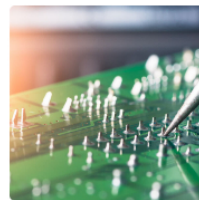


Our Take

India calling: Decoding the country's electronics manufacturing journey and the way forward

India's organic growth in the consumption of electronics, coupled with the Government's target of achieving USD 300 billion worth of domestic electronics manufacturing by 2025–26, creates a unique opportunity for global firms to look at India as the manufacturing hub for the Silicon Age. Mohammad Athar and Sujay Shetty perform a reality check

India's population has reportedly surpassed that of China's, having reached 1.4 billion.¹ It is now the most populous nation in the world. Supported by a demographic advantage where around 26% of the population belongs to the age group of 15–29 years and another roughly 26% is in the group of 0–14 years, India is positioned to become the largest global market for a tech-savvy young population.²



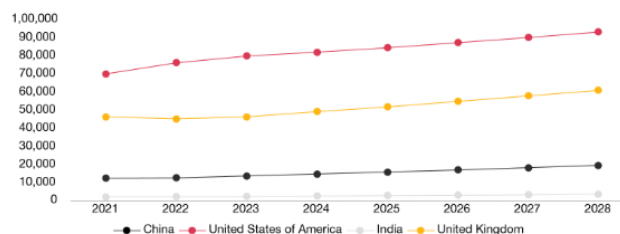
Excerpts from the report



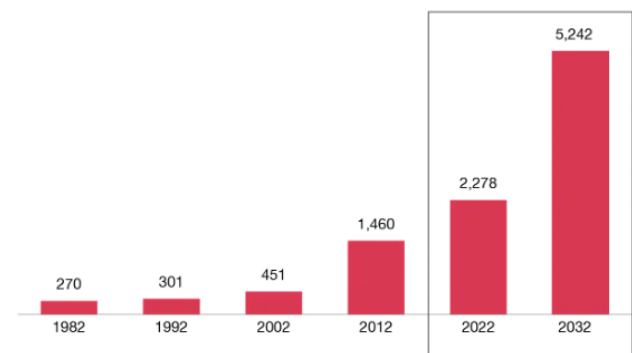
The country has emerged as the second-largest mobile phone manufacturer in the world with more than 200 mobile phone manufacturing units having been set up on its soil.³ With some commodities gaining aspirational value and an increase in discretionary spending, this decade is poised to bring major market opportunities for global players to enter India and leverage its markets along with its young demography.

Further, the increasing spending power of the aspirational Indian middle class is expected to drive India's GDP at nearly twice the global rates.⁴ As per International Monetary Fund (IMF) projections,⁵ India is poised to become the third largest economy in the world by 2028 with an estimated nominal GDP of USD 5.58 trillion, growing at an average rate of 6.55% per year between 2021 and 2028. Per capita GDP is set to cross USD 3,000 by 2025, further accelerating discretionary spending and fuelling demand in the electronics sector.

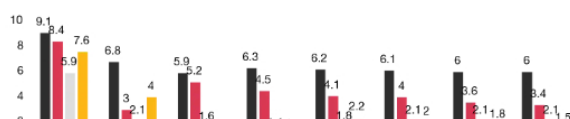
GDP Per Capita, Current Prices (US\$)



Per capita GDP (India 1982–2032) in USD



IMF estimates of real GDP growth (%)





Source: PwC analysis based on secondary research data











Competitive wages, highly skilled human resources and geopolitical nudges are pushing companies to explore India as the ‘next’ manufacturing destination.

India's stable policy climate, synergies between the Central and state governments on the overarching direction of industrial growth, and holistic operational policy measures have fuelled the demand for translocating manufacturing to India. A growing push towards supply chain diversification by large firms in the aftermath of the COVID-19 pandemic and globally emerging geopolitical fault lines have further facilitated this. In addition to these factors, India has continued to maintain competitive manufacturing wages. Sustained reduction in infrastructure gaps within the country through the implementation of programmes such as Bharatmala, Sagarmala and PM Gati Shakti, together with supply-side incentives from the Government, will further improve capital productivity and the greater investment-to-GDP ratio, creating a virtuous cycle.

India's digital push and changing lifestyle choices are increasing the demand for discretionary merchandise such as smartphones, electronics and related products.

There is more. The concerted push for digitisation across the country has prompted the start of a digital era. With the needle moving on the Digital India initiative, people of all age groups desire an improved quality of life. Between 2017 and 2022, the total number of internet subscribers in India has grown at a compound annual growth rate (CAGR) of 15%, reaching 850.95 million by September 2022.⁶

India continues to rank high on several macroeconomic parameters – financial attractiveness, consumption pattern, people skills and availability, and need for technology

Key metrics driving the demand in India				
 2x Growth in per capita income in 7 years	 2nd Largest smartphone market (920 million subscribers)	 >91 billion Digital transactions (largest number worldwide)	 Top 3 Global economies for digital consumption	 9,200 million Market size of IoT by 2025 (100% growth from current)
 ~1.4 million Digitally skilled employee base	 ~50% Of global capability centres (GCCs) set up in India	 6th Largest OTT market (28% CAGR)	 >35% Of technology workforce in MNCs	 >65% Data revenue from 5G services by 2026

Source: PwC analysis

India ranks first in terms of global mobile commerce wherein consumers are engaging in e-commerce transactions exclusively from their mobile phones. Digital payments too have seen a CAGR of 46% between FY18 and FY22, reaching 91.9 billion transactions until December 2022.⁷ Even the consumption of personal entertainment in India is shifting from cable to over-the-top (OTT) platforms. Devices such as mobile phones and tablets as opposed to ‘unsmart’ television sets of the past have prompted multiple discretionary purchases by the consumer. The pandemic further spurred digital use cases in the domain of education, healthcare and governance, with app-based solutions being rolled out for each of these. Besides, the demand quotient for mobile and electronics in India increased, creating a case for these companies to encash on the India opportunity.

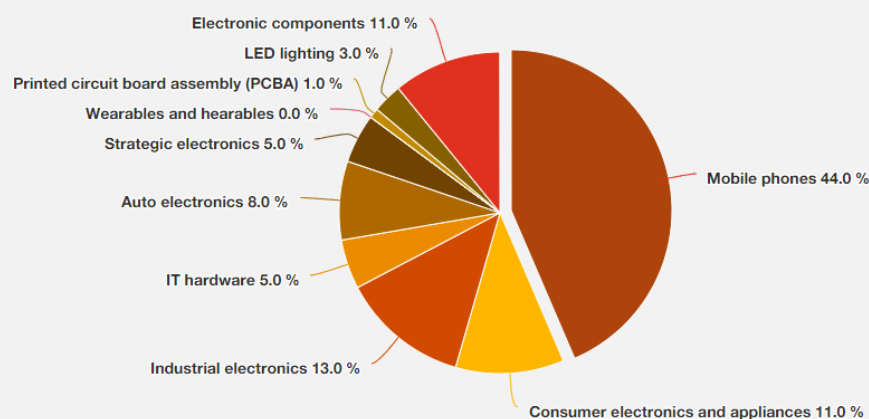
for these companies to encash on the India opportunity.

Electronic and mobile companies have emerged as successful first movers to capitalise on the India opportunity in manufacturing.

It comes as no surprise then that electronics has emerged as one of the fastest growing industries in the Silicon Age when the double movement of globalisation and the World Wide Web created a massive demand for electronic commodities. An increasingly digitalised world has ensured that there is no slowdown in the global electronic trade. Along with energy security, the pandemic also prompted the need for 'electronic security' with supply chain disruptions stalling the production of components in some sectors – from automobiles to healthcare devices – and resulting in a shortage of electronic components.

Today, due to the explosion of the Silicon Age paradigm and the digital era lifestyle globally, electronics system design and manufacturing cost-effective manufacturing, which is mostly done at cost-competitive locations in East and Southeast Asia through electronics manufacturing services (EMS) companies. The collective EMS market is projected to reach USD 1,145 billion by 2026 with a CAGR of 5.4% between 2021–26.⁸ India's domestic demand for consumer electronics is also witnessing growth and is expected to touch USD 21.18 billion by 2025.⁹

Production profile of the Indian electronics industry – FY2022

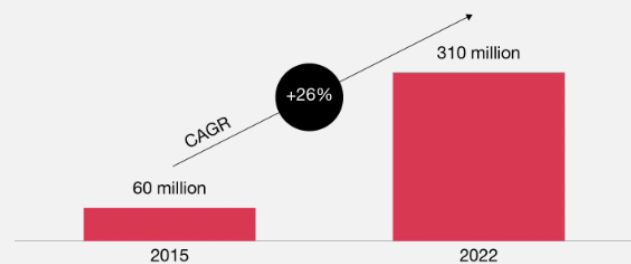


Source: MeitY Annual Report 2022-23

India's capacity to manufacture for the world has been demonstrated across four major segments – mobile phones, consumer electronics, IT hardware and electronic components – that account for over 70% of India's domestic manufacturing profile.¹⁰ Global firms can readily leverage these domestic capabilities to achieve supply chain diversification and scale up production by manufacturing in India.

The result – India is the second largest mobile phone manufacturer globally and is also the second largest market for smartphones in the world, making it the fastest growing smartphone market in the world.¹¹ Production of mobile phones has gone up from 60 million in 2015 to 310 million in 2022 at a CAGR of 26%. The consideration of mobile phone manufacturing and its sub-assemblies or sub-components as flagship initiatives under the Make in India initiative has further supported this growth. As on date, the over 200 manufacturing units of mobile phones, sub-assemblies, parts and components that have been set up in the country during the last couple of years have employed around 700,000¹² people in the country – a success story of successful manufacturing localisation worth emulating in other sectors.

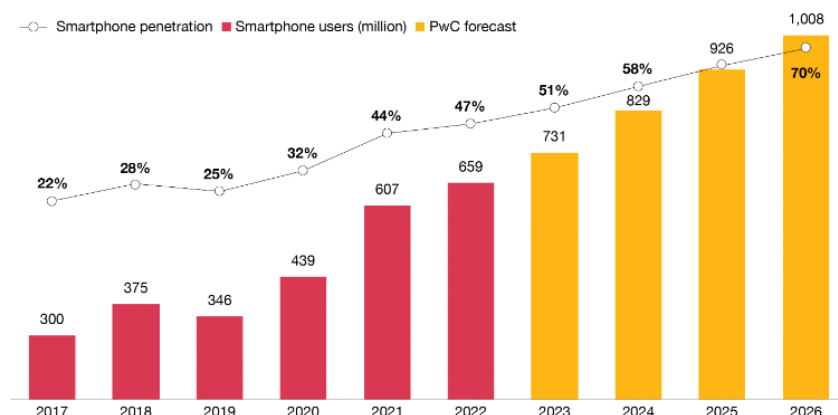
Mobile manufacturing in India has grown 5x in the last 7 years



Source: PwC analysis

Mobile phone manufacturing has grown at a CAGR of 32% in the last two decades, showing unprecedented growth.

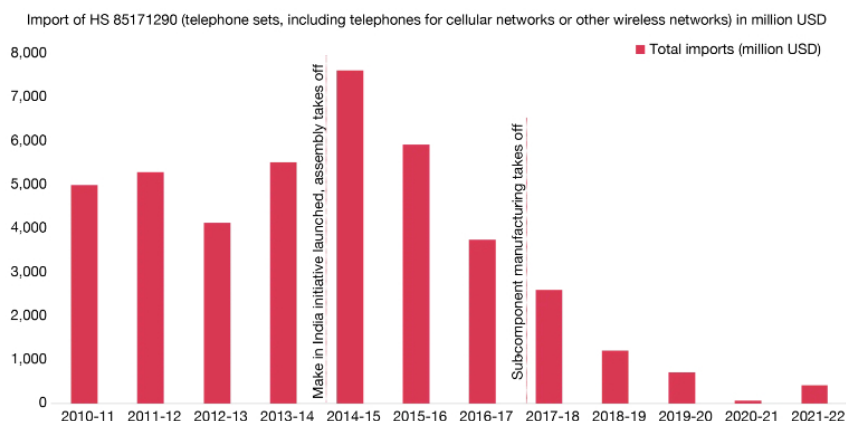
Current trends indicate India may have 1 billion smartphone users by 2026



Source: PwC analysis based on secondary research data

The staggering growth of India's smartphone penetration continues even today with an estimated 659 million smartphone users in the country.¹³

Import of finished smartphones has been on a steady decline in India



Source: MoCI-EXIM data

HS Code 85171290 is the eight-digit merchandise class that incorporates finished smartphones. The graph above shows the drastic decline of the product category into India. The first dip happened with the establishment of assembly players in India's EMS as phones started to be manufactured in India under the Make in India initiative. Thereafter, with supply-side initiatives and targeted incentive structures discussed in the subsequent sections, the steady decline continued. In 2020-21, the decline was further accelerated owing to minimum imports from East Asian countries due to their stringent COVID-19 measures and assembly and manufacturing activities – even for premium segment phones.

The unprecedented spike in demand for phones created a huge demand and supply gap in the market which was serviced primarily through the import of finished goods. Indian players in the segment were mostly white-label retail brands importing manufactured handsets from East Asia and selling them in India. Import of smartphones peaked around 2014-15, after which the opportunity represented by Indian markets gained recognition and manufacturing in India took off. It also marked a landmark shift in India's manufacturing endeavour when new and existing supply-side impetus on manufacturing was synergised under the Make in India initiative of the government. The staggered results of the same followed through 2017-18 with sub-component manufacturing significantly taking off in India. It was no surprise that the import-driven electronics sector became the cornerstone for initiatives focused on reducing India's import burden and promoting Indian manufacturing for the local and global consumer. As mobile phones were the largest segment by

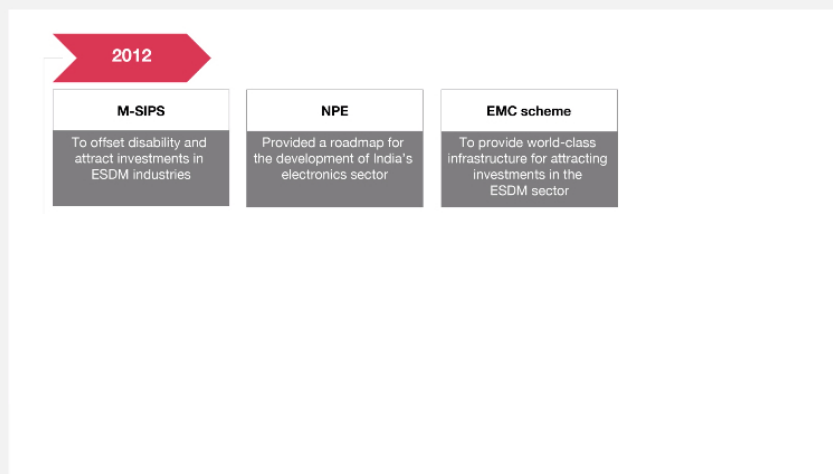
proportion within electronics, the supply-side initiatives targeted the segment head on. These initiatives catalysed India's mobile phone manufacturing ecosystem, thus reducing India's dependence on imports and simultaneously enhancing India's export capabilities.

A paradigm shift in the incentivisation of investments coupled with infrastructure upgrade has played a significant role in attracting anchor manufacturing units and their ancillaries.

India has witnessed a surge in the focus of the Central and state governments on the overall development of the electronics ecosystem, by attracting investments across the value chain. In the early years of the last decade, the Indian electronics industry faced a wide demand-supply gap amid import dependency, limited quality infrastructure, a complex tax structure, limited localisation of supply chain, staggered logistics and last-mile connectivity, inflexible labour laws, limited R&D focus, inadequate funding and negligible domestic value addition.

In 2012, the first National Policy on Electronics (NPE) was implemented to offset shortcomings in the Indian electronics industry. Under the policy, schemes such as the Modified Special Incentive Package Scheme (M-SIPS) and Electronics Manufacturing Clusters (EMC) Scheme, followed by the Phased Manufacturing Programme (PMP) and Electronics Development Fund (EDF) Policy, were introduced. The Make in India and Digital India initiatives provided yet another boost to the dedicated national efforts in the electronics sector.

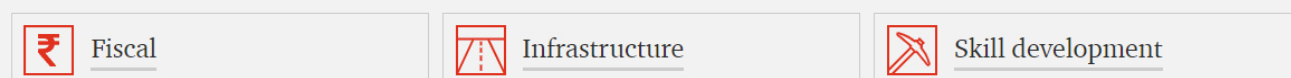
In 2016, the Gol prepared a phased roadmap to promote domestic manufacturing of mobile phones. The Gol's PMP notified a 12.5% countervailing duty on imports and a 1% excise duty without input tax credit for domestic companies manufacturing mobile phones. Further, basic customs duty was exempted for parts, components and accessories.



Source: PwC analysis

In 2019, the Gol revamped the National Policy on Electronics, adopting an integrated approach to build India's capacity in core technology development, incentivising capital expenditure (Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors), promoting scale of production (Production Linked Incentive [PLI] schemes) and expanding the scope of the Electronics Manufacturing Clusters Scheme for supporting new age infrastructure for electronics manufacturing. These efforts are also being complemented by extensive skill development initiatives across the electronics manufacturing value chain.

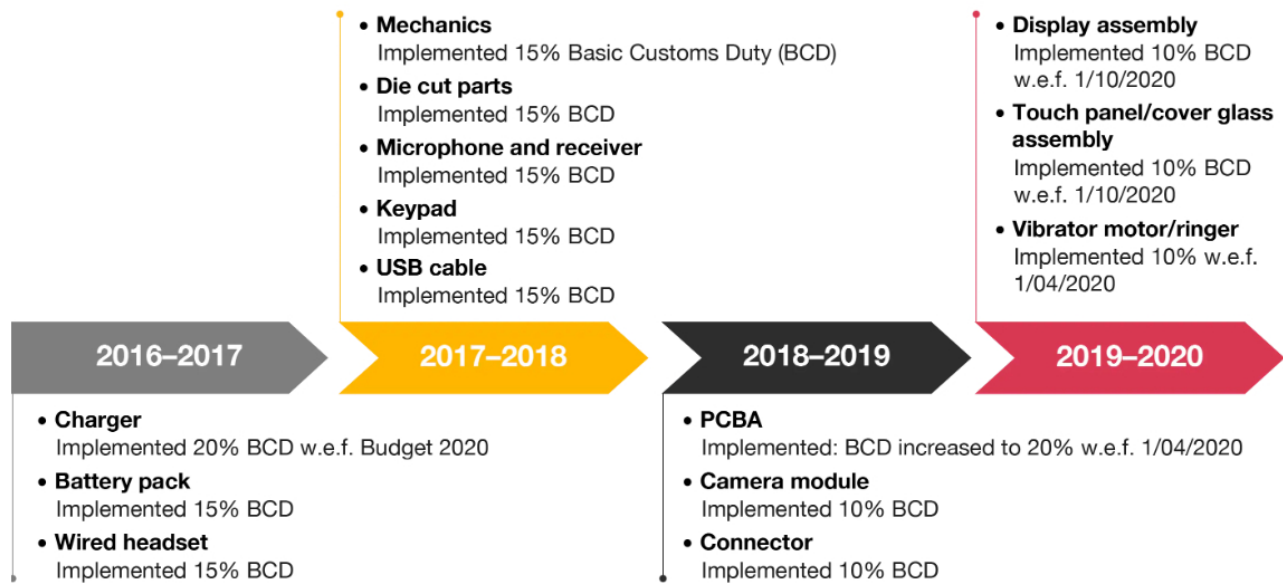
Three pillars under the integrated approach undertaken by the Gol in the electronics sector



To attract investments for smartphone manufacturing, the Gol is incentivising 20–25% of the capital expenditure, combining it with a differential excise duty dispensation on mobile phones and its components/accessories.

Given that core electronics manufacturing is highly capital intensive, the GoI's M-SIPS scheme provided incentives to the tune of 20–25% on capital expenditure to electronics manufacturers, including those manufacturing smartphones and their ancillaries. Target products include mobile phones, telecom equipment such as optical fibre equipment, terrestrial communication equipment, satellite communication equipment, IP-based new generation soft switches/routers, data networking equipment, transport systems, cross-connects, radio over fibre (RoF), carrier ethernet, packet optical transport platform, wireless technology, and distributed antenna systems.

Phased manufacturing programme as set out by the GoI



Source: MeitY

To further promote domestic mobile phone manufacturing and offset the manufacturing cost disabilities, the GoI is incentivising annual sales in the form of PLI schemes.

In 2020, the GoI launched the PLI scheme for large-scale manufacturing, providing incentives of 4-6% on the incremental sales of manufactured goods as a means to offset the disability of 8.5–11% that the electronics sector was suffering in terms of the high cost of finance, inadequate availability and cost of power, water and logistics. Mobile phones are one of the two broad target segments under this PLI scheme.

Production-linked and capital incentives are also being provided to the value chain of mobile phones, giving impetus to the drivers of demand for mobile phones and potentially localising the critical supply chain ecosystem which is pertinent for core mobile phone manufacturing.

For specified telecom and networking products, the GoI introduced another PLI scheme for goods such as core transmission equipment, 4G/5G, next generation radio access network and wireless equipment, access and customer premises equipment (CPE), IoT access devices and other wireless equipment and enterprise equipment (switches and routers).

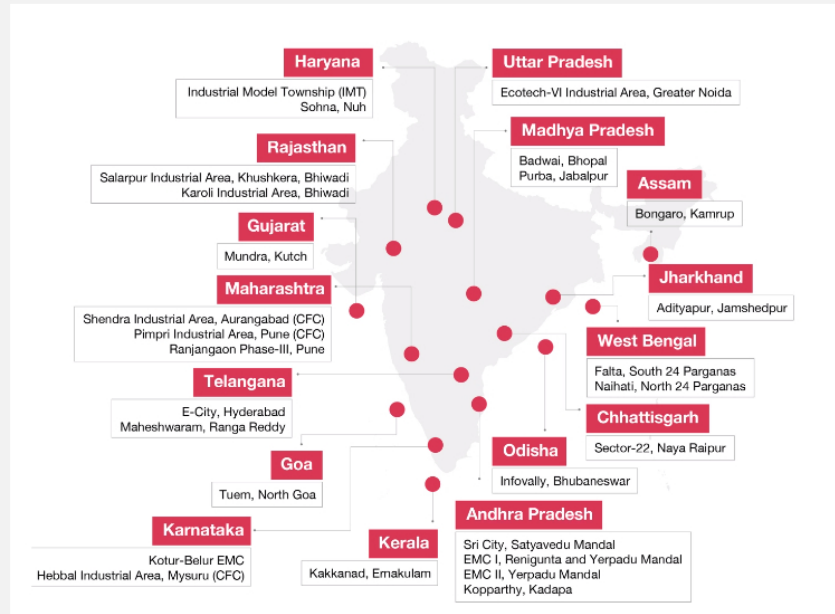
In addition to the PLI schemes, the GoI has also initiated schemes like Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors (SPECS) and the Programme for Development of Semiconductors and Display Manufacturing Ecosystem in India, providing capital incentives to the overall value and supply chain of semiconductor manufacturing which has the potential to further substantially promote domestic manufacturing of mobile phones in India.

Commitment from state governments with the support of the Central government to prepare large infrastructure spaces for investments in the electronics sector with first

prepare large infrastructure spaces for investments in the electronics sector with first-class facilities is now at the forefront.

Under the National Policy on Electronics 2012 and 2019, the GoI introduced infrastructure interventions focused on promoting electronics and semiconductor manufacturing. Under the EMC Scheme, the Central government provides financial assistance to state governments for setting up of EMCs and Common Facility Centres (CFCs) across the country. These EMCs are expected to provide a package of best-in-class services to investors who plan to set up their manufacturing facilities within the country. Within this scheme, 23 EMCs and three CFCs are being set up across India in sub-segments such as mobile phones, printed circuit board (PCB), consumer electronics, medical electronics, solar cells and modules, electronic components and automotive electronics.

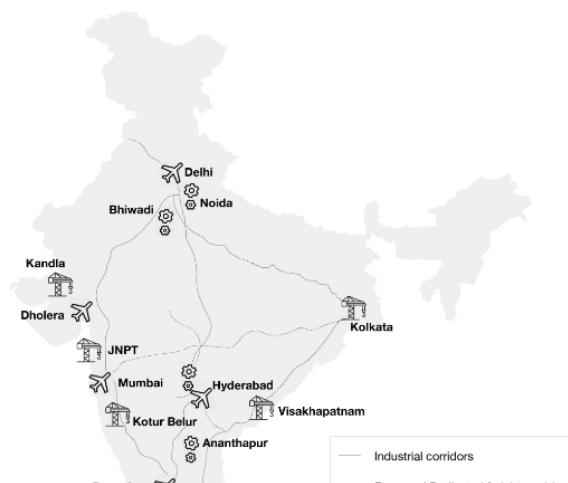
16 states
23 EMCs, 3 CFCs



Source: [Setting up of Software Technology Parks of India](#)

Infrastructure upgrade projects have been undertaken to improve multimodal connectivity and promote development of industrial clusters.

Several infrastructure upgrade initiatives have been taken up by the GoI to develop multi-sector and dedicated industrial clusters and further improve multimodal connectivity from prominent gateways to economic zones. Projects for revamping of roads, development and upgrade of airports, mass transport, logistics infrastructure, railways, ports and waterways are being taken up to transform the infrastructure landscape in India. Such infrastructure projects are helping companies efficiently manage their supply chain logistics and connect to key domestic markets.





Source: PwC analysis

Public private partnership initiatives have consistently made a skilled talent pool available, supporting the talent requirement of electronics manufacturing companies.

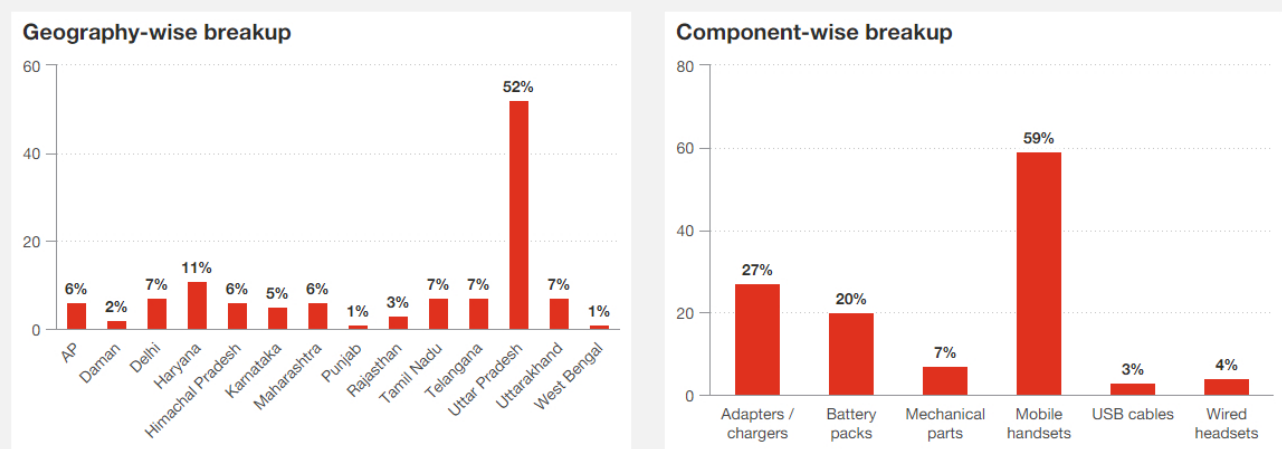
Under the National Policy on Skill Development and Entrepreneurship, 2015, a Skill Qualification Framework was designed. The GoI created an institutional framework to implement and monitor the various initiatives which have been undertaken to skill and upskill the youth of the country. Under this institutional framework, the Electronics Sector Skill Council was set up to bring the industry and government together and design a national curriculum for the job roles in demand in the electronics sector, enhance the quality of skill training centres and promote skill training in the electronics sector in India. As of 2022, around 1.6 million candidates have been trained across an array of sub-sectors such as semiconductor and components, consumer electronics and IT hardware, EMS, solar and LED, PCB design and manufacturing, industrial automation, e-mobility and battery, communication and broadcasting, and security and surveillance.

While there are nationwide programmes such as Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Pradhan Mantri Kaushal Kendras (PMKK), Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY), and skill training at Industrial Training Institutes which are providing training to the masses across job roles, industry partners have undertaken initiatives under programmes such as Recognition of Prior Learning (RPL) under public private partnerships in order to provide on-the-job training to apprentices and new employees, and upskill the existing workforce.

A total of 314 companies in the electronics sector have received an approval under M-SIPS with a proposed investment of INR 86,824 crore.¹⁴ Besides, 32 companies have been approved under PLI for large-scale manufacturing.¹⁵ The PLI scheme is expected to generate an additional production worth INR 10,69,432 crore and create employment opportunities for 7,00,000 people.¹⁶ It will also facilitate the production of diverse electronics merchandise in India.

The PMP has provided a boost to domestic manufacturing of mobile phones. About 120 new manufacturing units for mobile phones and components were set up in India by 2017–18. These units led to an increase in the production capacity and India manufactured mobile phones worth USD 20 billion in 2017–18 compared to USD 3 billion in 2014–15.¹⁷

Geographical and component-wise breakup of the 120 mobile phones and components manufacturing units in 2017–18

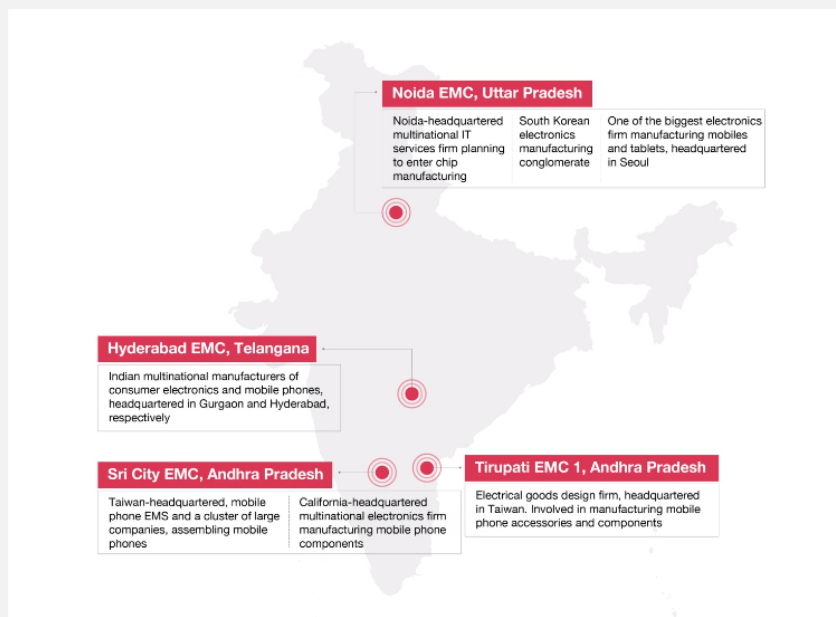


Source: CEA report

Furthermore, 42 companies have received an approval for manufacturing telecom and networking products under PLI which is expected to generate an additional sales of INR 2.45 lakh crore and create employment opportunities for 44,000 people.¹⁸

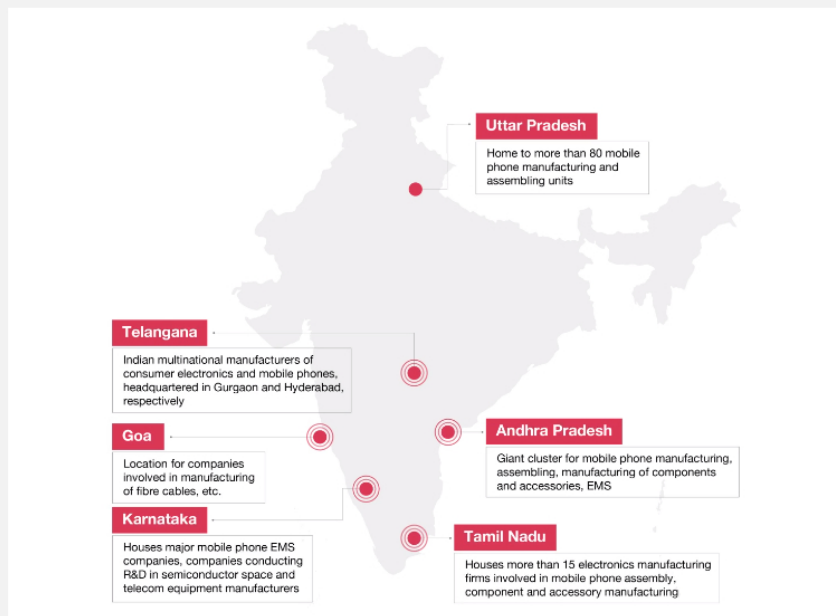
As an outcome of the continued efforts to upgrade the infrastructure available for manufacturing through 23 EMCs, there are five EMCs which have the presence of major companies in the mobile phone supply chain.

Mobile phone and component manufacturing/assembling units set up in existing EMCs across India



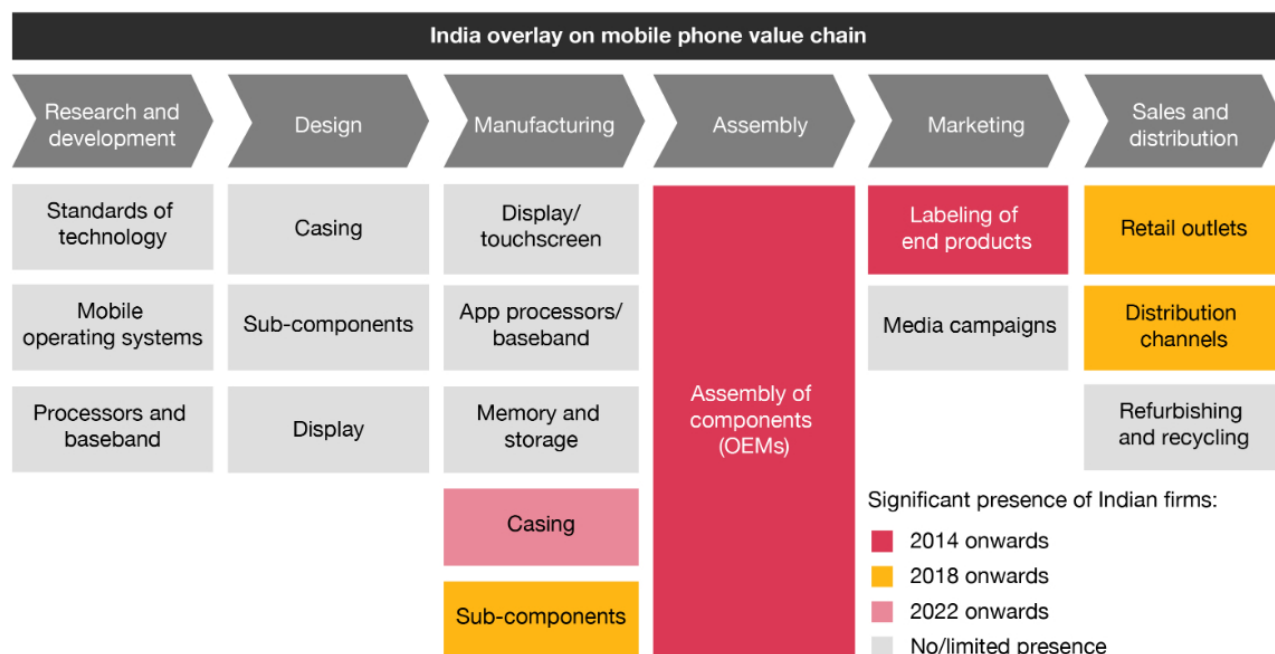
Source: PwC analysis

Many mobile phone and component manufacturing companies have set up their units outside the industrial areas developed by the state governments, creating clusters of manufacturing units to further augment India's mobile phone production capacity.



Our take

The limited presence of Indian firms across the mobile phone value chain provides opportunities for diversification and growth, and can help them capture higher value activities.

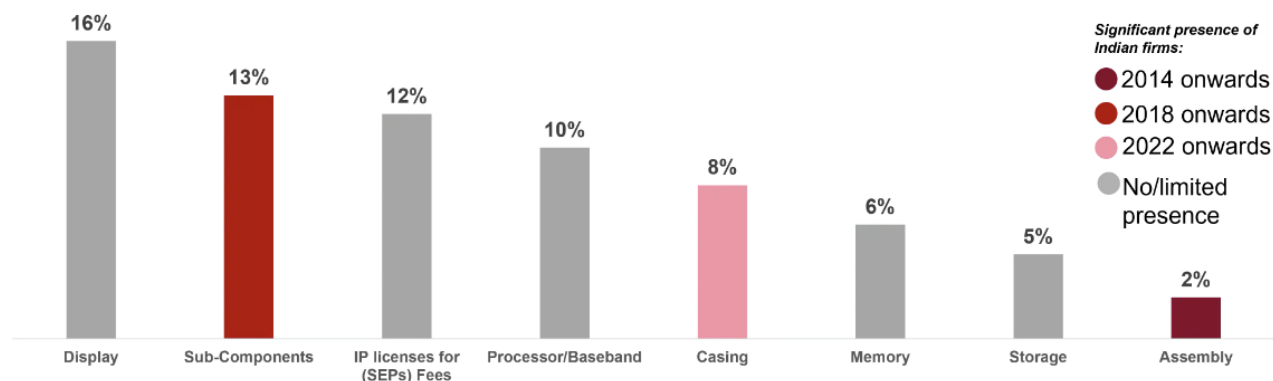


Source: PwC analysis

Although PMP for mobile phones was introduced with the objective of progressively increasing the domestic value addition across the product value chain, a significant number of Indian firms were initially restricted to assembling and labelling the end-products imported from China to meet the local needs of the market. However, this trend is now changing with new players establishing their operations in India across the domains of complex sub-component manufacturing and casing.

An example of this is the entry of a camera module manufacturer, a subsidiary of a China-based optical products company, in India. Currently, the company is operating through its original equipment manufacturers (OEMs) in Andhra Pradesh and this manufacturing unit is expected to generate a revenue of nearly USD 4 billion for India. Indian companies are also venturing into newer areas of the value chain by initiating the manufacturing of casings in Tamil Nadu which will also generate employment opportunities for 60,000 people. With the government taking concerted efforts to develop the semi-conductor space, it is expected that Indian firms would also be venturing into manufacturing chip-level commodities enabling them to produce processors, memory and storage units for mobile phones.

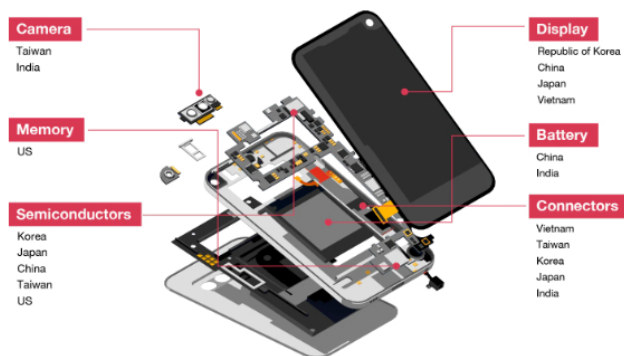
Where does value addition happen across the mobile phone value chain?



India's presence has grown from just 2% (assembly) value addition in 2014 to about 15% (assembly + sub-components) in 2022. It can grow its presence by another 8% by localising manufacturing of casing of phones.

Source: PwC analysis based on data from World Intellectual Property Report 2017

as Korea, Japan, Taiwan and China at higher levels of the smile curve. While Vietnam has also been able to increase its local value through the assembly of complex products such as displays, India is working towards developing capabilities across domains such as display assembly, camera module, flexible printed circuits, and speakers to localise its manufacturing capabilities. However, the transition will not be smooth as the country needs to build its capacity in order to remain competitive. The ability to build trust among all relevant stakeholders and promote a conducive ecosystem of enablers for sustainable outcomes will go a long way in making India the destination of choice for manufacturing complex electronic products.



Source: MeitY and ICEA, Vision Document Volume 2

So far, India's focus has been on boosting the assembling capacity; however, the next phase of electronics manufacturing should focus on pushing 'winners' towards value chain localisation for capturing value and strengthening their manufacturing capabilities.

Key recommendations

Increase manufacturing capacity

Engage with Indian start-ups

Provide skill-based training

Promote research and development

Develop customised incentive packages

Increase manufacturing capacity

India's ability to assemble mobile phones at scale enables the country to become a significant global player in the contract manufacturing space. The next step for Indian firms is to increase manufacturing capacity to capture higher value segments of the electronics value chain. Furthermore, at every stage of inter-governmental or foreign investor negotiations, it is important for the government, both the Centre and state, to ensure that manufacturers do not look at India merely for assembling products, but leverage policy incentives in the country to integrate Indian firms into their value chains. It should also facilitate access to technology for India's small and medium manufacturers to enhance their capabilities. Indian firms need to develop their own growth strategy as per their business needs and design sound expansion plans which will enable them to leverage the opportunities in the electronics manufacturing sector.

India can benefit from an agile response towards value chain localisation, as global businesses are pushing for the re-organisation of manufacturing activities across supply chains.

The focus on the diversification of supply chains, especially in the electronics segment, under the China+1 initiative can be beneficial to India and help in localising higher value activities within the country. An example of the push towards on-shoring or re-shoring value chain can be seen in the context of one of the world's most premium smartphones. Compared to its previous version, a trillion-dollar company has moved its supply chain back to the US with the country capturing more substantial value in the case of its recent edition as compared to its earlier edition which was launched in September 2021.

Therefore, global transitions, coupled with India's initiatives, could catapult its electronics manufacturing sector to the next level and can provide access to new opportunities for the country to localise the mobile phone value chain and venture into manufacturing more complex electronic products and components. In this context, it is essential to focus on gaining the trust of the organisations and harness sustainable outcomes across the value chain to further boost India's capabilities in mobile phones and its related electronics merchandise.

Focusing on the localisation of the value chain will not only give a boost to the electronics sector but also increase the opportunities for

tertiary sectors such as packaging, logistics and warehousing, and benefit other complex manufacturing segments.

The road ahead

While macro-economic conditions, presence of a large consumer market and government initiatives are conducive for investments, there are associated risks that an investor needs to navigate to ensure the successful entry and expansion of its existing business in India.

Therefore, partnering with an advisor who has a strong network along with a sound understanding of the Indian electronics manufacturing ecosystem and a longstanding relationship with the Central and state governments can help businesses to unlock the potential and mitigate the impending risks of the Indian market.

Some areas in which investors may need professional assistance are:

Latency in market entry

Ease of doing business

Delay in policy implementation

Localisation of supply chain

Attraction and retention of skilled manpower

Latency in market entry

Dimensions of risk

Rapid changes in technology, changing market conditions, competitors' stance in India, changing Central and state government policies that can impact the target products which are to be manufactured.

Key areas of support

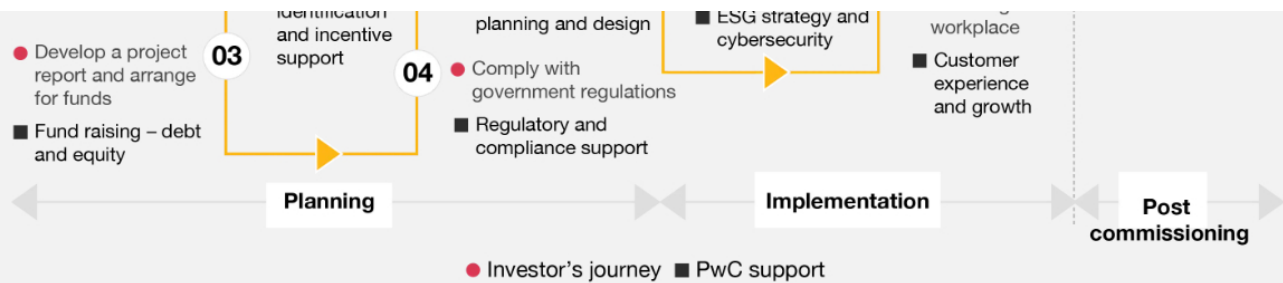
Competition scanning, close mapping of the changing market indicators in terms of demand/supply trends, India's stance in global trade/new trade treaties being signed, deep understanding of government policies favouring investment zones and regions, and location strategy for optimal location identification can help business with a timely entry into the Indian electronics manufacturing sector.

How PwC India can help

The electronics and semiconductor practice at PwC India specialises in providing experienced and comprehensive solutions for a wide range of business needs to help clients achieve their goals. Having worked with several Government entities covering Central and state governments and investors across geographies, the team has a clear understanding of Government asks and investor needs. This understanding helps provide customised and integrated solutions based on specific client requirements. Having successfully advised clients across the business lifecycle from conceptualisation of a business to commissioning a business, the team has an insight into the industry tasks and is equipped to provide relevant inputs to government policy-making, market opportunity assessment, market entry strategy, location advisory, implementation support to seek incentives, tax and regulatory support, supply chain optimisation, project management services and after-care services such as business monitoring, business expansion and sales acceleration. The Industrial Development and Investment Promotion (IDIP) platform has been devised to offer clients a bouquet of services to choose from as part of their investment journey.

An integrated approach to partner with national and global investors during their capital investment, growth and expansion stages





Sustained policy stability, continuous focus on delivering with ease and lowering the cost of doing business can incentivise organisations to set up manufacturing units in India.

A consistent focus on designing and implementing policies based on medium-term and long-term development goals is essential for the potential growth envisioned for the Indian electronics sector. Given the dynamic nature of the trends in the industry and the current stage of development within the sector, policy learning – i.e. course correction based on feedback from different stakeholders – is as important as policy formulation in the electronics sector.

A streamlined approach based on stakeholder interactions and a need-gap analysis across critical success factors are needed for the growth of the electronics sector in India, along with a concrete implementation and monitoring mechanism to build long-term manufacturing competitiveness in the country.

Sources

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