The Rise of Contract Manufacturing in India's Electronics Sector

India's rise to become a large center for electronics manufacturing services is one of the most significant manufacturing changes in India's recent history. A decade ago, the industry was very reliant on imports, while domestic manufacturing was poorly developed even though there was increasing demand for mobile phones, consumer electronics, and home appliances.

However, a lot has changed over the last decade. Currently, India is the second largest manufacturer of mobile phones by volume and an important production center for several leading global tech companies. Smartphone exports are rising rapidly, while Apple and other companies along with their suppliers are increasingly relying on Indian plants as one of the main export centers, which is another indicator of rising local manufacturing and competitiveness on the export market.

Such development is possible through various measures including PLI Scheme, SPECS, EMC 2.0, India Semiconductor Mission, and Electronics Components Manufacturing Scheme (ECMS) along with the changing geopolitical situation and increased popularity of China+1 strategy. The result of all these measures is that the EMS industry became one of the fastest growing parts of the industrial economy of India.

The current paper analyses the evolution of India's contract manufacturing sector, the policy measures behind it, the players in the industry, the opportunities, challenges, and future of the industry.

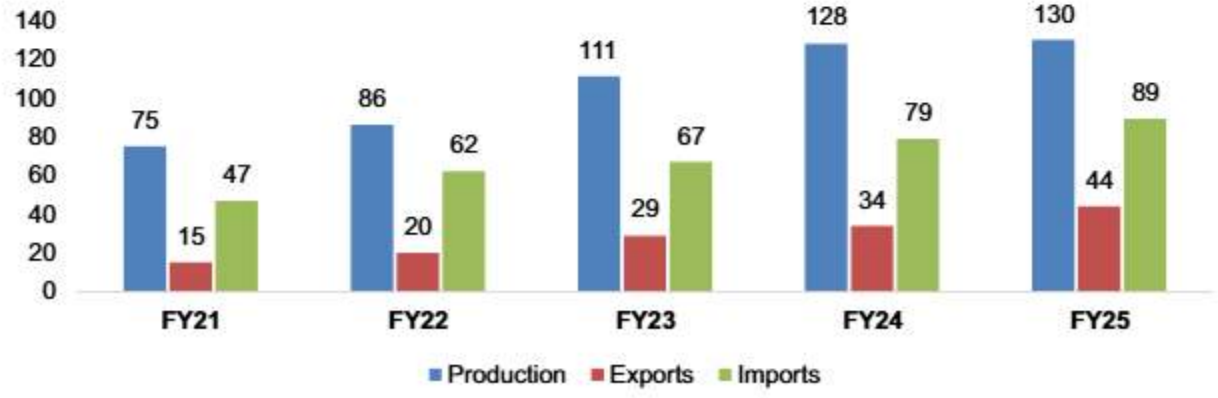
HISTORICAL BACKGROUND: FROM IMPORT DEPENDENCE TO MANUFACTURING AMBITION

Over the last few decades, India's development in the field of electronics manufacturing has passed from decades-long reliance on imports to increasingly bold ambitions to become a global manufacturing center. Although the country managed to develop a solid position in software services and IT sphere over the 1990s and 2000s, the development of manufacturing capabilities was weak, and the lack of ambition to build the ecosystem for semiconductors resulted in the dominance of Taiwan, South Korea, Singapore and subsequently China as the dominant global manufacturing centers.

The increasing use of mobile connections and consumption of consumer electronics over the 2000s increased India's reliance on electronic product imports. The government announced NPE 2012 – the first national policy for developing the sector into globally competitive Electronic System Design and Manufacturing sector aiming to achieve turnover of electronics of Rs. 29.64 lakh crore (US$ 400 billion) by 2020. However, India produced electronics worth only around Rs. 5.4 lakh crore (US$ 68 billion) in 2019-20.

Indeed, the momentum gathered considerable impetus after 2014 due to the flagship programs Make in India, Digital India, and Startup India, along with measures like M-SIPS and NPE 2019. As a result, the manufacturing industry for electronics in India grew from around Rs. 1.9 lakh crore (US$ 31 billion) in FY15 to Rs. 11.3 lakh crore (US$ 130 billion) in FY25 and ended up making India the second largest manufacturer of mobile phones in the world.0

India Electronics Sector in Last 5 Year (US$ Billion)



Source: MeitY, DGFT

Furthermore, leveraging these initiatives, the Government took policy actions like PLI Scheme for Large Scale Electronics Manufacturing, SPECS, and EMC 2.0, which were instrumental in attracting renowned manufacturers like Foxconn, Pegatron, and Tata Electronics as well as promoting domestic champions like Dixon Technologies, Syrma SGS, and Kaynes Technology.

Currently, the electronics industry in India is evolving from an import-oriented market into a more holistic manufacturer-exporter with growing domestic demand, exports, and involvement in global value chains. The trend is contributing to the rise in the importance of contract manufacturing in India as a hub for global electronics manufacturing and supply chain.

WHY CONTRACT MANUFACTURING HAS BECOME STRATEGIC FOR INDIA'S ELECTRONICS SECTOR

As evident, one reason behind the importance of contract manufacturing is the evolution of the electronics industry worldwide towards innovation-oriented and asset-light business models where the companies look for manufacturing partners capable of offering scale, capability, and flexibility without any capital investment.

Capital Efficiency and Asset-Light Manufacturing

One reason behind the relevance of contract manufacturing is the ability of contract manufacturers to leverage their established processes in order to reduce costs through scale. They purchase components in bulk and utilise advanced infrastructure effectively, thereby enabling the firm to turn fixed costs into operational costs and focus on innovation and market expansion.

Access to Advanced Manufacturing Expertise and Technologies

With modern electronics manufacturing requiring special engineering capabilities and quality control, contract manufacturers offer access to advanced technologies including high density SMT technology, automation of inspection, and X-ray testing. Moreover, Design for Manufacturing (DFM) methods help to increase production yield and efficiency

without any need for the brand to have these capabilities in-house.

Faster Time-to-Market and Production Flexibility

In the competitive consumer electronics industry and in telecommunications, Internet of Things (IoT) devices, etc., speed makes an important factor of difference. Electronics Manufacturing Services (EMS) vendors employ existing supplier networks and special New Product Introduction (NPI) processes in order to accelerate transition from the stage of developing new products to mass production thus making possible timely response to changes in consumer demands.

Scalability and Capacity Expansion

Contract manufacturing provides opportunities for efficient scaling of production depending on changing market demand and moving from prototype/pilot production to commercial manufacturing capacity without any capital expenditure on building additional infrastructure. Leading EMS vendors can provide brands with immediate access to existing manufacturing infrastructure that allows increasing manufacturing volumes quickly and maintaining high quality.

Strengthening Global Value Chain Integration

Contract manufacturing helps India integrate into the global electronics value chains since foreign brands outsourcing production to Indian plants make Indian manufacturers aware of international quality and supply chain standards and thus enhancing India's place in international electronics value chains.

Supporting Export Competitiveness

Contract manufacturing has been playing the role of a crucial tool that has enabled export-oriented development of India's electronics industry by allowing integrating Indian manufacturing plants into global supply chains and delivering products to foreign markets. The Production Linked Incentive (PLI) Scheme has helped to further improve export competitiveness of the industry and India has started to occupy an important position among the world exporters of smartphones and electronics. Such foreign brands as Apple, Samsung, Foxconn, and Tata Electronics manufacture their

products in India and use this country as an export platform.

UNDERSTANDING THE ELECTRONICS CONTRACT MANUFACTURING ECOSYSTEM

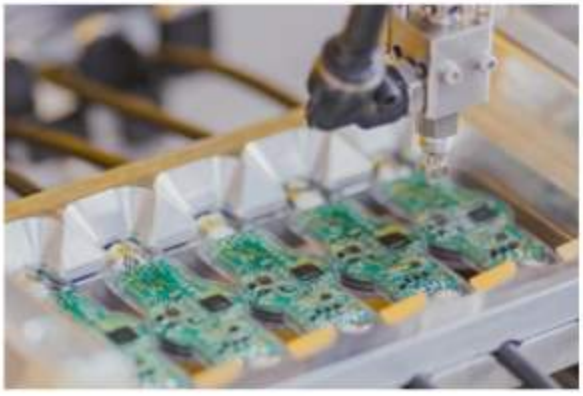
Contract manufacturing implies a business model when the company contracts production to a specialised third party vendor and keeps full responsibility for product design and brand and marketing strategies. ECM represents the implementation of this concept in the sphere of electronics manufacturing when specialised EMS vendors perform design, component sourcing, PCB assembly, system integration, testing, and assembly of end products, thus allowing accelerating product launch and preserving high quality standards.

During last twenty years, contract manufacturing has changed from just a manufacturing process into an important pillar of global electronics industry and contemporary EMS vendors provide support of all stages of product life cycle from design optimization through PCBA, system integration, and logistics management. Contract manufacturing has become an integral part of global electronics value chains and such companies as Apple, Dell, HP, etc., are supported by large network of contract manufacturers. In India, expansion of global EMS and domestic manufacturers has accelerated development of electronics manufacturing ecosystem.

The modern electronics contract manufacturing partner provides not just assembly but also engineering, quality assurance, and logistics within one integrated solution in order to speed up the process and increase visibility from prototypes all the way to delivery. Modern electronic contract manufacturers (ECMs) possess knowledge on both electronic and mechanical assembly and manufacture in order to produce products on the PCB level as well as full systems.

Key Business Models in Electronics Manufacturing

Model	Description	Primary Role
OEM (Original Equipment Manufacturer)	Owns the product design, intellectual property and brand	Product development, marketing and sales
ECM (Electronics Contract Manufacturer)	Manufactures products according to OEM specifications	Production and assembly
EMS (Electronics Manufacturing Services)	Provides end-to-end manufacturing solutions, including sourcing, testing and logistics	Comprehensive manufacturing support
ODM (Original Design Manufacturer)	Designs and manufactures products that can be marketed under another company's brand	Design and manufacturing services



As global supply chains keep developing, the line between manufacturing and innovation is becoming blurred, with modern contract manufacturers being key players in the sphere of product development, supply chain resilience, and innovation.

From Design to Delivery: How Electronics Contract Manufacturing Work

Electronics contract manufacturing includes a wide range of activities beyond assembling, which helps brands turn product ideas into marketable products, while Electronics Manufacturing Services (EMS) help in the whole process of product manufacturing. Usually, it starts with Design for Manufacturing (DFM), where manufacturers help to optimise products and detect any engineering problems before mass manufacturing and component sourcing, where EMS use their network of suppliers to buy components and control inventories.

Then there is production, which involves Printed Circuit Board Assembly (PCBA), where the components are mounted by means of modern surface mount and through-hole techniques. Then the boards are integrated into finished products with the help of system integration and box-build assembly, along with extensive testing involving automatic optical inspection, functional testing, and compliance verification. At the last stage, there is packaging, logistics, and delivery in order to ensure that the products are delivered to customers in different markets around the world. In this way, contract manufacturers help businesses to simplify the process, improve efficiency, and speed up the time to market.

Core Services Offered by Electronics Manufacturing Services Providers

Modern Electronics Manufacturing Services (EMS) provide integrated solutions that include everything from product assembly to its delivery.

- **Design and Engineering Support:** EMS helps in increasing product manufacturability through design review and Design for Manufacturing (DFM) by detecting prospective production problems and decreasing costs.

- **Printed Circuit Board Assembly (PCBA):** EMS assembles components on the circuit board using the surface mount technology (SMT), through hole, and mixed technologies for different types of applications from consumer electronics to industrial automation.

- **System Integration and Box-Build Assembly:** More and more manufacturers start offering the services

of box build in which the manufacturers assemble the electronic, mechanical, and software components into finished products.

- **Testing and Quality Assurance:** EMS performs numerous tests such as Automated Optical Inspection (AOI), In-Circuit Testing (ICT), x-ray testing, and functional testing in order to maintain quality in large volume productions.

- **Supply Chain and Lifecycle Management:** EMS companies take care of component sourcing, inventory management, and logistic services, and also obsolescence monitoring and after-sales services provided by a number of companies.

POLICY FRAMEWORK ACCELERATING ELECTRONICS CONTRACT MANUFACTURING

Make in India

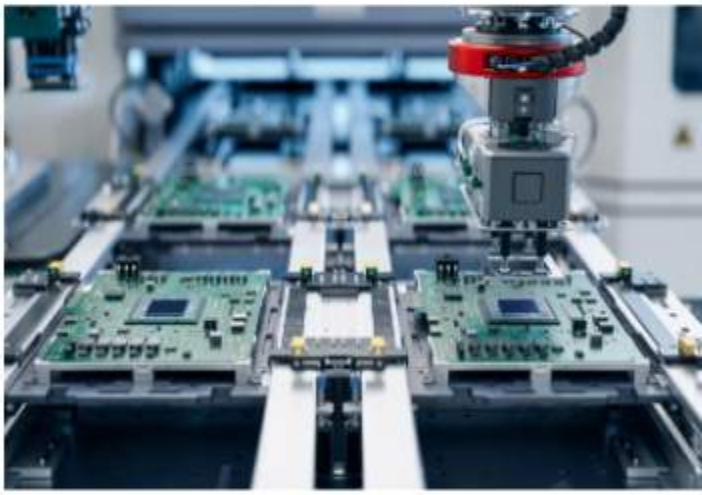
Make in India initiative started in 2014 included electronic manufacturing as an industry that requires the stimulation and improvement. The main goals of this policy include improvement of ease of doing business, attraction of foreign investments and strengthening manufacturing infrastructure. This initiative became an important factor for attraction of global EMS firms in India that laid the foundation for contract manufacturing in India.

Production Linked Incentive (PLI) Scheme

The Production Linked Incentive (PLI) Scheme for Large-Scale Electronics Manufacturing is the program that was created in 2020 for the promotion of domestic production and attraction of investments in return for financial incentives depending on incremental sales of manufactured goods. This program allowed for significant investments from global and domestic EMS companies and made a notable contribution to the production of mobile phones and export of electronics.

Electronics Components Manufacturing Scheme (ECMS)

Electronics Components Manufacturing Scheme (ECMS) was implemented with the aim of strengthening domestic component manufacturing and decreasing dependence on imported goods. Total outlay of the project is Rs. 22,919 crore (US$ 27.10 billion), the aim of



the project is to attract investments amounting Rs. 59,350 crore (US$ 70.19 billion) and creation of about 91,600 direct employment opportunities. The scheme received 249 applications exceeding the expectations and in Union Budget 2026-27 its budget was increased to Rs. 40,000 crore (US$ 41.92 billion).

Scheme for Promotion of Manufacturing of Electronic Components & Semiconductors (SPECS)

Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) stimulates investments in electronic components, semiconductor assembly and special equipment manufacturing and provides financial incentive 25% of capital expenditure to overcome the shortcomings in the supply chain and increase domestic value addition.

Electronics Manufacturing Clusters (EMC 2.0)

Electronics Manufacturing Clusters (EMC 2.0) Scheme is aimed at creation of world-class infrastructure for electronics manufacturing and provides financial assistance for manufacturing clusters with common facilities and testing infrastructure. Financial assistance of up to 50% of total project cost not exceeding the ceiling of Rs. 50 crore per 100 acres is provided for greenfield projects.

PM Gati Shakti and National Logistics Policy

PM Gati Shakti and National Logistics Policy aims at enhancement of multimodal connectivity and lowering of logistics costs through the integrated infrastructure planning that will help to strengthen electronics manufacturing industry by improving connectivity of manufacturing clusters, ports, airports, and industrial corridors.

State-Level Incentives

Some states of India have enacted electronics manufacturing policy in order to provide additional stimulus from central government initiatives. The states of Tamil Nadu, Uttar Pradesh, Karnataka, Telangana and Andhra Pradesh offer some incentives such as capital subsidy, land and electricity support leading to the creation of such centers as Noida-Greater Noida, Sriperumbudur, Hosur and Hyderabad.

HOW INDIA IS BECOMING A GLOBAL CONTRACT MANUFACTURING HUB

Smartphones: India's Flagship Manufacturing Success Story

The manufacture of smartphones presents the biggest success story in India in terms of electronics contract manufacturing. In the context of the PLI Scheme, India has achieved the position of being the world's second largest manufacturer of mobile phones. The output increased from about US$ 3

billion in Fiscal Year 2015 (FY15) to Rs. 4.10 lakh crore (US$ 49.27 billion) in FY2024. With exports exceeding US$ 30 billion in 2025, major producers like Foxconn, Tata Electronics, and Pegatron have made India the alternative choice to China as a part of the smartphone supply chains in the world.

Consumer Electronics: Expanding Beyond Mobile Phones

The scope of the electronics contract manufacturing in India has extended to the inclusion of televisions, appliances, and smart devices. Increased participation of contract manufacturers has allowed global companies to increase their sourcing and manufacturing activity locally. Samsung has increasingly relied on India as both manufacturing and exporting country; the total exports of smartphones, televisions, refrigerators, and washing machines in FY2025 was Rs. 45,930 crore (US$ 5.43 billion).

IT Hardware: Building Domestic Manufacturing Capabilities

Domestic manufacturing of IT hardware in India will be improved through specific policies. The IT Hardware PLI 2.0 Scheme with the budget of Rs. 17,000 crore (US$ 1.78 billion) seeks to boost production of laptops, tablets, servers, and PCs; to attain a production value of Rs. 3.35 lakh crore (US$ 35.11 billion); and to provide around 75,000 jobs.

Telecom Equipment: Supporting Digital Infrastructure Expansion

The swift deployment of 4G/5G networks has spurred domestic production of telecom equipment, facilitated by government efforts promoting local production and manufacturing of components. The projects in component manufacturing, approved by current government initiatives, are expected to benefit industries of telecom, defence, electric vehicles, and renewables.

Wearables and Smart Devices: An Emerging Manufacturing Opportunity

India is becoming a manufacturing leader in wearables (smartwatches, hearables, and fitness devices). Total domestic production in FY2023 amounted to approximately Rs. 8,000 crore (US$ 905.23 million), benefiting from the Phased Manufacturing Programme (PMP) and EMS expansion. Potential for growth is high in the long term due to increasing adoption of digitalization, health monitoring capabilities, and development of smart consumer electronics.

MAJOR PLAYERS: THE CONTRACT MANUFACTURING ECOSYSTEM

India's electronics contract manufacturing ecosystem includes global EMS giants, global OEMs having captive manufacturing units in India, and Indian EMS companies. Each tier performs its own function in the supply chain.

Foxconn (Hon Hai Precision Industry)

Being the largest EMS company in the world and the primary manufacturing partner of Apple Inc., Foxconn has large

iPhone assembling units in Tamil Nadu state. As per the strategic plan of Apple to diversify manufacturing beyond China, Foxconn in 2025 announced an investment of Rs. 12,684.07 crore (US$ 1.5 billion) in its India unit, Yuzhan Technology India.

Tata Electronics: Building India's Domestic Manufacturing Champion

Tata Electronics has become one of the most significant participants in the electronics contract manufacturing ecosystem of India by joining Apple's supply chain by acquiring the India operations of Wistron Corporation in 2023 and the majority stake in Pegatron Technology India in 2025. As a result of these developments, Tata Electronics has become the first Indian conglomerate becoming a direct iPhone manufacturing partner of Apple. The company runs manufacturing facilities in Tamil Nadu and Karnataka states and expands from smartphone assembling into electronics manufacturing and semiconductor packaging besides building component ecosystems, indicating increasing involvement of India in global electronics value chains.

Dixon Technologies: India's Leading Home-Grown EMS Champion

Dixon Technologies has become India's largest indigenous Electronics Manufacturing Services (EMS) company. Being founded in 1993 in Noida, the company has diversified its manufacturing from televisions and washing machines to mobile phones, IT hardware, wearables, lighting products, and display modules. Having partnerships with Samsung, Xiaomi, Motorola, and Lenovo among others, the company in 2025 entered into collaboration with HKC Overseas and Chongqing Yuhai for manufacturing of display modules and mechanical enclosures. Moreover, Dixon has joined hands with Bharti Enterprises for establishing a manufacturing unit for telecom equipment in Punjab under Telecom PLI scheme with estimated investment of around Rs. 200 – 250 crore (US$ 23.65 – 29.56 million).

Samsung: Expanding India's Role as a Global Electronics Manufacturing Base:

Samsung has been one of the earliest and biggest investors in India's electronics manufacturing industry. The Noida, Uttar Pradesh-based factory of the company is one of the largest mobile phone manufacturing factories in the world. Unlike many other global brands

utilizing the services of contract manufacturers, Samsung has its own plants running independently, and the Noida factory acts as the main export base for smartphones, consumer electronics, and appliances.

Amber Enterprises and PG Electroplast: Expanding into Advanced Electronics Manufacturing

Amber Enterprises and PG Electroplast have become significant homegrown EMS companies involved in manufacturing of consumer electronics, appliances, and electronic components for major brands operating in India. In February 2025, Amber Enterprises announced a collaboration with Korea Circuit for

setting up an advanced electronics components manufacturing plant in Jewar, Uttar Pradesh with an expected investment of around Rs. 4,200 crore (US$ 496.70 million), indicating a gradual move of Indian EMS companies into advanced manufacturing activities.

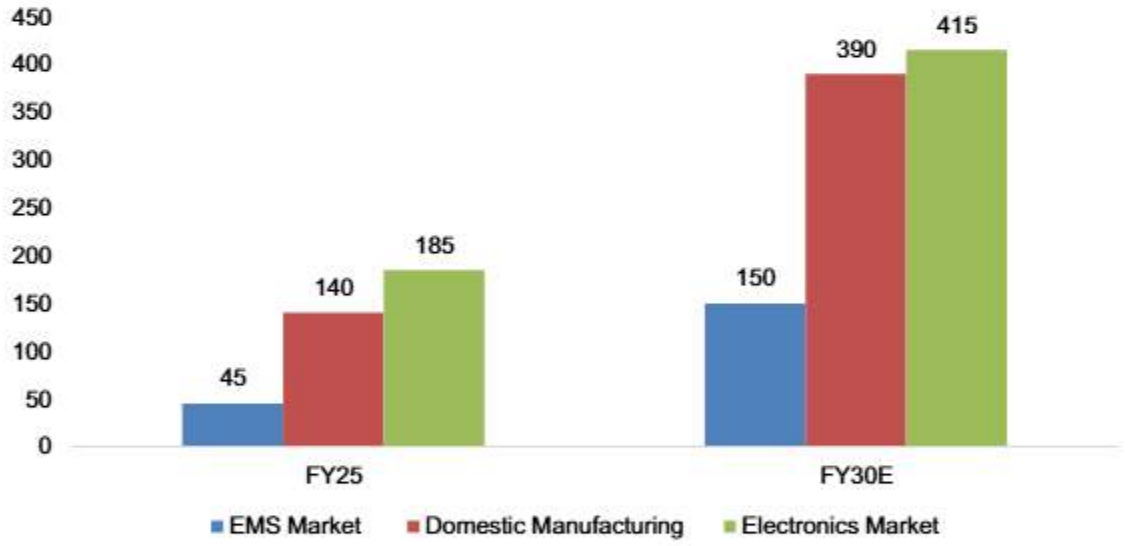
Jabil, Flex & Other Global EMS Players: Expanding India's Advanced Manufacturing Capabilities

Jabil and Flex, being the most popular EMS firms in the world, have extended their manufacturing reach in India for producing products meeting domestic demands and exports for telecommunication infrastructure, automotive electronics, health care devices, and industrial automation, and thus contributing to transferring the knowledge of manufacturing and global quality standards to India.

MARKET SIZE AND GROWTH

The EMS sector in India has become one of the fastest-growing sectors in the manufacturing sector of the country. According to KPMG, the Indian EMS market grew to approximately Rs. 3.38–3.81 lakh crore ($ 40-$45 billion) in FY25 and is set to reach beyond Rs. 12.68 lakh crore ($150 billion) by FY30.

India EMS Market in FY25 and FY30 (US$ Billion)



Source: KPMG

In addition to that, government initiatives such as PLI Scheme, Electronics Cleaning Manufacturing Services (ECMS), SPECS, and India Semiconductor Mission have brought many investments from foreign companies as well as from domestic manufacturers. Revenue CAGR in the EMS sector was around 24% between FY19 and FY24, and is estimated to grow around 27% between FY24-FY29 on account of the 'China+1' policy.

The electronics manufacturing sector saw an almost four-fold growth between FY15 and FY25, where the manufacturing increased Rs. 1.9 lakh crore (US$ 31 billion) in FY15 to Rs. 11.3 lakh crore (US$ 130 billion) in FY25. As a result of this, electronics have moved from the seventh-largest export segment in FY22 to be one of the top export segments in FY25.

Despite these achievements, India still only makes up around 5-6% of the total EMS manufacturing output in the world, which means there is plenty of scope left

for growth. Although India is good at smartphone assembly and PCBAs manufacturing, one of the major issues that still exists is dependency on imported components, where China and Hong Kong make up a large percentage of component imports.

The next stage of growth will be fueled by investments in electronic components manufacturing, semiconductor manufacturing, and higher domestic value addition as multinational companies move away from China and India develops its component ecosystem through ECMS and India Semiconductor Mission.

INDIA'S STRUCTURAL ADVANTAGES IN ELECTRONICS CONTRACT MANUFACTURING

- **Supply Chain Diversification and China+1 Opportunity:** Developments on geopolitical front and learnings from COVID-19 have led to further diversification of global electronics supply chain away from China. India is one of the clear beneficiaries of these trends, thanks to supportive policies and sizeable domestic market. Keeping in line with the trend, Foxconn has announced investment of over Rs. 10,147.25 crore (US$ 1.2 billion) in Karnataka for manufacturing iPhones and components.

- **Large Domestic Market:** Large and growing population of consumers forms a critical strength for electronics contract manufacturers. India is amongst the largest smartphone markets globally, along with rapid growth in consumer electronics and connected devices markets, giving manufacturers solid footing to build economies of scale.

- **Government Policy Continuity:** Consistent government policies over last decade form the key strengths of the country. Some of the recent examples include Make in India, Production Linked Incentives (PLI) Scheme, SPECS, EMC 2.0, India Semiconductor Mission and ECMS. This is because the above initiatives show consistent support for long term investments instead of temporary incentives, making investors feel confident enough to invest in India.

- **Technical Workforce:** Huge availability of skilled engineers in India has become a key factor supporting the growth of the industry. More than 2

million STEM graduates are produced annually in India in manufacturing, product engineering, and R&D roles. Also, India is known as semiconductor design center of the world with around 20% share in global semiconductor design workforce.

- **Geopolitical Positioning:** Global supply chains are currently going through a major transformation as companies try to diversify their manufacturing activities. India has emerged as an appealing destination due to its consistent policies and strategic collaborations with other key global markets.

EMPLOYMENT GENERATION AND WORKFORCE DEVELOPMENT

The expansion of electronics contract manufacturing is creating significant employment opportunities across India's manufacturing ecosystem, particularly in PCB manufacturing, module assembly and advanced manufacturing processes that require higher levels of technical expertise.

The rapid growth of global electronics supply chains in India has also contributed to large-scale employment generation across manufacturing, logistics, quality assurance and engineering, with demand for skilled technical talent expected to increase further as the industry moves towards higher-value activities.

A notable feature of India's electronics manufacturing sector has been the increasing participation of women in the workforce. Large manufacturing facilities operated by companies such as Foxconn have employed a substantial number of women workers, supported by structured technical training programmes, mirroring the experience of several East Asian manufacturing economies where electronics production expanded workforce participation and industrial employment.

Industry response to the ECMS scheme significantly exceeded expectations: by October 2025, it had received 249 applications worth Rs. 1,15,351 crore (US$ 136.42 billion). By March 2026, MeitY had approved 104 applications worth over Rs. 68,700 crore (US$ 81.33 billion), expected to create nearly 80,000

jobs, including India's first facilities for flexible PCBs, tantalum-based SMD capacitors and rare earth permanent magnets.

ROAD AHEAD

India's contract manufacturing of electronics industry has evolved from being a new manufacturing destination to become a key part of global electronics value chain, reaching the position of second biggest smartphone manufacturer in terms of quantity. The Government's efforts, including such programs as Production-Linked Incentive Scheme, Electronics committed Manufacturing Scheme (ECMS), India Semiconductor Mission, SPECS, and EMC 2.0 are trying to close the identified weaknesses of the value chain, but quite a significant part of components are still imported which makes the domestic value addition limited.

The target is to create an ecosystem worth of Rs. 42.28 lakh crore (around US$ 500 billion) by 2030 which will consist of Rs. 33.82 lakh crore (around US$ 400 billion) worth of manufactured products and Rs. 8.46 lakh crore (around US$ 100 billion) worth of components. In order to meet the target, the strategy needs to move away from assembly-driven to design-driven manufacturing.

In future, the following events can become key: the implementation of ECMS for decreasing import dependency, the further investments in semiconductor design and packaging and the diversification into IT hardware, telecommunication, automotive and medical electronics in addition to smartphones production.

With increasing diversification of global supply chains and expanding demand for electronics, India is capable of growing its manufacturing power if it continues having policy support and adopting new technologies.