

INDIA'S MOBILE

MANUFACTURING ECOSYSTEM

CHALLENGES AND OPPORTUNITIES



ENHANCING INDIA'S MOBILE MANUFACTURING SECTOR FOR GREATER GLOBAL VALUE CHAIN PARTICIPATION

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AHS	Effective Applied Tariff Rate
AI	Artificial Intelligence
ATSC	Advanced Television Systems Committee
BCD	Basic Customs Duty
BIS	Bureau of Indian Standards
BoM	Bill of Materials
CAGR	Compound Annual Growth Rate
CBIC	Central Board for Indirect Taxes and Customs
CRO	Compulsory Registration Order
D2M	Direct-to-Mobile
DLI	Designed Linked Incentive
DoT	Department of Telecommunication
DPIIT	Department for Promotion of Industry and Internal Trade
DVA	Domestic Value Addition
EMS	Electronics Manufacturing Services
EoDB	Ease of Doing Business
ESDM	Indian Electronics System Design and Manufacturing
FM	Frequency Modulation
FMCS	Foreign Manufacturers Certification Scheme
FTA	Free Trade Agreement
GPS	Global Positioning System
HSN	Harmonised System of Nomenclature
ICEA	Indian Cellular and Electronics Association
ICIO	Inter Country Input Output
IC	Integrated Circuit
IMEI	International Mobile Equipment Identity
IS	Indian Standard
ISRO	Indian Space Research Organisation
LM	Legal Metrology
LMPC	Legal Metrology Packaged Commodities
LPI	Logistics Performance Index
MeitY	Ministry of Electronics and Information Technology
MFN	Most Favoured Nation
MoCI	Ministry of Commerce and Industry
MRP	Maximum Retail Price
NavIC	Navigation with Indian Constellation
NIP	National Infrastructure Pipeline
OEM	Original Equipment Manufacturer
PCB	Printed Circuit Board
PCBA	Printed Circuit Board Assembly
PLI-LSEM	Production Linked Incentive for Large Scale Electronics Manufacturing
PMP	Phased Manufacturing Programme
QCO	Quality Control Order
R&D	Research & Development
TEC	Telecommunication Engineering Centre
WITS	World Integrated Trade Solution

EXECUTIVE SUMMARY



India's remarkable ascent in the global mobile phone manufacturing industry signifies a strategic triumph in its economic landscape. The Indian Electronics System Design and Manufacturing (ESDM) sector is growing at a robust compound annual growth rate (CAGR) of 13 percent, with domestic electronics production doubling from \$49 billion in 2017 to \$101 billion in 2023. India emerged as the second-largest electronics market trailing only China, with a market valued at \$155 billion.

This report, based on a comprehensive empirical study, outlines key recommendations and strategic initiatives to strengthen India's mobile manufacturing ecosystem and capitalise on its recent achievements. Our analysis reveals that while increased production has necessitated higher imports, significant cost-efficiency gains are emerging at the component level, indicating the sector is on the right track.

Additionally, India has a robust and rapidly growing domestic smartphone market, with even greater opportunities in the global arena. However, the reliance on imported components remains substantial and will likely grow as manufacturing scales. Adopting a liberalised trade regime could help sustain the momentum by leveraging economies of scale and offsetting the import bill through increased exports -- a theme we explore in this report. To transform into a global mobile manufacturing hub, India must address the challenges and seize the opportunities within its mobile manufacturing ecosystem. Below is a summary of suggested actions and recommendations.

1. Strategic Trade Policies: Rationalising and Simplifying Tariffs

- **Current Tariffs:** The Indian government increased tariffs (import taxes) on mobile phone components by 5-15 percent since 2016. However, with an overall lower level of localisation in mobile components, high tariff rates have become one of the major cost disability factors when compared to competitors like China. This led to higher prices, reducing their competitiveness in the global market. Additionally, the seven-slab tariff system is complex and results in higher compliance costs increasing the overall administrative burden on the industry.



- **Action Plan:** Identify components with increased costs due to tariff rates. Begin phased reduction of tariffs and duties from FY 2024-25. The government is already considering bringing majority of the tariff lines to 15 percent tariff rate or less and have done so for several tariff lines. Further simplify the current complex tariff structure from seven slabs to just three slabs—0 percent, 5 percent, and 10 percent, for intermediate goods/ components/ sub-assemblies starting FY 2025-26. This approach will enhance India's global competitiveness and boost the volume and export of mobile phones.

2. Extending the Performance Linked Incentive (PLI) Scheme

- **Impact:** Introduced in 2020, the PLI scheme aimed to offset several cost disadvantages of manufacturing in India compared to competitors such as China and Vietnam. By rewarding performance with incentives of 4-6 percent on incremental sales over a base year, the scheme helped partially mitigate cost gaps.
- **Action Plan:** Despite gains, cost disabilities persist at 10-14 percent for assembly and 14-18 percent for component manufacture. To address these challenges and maintain momentum, a higher scale of domestic production is needed. We propose extending the scheme for an additional five years. In its second phase the incentives should allow for the fine-tuning of lessons learned from the first five years of its initiation: contemplating removing incentive caps on foreign manufacturers for devices priced more than ₹15,000, focusing on output growth instead, and eliminating the scheme's minimum volume threshold. This will attract niche players, leveraging the long tail of business.

3. Expanding Incentives to Mobile Components

- **Current Localisation:** Although some components like battery packs and printed circuit board assemblies (PCBA) have seen increased localisation, these levels remain well below 50 percent for most components. Non-localised components (camera module, display assembly) constitute around 40 percent of a smartphone's total Bill of Materials (BoM).

- **Action Plan:** Expand PLI to encourage the localisation of components such as camera modules and display assemblies to help offset India's cost disability while strengthening supply chains. Additionally, as many of these components are used in other electronics, such as laptops and tablets, this approach could foster broader synergies and contribute to the growth of the broader industry.

4. Improving Ease of Doing Business

- **PLI Scheme Flexibility:** Allow existing PLI beneficiaries to select any five years within the six-year scheme period to maximise their benefits and meet targets, even if there were early shortfalls.
- **Decriminalisation:** Decriminalise minor offences under the Legal Metrology (LM) Act, focusing on civil penalties only while introducing a system for explaining offences before imposing penalties to prevent rent-seeking behaviour.
- **Transition Periods for Compliance:** Provide adequate transition periods for new regulation and engage stakeholders to assess readiness before issuing new mandates. This will facilitate smoother compliance and minimise supply chain disruptions.
- **Stakeholder Consultations for Updating Customs Classifications:** Ensure regular stakeholder consultations before changing customs classifications. Allow a transition period after classification changes to allow companies to adapt and comply effectively.

5. Bridging the Skills Gap

- **Rising labour demand:** According to government estimates, employment in the electronics industry, currently at nearly 1.4 million, is expected to rise to around 6.5 million by fiscal year 2025-26, highlighting the need for investments in human capital to support job creation and skill development.
- **Action Plan:** Modernised training curricula and streamlined visa processes for foreign experts, will be crucial for enhancing the workforce's capabilities.

6. Addressing Other Structural Barriers

- **Corporate Tax Rate:** Reduce the effective corporate tax rate (currently 22.2 percent) and consider extending Section 115BAB of the Income Tax Act to the companies incorporated before October 2019. Explore incentives for research, testing and component hub to encourage the relocation of supply chains from destinations like Vietnam, China and other competitors to India.
- **Logistics Efficiency:** To further reduce logistics costs (currently 14 percent of GDP) to match global standards (8-10 percent in the US, EU and China), strengthen existing initiatives such as PM Gati Shakti and the National Infrastructure Pipeline.

These recommendations aim to position India as a prominent player in the global mobile phone manufacturing market by enhancing competitiveness, simplifying regulatory frameworks, and fostering an environment conducive to investment and innovation.

INTRODUCTION

India's mobile phone manufacturing ecosystem has transformed over the past decade. The Indian Electronics System Design and Manufacturing (ESDM) sector grew at an impressive compound annual growth rate (CAGR) of 13 percent from FY 2017 to FY 2023. This led to the doubling of domestic electronics production from \$49 billion in 2017 to \$101 billion in 2023. India is now the second-largest market for electronics after China, with a market valued at \$155 billion¹ in terms of the total value of electronic goods and services consumed. Now is the time to assess achievements and lessons learned to calibrate future policies as India lays the groundwork to become a global electronics manufacturing hub. The Ministry of Electronics and Information Technology (MeitY) is the main government agency in India responsible for promoting e-government, digital infrastructure, and the information technology industry. It also led initiatives like the 2017 Phased Manufacturing Programme (PMP), which promoted local production of mobile handsets and sub-assemblies, and the 2020 production-linked scheme, offering a 4-6 percent incentive on incremental sales of goods made in India. These initiatives are meant to offset costs of disabilities related to power, labour, and duties compared to competitor nations, under the broader Make in India strategy which aims to transform India into a global manufacturing hub, boost production, attract foreign investment, and create jobs. MeitY is also in the process of establishing a new electronics policy, which will likely influence state support for smartphones in the years ahead.

India has a strong history in mobile phone manufacturing. Samsung began production and assembly in India in 2007, followed by Nokia in 2008, which significantly boosted large-scale manufacturing. However, Nokia's exit in 2014 due to tax disputes with Indian authorities led to a sharp decline in domestic production, increasing India's dependency on imports. Consequently, the trade deficit in mobile phones peaked at \$6.9 billion that year. Table 1 shows a timeline of milestone events.

Table 1: Key Milestones in the Development of India's Mobile Manufacturing Sector

Year	Events
2008	Nokia starts production of feature phones in India, marking a significant development in the mobile manufacturing sector.
2013	Driven by Nokia's production, India emerged as a major mobile phone production hub, with a significant portion of output designated for exports.
2014	-Nokia shut down operations, leading to increased reliance on imports and a trade deficit peak of \$6.9 billion. - Make in India launched, prioritising electronics as a key sector
2017	PMP was launched to boost domestic production by incentivising component manufacturing.
2018	Samsung inaugurated its Noida factory, which was touted as the world's largest mobile phone manufacturing facility
2019	Domestic production surpassed domestic demand; India became a net exporter of finished mobile phones.
2020	The government launched the Production Linked Incentive (PLI) scheme to encourage large-scale electronics manufacturing
2021	Samsung sets up India's first mobile OLED display factory in Noida (3 rd in the world)
2024	The total value of mobile devices produced in India for both export and domestic markets in FY24 soared to ₹4.1 lakh crore (\$49.16 billion)

Source: Various articles and government notifications

1 Invest India, n.d. *Electronic Systems Sector in India*. Accessed July 19, 2024. <https://www.investindia.gov.in/sector/electronic-systems>.

We take stock of the current state of the Indian mobile manufacturing ecosystem, highlighting the key achievements and challenges, based on empirical studies and interviews with industry experts. We rely on a mix of both primary and secondary data sources.

Overall, we find high tariff rates on components and capital goods have held India back making its manufacturing less competitive compared to countries like China and Vietnam. Its seven-tier tariff system, which classifies mobile components and subcomponents into different categories with varying rates, adds complexity to the ecosystem. In contrast, for instance, China with a simpler tariff system of only three tax rates, benefits from transparency and predictability, making it more competitive.²

Although the localisation rate for components such as battery packs, printed circuit board assemblies (PCBA), and vibrator motors surpassed 80 percent, the overall import bill for these components increased due to the growth in domestic mobile phone manufacturing. Conversely, the per-phone import cost decreased by nearly 24 percent between 2014 and 2022. This trend highlights the positive impact of scaling up production for the mobile phone manufacturing industry in terms of competitiveness.

Despite significant progress over the past decade, addressing key challenges would be essential to enhance the competitiveness of India’s mobile manufacturing. Domestic demand has grown rapidly from a low base, showing significant early growth. To sustain this momentum and continue expanding, the focus now needs to shift towards boosting exports and tapping into global markets. This is crucial for meeting the ambitious \$300 billion electronics manufacturing target by 2025-26 set by the National Policy on Electronics 2019.³ We rely on both secondary data and primary data (industry expert interviews). Table 2 summarises the data categories and their sources.

Table 2: Summary of Data Sources

Category	Data Source
Import, Export, and Balance of Trade	Trade Map, UN database
Tariff Rates and Slabs by Country (mobile phones, components, and capital goods)	ICEA
Localisation level of mobile components	ICEA
Mobile Phone Production (2014-2023)	Ministry of Electronics and Information Technology (MeitY)
Employment trends in mobile manufacturing	Electronics Sector Skills Council of India
Logistics performance across countries	World Bank
Insights on EoDB, workforce, and the skills gap	Interviews with Industry experts/Contract manufacturers, and sub-contractors, ICEA Press articles

Source: Authors compilation

- 2 India currently has a complex tariff structure of 7 slab with tariffs for some components going up to 25 percent. On the other hand, China and Vietnam have a 3+1 slabs system, with just three tariff rates 5 percent, 10 percent, 15 percent with an additional rate of zero percent for certain components.
- 3 PIB, *supra* note 1

In this context, the report investigates issues such as tariff and customs rates, India's challenges related to the ease of doing business (EoDB), and workforce participation opportunities. The report comprises eight sections.

Section 1 provides an overview of the Indian mobile phone sector, tracing significant developments and milestones in the electronics industry over the last decade.

Section 2 explains the rationale and objectives of two major government initiatives: PMP and the PLI schemes.

Section 3 examines trends in domestic manufacturing, demand, and the balance of trade in mobile phones. It also analyses the localisation levels of key mobile components to assess the impact of government initiatives.

Section 4 looks at the impact of tariff rates on the competitiveness and performance of mobile manufacturing. It identifies challenges and opportunities and suggests ways to reduce cost disadvantages compared to countries such as China and Vietnam.

Section 5 addresses the issue of low localisation among key mobile phone components. It discusses the importance of extending and expanding the PLI scheme to enhance localisation and domestic value addition (DVA).

Section 6 discusses key EoDB challenges and proposes corrective measures based on interviews with industry experts.

Section 7 examines workforce trends over the years and reviews various state-level government policies related to electronics. It also offers suggestions to reduce the skills gap.

Section 8 focuses on broader cost disadvantages arising from relatively higher corporate tax and logistics costs compared to competitors. It reviews government efforts over the last decade and offers recommendations to minimise these cost disadvantages.



GOVERNMENT POLICIES FOR MOBILE MANUFACTURING

The electronics industry is a priority under the 'Make in India' Initiative, 2014. Between 2014 and 2022, the value of mobile phones produced grew from \$12 billion to \$44 billion.⁴ This progress is driven by two policy measures under the ambit of Make in India as outlined:

- **Phased Manufacturing Programme (PMP):** The 2017 programme aimed to reduce import dependence by gradually increasing domestic value addition (DVA) in electronics manufacturing. It introduced a yearly schedule for imposing basic customs duty (BCD) on mobile phone components increasing BCD rates for components such as battery packs and USB cables. This phased approach allowed manufacturers time to adapt and invest in local production capabilities. By gradually increasing BCD on imported components, the PMP intended to make it financially more attractive for manufacturers to set up local production facilities for these components instead. Despite these efforts, manufacturers continued to import components.

There are two reasons for the limited success of this import substitution approach. First, the lack of necessary skills and technology hinders local production making it difficult to make sophisticated components like memory and processors, a challenge even established players like China face.⁵ Second, domestic demand, after growing significantly from a small base would still require higher scale to justify investment in certain inputs for profitable localisation. To achieve commercial viability, the focus must shift to exports, tapping into larger global markets.⁶ Consequently, this PMP led to an increase in the domestic prices rather than enhancing DVA.

4 India Cellular & Electronics Association (ICEA). 2024. *A comparative study of import tariffs impacting India's competitiveness in mobile manufacturing & exports*. https://icea.org.in/blog/wp-content/uploads/2024/01/Tariff-Report-3.0-2_compressed.pdf.

5 Ibid.

6 Ibid.

- Production Linked Incentive (PLI) scheme: Many studies have laid bare India's cost disadvantages, as compared to its closest competitors China and Vietnam. This incentive scheme was introduced to offset these disabilities. A 2018 study by mobile and electronics industry trade body India Cellular and Electronics Association (ICEA) identified 14 cost disadvantages grouped into four categories.
 - Poor infrastructure such as irregular electricity and water supply;
 - High financing costs for industrial sites, logistics, and buildings;
 - Limited design capabilities due to limited research and development (R&D); and
 - Skills shortage due to lack of training.

It is estimated that these disadvantages resulted in a cost differential of 17-19 percent compared to China and 7.5-10 percent compared to Vietnam.⁷ While ICEA figures were based on 2018 data, a 2024 report by government think tank NITI Aayog placed the overall cost trends at 10-14 percent for assembly and 14-18 percent for component manufacturing, which is not far better.

In 2020, the scheme was expanded to the large-scale electronics sector (PLI-LSEM) – mobile phones in particular – and offered incentives of 4-6 percent on annual incremental sales to offset India's cost disabilities compared to its closest competitors – Vietnam and China.⁸

As per the Ministry of Commerce and Industry (MoCI), by November 2023 more than half of the allocated ₹1.97 lakh crore, had already been disbursed. The schemes spanned 14 sectors and led to ₹0.9 lakh crore in total sales, creating around seven lakh jobs.⁹

In 2024 Global Trade Research Initiative reported the scheme had enhanced beneficiaries' profit margins by 30 to 40 percent, making a compelling case for companies to expand production in India.¹⁰

7 India Cellular & Electronics Association (ICEA). 2022. *Globalise to Localise*. <https://icea.org.in/blog/wp-content/uploads/2022/09/Globalise-to-Localise-Report.pdf>.

8 Annual incremental sales refer to the increase in the total value of domestically manufactured sales over the base year 2019-20.

9 Press Information Bureau, Government of India. 2023. *PLI Schemes Contribute to Increase in Production, Employment Generation, and Economic Growth*. <https://pib.gov.in/PressReleasePage.aspx?PRID=1932051>.

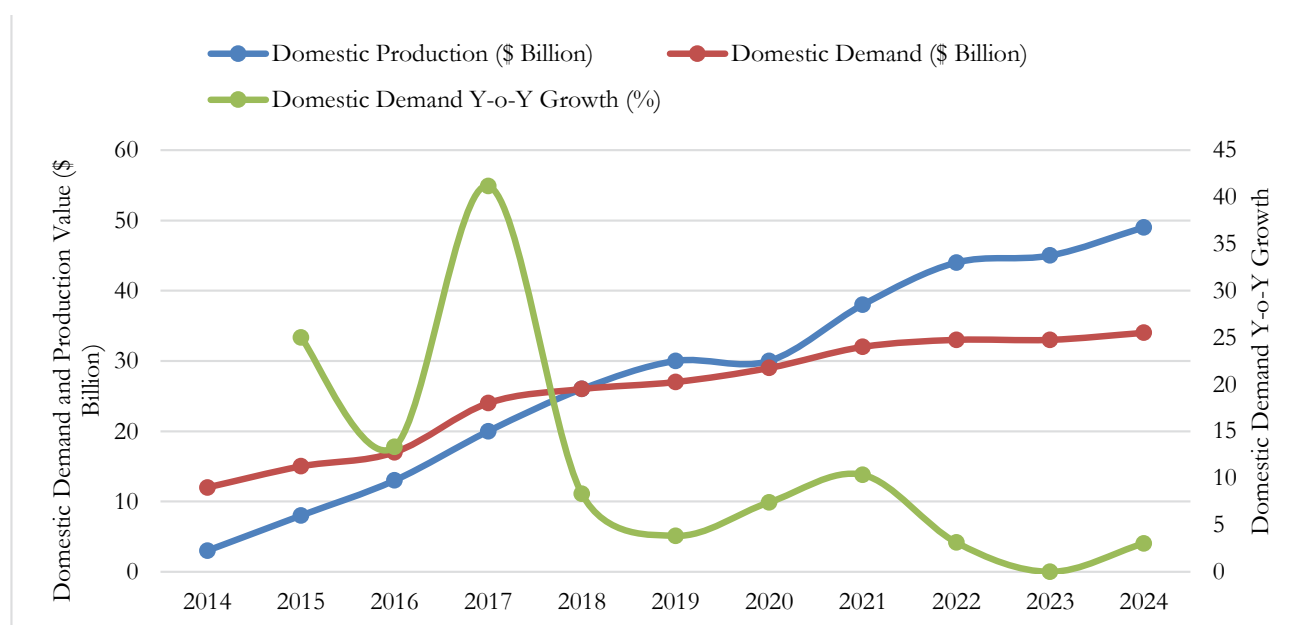
10 Press Trust of India. 2024. *GTRI Suggests Criteria to Simplify Granting Incentives Under PLI Schemes*. https://www.business-standard.com/industry/news/gtri-suggests-criteria-to-simplify-granting-incentives-under-pli-schemes-124020400253_1.html

TRENDS IN INDIAN MOBILE PHONE MANUFACTURING AND TRADE

Domestic Manufacturing and Demand Overview

Domestic production grew from \$3 billion in 2014 to \$49 billion in 2024 (Figure 1) and demand from \$12 billion to \$34 billion. This meant production which had so far lagged demand overtook it by 2024, with 2018 being the year of inflection. Higher growth in domestic production demonstrates the effectiveness of policy measures to promote domestic value addition, by reducing dependence on imports. With over 99 percent of current demand already met by local production,¹¹ further growth will rely on new opportunities, such as nearly 200 million 2G feature phone users transitioning to smartphones, replacement demand, and increasing mobile penetration. Tapping into the larger global markets will provide even greater opportunities for growth.

Figure 1: Mobile Phones Production and Demand in India



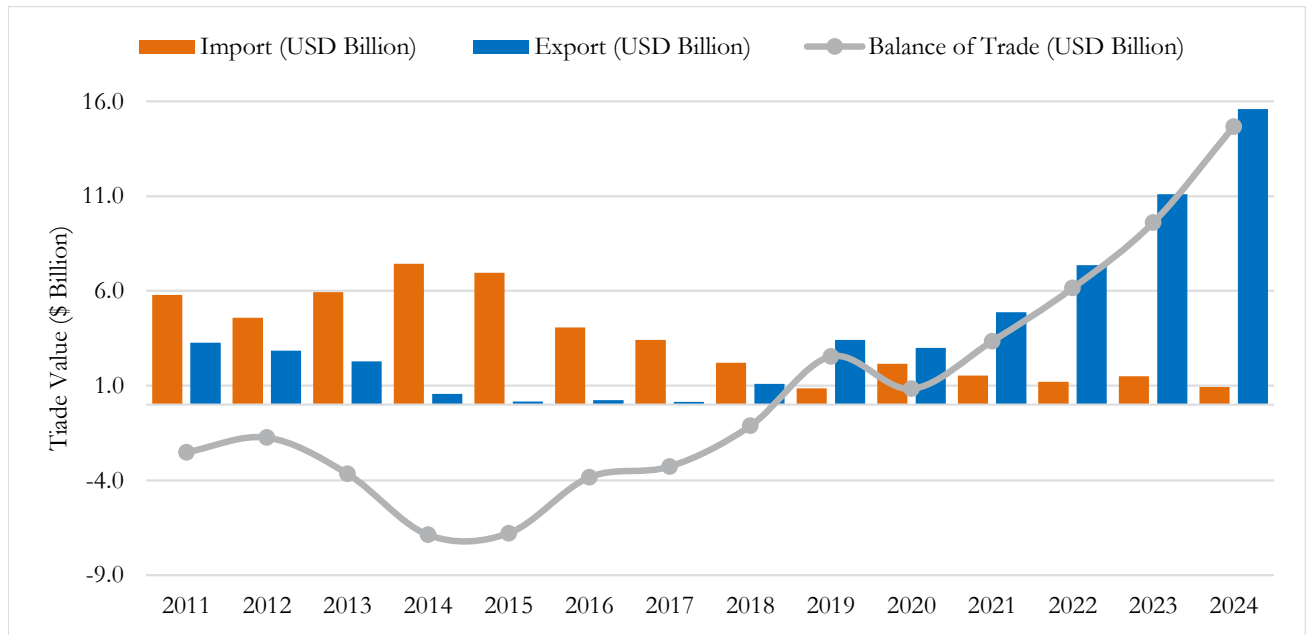
Source: ICEA (2024)

Balance of Trade in Mobile Phones

Figure 2 shows India remained a net importer of finished mobile phones from 2011 until 2018 as the trade deficit bottomed out in 2014 at around \$7 billion, with 2019 as the year of inflection. The balance of trade has been in India's favour since 2019. The exports to imports ratio went up also from four in 2019 to nearly 17 by 2024.

11 Asian News International. 2023. 99.2 per cent of mobiles 'Made in India': Ashwini Vaishnaw reviews meteoric growth of Indian mobile sector. <https://economictimes.indiatimes.com/industry/cons-products/electronics/99-2-per-cent-of-mobiles-made-in-india-ashwini-vaishnaw-reviews-meteoric-growth-of-indian-mobile-sector/articleshw/105496885.cms>

Figure 2: Balance of Trade in Mobile Phones

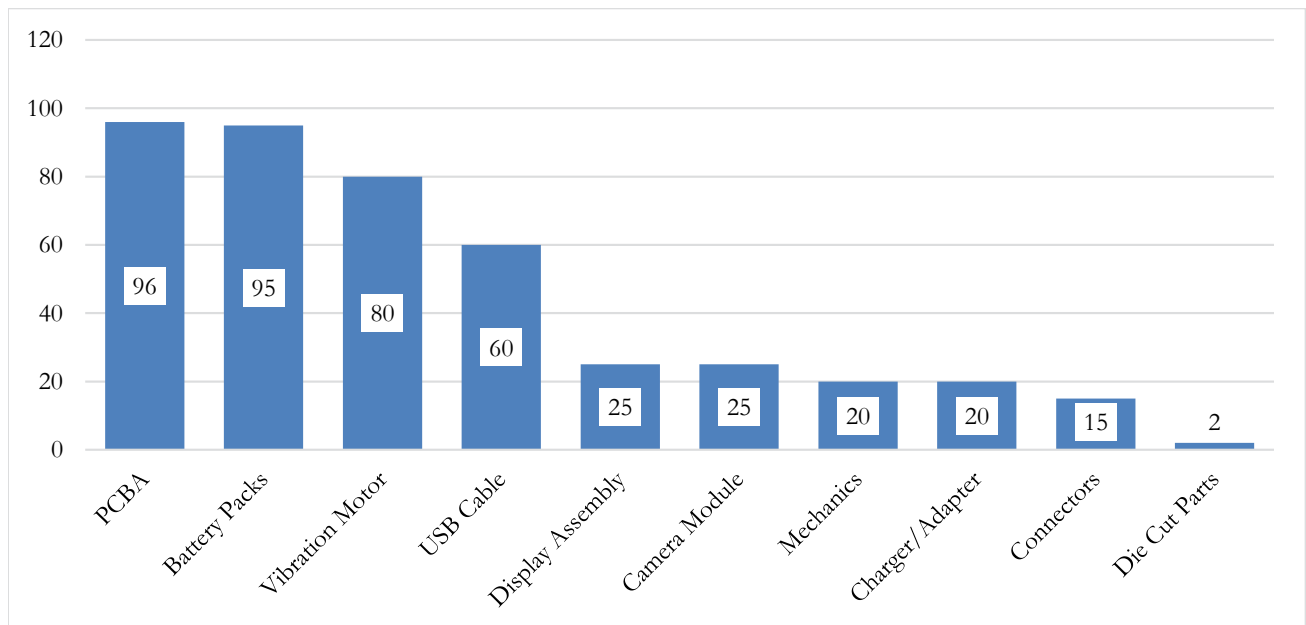


Source: ITC Trade Map

Balance of Trade in Mobile Phone Components

A typical smartphone consists of 1600-2000 components, most of which are still imported in India. Figure 3 illustrates the level of localisation for several key sub-assemblies used in mobile production.¹²

Figure 3: Level of Localisation of Mobile Phone Components and Sub-Assemblies



Source: ICEA (2024)

12 ICEA, *supra* note 3.

While localisation has improved for some components like battery packs and PCBA, it remains below 50 percent for most components and is zero for microphone and receiver as well as wired headset. Figures 4-8 show trends in the balance of trade of some of these. Non-localised components such as camera modules and display assemblies among others make up around 40 percent of a smartphone's total bill of materials (BoM), with camera modules contributing 10, and display assemblies 13.5, percent.

Data from 2011-23 was marked by two pivotal developments: (a) Nokia's exit from India's mobile phone manufacturing ecosystem in 2014, which led to a significant trade deficit in mobile phones and (b) the 2017 introduction of PMP, which aimed to increase domestic value addition (DVA). While PMP helped in localising components like PCBAs and battery packs, it fell short for camera modules and display assemblies. Compliance with PMP – and the resulting production planning adjustments typically require a year.

To analyse trade patterns in mobile phone components, the timeframe is divided into two phases: the pre-PMP period (2014-17) and the post-PMP period (2018-23). The harmonised system of nomenclature (HSN) codes used in this analysis represent broad product categories and are not exclusive to mobile phone manufacturing which could lead to an overestimation of imported components. Therefore, two scenarios are considered:

- Scenario I: Assuming that 65 percent of total imports are used in mobile phone production (base assumption).¹³
- Scenario II: Assuming 50 percent of imports are used in mobile phone production.

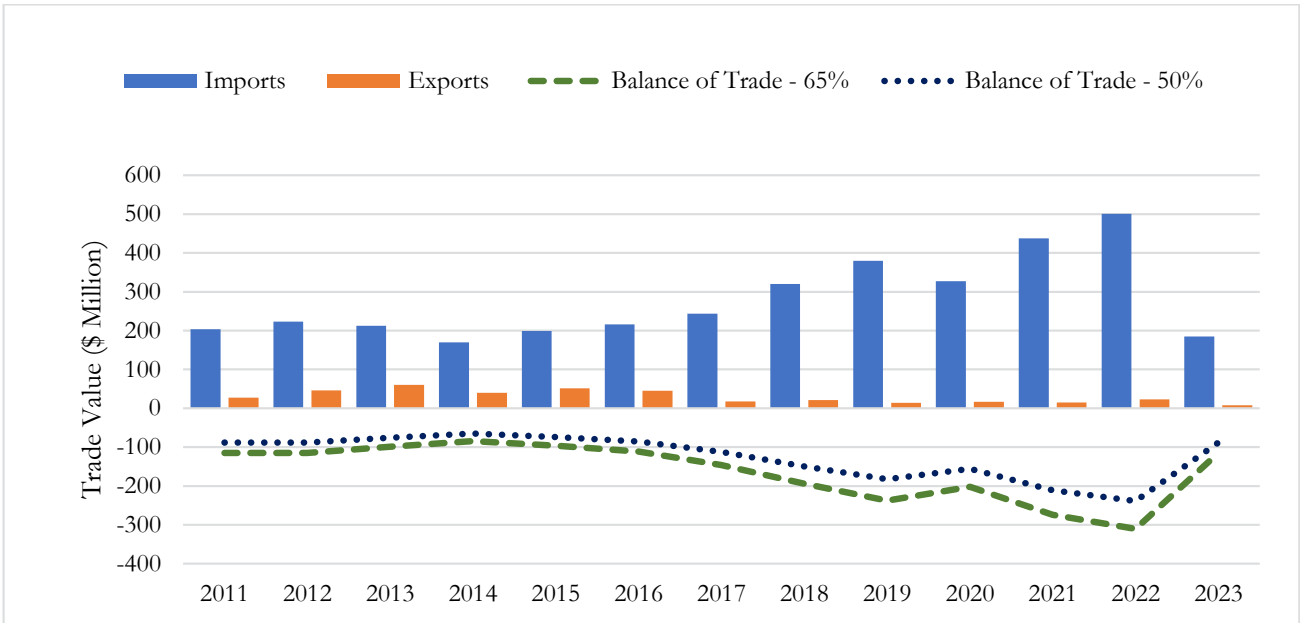
Additionally, industry stakeholders indicate more than 90 percent of USB cables bundled with mobile phones are localised.

Figure 4 begins with an analysis of microphones and receivers, showing a persistent reliance on imports, which contributed to a growing trade deficit. The average trade deficit for these components was \$109 million between 2014 to 2017, which increased to \$222 million between 2018 to 2023. Despite continued imports, the shrinking deficit suggests a reduction in import dependency.

However, the trade deficit is not relevant because the net export earning from that covers the cost of imported inputs (components and sub-assemblies). In 2023, exports constituted 30% of domestic production

13 Rajeev Chandrasekhar. 2023. *My Response to Raghuram Rajan*. https://www.linkedin.com/posts/rajeev-chandrasekhar-971203257_my-response-to-raghuram-rajana-activity-7075104016266838016-XUlu/.

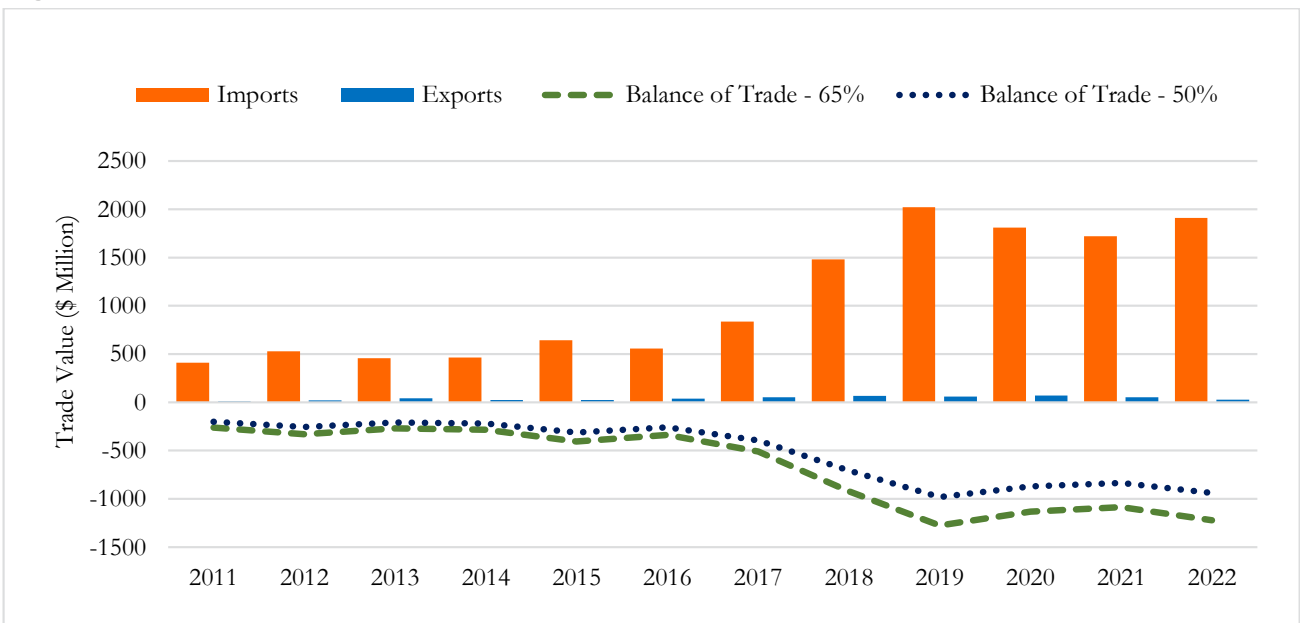
Figure 4: Balance of Trade in Microphones and Receivers



Source: ITC Trade Map

In Figure 5, we see that camera modules too have been consistently imported since 2014. The average trade deficit for camera modules was \$384 million in 2014-17 which increased to \$1127 million in 2018-22.¹⁴ Despite the continued reliance on imports, however, significant progress has been made with the incorporation of three key manufacturing companies making camera modules in India: Holitech India Pvt. Ltd. from 2018, and Sunny Opotech India and Kunshan Q Tech India Pvt. Ltd. from 2019. These are positive developments toward import reduction.

Figure 5: Balance of Trade in Camera Modules

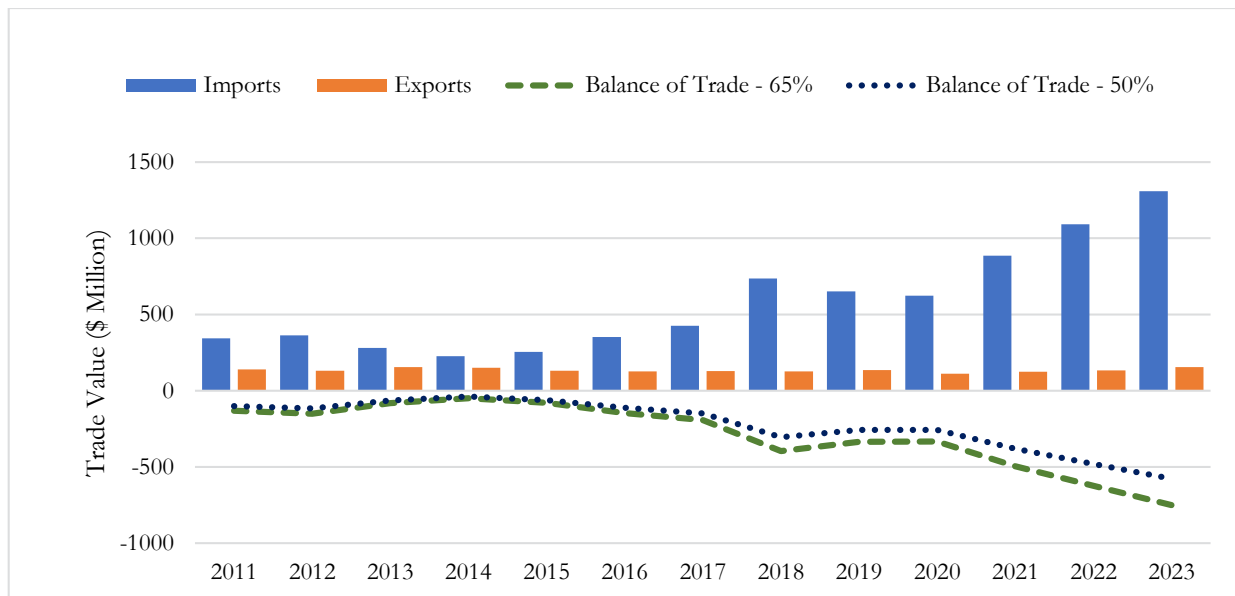


Source: ITC Trade Map

14 In FY 2023, camera modules were imported under the HSN codes 851770 and 851779, which classify them as other parts of mobile phones.

The balance of trade in PCBs remained negative throughout, with a rise in deficits between 2014 and 2022 (Figure 6). The average trade deficit in this mobile phone component was \$117 million between 2014 and 2017, which changed to \$507 million between 2018 and 2023 (i.e. a more than 4X growth in deficit). These numbers point to a continuing challenge, a domestic production capacity shortfall of PCBs relative to demand.

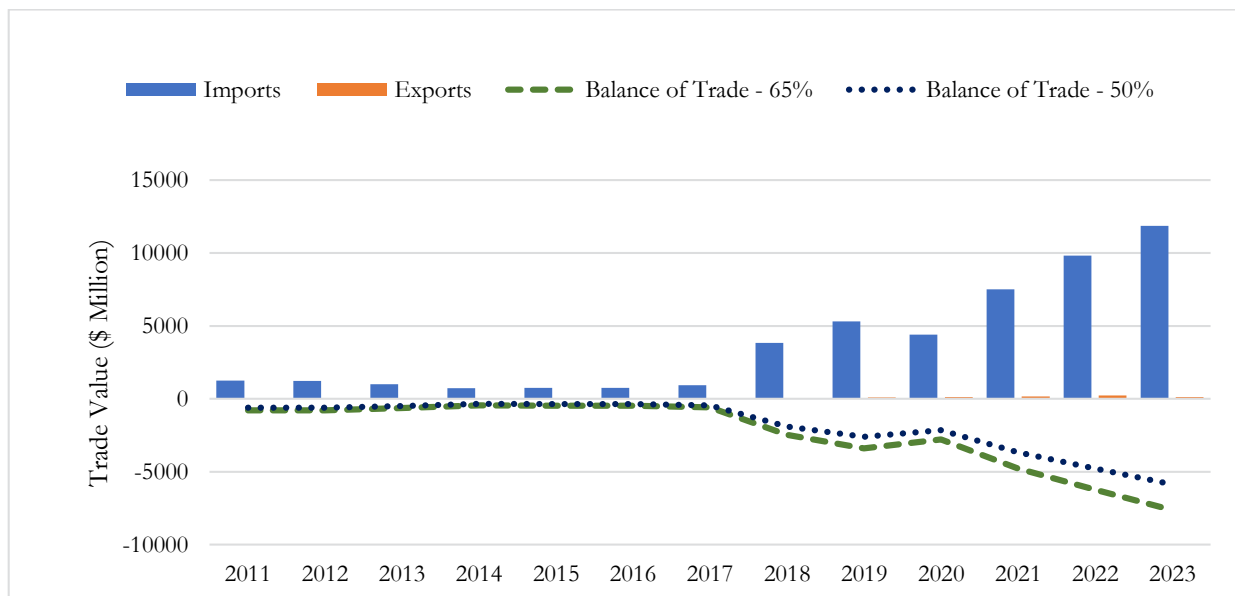
Figure 6: Balance of Trade in PCBs



Source: ITC Trade Map

The balance of trade in integrated circuits (ICs) also remained negative, with deficits rising post-2017 (Figure 7). The average trade deficit in this mobile phone component was \$500 million between 2014 and 2017, which changed to \$4.5 billion between 2018 and 2023 (a 9X rise in deficit). Again, there is a growing shortfall in domestic production relative to consumption demand.

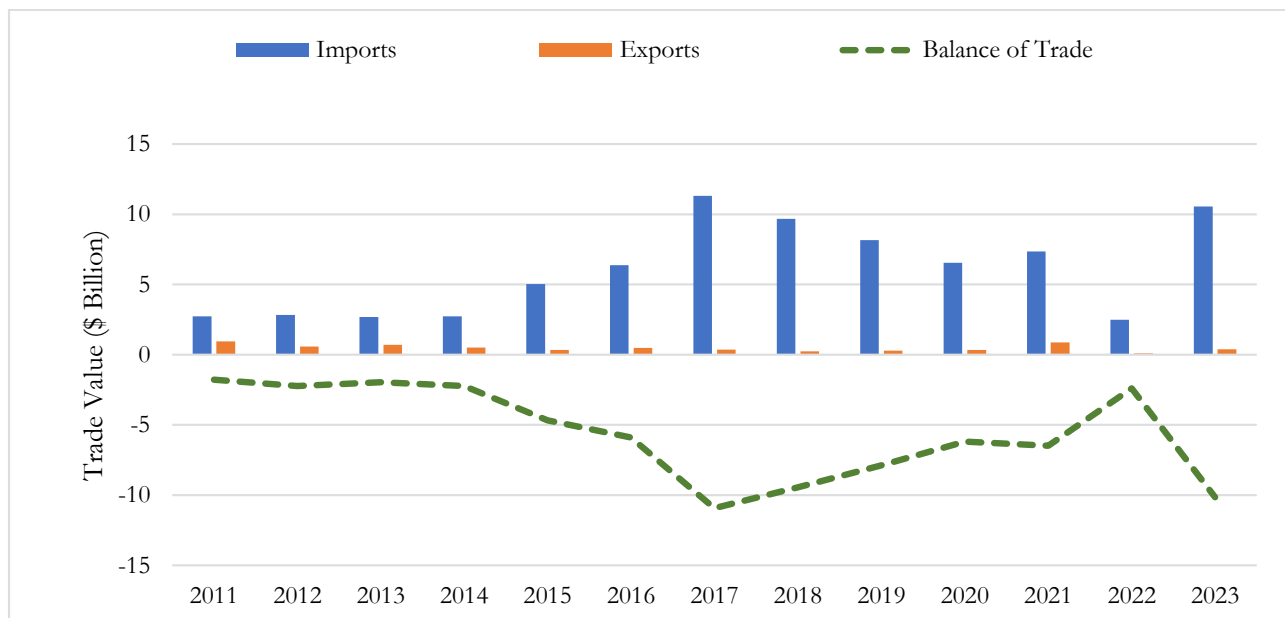
Figure 7: Balance of Trade in ICs



Source: ITC Trade Map

In Figure 8, we notice that other mobile phone parts under the HSN code 851770 (displays, PCBA, antennas, buttons, keypads, and others not included elsewhere) suffered a negative trade balance with the average trade deficit at about \$6 billion between 2014 and 2017. It rose to \$7 billion in 2018-2023 and remains negative.¹⁵

Figure 8: Balance of Trade in Other Mobile Phone Parts



Source: ITC Trade Map

Note: Other parts of mobile phones (HSN Code 851770 and 851779) include PCBA, camera modules, vibrator motor/ringer, display assembly, touch panel, and other parts that are not included elsewhere and are used exclusively for the production of mobile phones.

We summarise this section below (Table 3):

- **Mobile Phones:** The average trade deficit in mobile phones showed a positive trend, moving from an average deficit of \$5191 million (2014-2017) to an average surplus of \$3555 million (2018-2023), indicating an improvement in domestic manufacturing capabilities. Though recorded in this study, for exported mobile phones, the trade deficit is not relevant because the next export earning from that covers the cost of imported inputs (components and sub-assemblies). In 2023, exports were 30% of domestic production.
- **PCBs:** Printed Circuit Boards (PCBs) have seen a rising trade deficit, increasing from an average of \$116 million (2014-2017) to an average of \$488 million (2018-2023), reflecting the ongoing reliance on imports.
- **Microphones and Receivers:** These components have also experienced a rising trade deficit, with the average deficit growing from \$109 million (2014-2017) to \$222 million (2018-2023).
- **Camera Modules:** The trade deficit for camera modules increased from an average of \$384 million (2014-2017) to an average of \$1126 million (2018-2022). However, the establishment

¹⁵ It may be noted that the steep rise in deficit in 2023 is due to changes in composition of HSN codes for 'other parts of mobile phones' category.

of several camera module manufacturing companies marks a positive development toward reducing import dependency and enhancing local manufacturing capabilities.

- **ICs (Integrated Circuits):** The balance of trade for ICs rose from an average of \$500 million (2014-2017) to an average of about \$4547 million (2018-2023), highlighting a critical area for improvement.
- **Other Parts:** For other parts of mobile phones, the trade deficit showed a slight increase from an average of \$5934 million (2014-2017) to an average of \$7092 million (2018-2023).

Table 3: Balance of Trade of Mobile Phone and Components

Category	2014-17		2018-22	
	Average Value of Surplus (\$ Million)	Trend in BoT during the period	Average Value of Surplus (\$ Million)	Trend in BoT during the period
Mobile phones	-5191	Deficit Falling	3555	Surplus Rising
PCBs	-116	Deficit Rising	-488	Deficit Rising
Microphone and receiver	-109	Deficit Rising	-222	Deficit Falling
Camera Modules	-384	Deficit Rising	-1126	Deficit Rising
ICs	-500	Deficit Rising	-3930	Deficit Rising
Other parts	-3900	Deficit Rising	-4225	Deficit Falling

Source: ITC Trade Map

To provide a more nuanced understanding, we analyse the net import bill of these components, both overall and per mobile phone manufactured in India, for 2014 and 2022. This analysis considers two scenarios: one where 65 percent of these imports are used in mobile phone manufacturing, and another where 50 percent are used. This approach allows us to determine how localisation efforts impact the overall import bill and assess trends in import dependency.

According to MeitY, mobile production in India grew from 60 million units in FY 2014 to 320 million units in FY 2022.¹⁶ As production volumes increased, the demand for imported inputs also surged, leading to higher overall import costs. However, the net import bill per mobile phone produced decreased from \$38.6 to \$31.1 during this period, indicating improvements in efficiency and localisation efforts (Table 4). Specifically, the import bill per mobile phone for components like microphones and receivers, camera modules (for entry and mid-level smartphones), and other parts have declined, suggesting reduced import dependency. Conversely, the net import bill and the import bill per mobile phone for components like PCBs and ICs have increased, indicating continued import reliance.

Overall, while increased production necessitated higher imports, significant cost-efficiency gains are being realised at the component level, indicating positive momentum in India's mobile

16 Press Information Bureau, Government of India. 2023. *Atmanirbhar Bharat: Becoming an Electronics Manufacturing hub*. <https://pib.gov.in/PressReleasePage.aspx?PRID=1920586>.

manufacturing sector. Table 5 illustrates a similar trend, assuming that 50 percent of component imports are used in mobile phone production.

Table 4: Net Imports by Component (2014 and 2022): Scenario I

Components	2014		2022		Change in Net import per mobile phone
	Net Import bill (In \$ Million)	Value of net import per mobile phone (\$)	Net Import bill (In \$ Million)	Value of net import per mobile phone (\$)	
Microphone and receiver	84	1.4	310	0.9	Decline
Camera Modules	28	4.7	1222	3.8	Decline
Other parts	1445	24.1	1566	4.9	Decline
PCBs	49	0.8	623	1.9	Rise
ICs	452	7.5	6231	19.5	Rise
Total Components	2316	38.6	9953	31.1	Decline

Source: Authors calculation

Table 5: Net Imports by Component (2014 and- 2022): Scenario II

Components	2014		2022		Change in Net import per mobile phone
	Net Import bill (In \$ Million)	Value of net import per mobile phone (\$)	Net Import bill (In \$ Million)	Value of net import per mobile phone (\$)	
Microphone and receiver	65	1	238.8	0.7	Decline
Camera Modules	219.2	3.6	940.3	2.9	Decline
Other parts	1111.7	18.5	1204.5	3.8	Decline
PCBs	37.9	0.6	479.5	1.5	Rise
ICs	347.6	5.8	4793.2	14.9	Rise
Total Components	1781.5	29.7	7656.5	23.9	Decline

Source: Authors calculation

India has a growing domestic smartphone market, with the global market offering opportunities for future growth. However, even as domestic manufacturing scales, India relies heavily on imported components, a need that will only increase. A liberalised trade regime may help sustain this momentum and offset the import bill with increased future exports, a theme explored further in the following section.

Key Takeaways

- Government initiatives have played a vital role in increasing mobile manufacturing in India and since 2019 domestic production has exceeded domestic demand for mobile phones
- Mobile phone components like PCBA, vibrator motors and battery packs have been successfully localised well above 50 percent. However, technologically sophisticated components like camera modules, display assembly, PCBs and ICs still have a low localisation level
- The total exports of mobile phones has increased to \$15,600 Million in FY 2023-24 from \$11,100 million in FY 2022-23.
- The net import bill for mobile phone components surged from \$2316 million in 2014 to \$9953 million in 2022, primarily due to the significant increase in mobile phone production in India
- The import of inputs will continue to increase as Indian manufacturing scales to become export competitive. This is a delicate phase, which likely requires careful policy calibration

OPTIMISING TARIFFS FOR COMPETITIVENESS

Addressing India’s cost disadvantages requires a broader assessment beyond government initiatives like PLIs. A review of factors that hinders global competitiveness is essential. Our analysis indicates high tariff rates significantly drive up production costs in India, hampering the sector’s global competitiveness.

On tariffs, it needs to be mentioned that China has “Bonded Zones” covering a very large portion of its export production. Tariffs on inputs are zero for production in the bonded zone.

Tariffs raise domestic costs and this cost increase is not remitted through duty drawback scheme.

An in-depth analysis of tariffs is presented below.

Tariff on Components

As Chinese mobile manufacturing shifts towards higher value-added activities, labour costs have risen correspondingly. In 2022, the average labour cost per hour in China was estimated at around \$8.31, compared to less than \$3¹⁷ in Vietnam and India. Additionally, supply chain disruptions caused by Covid-19 and the US-China trade war have compelled several leading companies to diversify their operations to mitigate supply chain risks. Consequently, major brands such as Samsung, LG, Apple and Google have relocated part of their production facilities from China to countries like India and Vietnam.¹⁸

India is well placed to potentially benefit from the shift in production away from China. However, competition from Southeast Asian countries such as Vietnam and Thailand are a challenge. These countries offer similar incentives to India’s PLI scheme in the form of corporate tax breaks and income tax exemptions for investment and manufacturing of electronic goods.¹⁹ Additionally, they have lower tariff rates, which gives them a competitive edge.

A comparison based on 65 tariff lines in India that go into smartphone production shows that India generally imposes higher tariffs compared to China and Vietnam (Table 6).

Table 6: Slab-wise MFN/FTA Tariff Distribution: Mobile Phone Components

	Type	Zero	0+ to 5%	5+ to 10%	10+ to 15%	15+ to 20%	20+ to 25%
India	MFN	15	9	6	21	11	3
	FTA	15	12	17	15	5	1
China	MFN	36	3	28	0	0	0
Vietnam	FTA	39	24	2	0	0	0

Source: ICEA (2024)

Note: Following the July 2024 budget, tariffs for three HS code 85044030 and 85044090 (phone chargers) and 85177910 (PCBA), have been reduced from 20 percent to 15 percent. Further, the government is already considering bringing majority of the tariff lines to 15 percent tariff rate and have done so for several tariff lines.

17 The Economist. 2023. *These countries could lure manufacturing away from China*. <https://www.economist.com/graphic-detail/2023/03/03/these-countries-could-lure-manufacturing-away-from-china>.

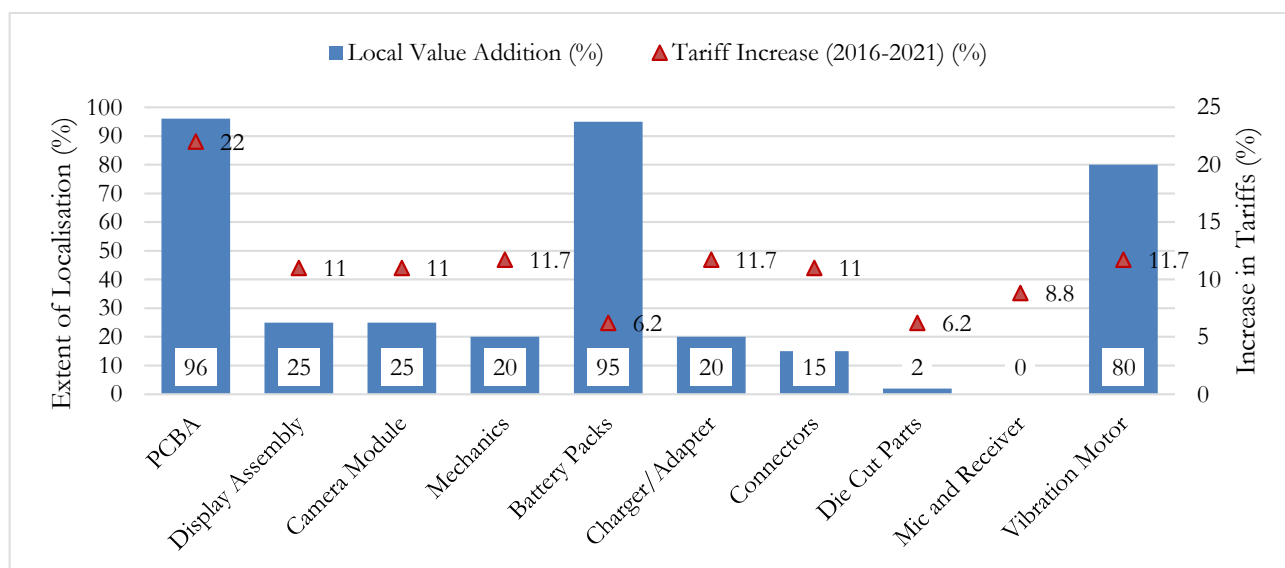
18 Billy Perrigo. 2023. *The Story of One iPhone Factory Powering Apple’s Pivot to India*; TIME. <https://time.com/6318369/apple-iphone-factory-india/>; Paul-Bernard Jaroslowski. 2023. *Samsung & Apple: Supply Chain Shift from China to Southeast Asia*. Freight Caviar <https://www.freightcaviar.com/inside-apples-samsungs-supply-chain-shift/>

19 HSBC. n.d. *Thailand, Vietnam and the Evolution of ASEAN Manufacturing*. <https://www.business.hsbc.com/asean/smart-manufacturing>.

China maintains relatively lower import taxes (tariffs), with none exceeding 10 percent. In contrast, India imposes high tariffs on 35 components, exceeding 10 percent. Additionally, nearly 97 percent of all mobile components imported into Vietnam incur modest tariff rates ranging from 0-5 percent, whereas India applies tariffs above 10 percent to 21 components. This puts India at a disadvantage when compared to China and Vietnam. While this comparison is based on average tariffs, the effective tariff rates in competing countries are nearly zero, for example, the majority of production in China occurs in bonded zones (tax-free regions where imported goods are stored or processed until sold or exported) allowing for duty-free imports, especially for exports. Similarly, Vietnam's effective tariffs are reduced to zero through tariff remission for imports intended for re-export. According to ICEA, the cumulative tariff rates differentials on all components jointly lead to around six percent higher production costs for business in India when compared to business in China and Vietnam. Notably, NITI Aayog highlights that of the 10-14 percent cost disabilities on assembly, high tariffs alone contribute 7-9 percent.²⁰

Given the complex and fragmented nature of the electronics value chain, importing components to continue manufacturing mobile phones is essential for maintaining a competitive edge. However, India's tariff rates on various mobile phone components have increased by an average of 5-15 percent since 2016. Despite tariff hikes, local value addition for most products remains below 30 percent (Figure 9). These factors suggest that tariff liberalisation is warranted.

Figure 9: Level of Localisation Versus Increase in Tariffs Between 2016 and 2022



Source: ICEA (2024)

Rationalising tariff rates to align with countries like China and Vietnam can ensure price competitiveness. It would also reduce mobile phone prices for the domestic market, making domestically manufactured phones more affordable and accessible. There should be phased reduction of tariffs, especially for components with low localisation. This will allow manufacturers to focus on scaling up mobile phone production, which, in the long run, will lead to greater localisation.

Additionally, related policies that can influence the scale of production such as duty drawback, advance authorisation scheme, special economic zone, remission of duties and taxes on exported

²⁰ NITI Aayog, *supra* note 6.

products, and export-oriented units should be evaluated. Even China, with more than 20 years' experience in mobile phone manufacturing only managed to successfully localise passive components such as inductors, resistors, and capacitors. It is still in the process of localising the technologically advanced active components like memory, storage, etc.

A concern linked to lowering tariffs is that it might lead to a rise in import bills, at least in the short term, especially for the non-localised components. However, these components account for derived demand, which means that demand for components is because they are needed as inputs for the manufacturing of mobile phones. Therefore, part of these imports will be offset by the rise in the exports of mobile phones. This aligns with trends in China and Vietnam, where increased component import bills have been offset by higher exports from mobile phones. Thus, components with low localisation should have effectively low tariffs.

The Government of India (GoI) also acknowledged the challenges associated with high tariffs and provided relief by slashing the custom rates from 15 percent to 10 percent for key components used in mobile manufacturing in the Budget 2024-25.²¹ However, these rates can be further reduced, and the list of components broadened. Policy efforts should be directed toward expanding production scales and increasing exports. This, in turn, will create a derived demand for components and encourage local production.

Tariff on Capital Goods

India also imposes high tariffs on machinery and equipment used for mobile phone manufacturing. Given the rapid technological advancement in this sector, capital goods need upgrading every 12-36 months. According to industry experts, high tariffs not only increase the production costs of mobile phones (as discussed earlier) but also incentivise postponing the purchase of these capital goods, causing delays in manufacturing the latest mobile phone models in India.

India has the highest most favoured nation (MFN) weighted average tariff rate on capital goods (7.53 percent) among competitors like Thailand, China, Vietnam, and Malaysia, putting it at a disadvantage (Table 7). The applied tariff rates (AHS) Weighted Average represents the average tariff rate applied to capital goods, adjusted according to the import volumes of each tariff line. Similarly, the MFN Weighted Average calculates the average tariff rate granted under MFN status, taking into account the import volumes. This MFN rate applies to imports from WTO members without preferential trade agreements with the importing country. In both measures, India's tariff rates are higher than competitors. Therefore, rationalising the tariff rates on both components and capital goods and aligning them with countries like China and Vietnam is key to competing with them.

21 TimeofIndia. 2024. *Government slashes import duty on mobile phones, chargers, some components*. <https://timesofindia.indiatimes.com/business/india-business/government-slashes-import-duty-on-mobile-phones-chargers-some-components/articleshow/111953870.cms>

Table 7: Weighted Average Tariff Rates on Capital Goods by Country (2021)

Country	Import of Capital Goods (\$ billion)	AHS Weighted Average (%)	MFN Weighted Average (%)
India	121	5.85	7.53
China	1022	1.43	1.72
Vietnam	147	0.35	2.3
Thailand	90	1.65	4.42
Malaysia	99	1.88	1.88

Source: World Integrated Trade Solution (2021)

Simplifying Tariff Slabs

In addition to the higher tariff rates, India's multiple slabs tariff system adds another layer of complexity to the manufacturing ecosystem. To integrate further with the electronics and attract investments, India must enhance its manufacturing scale and competitiveness relative to China and Vietnam.

India's multifaceted tariff structure significantly complicates the import and export processes when compared to simpler tariff structures adopted by competitors such as China and Vietnam. For instance, from Table 6, it can be seen in the case of both China and Vietnam that most of the tariff lines have a tariff rate of less than 10 percent with just three slabs, whereas India imposes tariff rates as high as 20-25 percent on several tariff lines.

Hence the current high and complex tariff structure of 7 slabs must be replaced with a simplified structure in the following manner:

1. For intermediate goods/ components/ sub-assemblies, the proposed tariff slabs should be zero, 5 and 10 percent, starting from 2024-25.

Simplifying the tariff structure will bring four key benefits. First, it will make it easier for manufacturers to understand and comply with the regulations, thereby reducing administrative costs. Second, it would increase the transparency of the system. With fewer tariff categories, it would be easier to predict and calculate the costs of importing components and exporting finished products. This predictability is crucial for manufacturers when planning and budgeting, as it reduces the uncertainty and potential financial risks associated with fluctuating tariffs. Third, simplified tariffs would lower the barriers to entry for international companies looking to set up operations in India. This alignment could lead to an increase in foreign direct investment (FDI), bringing not only capital but also advanced technologies and expertise. Further strengthening India's manufacturing capabilities.

However, to advance into higher value-added activities, India must address ecosystem challenges, such as the skills gap, infrastructure bottlenecks, and regulatory complexities. This requires a comprehensive review of the tariff structure, ease of doing business, skills gap assessment, rationalisation of corporate taxes, and logistics costs. A detailed analysis of prevailing gaps and future challenges is discussed in the subsequent section.

Large scale investment requires additional policy compared to regular investment. **The policies to encourage large scale investment are; stability and predictability of the policy regime, and making special provisions for continued easy access to inputs in times of disruption in regular input supply.**

India has a robust and growing domestic smartphone market. However, the global market presents a much bigger opportunity for the future growth of Indian smartphone manufacturing. India should seek to enter and prioritise free trade agreements with countries that offer wider market access for mobile phone exports such as the US and EU.

Key Takeaways

- Lower tariff for components allows for continuous and smooth production of mobile phones at competitive prices that are key for export-led growth. Gradually lowering tariffs on mobile phone components to levels comparable to China and Vietnam will reduce production costs, enhance export competitiveness, and offset the current cost disabilities that tariffs impose
- Streamline the tariff structure to make it simpler and more predictable. Reducing the number of slabs can facilitate smoother import processes and reduce administrative burdens on businesses
- India's AHS (Applied Tariff Weighted Average) rates on capital goods imports are 5.85 percent, higher than China (1.43 percent), Vietnam (0.35 percent), Thailand (1.65 percent), and Malaysia (1.88 percent). To stay competitive, India should reduce these tariffs to match its peers.

scales up, a consistently high demand for components will prompt smartphone brands and OEMs to establish local supply chains. These supply chains, characterised by complex technology and high capital expenditure, are viable only at high production thresholds and high exports, ranging anywhere from \$30-\$70 billion, as seen in countries like China and Vietnam.²⁵

However, one needs to highlight the high increase in Domestic Content Ratio over time in India. Please see Table below.

Table 8: Domestic Value Addition of Components in Mobile Devices Subsystem

Component	DVA in Base Year	2024
PCBA	9 (2018)	96
Battery Packs	7 (2016)	95
Vibration Motors	0 (2019)	80
USB Cables	7 (2017)	60
Display Assembly	1 (2019)	25
Camera Module	2 (2018)	25
Mechanics	2 (2017)	20
Charger/Adapter	9 (2016)	20
Connectors	1 (2018)	15
Die cut Parts	0 (2017)	2

The source of Column 2 is Table on page 30 of <https://icea.org.in/blog/wp-content/uploads/2021/02/RoDTEP-Report-ICEA.pdf>

An important part of the strategy to increase domestic content is to start with a focus on sub-assemblies and then go on to parts and components.

Though the PLI scheme has been effective in increasing the scale of production in India, cost disabilities persist. High tariffs have not led to localisation of components as expected during the design of the PMP. The PLI for LSEM should be extended for five more years to ensure manufacturers remain committed to scaling up production in India, further enhancing industry localisation.

- For domestic components that constitute less than 25 percent of the Bill of Materials (BoM), an additional incentive of 1 percent on net sales is proposed.
- For domestic components making up 25-50 percent of the BoM, a 2 percent incentive on net sales is suggested.
- For domestic components comprising 50-75 percent of the BoM, a 3 percent incentive on net sales is recommended.
- For domestic components exceeding 75 percent of the BoM, a 4 percent incentive on net sales is proposed.

While the PLI has been able to attract large leading brands and contract manufacturers, it has missed the so-called long tail. Players that start with lower volumes are very important in the tech industry because of the “long tail effect” it could have for India. In the tech industry, long tail

25 ICEA, *supra* note 5.

refers to a portion of the market that consists of a large number of products with low individual volumes, but collectively, they make up a significant portion of overall sales. India needs to attract those players in terms of brands and contract manufacturing. A good example is the emerging wave of AI smartphones that are just starting, with players who are new to the field. To create space for India to attract those new players, a new PLI for smartphones could focus on the growth rate of nascent businesses manufacturing phones in the premium segments (well above INR 15000) by removing the base volume thresholds to qualify for PLI. This will help business grow which will in aggregate lead to significant increases in production and exports.

The Indian government has recognised the importance of establishing a strategic semiconductor ecosystem, as semiconductors are used to power everything from smartphones to national defence systems. Accordingly, the government launched the India semiconductor mission (2021) with an investment of \$10 billion.²⁶ A similar focus on other key components with low levels of localisation and higher value addition potential such as camera modules, display assemblies, mechanics, and die cut parts (precision engineered from plastic, rubber, foam or metal sheets), should also be explored. The benefits of the extension of PLI to components will extend beyond the mobile phone ecosystem, and facilitate economies of scale and scope in the entire electronics industry. That is, a rapidly growing mobile phone manufacturing industry could be the catalyst for the larger electronics sector, helping India achieve its \$300 billion electronics manufacturing target by 2025-26.

Similar to the India Semiconductor Mission's Design Linked Incentive (DLI), the government should encourage more design in India, especially for mobile hardware components. For the same, MeitY should either expand the DLI Scheme to allow other component designs or draw up another scheme to encourage localisation and IP generation in India.

Key Takeaways

- The PLI scheme has propelled India to become the second-largest mobile phone manufacturer. To sustain this momentum and establish India as a global manufacturing hub, the PLI for LSEM should be extended for five more years. This extension will ensure manufacturers remain committed to scaling up production in India, further enhancing industry localisation.
- Extending PLI to high value components should be explored, for camera modules, mechanics and die cut parts in particular. This would not only enhance the localisation which would significantly enhance the DVA, but it could also create a synergistic impact on the growth of the entire electronics industry.
- Additional focus on design and IP generation in India is necessary. Further, schemes should incentivise use of Indian design or manufactured components in mobile phones.

OTHER REGULATORY AND EASE OF DOING BUSINESS

26 Press Information Bureau, Government of India. 2022. *India Semiconductor Mission*. [Press Release: Press information Bureau \(pib.gov.in\)](https://pib.gov.in)

(EODB) CONCERNS

Several EoDB concerns have been raised by the industry in the past and some of the most pressing ones are discussed below:

Decriminalisation of Labelling Requirements Under the Legal Metrology Act, 2009

Product labelling in India is regulated by the Ministry of Consumer Affairs through the Legal Metrology (LM) Act, 2009, which mandates standard quantity and disclosures on pre-packaged commodities. The Legal Metrology (Packaged Commodities) Rules, 2011 (LMPC Rules) issued under the LM Act, further specify requirements for declarations on packages, including maximum retail price (MRP) and quantity, with specific rules on spacing and colour contrast.²⁷

Non-compliance to the LMPC Rules attracts penalties under Section 36 of the LM Act which ranges from ₹25,000 for the first offence and up to ₹1 lakh for repeat offences as well as an imprisonment term of up to one year.²⁸ Legal metrology inspectors often issue notices for minor non-compliances, such as the capitalisation of alphabets. Declaration of MRP without decimal points for instance using 1,200 instead of 1200.00, and for minor spacing deviations.²⁹ Furthermore, if an individual is held criminally liable under section 36 (1), they can escape liability by compounding the offence, which means paying a penalty to be absolved of the offence.

Section 36 (1) creates a tendency for 'rent-seeking', where officials exploit their regulatory power to extract financial gain by strictly enforcing regulations. For instance, under the LM Act, the first case is often filed against individuals on trivial grounds and they are subsequently threatened with criminal prosecution for secondary offences. This was also pointed out by the commerce minister, Piyush Goyal at the 2022 National Workshop on the Legal Metrology Act, 2009.³⁰ The government attempted to address this through the Jan Vishwas (JV) Act, of 2023 which decriminalised provisions across various legislations. While many other provisions of the LM Act were decriminalised, Section 36(1) continues to impose criminal liability on violators.

Additionally, Section 49 of the LM Act imposes liability on 'every person who at the time the offence was committed was in charge of, and was responsible to, a company for the conduct of its business, for an offence committed by a company'. The Legal Metrology Department often initiates proceedings against top management. While the 2022 amendment to the LM (General Rules) 2011 provides that criminal proceedings may not always be initiated against directors, if another officer is handling the affairs of a particular branch.³¹ Yet it remains criminal proceedings for trivial issues against any officer of the company create challenges for businesses.

Legal obligations to declare MRP are unique to India.³² In most countries, displaying the MRP

27 Rule 8 sets out requirements for vertical and horizontal spacing around the declaration. Rule 9, in addition to prescribing that declarations are legible and prominent, goes on to state that the numerals of the retail sale price and net quantity declaration be printed, painted or inscribed on packages in a colour that contrasts conspicuously with the background of the label

28 Section 36(1) of the Legal Metrology Act, 2009

29 Prime Minister's Economic Advisory Council, Reforming the Legal Metrology Regime, September 2023, pg. 4, available at: [EAC-PM-Working-Paper-Reforming-the-Legal-Metrology-Regime.pdf \(eacpm.gov.in\)](https://eacpm.gov.in/Working-Paper-Reforming-the-Legal-Metrology-Regime.pdf)

30 Press Information Bureau, Government of India. 2022. Shri Piyush Goyal emphasises balance between the need to protect consumers, and preventing harassment of entrepreneurs. Press Information Bureau (pib.gov.in)

31 The Legal Metrology (Packaged Commodities) (Amendment) Rules, 2022, available at: <https://consumeraffairs.nic.in/legalmetrologyactsandrules/legal-metrology-packaged-commodities-amendment-rules-2022-0>

32 SS Rana. 2017. India: Exemption for Single Brand Retailers To State MRP On Packaged Commodities. Mondaq <https://www.mondaq.com/>

tag is not a legal mandate and prices are generally labelled on store shelves. For instance, Canada's Consumer Packaging and Labelling Act, of 1985 does not mandate a declaration of retail price. Even with respect to penalties, the Indian standard of imposing criminal liability is more stringent compared to other countries.³³ The Australian government in their review of the legal metrology regulation concluded that a civil penalty regime is appropriate for the majority of offences under the measurement framework and fairer for offenders.³⁴

The standard for imposing criminal liability requires mens rea or malicious intent to carry out an act to be established.³⁵ The provision of MRP and affixing labels on packages was introduced to provide information to consumers about the quality and price of products they purchase. The penalties emerging from omission are not intentional; instead, are an inadvertent, technical or procedural omission of the manufacturer. It is unlikely that there is any mens rea which is essential for establishing a criminal act. Also, if there is negligence amounting to a violation of law, then a civil penalty is sufficient and does not need the additional threat of imprisonment. Thus, we recommend the government consider decriminalising section 36 of the LM Act in the next amendment to the JV Act. The government should also consider a reduction in the civil penalty amount for violation of section 36.

IMEI Registration for Mobile Phone Exports

The Prevention of Tampering of the Mobile Device Equipment Identification Number, Rules, 2017 (IMEI rules) were amended in September 2022. After the amendment, Rule 4 mandated that manufacturers must register the International Mobile Equipment Identity (IMEI) number of every mobile phone manufactured in India on the Indian Counterfeited Device Restriction portal.³⁶ Since the notification stated that it applied to all mobile phones manufactured in India, it was interpreted to apply to exported mobile phones as well. However, after receiving industry feedback, the requirement of IMEI registration for exports was suspended in December 2022.³⁷ Kindly refer to DoT letter dated 2nd December 2022 (letter no. 13-15/2021-UDS).

India's IMEI registration requirement for export-bound devices is contrary to global precedence, and if implemented it would add time and cost to the export process, making Indian-manufactured devices less competitive in the global market. While other Asian nations such as Bangladesh and Indonesia have IMEI registration norms for imported mobile phones, no country has obligations for exported mobile phones.³⁸ The IMEI registration process imposes an asymmetric administrative burden on mobile phone manufacturers in India. It also has a limited impact on counterfeiting, since such devices tend to originate from unauthorised production facilities and

[india/product-liability-safety/640768/exemption-for-single-brand-retailers-to-state-mrp-on-packaged-commodities](https://www.india.gov.in/product-liability-safety/640768/exemption-for-single-brand-retailers-to-state-mrp-on-packaged-commodities)

33 Consumer Packaging and Labelling Act, available at: <https://laws-lois.justice.gc.ca/eng/acts/c-38/FullText.html>

34 Prime Minister's Economic Advisory Council, Reforming the Legal Metrology Regime, September 2023, pg. 12, available at: <https://eacpm.gov.in/wp-content/uploads/2023/09/EAC-PM-Working-Paper-Reforming-the-Legal-Metrology-Regime.pdf>

35 Mens rea is an essential ingredient of a criminal offence" - para 4, Nathulal v. State Of Madhya Pradesh AIR 1966 SC 43, available at: <https://indiankanoon.org/doc/1834977/>

36 Rule 4 of the Prevention of tampering of the Mobile Device Equipment Identification Number, Rules, 2022. Link: <https://dot.gov.in/circulars/prevention-tampering-mobile-device-equipment-identification-number-amendment-rules-2022>

37 Department of Telecommunications (DoT) Circular No. 01/2023, dated December 22, 2022, on "Temporary Exemption from IMEI Registration for Export Bound Devices", available at: https://dot.gov.in/sites/default/files/Request%20for%20removing%20export%20requirements%20and%20extension%20in%20t%20imelines%20for%20registering%20IMEIs%20of%20locally%20manufactured%20phones_0.pdf

38 Bangladesh IMEI Portal: <https://btrc.portal.gov.bd/site/page/19ac6abd-d10b-4cd3-80ba-0c83ebed7c1b>. Indonesia also created similar law mandating IMEI registration: <https://come2indonesia.com/how-to-register-the-imei-of-the-mobile-to-be-able-to-use-it-in-indonesia/>. The link to the IMEI registration portal is as follows: <https://imei.kemenperin.go.id/>

do not enter the formal export process.

To avoid a recurrence of this policy, we recommend that the Department of Telecommunications (DoT) should revoke the IMEI registration requirement for export-bound devices. Instead of a blanket IMEI registration requirement, the DoT should focus on additional targeted enforcement measures to identify and address counterfeit devices, particularly those entering the domestic market. The DoT could consult industry stakeholders to develop enforcement mechanisms to address counterfeit goods without hindering economic competitiveness.

Insufficient Transition Time for Compliance with Quality Control Orders (QCOs)

The Bureau of Indian Standards (BIS) is a national standards body responsible for promoting and regulating standards of products and goods in India. It issues a certificate attesting to the product's quality, reliability, and safety to the customers. While BIS issued standards are voluntary, on occasion they make it mandatory for certain products in the interest of public safety, health, the environment, fair trade practices, and national security as stated under Section 16 of the BIS Act., 2016.³⁹

In such cases, the Central Government directs the mandatory use of standard mark under BIS licensing through the issuance of Quality Control Orders (QCOs).⁴⁰ After the commencement of a QCO, 'the manufacture, import, distribute, sell, hire, lease, store, or exhibit for sale' of products covered under the QCO are prohibited without a valid BIS registration and the accompanying Indian standard (IS) mark.⁴¹

Since 2020, the Department for Promotion of Industry and Internal Trade (DPIIT) in consultation with BIS has been frequently enacting QCOs. The stated objectives include some of the previously stated aspects such as enhancing the quality of domestically manufactured products, curbing the imports of sub-standard products into India and prevention of unfair trade practices. However, in practice, the applications are increasingly being driven by objectives related to diversifying supply chains to India. The implementation of these QCOs may also gradually enable the development of the local vendor ecosystem in India. However, these must be implemented in a staggered manner, and only after the concerned ministry has mapped the demand vs. supply ecosystem for the products under the QCO, so as to ensure that manufacturing in India is not disrupted.

One such example is the QCO for copper products issued in October 2023⁴² which mandates the use of various BIS-certified items for the electronics industry such as copper strip (IS 1897:2008).⁴³ The order was subsequently rescinded due to the lack of industry readiness and will now apply to all businesses, barring micro and small enterprises from October 2024 onward.⁴⁴ While a few exemptions are indeed welcome, the broader issue of insufficient time for transitioning persists. As a result, companies scramble to find certified domestic vendors. Abrupt enforcements disrupt

39 Section 16 of The Bureau of Indian Standards Act, 2016

40 Ibid.

41 Section 17 of The Bureau of Indian Standards Act, 2016

42 Copper Products (Quality Control) Order, 2023. Link: <https://static.pib.gov.in/WriteReadData/specificdocs/documents/2023/oct/doc20231023263601.pdf>

43 India is a net importer of Copper electrical strips, which is grouped with Copper plates and sheets under HSN code 7049 and 40% of those imports are from China in 2022: https://www.trademap.org/Country_SelProductCountry_TS.aspx?nvpnm=1%7c699%7c%7c%7c7c7409%7c%7c%7c4%7c1%7c1%7c1%7c2%7c1%7c2%7c1%7c1%7c1

44 Copper Products (Quality Control) Order, 2024. Link: <https://www.teamleaseregtech.com/updates/article/31584/copper-products-quality-control-order-2024/>

production schedules and increase costs, delaying exports and, at times, even non-compliance which may impact quality.

To address this, authorities must assess regulatory impact ahead of announcing mandates. Importers' decisions about quality and technical standards, testing and certification, choosing the right BIS-certified suppliers, and a smooth transition to new supply chains can take time. Collaborating with stakeholders will reveal the practical challenges companies face when switching vendors and optimal transition periods will allow them time to adapt supply chains to include domestic manufacturers. Companies will be more inclined to look at BIS-certified components if compliance does not get in the way of their output and margins.

Additionally, the government must exempt all inputs to electronic products covered under Electronics and Information Technology Goods (Requirement for Compulsory Registration) Order” 2012- Phase II. (CRO Scheme-II).⁴⁵ Since these products already follow Indian standards through this order, additional QCOs create an unnecessary layer of quality control.

The government should also add an explanatory note prefacing a QCO which states the specific concern as per Section 16 of the BIS Act that the QCO addresses. This will build confidence among stakeholders regarding the rationale behind the QCO. Additionally, transparency can also help prevent other countries from imposing retaliatory non-tariff barriers against Indian exports.

Lastly, the government must exempt all inputs to electronic products covered under Electronics and Information Technology Goods (Requirement for Compulsory Registration) Order” 2012- Phase II. (CRO Scheme-II).⁴⁶ Since these products already comply with Indian standards through this order, additional QCOs only add unnecessary layers of regulation. The BIS Compulsory Registration Scheme, introduced in 2012, is a well-implemented mechanism managed by MeitY. Initially applied to 15 products, the scheme expanded in a staggered manner, providing time for labs to build capacity and adapt to testing needs. Its phased implementation helped labs grow, while enabling the industry to meet standards and compliances without disrupting supply chains, production schedules and product launches.

BIS certification of cross-border facilities

Since 2000, BIS has issued licenses to foreign manufacturing units under the Foreign Manufacturers Certification Scheme (FMCS). This scheme allows a foreign manufacturer to use the IS mark on a product if they meet BIS specifications. Many companies have applied under this scheme and received licenses for their manufacturing units in countries like China, Vietnam, and Thailand.

However, due to ongoing geopolitical tensions, especially with China, BIS has been slow in issuing new licenses to manufacturing units in these regions. Even in Vietnam and Thailand, there is concern that companies may use these locations to import Chinese products with minimal value addition, effectively bypassing restrictions.⁴⁷ Moreover, BIS has also delayed renewing licenses

45 “Electronics and Information Technology Goods (Requirement for Compulsory Registration) Order” 2012- Phase II. Link: <https://www.meity.gov.in/writereaddata/files/Series%20Guidelines%20Phase%20II.pdf>

46 “Electronics and Information Technology Goods (Requirement for Compulsory Registration) Order” 2012- Phase II. Link: <https://www.meity.gov.in/writereaddata/files/Series%20Guidelines%20Phase%20II.pdf>. This order was superseded by the Electronics and Information Technology

47 Shambhavi Anand & Writankar Mukherjee, *Nike, Carrier have a problem as India rubBIShes China factories' quality certification applications*. Economic Times. <https://economictimes.indiatimes.com/news/economy/foreign-trade/india-rubbishes-china-factories-quality->

for existing units in these countries.

These QCOs cover a wide range of imports and can unintentionally disrupt electronics manufacturing in India, which relies heavily on materials, components, and subassemblies from our Asian neighbours. To maintain the “Make in India” initiative and ensure smooth manufacturing, it is essential to adopt business-friendly measures that streamline QCO implementation.

We recommend that BIS and DPIIT provide and adhere to clear timelines for granting licenses to factories outside India. For example, after a QCO is notified, the implementation timeline should include 1 month for application submission, the necessary time to grant licenses in foreign jurisdictions, and an additional 3 months to ensure supply chains are operational. If delays or non-issuance of licenses are anticipated in specific regions, this should be communicated to the industry promptly.

Devising a Flexible PLI Scheme

The PLI scheme for LSEM offered incentives over five years from FY 2020-21 to FY 2024-25. However, due to the onset of the Covid-19 pandemic and subsequent lockdowns, the tenure of the scheme was extended by one year to FY 2025-26.⁴⁸ The selected firms were allowed to choose Year 1 of the scheme which could be either FY 2020-21 or FY 2021-22.⁴⁹

To receive incentives, they needed to choose a period of any five consecutive years between FY 2020-21 and FY 2025-26 to achieve targets for incremental sales of manufactured goods. However, the firms that participated in the scheme from FY 2020-21 onwards and missed their targets in the following years are now disadvantaged, as they cannot utilise the scheme’s benefits through to FY 2025-26. This lack of flexibility hinders early entrants from achieving the full potential of the scheme, despite their initial compliance and investment.

The government should thus allow the existing beneficiary companies to choose any five years out of the total scheme period of six years and dispense with the requirement of choosing 5 consecutive years. This will provide greater flexibility to the beneficiaries to utilise the full scheme duration until FY 2025-26.

Eliminating the PLI Price Threshold for Mobile Phones

The PLI scheme restricts global mobile phone manufacturers by only allowing mobile phones priced above ₹15,000 to be considered for incentives.⁵⁰ However, this restriction does not apply to the global manufacturers who opt to manufacture through a domestic contract manufacturer and thus indirectly benefit from the scheme without adhering to the threshold of ₹15,000.

Global manufacturers that are investing in India and directly manufacturing lower-end phones are at a competitive disadvantage vis-a-vis global brands that are manufacturing through a domestic contract manufacturer. This provision discourages global manufacturers from investing and manufacturing lower-priced mobile phones that can cater to the large domestic market in

[certification-applications/articleshow/105428102.cms?from=mdr](https://www.meity.gov.in/writereaddata/files/certification-applications/articleshow/105428102.cms?from=mdr)

48 Government of India Ministry of Electronics and Information Technology (MeitY), Notification No. W-28/1/2020-IPHW-MeitY-Part(1), (23rd September 2021), https://www.meity.gov.in/writereaddata/files/Extension%20of%20tenure%20of%20PLI%20LSEM_23.09.2021%281%29.pdf

49 Ibid.

50 Clause 3.2.1.1 in the Guidelines for PLI for LSEM, available at: https://www.meity.gov.in/writereaddata/files/Guidelines_Final_PLI%20for%20LSEM_01.06.2020.pdf

the country, ultimately hindering the spread of digital connectivity. The Indian consumer is the one who loses out. Therefore, the government should remove the ₹15,000 threshold which will enable holistic development of the mobile phone market in India and offer access to product offerings at reasonable prices to the people at the bottom of the economic pyramid.

The Need for Stakeholder Consultation on Customs Classifications

India adheres to the HSN classification rules, categorising goods into tariff headings based on their description, components, and intended use.⁵¹ Classifying goods using the correct classification code is an essential step in import-export management. The importer or exporter at the time of self-assessment has to state the correct details concerning classification, applicable rate of duty, value, and benefit of exemption notifications claimed, if any, in respect of the imported/exported goods while presenting Bill of Entry, the legal document to be shared with customs officials before the arrival of imported goods. Custom authorities identify products stated in the Bill of Entry to assess the applicable duties.

If a company incorrectly categorises commodities for import and export, the local customs authority may designate the company for additional scrutiny. This can result in an extended review process for the products, causing delays in import and export procedures. For instance, misclassification and an incorrect grant of exemption of cameras under 'digital still image video cameras, as opposed to camcorders, resulted in a levy of ₹20.68 lakh on a hardware importer.⁵²

Given this context, sudden changes to customs classifications without stakeholder deliberations significantly impact the EoDB in India. A recent example is the reclassification of set-top boxes under HSN code 85176960, where the term wireless was removed effective May 1, 2023. This change led to ambiguity for Android set-top boxes utilising wireless technology, causing confusion and potential compliance issues. The wireless category of set-top boxes is presently getting classified under HSN code 85176990 which is for 'others' and attracts customs duty of 20 percent. Given the ambiguity and non-issuance of an official order, it may attract an investigation or inquiry from customs officials. This is but one example which shows that incorrect product classification creates unwarranted risks for electronics manufacturers, leading to increased scrutiny and delays in import and export processes.

To address these challenges, it is essential to establish a structured mechanism for continuous dialogue between government entities and industry stakeholders. We recommend that the government must constitute an inter-ministerial group with representatives from key stakeholders, including the MeitY, Central Board for Indirect Taxes and Customs (CBIC), DoT and MoCI. This group would facilitate effective deliberation with industry stakeholders on any proposed changes to goods classifications in the electronics hardware industry.

There is precedence for this with the Indian government's decision to introduce a pre-legislative consultation policy in 2014.⁵³ The policy mandates a mandatory consultation before the implementation of any legislation or delegated legislation issued under the parent act. A similar approach could be taken concerning customs classification. This approach ensures that diverse

51 Divyansh Shrivastava. Custom Duty and Import-Export taxes in India, India briefing, India Briefing. [Customs duty and Import-Export taxes in India - India Guide | Doing Business in India \(india-briefing.com\)](#)

52 Government of India, 2010, Report No. 14 of 2009-10 – Union Government (Indirect Taxes - Customs), pg.38. https://cag.gov.in/uploads/download_audit_report/2009/Union_Compliance_Indirect_Taxes_Customs_14_2009.pdf#page=38

53 Pre-Legislative Consultation Policy, 2014, available at: <https://ddashboard.legislative.gov.in/documents/pre-legislative-consultation-policy>

perspectives are considered, thereby fostering transparency, predictability, and confidence in government policies.

Additionally, conducting regulatory impact assessments before implementing changes would ensure transparency, and predictability, and minimise trade disruptions. Lastly, allowing a transition period following classification modifications would further enable businesses to adapt their operations and ensure compliance.

Concerns Regarding Customs Interpretation

Smartphone manufacturers faced challenges related to customs duty interpretation. A prime example is the classification of display assemblies. Due to technology advancements, components such as a receiver mesh, speaker net, support frame, and antenna pin have become smaller. They are fabricated or attached to the display assembly of smartphones.⁵⁴ Customs officials, however, were unable to understand this convergence and were misclassifying this product to a different tariff slab.

According to Rule 1 of the General Rules for Interpretation of the Harmonised System, the authorities must consider the essential character of a product while imposing a tariff slab.⁵⁵ Thus, regardless of whether the display set of a smartphone includes additional components, if the essential character of the product remains unchanged, it should not be misclassified under a different tariff category. After sustained industry engagement, this issue was finally addressed.⁵⁶ Despite this resolution, the broader issue of customs officials misclassifying products persists.

To address this issue, we recommend that CBIC must create a standard operating procedure for customs field formation officers, reiterating the above stated principle while appraising a product for tariff imposition. A broad-based approach would ensure that the industry would not have to request the government for clarification in every instance where there is confusion regarding customs interpretation.

The Cost of Technological Mandates in India's Smartphone Industry

The Gol has considered mandating various technologies in smartphones. These include the enabling of frequency modulation (FM) receivers and a prospective mandate on direct-to-mobile (D2M) technology once it is feasible.

• D2M

Terrestrial D2M technology is a new content delivery method that removes the need for a data connection to deliver the content directly to the smartphone. A dedicated spectrum will be allocated to deliver the content to the consumers. To make this technology operational in smartphones, manufacturers will need to adopt the Advanced Television Systems Committee 3.0 (ATSC 3.0), a US-based, digital television broadcasting standard.

Smartphone manufacturers have raised concerns against the concerted push from vested parties

54 Press Trust of India. 2024 CBIC clarifies on display assembly of mobile phones for levy of 10 pc import duty, Economic Times. <https://economictimes.indiatimes.com/industry/cons-products/electronics/cbic-clarifies-on-display-assembly-of-mobile-phones-for-levy-of-10-pc-import-duty/articleshow/110814444.cms?from=mdr>

55 General Rules of Interpretation of the Harmonised System, available at: https://www.wcoomd.org/-/media/wco/public/global/pdf/topics/nomenclature/instruments-and-tools/hs-interpretation-general-rules/0001_2012e_gir.pdf?la=en

56 Government of India, Central Board for Indirect Taxes and Customs, Circular No. 06/2024, "Customs duty on Display Assembly of a cellular mobile phone -reg." (20th May, 2024) available at: <https://taxinformation.cbic.gov.in/content-page/explore-circulars>

to mandate the adoption of ATSC 3.0 technology for D2M broadcasting. One of the primary concerns is the cost increase, as the necessary hardware changes to support ATSC 3.0 are expected to raise the price of each device by \$30.⁵⁷ They state that smartphones in India are not equipped to work with this technology as mobile phones are based on globally accepted 3GPP standards, and incorporating it would require adding more components, thereby increasing production costs and potentially disrupting current manufacturing plans.⁵⁸ For instance, smartphones will require an entirely new receiver chain for ATSC 3.0 reception, including new antenna(s), filters, amplifiers, oscillators, and ATSC 3.0 demodulator/receiver.⁵⁹

The companies have also highlighted technical drawbacks associated with integrating D2M technology. In a joint letter to the Ministry of Communications, they pointed out that enabling D2M broadcasting could degrade battery performance and negatively impact cellular reception.⁶⁰ They also added that digital broadcasting of TV channels on smartphones saw no adoption in other countries, such as South Korea and the United States, due to the lack of compatible mobile devices, suggesting that the demand and practicality of such a technology in India may be overestimated.

DoT's Telecommunication Engineering Centre (TEC) has also stated that implementing ATSC 3.0 might necessitate a new nationwide network for indoor coverage, adding complexity.⁶¹ Another important challenge pointed out by TEC is the lack of commercially available mobile handsets for all the candidate technologies including ATSC 3.0 and that the success of such services depends on consumer preferences and market dynamics.

Other unresolved issues regarding this technology's adoption also emerged when TEC constituted a consultative committee to assess the viability of ATSC 3.0 as a national standard. This committee comprised of smartphone manufacturers, chipset companies, academic institutions and government stakeholders. The committee's finding was that there was lack of consensus amongst stakeholders on the adoption of ATSC 3.0 as a national standard due to various unresolved issues. These include the lack of support for NavIC (Navigation with Indian Constellation) system and the absence of capabilities to ensure that ATSC 3.0 broadcasts can be received and processed by mobile devices and vice versa.

• FM receiver

FM radio capabilities were originally included in phones as a convenient way to listen to broadcasts without needing a separate device. However, in recent years, smartphone manufacturers have disabled these receivers due to diminished demand for FM radio services, as more people have shifted to internet-based content consumption. High-end smartphones no longer include FM receivers, as manufacturers prioritise other features that utilise internal space more effectively. The government's rationale is that FM receiver capabilities can be crucial during disaster situations

57 T-Mobile. 2017. Complications Associated With ATSC 3.0 Implementation in Mobile Devices Technical White Paper. <https://paragkar.com/wp-content/uploads/2023/08/T-Mobile-FCC-Comments-ATSC3.0.pdf>

58 Munsif Vengattil. 2023. Samsung, Qualcomm flag concerns with India's push for live TV on phones. Reuters. <https://www.reuters.com/world/india/samsung-qualcomm-flag-concerns-with-indias-push-live-tv-phones-2023-11-08/>

59 T-Mobile, *supra* note 58

60 Reuters, *supra* note 59

61 Telecommunication Engineering Centre, Department of Telecommunications. 2024. *Technical Report on Direct Broadcasting to Mobile Handheld Devices*. pg. 40. <https://tec.gov.in/public/pdf/TR/Draft%20Technical%20Report%20on%20Direct%20Broadcasting%20to%20Mobile%20Handheld%20Devices%20Version%203%2021.02.2024.pdf>

when cellular networks might be down, providing an alternative means of communication and information dissemination.⁶²

Mandating FM receivers in smartphones poses several challenges. It introduces an additional cost burden, as including FM receivers would require extra work and manufacturing adjustments, which manufacturers are reluctant to undertake solely for the Indian market. For instance, to support FM broadcasting, smartphones would require a separate, larger antenna to accommodate FM signal wavelengths, which are much lower than those used for cellular signals.⁶³ Additionally, all major chipset manufacturers of smartphones are excluding FM radio features from their chipsets due to the progression to 4G & 5G technologies. The inclusion of FM radio features would necessitate a separate chipset which needs to be designed separately along with amendments in the design of other components and circuits. This would result in a fundamental re-design of the mobile handset.

Given that chip and antenna space in smartphones is already at a premium, this requirement would constrain design flexibility and limit opportunities to integrate innovative features that consumers may value more. This, in turn, could stifle competition and differentiation among device manufacturers, hindering the development of more advanced functionalities and potentially slowing innovation in the smartphone market.⁶⁴ It is pertinent to note that no other country has mandated that hardware changes be introduced to operationalise FM receivers in mobiles.⁶⁵ Further, there is no global demand for such hardware in phones when streaming services are readily and easily consumed.

Also, according to a parliamentary response, FM coverage in India is limited, reaching only 59 percent of the geographical area and 68 percent of the population, whereas mobile networks cover approximately 95 percent of the geographical area and 98 percent of the population.⁶⁶ This disparity raises questions about the effectiveness of FM receivers in disaster management, given the broader and more reliable coverage of mobile networks.

- **NaVIC**

NavIC (Navigation with Indian Constellation) is an independent, stand-alone navigation satellite system developed by the Indian Space Research Organisation (ISRO). The Indian government initiated this system to reduce reliance on foreign navigation systems like the U.S. Global Positioning System (GPS), the European Union's Galileo, Russia's Global Navigation Satellite System, China's BeiDou, and Japan's Quasi-Zenith Satellite System.

Although NavIC has been operational since 2018, its user adoption remains limited, primarily

62 Government of India, Ministry of Electronics and Information Technology, "Advisory on inbuilt FM Radio receiver feature in mobile phones", Notification No. W/25/2023-IPHW. Link: https://www.meity.gov.in/writereaddata/files/Advisory%20on%20inbuilt%20FM%20Radio%20receiver%20feature%20in%20mobile%20phones_28.04.2023.pdf. While MeitY issued an advisory, TRAI has also been considering mandating the operationalisation of FM receivers in smartphones and feature phones. See Ayushi Kar, 2023. TRAI explores making FM radio receivers mandatory on smartphones, Hindu Businessline. <https://www.thehindubusinessline.com/info-tech/trai-explores-making-fm-radio-receivers-mandatory-on-smartphones/article66556325.ec>

63 Broadband India Forum (BIF), BIF's counter-comments on TRAI Consultation paper on "Issues related to FM Radio Broadcasting. https://traigov.in/sites/default/files/BIF_24032023.pdf

64 Ibid.

65 BIF, *supra* note 64. Mexico and Brazil have introduced legislation mandating the activation of FM receiver chips in smartphones possessing that capability and not a mandate applicable to smartphones which did not possess that capability. See [Brazil, Act No. 10003, of November 16, 2001](#) and [Mexico IFT-011-2022](#)

66 Rajya Sabha, Unstarred Question No. 256 available at: <https://sansad.in/getFile/annex/260/AU256.pdf?source=pqars>

because it has only been mandated for public vehicle location trackers. To expand its usage, the government has been engaging with smartphone manufacturers to ensure that NavIC can be integrated into their devices.⁶⁷

However, two significant challenges hinder the widespread deployment of NavIC. First, not all smartphones and navigation devices are compatible with NavIC. To decode NavIC signals, devices must be equipped with a NavIC-compatible chipset or microchip. These chipsets are designed to process signals from the ten Indian satellites that make up the NavIC system. While major chipset manufacturers like Qualcomm and MediaTek have shown support by developing compatible chips, these are only available in select smartphone models.⁶⁸ Consequently, manufacturers cannot fully comply with the proposed mandate requiring all devices to be NavIC-compatible and the increased functionality of these new chipsets will raise costs for manufacturers.

NavIC provides two types of services: The Standard Positioning Service for civilian users and the Restricted Service for strategic users. These services are available in only the L5 (1176.45 MHz) and S-band (2498.028 MHz) frequencies. Thus, this becomes the second challenge for NavIC deployment as it is not offered on the L1 (1575.42 MHz) frequency, which is widely used by other navigation systems like GPS. Integrating NavIC with the L1 frequency would simplify the incorporation of NavIC into chipsets, as most global devices are already designed to support GPS which is available on the L1 band, thereby reducing separate development costs for NavIC.⁶⁹

Although ISRO has announced plans to make NavIC available on the L1 frequency, this will require the launch of additional satellites, a process that could take several more years.⁷⁰ In the absence of this integration, manufacturers will face challenges in deploying NavIC across their smartphone lines without incurring significant additional costs or development delays, potentially hindering its broader adoption.

Over the past decade, the GoI efforts have successfully fostered the emergence of a robust smartphone manufacturing ecosystem in the country. However, the mandatory imposition of technological standards, such as FM radio receivers, D2M technology and NavIC threatens to significantly increase manufacturing costs, thereby creating a cost disadvantage. Mandating such functionalities for the country alone would mean that manufacturers would have to produce the same model with different requirements, one for the local market and one for the burgeoning export market where there is no demand. As India aims to expand its manufacturing footprint both domestically and globally, it is crucial to resist imposing such mandates on manufacturers. Thus, we recommend that the government leave any technology adoption for the market to decide. This will enable continued innovation and competitiveness within the Indian smartphone manufacturing sector. In so far as NavIC is concerned, we recommend that any compulsory mandates for adoption of NavIC should take into account realistic timelines of the full operationalization of the L1 band, and sufficient transition time thereafter for the development of the related ecosystem.

Overlap of testing and certification requirements

67 Munsif Vengattil & Aditya Kalra. 2022. *Exclusive: India's push for home-grown navigation system jolts smartphone giants*. Reuters. <https://www.reuters.com/technology/exclusive-indias-push-home-grown-navigation-system-jolts-smartphone-giants-2022-09-26/>

68 Ibid. As of 2022, there were 300 NavIC compatible smartphones available in the market.

69 *supra* note 68

70 Indian Space Research Organisation (ISRO). Nd. *Satellite Navigation Services*. ISRO <https://www.isro.gov.in/SatelliteNavigationServices.html>

MeitY is the nodal ministry for mobile handset and information technology equipment and services, implementing conformance assessment testing and certification of such products since 2012 through BIS.⁷¹ However, there have been attempts by other ministries to create parallel testing and certification mechanisms for mobile devices. For instance, DoT/TEC issued a notification in 2017 to include consumer electronic devices including mobile handsets under the Mandatory Testing and Certification of Telecommunication Equipment regime even though MeitY/BIS were already overseeing it.⁷² Eventually, TEC rescinded the notification in 2022 following intense industry pushback.⁷³

For the continued success of mobile manufacturing, it is imperative that a single ministry continues to take responsibility for the testing and certification requirements and there is no overlap in certifications. Inter-ministerial/departmental dialogue between BIS, Wireless Planning & Coordination, National Centre for Communication Security and TEC is necessary to ensure that no more than one entity is working on standards or certifications in any specific area. The presence of a light-touch regulatory framework is the need for conformance testing for mobile handsets to attract greater investments in India.

The De Facto Ban on Import of Refurbished Mobile Devices for Trade in India

The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 issued by the Ministry of Environment, Forest and Climate Change aims to manage the import, export, and safe handling of hazardous and other wastes, including used electrical and electronic equipment such as mobile phones. Mobile phones classified as hazardous waste (e.g., containing certain high-risk substances) are subject to stringent import restrictions. Refurbished mobile phones fall under this category and can be imported only under specific conditions. Primarily, these rules protect the environment and public health by preventing the influx of electronic waste, which can lead to significant harm if not properly managed. By restricting these imports, the rules also encourage the development of domestic recycling and refurbishment industries, reducing dependence on foreign electronic waste. Additionally, the regulations ensure that hazardous substances contained in electronic waste do not enter the country, thereby minimising environmental and health risks.

The Directorate General of Foreign Trade import authorisation of 2024 also prohibits the import of refurbished mobile phones unless they are registered with the BIS and comply with the labelling requirements outlined by the BIS.⁷⁴ The primary reason for these stringent measures is to ensure that all electronics and IT goods, including refurbished mobile phones, meet high safety and quality standards. Further, by enforcing strict import regulations, the government aims to promote domestic manufacturing and reduce dependency on imported goods.

These two orders coupled together form an effective barrier to the import of refurbished mobile phones for trade in India. The de facto ban on the import of refurbished mobile phones should thus continue to protect both the consumers and the nascent domestic mobile phone manufacturing industry.

71 CRO Scheme II, *supra* note 47

72 Indian Telegraph (Amendment) Rules, 2017 available at: <https://www.mtcte.tec.gov.in/aboutMTCTE>

73 Press Information Bureau, Government of India. 2022. Regulatory overlap in Mandatory Testing removed – one more step towards ease of doing business. <https://pib.gov.in/PressReleasePage.aspx?PRID=1920586>

74 Government of India, Directorate General of Free Trade, Notification No. 13/ 24-25 (20th May, 2024), available at: https://content.dgft.gov.in/Website/dgftprod/e030ebcf-6b7a-482a-85b0-5dc1793a960c/Notification%20no.%2013_eng.pdf

Impetus for New Technologies

Radio frequency spectrum allocation is managed by the DoT and these spectrum bands can be bifurcated into licensed spectrum bands and unlicensed spectrum bands. Licensed spectrum bands come with a 'right to exclusive use' and are usually allocated through auction while unlicensed spectrum bands are 'free to use' by anyone, and the users need not pay any fees or obtain a licence from the government.

India has around 660 MHz of spectrum available for unlicensed use, spread across various spectrum bands. In comparison to other countries (the US 15,403 MHz, the UK 15,404 MHz, China 15,360 MHz, Japan 15,377 MHz and Brazil 15,360 MHz), this is significantly less.⁷⁵

A major reason for the lack of unlicensed spectrum is because of the DoT's reluctance to make more unlicensed spectrum available owing to the department's narrow interpretation of the 2012 Supreme Court judgement on 2G spectrum allocation.⁷⁶ The case concerned the method of allocation of the 2G spectrum, which was done on the principle of first come first serve basis during FY 2007-08.⁷⁷ The Apex court held that allocation of spectrum on this principle was arbitrary, mandated the existing allocations to be cancelled and the process to be carried out through auctions. In a subsequent Presidential reference made, the apex court clarified that the 2012 judgement was limited to 2G spectrum allocation.⁷⁸ Further, the presiding judge held that the auction of natural resources was not a constitutional principle but a matter of policy. The key is to ensure that the method spectrum release should have a social or welfare purpose, and should not arbitrarily benefit certain parties.

In the case of unlicensed spectrum, since there is no need to allocate spectrum specifically to any user, there is no contention regarding the choice of the allocation method. By not adopting clarifications in the judgement and the Presidential reference, DoT delayed spectrum allocation in different bands, including unlicensed bands.

Advancements in technology have shown that when cost-efficient and flexible spectrum usage is available through de-licensed spectrum, innovation flourishes. Technologies such as Wireless Local Area Network, Ultra-Wideband, Bluetooth, Radio Frequency Identification and Near Field Communication systems all demonstrate this.⁷⁹ De-licensed spectrum supports innovation by serving as a barrier-free and cost-effective platform for testing and implementing new technologies. This is specifically relevant for new WiFi technologies like WiFi 6E and WiGig which will operate best if the spectrum bands of 6 GHz and 60 GHz range are delicensed as they offer faster speeds and less latency in multi user connected, congested networks.⁸⁰

We recommend that MeitY consider engaging with other ministries and departments like the DoT to make available harmonised and contiguous spectrum required for the deployment of next-generation access technologies encouraging new technologies in the mobile industry. The

75 Broadband India Forum (BIF). 2021 *The Economic Value of Wi-Fi Spectrum for India*. <https://broadbandindiaforum.in/wp-content/uploads/2021/06/The-Economic-Value-of-Wi-Fi-Spectrum-for-India-online-19-MAY-2021-accessible.pdf>

76 Dr. Rekha Jain, 2020, *Short on Spectrum : Need for an enabling policy and regulatory environment*, Tele.net <https://tele.net.in/short-on-spectrum-need-for-an-enabling-policy-and-regulatory-environment/>

77 Centre for Public Interest Litigation & Ors. vs. Union of India (2012) 3 SCC 1

78 In re: Special Reference No.1 of 2012.

79 Centre for Internet & Society (CIS). *Brief on Unlicensed Spectrum*. <https://cis-india.org/telecom/unlicensed-spectrum-brief.pdf>

80 Abhishek Raj. 2021. Delicensing 6 GHz, 60 GHz bands is crucial to improve Wi-Fi scenario in India. The News Minute. <https://www.thenewsminute.com/voices/opinion-delicensing-6-ghz-60-ghz-bands-crucial-improve-wi-fi-scenario-india-158974>

Government must consider de-licensing bands (6 GHz, 60 GHz, TeraHertz) in line with the major economies and adopt global best practices for the growth of new services and technologies.

Key Takeaways

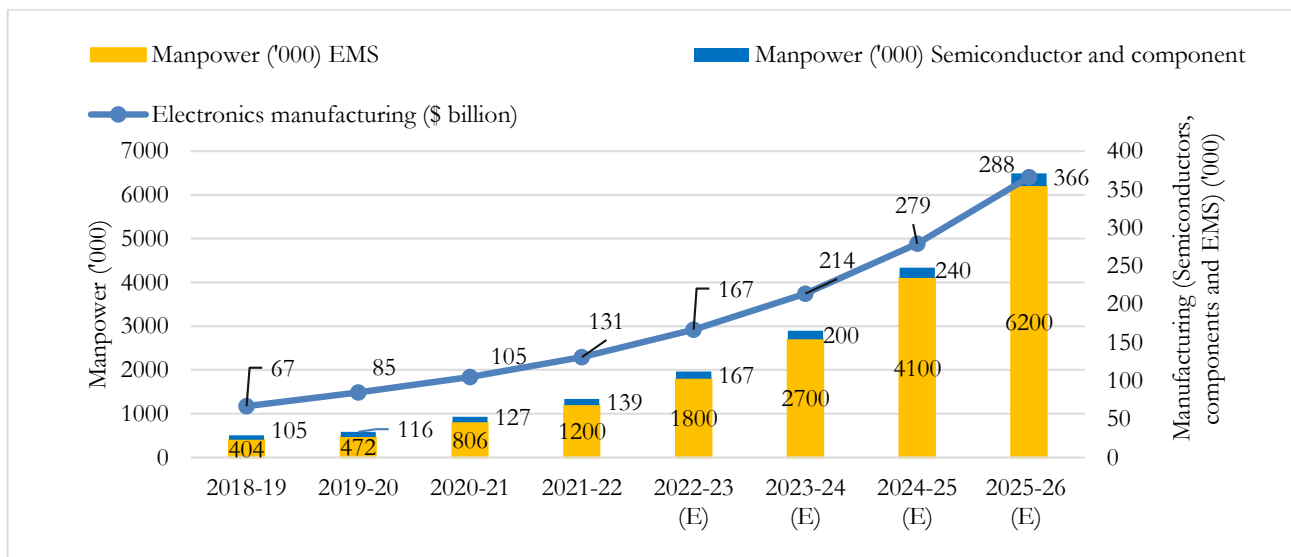
- The government should conduct regulatory impact assessments for various regulations, including quality control standards (QCOs), technology standards like D2M & NavIC, and changes to customs classification. This will enhance policy predictability and improve the ease of doing business, thereby fostering manufacturing growth in India.
- The PLI policy should be flexible, allowing beneficiaries to choose any five years within the six-year scheme period, and remove the ₹15,000 threshold for global manufacturers to foster broader digital inclusion and market growth.

BRIDGING THE SKILLS GAP

The semiconductor and Electronic Manufacturing Services (EMS) industries are poised for significant growth, with expected Compound Annual Growth Rates (CAGR) of 16 percent and 45 percent respectively. These industries are integral to the broader electronics ecosystem, particularly mobile phone manufacturing. Semiconductors are the foundational components of mobile devices, while EMS companies often handle the assembly and production of electronic products, including mobile phones. Therefore, trends and data from these industries can provide valuable insights into the skills gaps and growth potential within the mobile phone manufacturing sector. These industries have also demonstrated high employment generation potential, with the semiconductor and EMS industries experiencing CAGRs of 10 and 50 percent, respectively, until fiscal year 2022-23. Projections suggest that this growth in manpower will continue, reaching a projected CAGR of 50 percent.⁸¹

As of the fiscal year 2021-22, nearly 1.4 million people were employed within these industries. This number is projected to reach an estimated value of 6.5 million by the fiscal year 2025-26 (Figure 11). This growth presents a significant opportunity for investing in human capital and providing sustainable employment. According to the National Skill Development Corporation, the skills gap remains a major hurdle for India's ascent in the world order for manufacturing. This gap means there aren't enough skilled workers to meet industry demands, making it difficult for India to manufacture high-quality electronics, innovate, and compete globally.

Figure 11: Electronics Sector: Production and Manpower Estimates (FY 2019-26)



Source: Electronics Sector Skill Council of India (ESSCI - 2023)

In response to these challenges, various states have introduced their own electronics manufacturing policies aimed at addressing the skills gap and ensuring a steady supply of skilled manpower to bolster the sector (Table 9). Despite these efforts, there remains a disparity in workforce representation; while women constitute 20 percent of the overall manufacturing

81 Electronics Sector Skills Council of India (ESSCI). 2023. A STUDY TO IDENTIFY THE SKILL REQUIREMENT AND ASSESS THE JOB POTENTIAL IN THE INDIAN ELECTRONICS INDUSTRY. <https://www.essci-india.org/pdf/Report-ESDM%20Labor%20Market%20Information%20Survey.pdf>

workforce, their participation in the electronics industry is remarkably higher at around 80 percent. This indicates a unique dynamic in the sector’s workforce composition, highlighting the electronics industry as an area of opportunity for female workers.

Table 9: Launch of Electronics Policies by State

State Policies involving electronics	Launching year
Telangana	2016
Haryana	2017
Karnataka	2017
Maharashtra	2019
Tamil Nadu	2020
Uttar Pradesh	2020
Andhra Pradesh	2021
Odisha	2021
Gujrat	2022
Kerala	2023
Madhya Pradesh	2023

Source: Various articles and government notifications

State policies primarily focus on modernising the curriculum to align more closely with industry needs, including apprenticeship and membership-related programmes (Table 9). These updates aim to equip the workforce with relevant skills that meet the demands of contemporary electronics manufacturing sectors. Andhra Pradesh and Maharashtra, in particular, have placed additional emphasis on courses related to emerging technologies such as artificial intelligence (AI) and robotics, recognising the importance of these advanced skills in maintaining competitive advantages (Table 10).

Further, nearly all these policies include special provisions to enhance women’s participation in electronics manufacturing.

Table 10: Focus Areas of Electronics Policy by State

States	Apprenticeship/ Mentorship	Night Shift Allowance	Skill development centres including ITIs & Polytechnics	Industry-specific Courses	AI & Robotics Training	Special Programme for women
Andhra Pradesh	✓		✓	✓	✓	✓

Gujarat	✓	✓		✓		✓
Maharashtra	✓	✓			✓	✓
Punjab	✓	✓	✓			✓
Bihar	✓					✓
Chhattisgarh	✓		✓	✓		✓
Odisha	✓					✓
Uttarakhand	✓		✓			✓
Assam	✓					✓
Goa	✓				✓	✓
Kerala	✓	✓				
Tamil Nadu	✓					
Karnataka						✓

Source: Various articles and government notifications

The key challenge related to the electronics manufacturing skills gap stems from training-related issues. According to the industry's experts:

1. There is a misalignment between the training curriculum and the requirements of the industry, which means that the skills being taught often do not meet the needs of modern electronics manufacturing;
2. The rapid pace of technological advancements outstrips the current training efforts, leading to a workforce that is frequently underprepared for the latest technological demands;
3. Many regions suffer from inadequate training facilities and resources, further hampering the development of a skilled workforce;
4. There is a need for experienced and skilled employees, including technicians, engineers, and subject matter experts, who possess relevant skills in the high-tech manufacturing of mobile phones and can train the workforce in India. However, recruiting such talent, especially from countries like China, poses significant challenges due to visa-related issues.

The government has recognised that restricting skilled foreign nationals from entering into the country freely makes it harder to close the skills gap. Therefore, DPIIT is considering streamlining entry for Chinese workers,⁸² complementing the Ministry of Home Affairs' provisions for those linked to central schemes like PLI scheme and Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors. However, the existing procedure's scope is limited. It excludes suppliers and companies availing incentives under the state policies such state-

82 Rimjihim Singh, 2024. DPIIT working on SOP to ease entry for certain Chinese workers in India, Business Standard. https://www.business-standard.com/industry/news/dpiit-working-on-sop-to-ease-entry-for-certain-chinese-workers-in-india-124060300509_1.html

specific industrial policies. Allowing visas for Chinese suppliers will facilitate the training of Indian workers, catalysing diversification and strengthening India's electronics manufacturing value chain.

Faster visa approvals for foreign nationals will support advanced capacity building in India. This approach mirrors practices in countries like China, where despite geopolitical tensions with nations like Japan and the US, China has successfully enhanced its workforce capabilities by ensuring smooth visa entry for trainers. Adopting a similar strategy could significantly benefit India's electronics industry.

Key Takeaways

- Employment in the ESDM and semiconductor sectors stood at nearly 1.4 million, projected to rise to approximately 6.5 million by fiscal year 2025-26.
- The semiconductor and EMS industries are rapidly growing, underscoring the need for investments in human capital to support job creation and skill development.
- Addressing the skills gap through modernised training curricula and streamlined visa processes for foreign experts, is crucial for enhancing the workforce's capabilities and strengthening India's electronics manufacturing value chain.

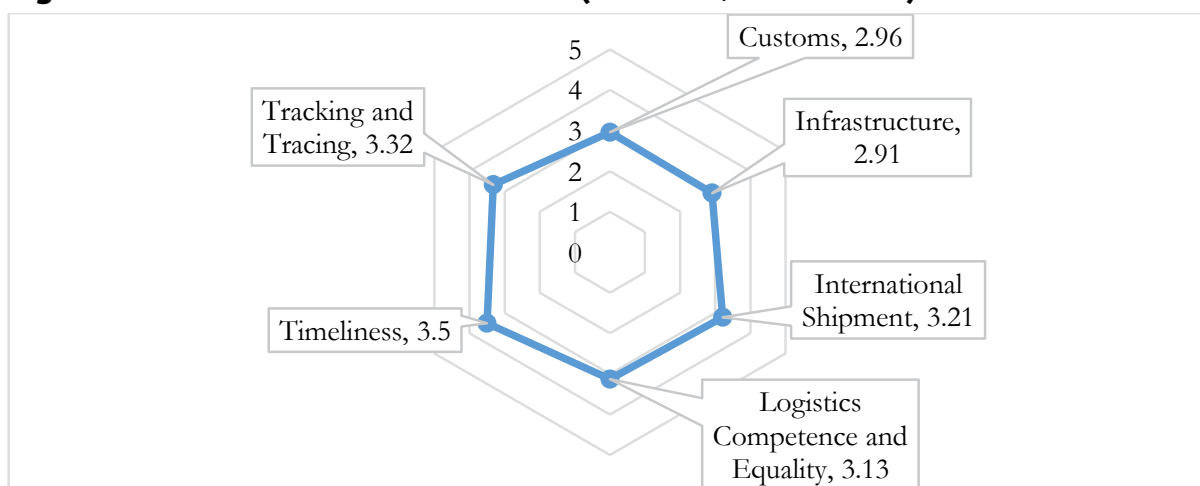
ADDRESSING OTHER STRUCTURAL BARRIERS

The Indian mobile phone manufacturing industry faces other structural barriers, notably high corporate taxes and elevated logistics costs, which hinder its competitiveness. These factors increase the overall cost of production, making it difficult for Indian manufacturers to offer competitive pricing in the global market. There is a pressing need for a mission-mode approach to effectively tackle these issues and support the industry's sustained development and success.

High Costs of Logistics

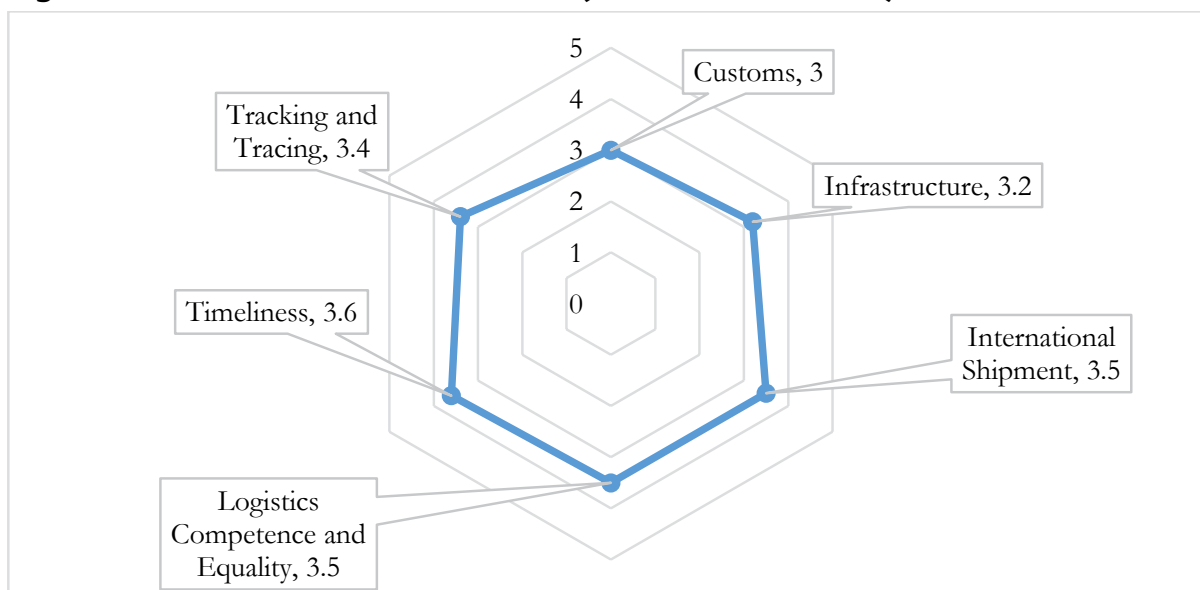
India moved up six places on the World Bank's Logistics Performance Index (LPI) from 2018, indicative of improved overall infrastructure and improved its ranking in all subcomponents of LPI since 2018 (Figures 12 and 13).

Figure 12: India's LPI Score in 2018 (Rank 44, Score 3.18)



Source: World Bank (2024)

Figure 13: India's LPI Score in 2023 (Rank 38, Score 3.4)



Source: World Bank (2024)

Despite these improvements, India lags competitors. China has the highest rankings, indicating it has well-developed logistics infrastructure, efficient customs procedures, and high-quality logistics services. Malaysia is positioned at rank 26, reflecting a robust logistics sector. This ranking showcase Malaysia’s capability to efficiently handle trade flows, making it an attractive destination for businesses relying on seamless logistics. On the other hand, India is ranked 38th, suggesting that while there are strengths in its logistics sector, significant improvements are needed (Table 11).

Table 11: LPI Rankings of Key Countries in Asia (2023)

Country	India	China	Vietnam	Thailand	Malaysia
Rank	38	19	43	34	26

Source: World Bank (2024)

The Economic Survey 2022-23 also indicates that India’s average logistics cost is about 14 percent of GDP, compared to 8-10 percent in the US, Europe, and China.⁸³ To reduce these costs and improve rankings, it is crucial to strengthen initiatives like PM Gati Shakti, a transformative infrastructure strategy aimed at enhancing multi-modal connectivity across highways, railways, waterways, and airways. Additionally, the National Infrastructure Pipeline focuses on improving energy, roads, railways, and urban infrastructure. Strengthening these efforts is vital for transforming India into a global manufacturing hub.

High Corporate Taxes

Higher corporate taxes discourage companies from expanding their operations and investments in India. In 2019, the Indian government reduced the effective corporate tax level for domestic companies from 35 percent to 25 percent to boost manufacturing. India’s effective corporate tax obligation for listed companies (22.2 percent) is still higher than other major economies such as the US (17.9 percent) and China (18 percent) even after slashing these percentages.^{84, 85} Compared to its competitors, higher corporate tax rates lead to higher costs of operating in India, making investments in India less attractive compared to competitors.

The cost disabilities are further exacerbated when we look at the additional tax-related incentives and support that competitors like Thailand and Vietnam offer to companies investing in these countries (Table 12).⁸⁶

83 Ministry of Finance, Government of India. 2023. *Economic Survey 2022-23*. <https://www.indiabudget.gov.in/budget2023-24/economicsurvey/index.php>.

84 Nandita Rajhansa and Saurabh Mukherjea. 2023. *India’s High Corporate Tax Rate is Holding Back Corporate Capex*. <https://marcellus.in/blogs/indias-high-corporate-tax-rate-is-holding-back-corporate-capex/>.

85 Effective tax rate calculated as income tax expense divided by profit before tax for S&P 500 companies for the US, CSI 300 for China, BSE 500 for India for FY23.

86 Hawksford (2023). China CIT for High Tech firms is 15 percent and for small/low-profit firms is 20 percent which is 10 percent and 5 percent lower than the statutory CIT rate of 25 percent in China.

Table 12: Income tax concessions and exemptions in competing countries

Indonesia	Tax holiday from 5 to 20 years for investors in industries such as electronics and telecom.
Malaysia	<ul style="list-style-type: none"> • Full income tax exemption for 10 years for projects of strategic and national importance (exemption for 5 years for high technology industry). • Carry forward unabsorbed capital allowances as well as accumulated losses incurred during the pioneer period.
Singapore	<ul style="list-style-type: none"> • An approved company can be eligible for CIT exemption or concessionary tax rate for 5 or 10 years, respectively, under the Pioneer Certificate or Development and Expansion Incentive. • Extension of the period may be considered subject to a company's expansion plans.
Thailand	<ul style="list-style-type: none"> • 10 to 13 years tax holiday for the core technologies development project. • Up to 8-year tax exemption for targeted industries. • 15-year tax holiday for new technologies and high-impact investment.
Vietnam	<ul style="list-style-type: none"> • For the high-tech industry, a 4-year tax exemption from the first year of profit, a 5 percent tax rate for the next 9 years, 10 percent tax for the next 2 years, and 20 percent after that. • Investors may also be eligible for additional tax holidays based on negotiations.

Source: ICEA (2021)

Despite a declining rate, India's effective corporate tax remains among the highest globally, making investments in India less attractive compared to competitors.

To bridge this gap, the Indian government should pursue rationalisation of corporate tax rates. The government could consider extending Section 115BAB of the Income Tax Act to companies registered before October 2019. This will enable a reduction in the basic corporate tax rate from 22 percent to 15 percent for the manufacturing sector, thereby achieving parity in corporate tax rates with competitors such as China, Vietnam, etc. Further, the government could explore other tax-related incentives to shift the supply chain from competitor economies like China and Vietnam. These include incentives for research, testing, and component-hubbing to accelerate the shifting of the supply chain from these nations.

Key Takeaways

- The effective tax rate for domestic companies remains around 30-35 percent, and over 40 percent for foreign companies. These rates are relatively high compared to competitors like Vietnam and Thailand, which have effective rates of 22 and 20 percent, respectively. To narrow this cost gap, tax-based incentives for emerging industries like mobile manufacturing should be explored.
- India's logistics cost is 14 percent of GDP, higher than the 8-10 percent in the US, Europe, and China. Reducing these costs is essential.
- We propose establishing an interministerial committee dedicated to ensure inter-ministerial coordination with single-window approval for regulatory compliance. This will streamline processes, prevent delays, and ensure timely issue resolution, similar to China's successful model.

CONCLUSION

India has made remarkable strides in mobile phone manufacturing over the past decade, witnessing a production surge from \$3 billion in 2014 to \$49 billion in 2024. This growth has been bolstered by strategic government initiatives such as the PMP and the PLI scheme, which have spurred sectoral expansion. Despite these achievements, attaining the ambitious \$300 billion target for electronics manufacturing by 2025-26 necessitates addressing several critical challenges.

High tariffs on components and capital goods, compounded by a complex tariff structure, have inflated production costs, placing India at a disadvantage against global competitors like China and Vietnam. Furthermore, India's domestic value addition remains modest, with many crucial components still reliant on imports. Numerous EoDB issues exacerbate these challenges, leading to operational inefficiencies and heightened costs for manufacturers.

Moreover, there is a pronounced skills gap within the workforce, as training programmes often fail to align with industry needs. This skills gap is further exacerbated by visa restrictions, hindering the entry of foreign experts essential for training and upskilling the local workforce. High corporate tax rates and elevated logistics costs further diminish the sector's overall competitiveness.

Addressing these issues through targeted policy interventions and sustained support is imperative to sustain momentum and achieve the government's ambitious targets. By doing so, India can consolidate its position as a global leader in mobile manufacturing and realise its vision of becoming a premier global manufacturing hub.

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