electronics manufacturing, favourable government policies, growing domestic consumption of electronic products, supply chain diversification initiatives and rising demand from sectors such as consumer electronics and appliances, automotive, telecommunication, aerospace and defence, energy and power, and industrial applications. These factors are expected to drive growth across various segments of the electronics manufacturing value chain. Further, certain categories, such as printed circuit boards, continue to present meaningful import substitution opportunities due to India's reliance on imported supply.

The global Electronic System Design and Manufacturing ("ESDM") market was valued at USD 1,100 billion in 2025 and is expected to grow at a CAGR of 6.7% to reach USD 1,520 billion by 2030E.

With the Indian government's focus on 'Make in India' and making the country globally competitive in electronics manufacturing through various policy support, India's share in the global ESDM market is expected to rise from approximately 8.0% in 2025 to approximately 14.5% by 2031.

The markets relevant to IL JIN's activities are expected to expand as electronics manufacturing in India scales and domestic value addition increases.

According to the F&S Report, key markets relevant to IL JIN's operations are expected to witness significant growth over the coming years, as set forth below:

(i) The ESDM market in India was valued at ₹8,750 billion in Fiscal 2026 and is expected to grow at a CAGR of 19.2% to reach ₹21,100 billion by Fiscal 2031, driven by increasing outsourcing by OEMs, localisation initiatives and policy support, and growing demand across consumer electronics, automotive, telecommunications and industrial applications. Within the ESDM market:

• The PCBA market was valued at ₹4,450 billion in Fiscal 2026 and is expected to grow at a CAGR of 21.6% to reach ₹11,850 billion by Fiscal 2031, driven by increasing outsourcing by OEMs, localisation initiatives and growing demand across consumer electronics, telecommunications, automotive and industrial applications.

• The box build and system integration market was valued at ₹1,140 billion in Fiscal 2026 and is expected to grow at a CAGR of 22.2% to reach ₹3,105 billion by Fiscal 2031, driven by increasing demand for turnkey electronic product assembly across telecommunications, defence, automotive and industrial applications.

(ii) The Indian PCB market was valued at ₹173.37 billion in Fiscal 2026 and is expected to grow at a CAGR of 16.0% to reach ₹364.14 billion by Fiscal 2031. As of Fiscal 2026, approximately 85.5% of PCB demand in India was met through imports, primarily from countries such as China, South Korea and Japan. The expected growth in domestic PCB demand, combined with continued import dependence, presents a substantial opportunity for import substitution that can benefit domestic manufacturers.

(iii) The industrial automation market in India, including PLCs, HMIs, VFDs and related control systems, was valued at ₹1,610 billion in Fiscal 2026 and is expected to grow at a CAGR of 11.1% to reach ₹2,730 billion by Fiscal 2031E.

(iv) The Indian power electronics market, including solar inverters, UPS systems, battery energy-storage systems and EV chargers, was valued at ₹290 billion in Fiscal 2026 and is expected to grow at a CAGR of 22.8% to reach ₹808 billion by Fiscal 2031.

These characteristics support higher value realisation and stronger margins compared with volume-driven consumer applications.

IL JIN's diversified electronics manufacturing platform positions it to participate across multiple areas of the electronics value chain and benefit from these industry tailwinds.

As a participant in the electronics manufacturing value chain, IL JIN is positioned to benefit from continued investments in domestic manufacturing capabilities, increasing outsourcing by OEMs, growing demand for locally manufactured electronic components and assemblies, and the government's continued focus on strengthening India's electronics manufacturing ecosystem.

The PCB opportunity is particularly relevant because India remains dependent on imports, especially across multilayer, HDI, flexible and other higher-performance PCB categories.

The Indian PCB market was valued at ₹173.37 billion in Fiscal 2026 and is expected to grow at a CAGR of approximately 16.0% to reach ₹364.14 billion by Fiscal 2031. Despite this expected growth, approximately 85.5% of India's PCB requirements continue to be met through imports, highlighting the significant scope for import substitution. Supported by increasing localisation initiatives, domestic value-addition efforts and government policies aimed at strengthening component manufacturing, this is expected to create substantial growth opportunities for domestic PCB manufacturers.

IL JIN's existing PCB manufacturing capabilities, its ongoing multilayer expansion and its investment in advanced PCB technologies provide exposure to this localisation and import-substitution opportunity. Existing capacity and facilities under development are presented separately so that future capacity is not treated as operational capacity as of March 31, 2026.

IL JIN's market position, the scale of its capital investments, broad technology portfolio, approved expansion projects, participation in advanced PCB technologies and alignment with localisation initiatives position it favourably to benefit from growing domestic demand for PCBs and the significant import-substitution opportunity within the Indian electronics manufacturing ecosystem.

Going ahead, IL JIN intends to expand its presence in industries such as automotive, aerospace, medical and defence. IL JIN intends to continue expanding its presence across industries that offer attractive long-term growth opportunities and higher value-added manufacturing opportunities. In particular, IL JIN intends to increase its focus on automotive, aerospace, medical and defence. These sectors benefit from favourable demand drivers, higher levels of product complexity, longer qualification cycles and greater engineering intensity, which support higher value realisation or create meaningful barriers to entry. IL JIN's integrated capabilities across each of its business verticals, together with its product-manufacturing capabilities, position it well to address the evolving requirements of customers in these sectors.

IL JIN therefore combines an established PCBA and box-build business with growing bare PCB manufacturing, power electronics and industrial automation capabilities. Its acquisitions, capacity investments and technology partnerships

have broadened the range of products, manufacturing processes and end-user industries it can address. This provides IL JIN with exposure to several structural growth opportunities shaping India's electronics manufacturing industry.