ELECTRICALS & ELECTRONICS MANUFATURING IN INDIA

ASSOCHAM INDIA

NEC Technologies India Private Limited

The electronic manufacturing has been continuously growing since past few years. The exports have remained constant at around USD 6 Billion in contrast to the electronics import, which has been growing year on year.

With such rising imports, there lies a huge opportunity for companies to look at the Indian market as their next destination and cater to the burgeoning domestic Indian demand for electronic goods.

We congratulate the Government of India for placing electronics manufacturing on high priority with major focus on initiatives such as Digital India, Make in India, Electronic Manufacturing Clusters and supportive FDI policies to bolster electronic manufacturing.

These initiatives will not only provide quantifiable benefits, but will also bring about intangible benefits, in terms of changed mindset of foreign investors towards India, wherein, they will start treating India as a true partner which can add significant value in the production cycle rather than being just a low cost manufacturing destination.

Apart from progressive government policies and reforms, the growing demand is also another major reason for increase in electronics' production. The growing demand coupled with government support for the sector has encouraged domestic players to invest in the sector.

I congratulate ASSOCHAM for organising this meaningful conference timely, which will benefit all the stakeholders in a significant way.

Shri Sandeep Jajodia
President, ASSOCHAM

If one were to consider India's evolution over the last decades, the journey would be incomplete without mentioning the path India is chartering to become a manufacturing destination. Time and again, policy after policy, the need for 'Make in India' has been underscored. Keeping the focus on manufacturing is not just good for the investments, but is equally important to boost employment as well as foster skills – which is relevant now, and for the future as well.

As a long-time member of ASSOCHAM National Council on Electronics and Hardware, it gives me immense pleasure to see the stride this sector has taken. We have seen impressive growth in consumer electronics, especially mobile handset manufacturing, where India has replaced Vietnam to become the world's second largest mobile manufacturer. The recognition to be ranked as 30th out of 100 spots on Global Manufacturing Index is an all-encompassing testimony. [Source: World Economic Forum]

I take this opportunity to appreciate various initiatives launched by the Government of India in the last few years, for these have set the right chord for discussing inclusive and responsive progress on manufacturing. We have come a long way, but have an equally long path to traverse, ahead of us. We need to analyse the success factors that have supported these bright spots in electronics manufacturing and emulate the lessons that we learn along the way to chart a similar growth story for other segments.

We also need to look outwards and be nimble in adopting the paradigm shift that would be caused by the advent of emerging technologies such as Artificial Intelligence, Robotics and Internet of Everything. This modernization, while providing a strong impetus to Industrial Electronics sector, will also bring the dawn of Fourth Industrial Revolution.

This NEC-ASSOCHAM report highlights the progress made by various sectors, comprising the Electronic Manufacturing Industry, and highlights the growth drivers witnessed by them.

On behalf of ASSOCHAM National Council on Electronics and Hardware, I look forward to a strong collaboration between the government, industry, and academia that will help build the 'New India'.

Sincerely,
Alok Ohrie
Chairman, National Council on Electronics and Hardware,
ASSOCHAM

To discuss and formulate the strategy to make India a 'Manufacturing Hub', ASSOCHAM, India's Apex Chamber for Commerce and Industry, is organizing the 8th National Conference on Electricals & Electronics Manufacturing with a view to achieve the Hon'ble Prime Minister's vision for zero import of electronics by 2020.

The Indian manufacturing sector's Gross Value Added (at basic prices based at current prices) has been expanding and is forecasted to reach approx. USD 388 Billion by FY 2018 from USD 284 Billion in FY 2014.

On behalf of ASSOCHAM, we would like to thank the team at NEC for preparing a comprehensive white paper on this subject.

We hope that this paper will be read by all the stakeholders and will prove to be beneficial for them.

D. S. RAWAT
Secretary General, ASSOCHAM

NEC Technologies India Private Limited (NECTI) had successfully collaborated as a knowledge partner with Associated Chambers of Commerce of India (ASSOCHAM) last year and is delighted to partner once again with the esteemed association to present the 8th edition of Electricals & Electronics Manufacturing in India.

India's manufacturing sector, with a gross value addition of approx. USD 388 Billion, has evolved into becoming one of the notable high growth areas today. The government has adopted an initiative-centric approach to strengthen the manufacturing sector and help construct a stable base for the economy. The ambitious 'Make in India' project is finally experiencing progress with India's position in the Ease of Doing Business Index jumping up to 30 ranks to reach 100th spot out of 189 countries.

Within the Electronics Industry, the cumulative equity inflow of FDI reached approx. USD 1.8 Billion in 2017. The Government has a continuous focus towards boosting indigenous electronic manufacturing. The latest union budget 2018-19 has introduced several amendments in the basic custom duty for electronics and electrical products to encourage domestic manufacturers. India is on the verge of becoming a Global Electronics Manufacturing Hub in the future. The effects have already started reflecting with several companies, such as Motherson Sumi Systems Ltd. increasing its capital expenditure, Samsung investing in manufacturing plants, Xiaomi setting up a new PCB assembling unit and emergence of fresh investments such as Japan's Suzuki Motor setting up lithium-ion battery production facility with Toshiba and Denso.

This report attempts to give an overview of Electronics Manufacturing in India, along with latest figures for the manufacturing, import and export of electronic goods. An important domain that has been touched upon is the increasing generation of Electronic waste. The report highlights that how India as a country can adopt best practices from developed nations, such as Japan.

We hope that this report would serve informative and give some knowledgeable insights in the field of Electronic manufacturing.

Anil Gupta
Chairman, NEC Technologies India Limited

NEC
NEC TECHNOLOGIES INDIA

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1 Industry Overview

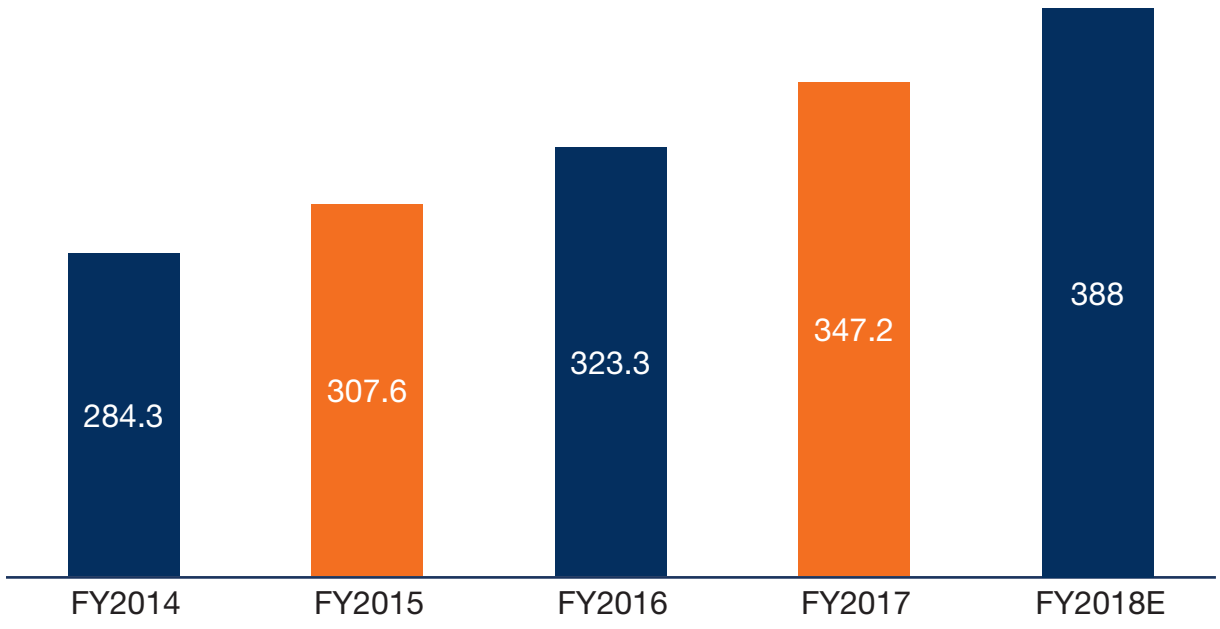
1.1 Indian Economy Roadmap

Manufacturing has evolved to become one of the high growth sectors in India. In the recent past, the government has adopted an initiative-centric approach to boost the overall Indian economy statistics. Programs such as Make in India have helped breathe new life into India's manufacturing sector and construct a stable base for the economy by introducing various reforms and schemes.

These reforms and programs have helped to give global recognition to the Indian economy and position India as a manufacturing hub on the world map, making the environment favorable for budding entrepreneurs.

The Indian Manufacturing Sector's Gross Value Added (at basic prices based at current prices) has been expanding and is forecasted to reach approx. USD 388 Billion by FY 2018 from USD 284 Billion in FY 2014.

Manufacturing Sector's Gross Value Added at Basic Price based at Current Prices (in USD Billion)



Advancement of Indian Electronics Sector:

The Indian electronics sector has seen noteworthy evolution from being a closed economy in the early 1980s to allowing 100% FDI via automatic route at present. Some significant milestones in the Indian electronics journey have been highlighted below:

Present Time

- 100% FDI approved through automatic routes in electronic manufacturing (excluding Defense)
- Startup India, Skill India, Make in India and Digital India launched

Late 2014s

Growth Era

- LEDs and LCDs introduced
- 26% FDI approved through government approval in Defense Electronics sector
- Smartphones introduced

2000 To 2014

Liberalization Era

- India signed WTO–FTA agreement, committing to waive all custom duties on IT
- Mobile Phones introduced in India
- Custom tariffs declined on electronic products

1991 To 2005

Golden Period

- Computer and Telephone introduced in India
- Manufacturing of color TVs started

1984 To 1990

Introductory Stage

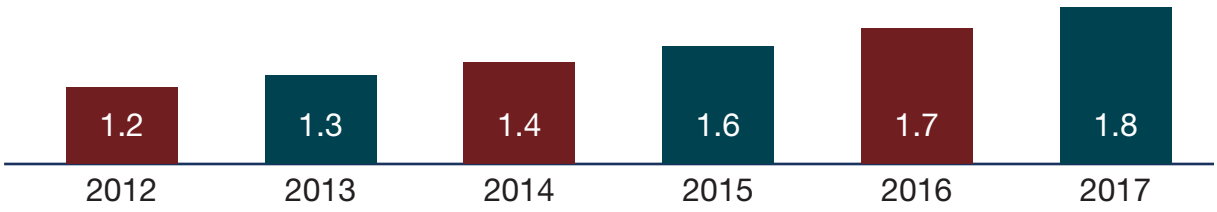
- India was a closed market
- Manufacturing of Radio,Transistors, Black & White TVs, Calculators, etc. started

Early 1980s

Growing Foreign Direct Investment (FDI)

The Government of India is encouraging FDI in the sector of Electrical and Electronics Equipment (EEE) manufacturing to achieve the vision of 'Net Zero Import by 2020'. As a result, the Government of India (GOI) received USD 1.8 Billion FDI in 2017 in Electronics sector.

Year wise Cumulative Equity Inflow of FDI in Electronics Sector (in USD Billion)



Improvement in Ease of Doing Business Ranking

A positive step in the direction of domestic manufacturing.

Global Manufacturing Index Ranking

In 2018, India secured 30th rank out of 100 emerging economies on the global manufacturing index.

Ease Of Doing Business Ranking (EODB)

Ranking of India jumped to 100th spot on the Ease of Doing Business Index from 131st rank out of 189 countries.

Rating on Indexes

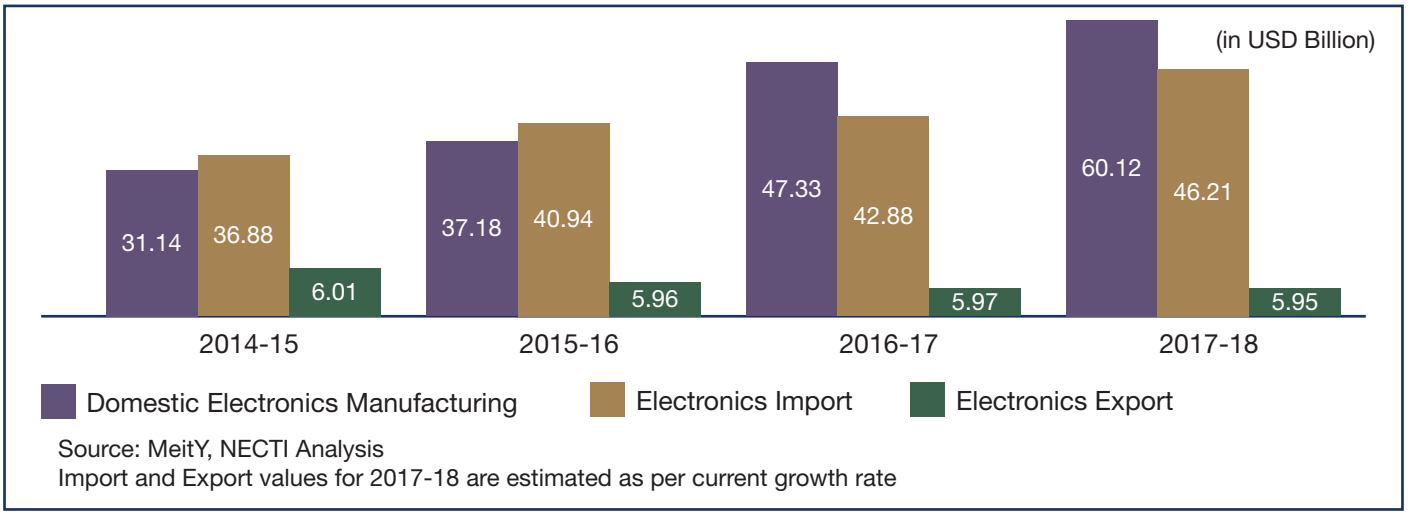
Index Name	Increase in Rating
Strength of Insolvency Framework	8.5 / 6
Post Filing	49.31 / 4.3
Strength of Legal Rights	8 / 6
Quality of Judicial Process	10.3 / 9
Strength of Minority Investor Protection	8 / 7.3
Extent of Conflict of Interest Regulation	7.3 / 6.7
Extent of Shareholder Governance	8.7 / 8

EODB Ranking

Parameter Name	Dip in Rating
Resolving Insolvency	136 / 103
Paying Taxes	172 / 119
Getting Credit Rank	44 / 29
Enforcing Contract Rank	172 / 164
Protecting Minority Investors	13 / 04
Construction Permits Rank	185 / 181

1.2 Indian Electronics Market Overview

The Indian electronics industry is one of the largest and fastest-growing industries in the world.



Source: MeitY, NECTI Analysis
Import and Export values for 2017-18 are estimated as per current growth rate

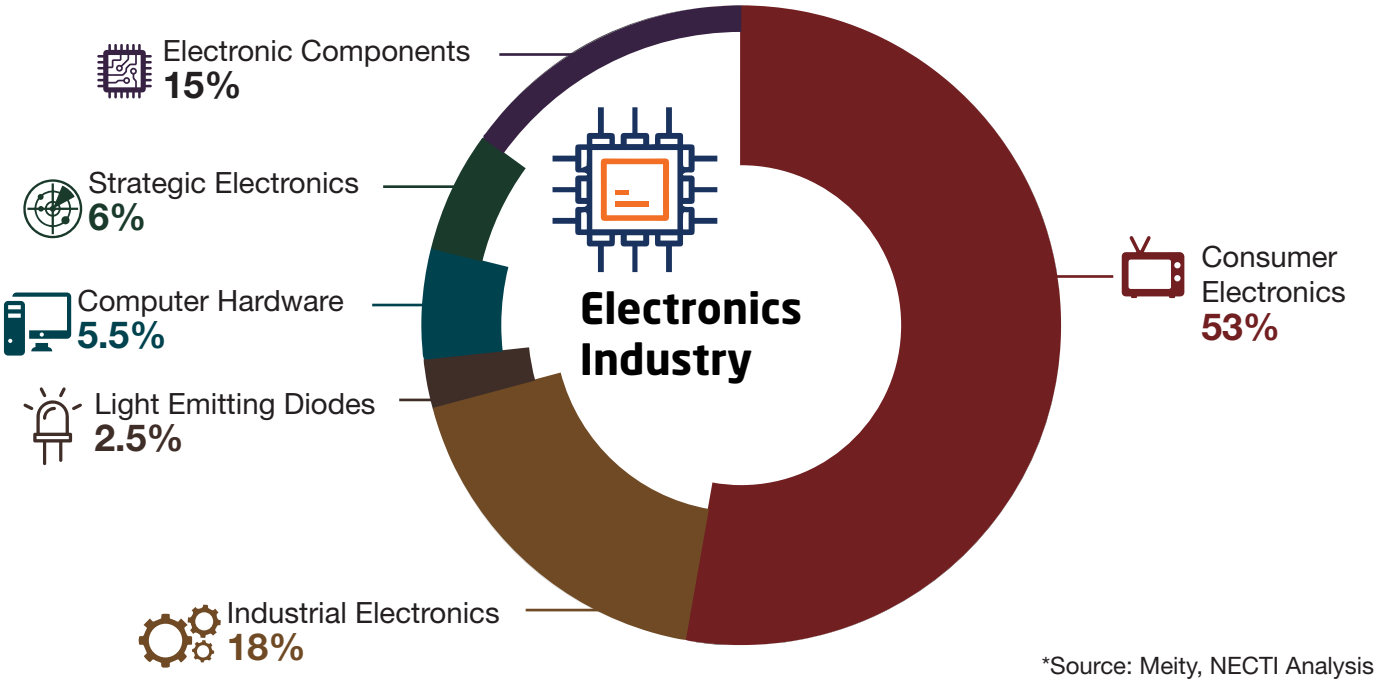
The electronic manufacturing has been continuously growing since past few years. The exports have remained constant at around USD 6 Billion in contrast to the imports, which have been growing year on year.

With such rising imports, there lies a huge opportunity for companies to look at the Indian market as their next destination and cater to the burgeoning domestic Indian demand for electronic goods.

India Advantage

- India has a growing customer base with an increased penetration of consumer durables segment. This gives rise to huge potential for the growth of the Indian Electronics sector.
- Electronics Manufacturing is one of the nine pillars of Digital India which focuses on promoting Electronics Manufacturing, and achieving net zero imports of electronic products by 2020.
- India offers several advantages such as relatively low labor cost, availability of skilled labor and a vast domestic demand because of which several foreign Electronic manufacturing companies are increasingly looking at setting up their units in India.
- India boasts of a vast talent pool and is executing several skill development initiatives to enhance capabilities in design and R&D. The workforce is not just skilled, but cost-effective as well.
- Increasing domestic demand, expansion in disposable incomes, the endeavor to build a Digital India through wider broadband connectivity and e-governance programs, and rising manufacturing costs in other manufacturing economies - all have been contributing towards the growth of the Electronics Sector in India.

Shares in Total Production of Electronic Goods (2017-18*)



*Source: Meity, NECTI Analysis

Electronics Industry Snapshot

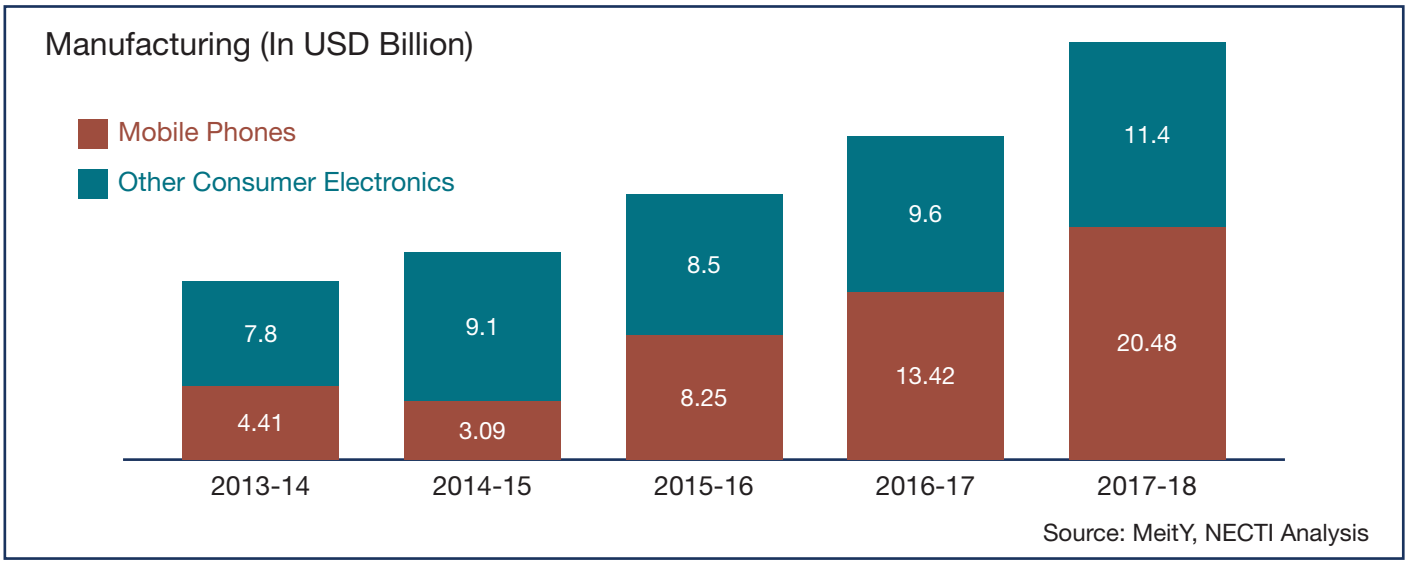
All values in Billions USD

		Manufacturing**	Import*	Export*
Consumer Electronics	2016-17	23.08	7.78	0.76
	2017-18	31.88	7.34	0.61
Mobile Phones	2016-17	13.42	3.79	0.17
	2017-18	20.48	3.32	0.16
Consumer Durables	2016-17	5.67	1.61	0.45
	2017-18	6.92	1.7	0.4
Others (TV, Home Theater etc.)	2016-17	3.99	2.38	0.14
	2017-18	4.48	2.32	0.05
Computer Hardware	2016-17	3.04	6.89	0.26
	2017-18	3.32	7.41	0.29
Light Emitting Diodes	2016-17	1.06	3.51	0.08
	2017-18	1.49	3.96	0.15
Electronic Components	2016-17	7.77	8.41	1.79
	2017-18	9.05	9.22	1.93
Others*** (Industrial, Strategic, etc.)	2016-17	12.38	16.29	3.08
	2017-18	14.38	18.29	2.97

* FY 17-18 values are from April 2017 to February 2018 | ** Source: MeitY
*** Import and Export values for Others in 2017-18 are estimated.
Graph: Not as per scale

1. Consumer Electronics

Consumer Electronics is one of the most prominent sectors of the electronic industry. It is helping the Indian economy to boost rapidly in terms of growth and revenues. The production of consumer electronics has been growing steadily with a CAGR of 27% from 2013-14 to 2017-18.



Source: MeitY, NECTI Analysis

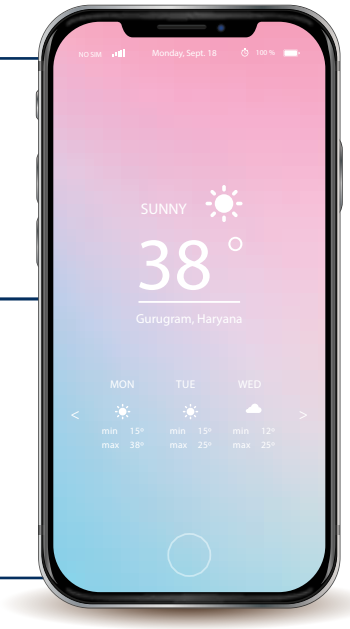
Mobile Phones

Significant contributors to the segment

- Mobile phone manufacturing was on fast track mode during 2017-18. Mobile phone production reached approx. INR 1,32,000 Crore (USD 20.47 Billion) in 2017-18, from INR 26,650 Crore (USD 4.41 Billion) in 2013-14.
- Majority of the global players in the mobile market are looking at India as a favorable manufacturing destination and are setting up their units, owing to the huge existing demand and strategic incentives to manufacture locally.
- In 2017, India replaced Vietnam and became the world's second largest mobile manufacturer holding a share of 11% in global mobile production as compared to 3% in 2014.
- In February 2016, India became the second-biggest smartphone market in terms of active unique smartphone users, crossing 220 Million users and surpassing the US market.

Major Mobile Phone Players In Indian Market

INDIAN BRANDS	**Micromax | Karbonn | Lava**
GLOBAL BRANDS	**Apple | Samsung | OPPO | VIVO | Xiaomi Nokia | Microsoft | LeEco | Gionee Honor | Lenovo**



Major Investments in Mobile Phone Market in India

March, 2017

Gionee announced to invest INR 500 Crore (USD 77.56 Million) in setting up a new manufacturing unit in Haryana for enhancing its capacity.

June, 2017

InFocus (Foxconn's handset brand) announced that it would invest USD 10 Million in the Indian market to expand its operations.

October, 2017

Comio, a relatively new player in the Smartphone market from China, plans to invest INR 150 Crore (USD 23.27 Million) in India to set up a manufacturing unit.

November, 2017

Xiaomi Corp. plans to invest USD 1 Billion in 100 startups over the next five years in order to create an ecosystem of apps around its Smartphone brand.

January, 2018

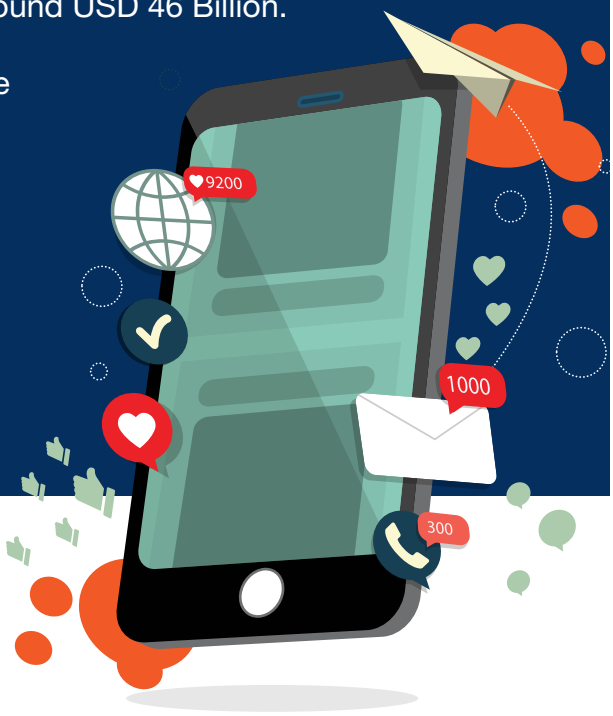
LAVA International plans to invest INR 2600 Crore (USD 403.3 Million) in its manufacturing units to reach a production capacity of 21.6 Crore over the next 5 years.

April, 2018

Samsung announced to invest approx. INR 5000 Crore (USD 0.77 Billion) to double the capacity of its manufacturing plant in Noida.

Growth Drivers for Mobile Phone Manufacturing

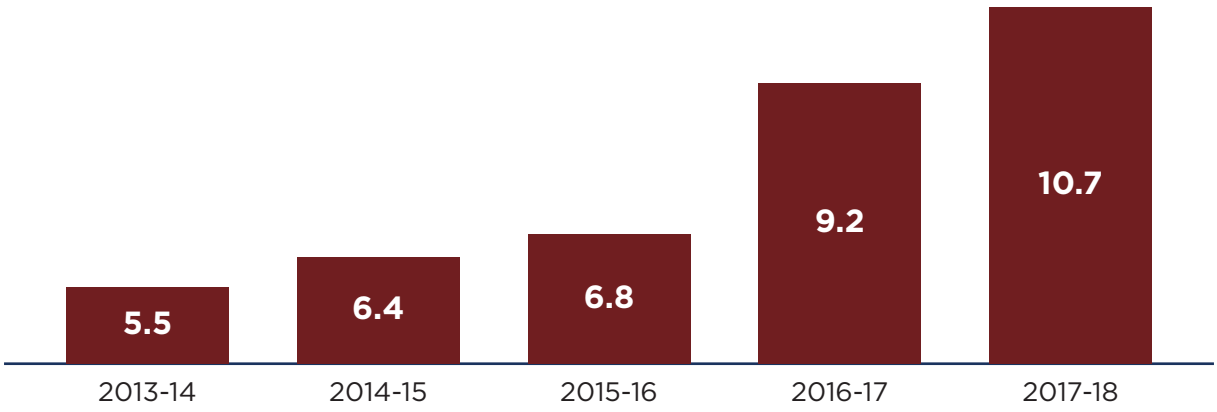
- In Union Budget 2018-2019, the import duty on mobile phones has been increased from 15% to 20%. The implementation of this reform would make the imported mobiles more expensive against the ones produced via domestic manufacturing. The rise in import duty will provide an impetus to domestic manufacturing, giving a competitive edge over imported foreign products.
- Fast Track Task Force (FTTF), a body under Ministry of Electronics and IT, has set a target to achieve around 500 Million mobile phone production by 2019, with value estimated to be around USD 46 Billion.
- Phased Manufacturing Program (PMP), an initiative by the government has been launched to promote growth of mobile phone manufacturing. It aims to give fiscal benefits such as tax reliefs on domestic manufacturing of various components of cellular handsets in different fiscals.
- India has the second largest wireless network in the world, providing a supportive infrastructure to mobile phone penetration.



2. Industrial Electronics

Industrial Electronics segment plays a vital role in molding the economy. Upcoming investments in the field of engineering, electrical and automotive segments are driving the growth of Industrial electronics sector. With modernization, automation and robotics being the technologies of the future, the industrial electronics segment is gaining more ground.

Manufacturing of Industrial Electronics (in USD Billion)



Graph: Not as per Scale

*Source: MeitY, NECTI Analysis

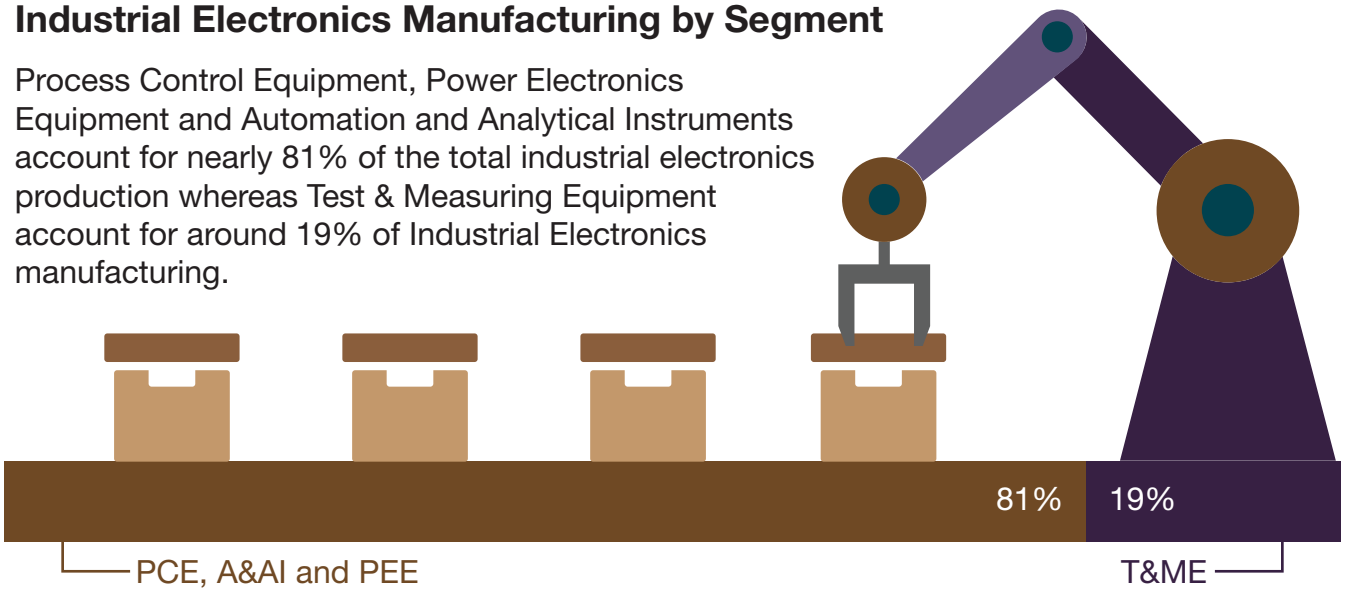
Industrial Electronics manufacturing has seen a continuous rising trend. The manufacturing value is estimated to have reached around INR 69,057 Crore (USD 10.7 Billion) in 2017-2018 from a production value of around INR 33,600 Crore (USD 5.5 Billion) in 2013-2014.

Industrial Electronics can be categorized into following segments

Process Control Equipment (PCE)	Automation and Analytical Instruments (A&AI)	Power Electronics Equipment (PEE)	Test & Measuring Equipment (T&ME)

Industrial Electronics Manufacturing by Segment

Process Control Equipment, Power Electronics Equipment and Automation and Analytical Instruments account for nearly 81% of the total industrial electronics production whereas Test & Measuring Equipment account for around 19% of Industrial Electronics manufacturing.



*Source: MeitY, NECTI Analysis

Major Industrial Electronics Players In Indian Market

INDIAN BRANDS	**BHEL | Blue Star** **Amara Raja | Su-Kam | Keltron**
GLOBAL BRANDS	**ABB | GE | Keltron | Allen-Bradely** **APC | Honeywell**

Major Investments in Industrial Electronic Market in India

March, 2018

Japan's Suzuki Motor will be setting up its lithium-ion battery joint venture with Toshiba and Denso, investing around INR 1151 Crore (USD 178.5 Million) to set up production facilities in India.

March, 2018

Delta Electronics India which deals in telecom power, renewable energy solutions and industrial automation is planning to invest around USD 500 Million to secure opportunities in the field of electric mobility and energy storage.

Growth Drivers for Industrial Electronics Manufacturing

- Transition towards adoption of upcoming latest technologies, such as artificial intelligence, robotics and modernization will give a strong impetus to the manufacturing of industrial electronics in future.
- The power electronics sector is largely dominated by unorganized regional players which are expected to grow at a higher rate owing to huge demand and low penetration.
- Inverters and UPS which are among the notable industrial electronic products are becoming household items, driving the growth of this segment.
- Advancements in the field of engineering, electrical, automotive and electronics sector will provide a boost to the manufacturing of industrial electronics sector.
- Several government projects are underway, which will give momentum to Industrial Electronics Manufacturing:

Metro Rail Projects: Currently, Metro is operational in 10 cities of India. In 5 cities, the Metro Rail project is under construction and in 16 cities, the project is under planning phase. The execution of the project is expected to strengthen the Industrial Electronics Manufacturing sector.

Bullet Train Project: The Indian government is projected to invest approximately USD 17 Billion (INR 1.08 Lakh Crore) for the construction of India's first high-speed train project, the 508-km long Mumbai-Ahmedabad bullet train corridor. With the start of the project in Jan 2019, India's Industrial electronics is expected to get a boost.

Smart Cities Project: The Government's ambitious Smart Cities project is aiming at building 99 smart cities in the country, which is expected to give huge thrust to the Industrial electronics sector.

Solar Power Projects: The Center has set a target of generating 100GW of solar power by 2021-22 under the National Solar Mission including the development of 60 solar cities and 33 solar parks. This initiative is another positive step in the direction of power electronics manufacturing.

Hyper Loop Project: Virgin Group plans to inaugurate a hyper loop linking Pune and Mumbai which would help cut down travel time to 25 minutes and address infrastructure bottlenecks. The project could result in socio-economic benefits of around USD 55 Billion and at the same time strengthen the Industrial Electronics sector.

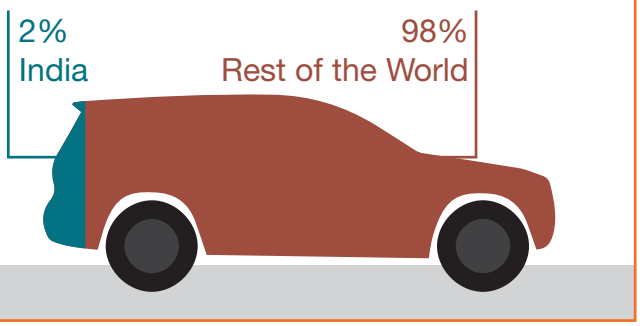
Automotive Electronics: Upcoming Area of Opportunity

Owing to the high demand and increasing modernization and digitization in the automobiles, the Automotive Electronics is forecasted to become an important segment of the Electronic Manufacturing industry.

Domestic Market For Automotive Electronics

By 2020, India is forecasted to account for approx. 2% share in the Global Automotive Electronics market reaching a value of approx. INR 36,500 Crore (USD 5.66 Billion). The auto components sector in India is currently estimated at USD 39 Billion.

India Automotive Electronics Market Share in 2020



Major Investments

March, 2017

Auto components' major investor Bosch is looking to invest up to INR 800 Crore annually for the next few years to develop its Bengaluru-based HQ into a modern connected and intelligent technology park.

May, 2017

Auto components' major investor Motherson Sumi Systems Ltd. (MSSL) has lined up capital expenditure of around INR 2000 Crore for FY 18, which includes setting up 3 plants in India.

Global auto electronic players like Johnson Controls and Denso have established presence in India through joint ventures and many are exploring options to further strengthen their base in the country.

Growth Drivers

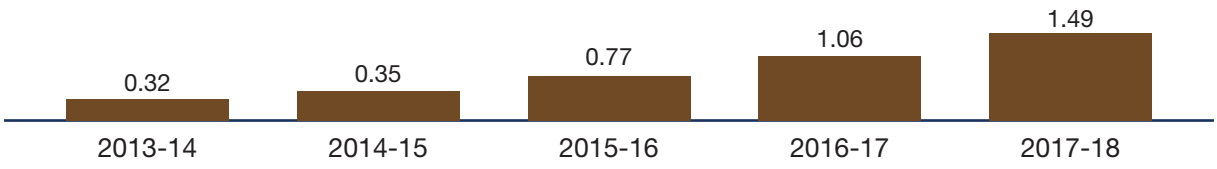
There exists tremendous potential in the Indian Auto Electronics space. Some prominent growth drivers are:

- **Increasing electronic content per car:** Cost of Auto Electronics content as a percentage of total automobile cost in India is expected to double from 23% to 45% over the period 2010-2030.
- **Increasing premium/luxury cars sales in India:** Higher-end car models constitute more auto electronics with larger and more complex electrical systems.
- **Emerging technologies:** Satellite navigation systems, remote security systems, traffic control systems, etc. are some of the emerging electronic accessories to be deployed in the Indian Auto Electronics space.
- **Huge potential in the aftermarket segment:** India has close to 20 million passenger vehicles on the road. More and more consumers are looking for electronic features in their cars, such as parking cameras, tyre pressure warning systems, parking sensors, etc.
- **Advent of Electric and Connected Vehicles:** With the government's continuous focus on electric vehicle adoption, the Automotive Electronic industry is expected to witness a boom.

3. Light Emitting Diodes (LED)

- The demand for energy efficient products has led to the production of Light Emitting Diode (LED). Because of the technical and economic benefits of LEDs, it is the choice for next generation energy efficient lighting. The demand for LEDs in residential and commercial space is growing rapidly.
- LED products are estimated to have a penetration of about 75% by 2020.

Manufacturing Of LEDs (in USD Billion)



Graph: Not as per Scale.

*Source: MeitY, NECTI Analysis

The manufacturing of Light Emitting Diode (LED) Products is estimated to reach INR 9,630 Crore (USD 1.49 Billion) in 2017-18 as compared to INR 1,941 Crore (USD 0.32 Billion) in 2013-14.

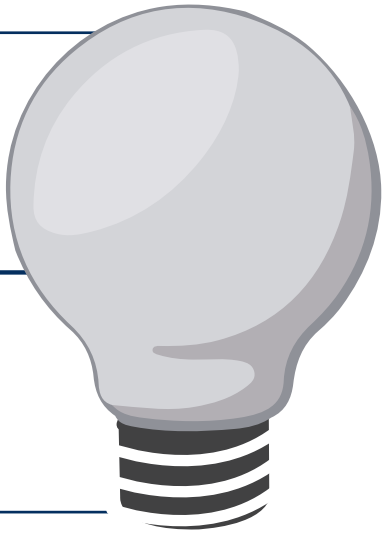
Major LED Players In Indian Market

INDIAN BRANDS

Wipro | Bajaj | Surya | Syska
Oreva | Moser Baer

GLOBAL BRANDS

Philips | Havells | Syska | Osram



Major Investments in LED Market in India

July, 2017

Hero Enterprise announced investment of USD 10 million (INR 65 Crore) in Mumbai-based consumer lighting firm Corv LED Light.

October, 2017

Philips is working with local municipal bodies to convert conventional lighting to LED system. This has been announced after Philips won a major portion of the government's LED distribution scheme.

March, 2018

Energy Efficiency Services (EESL) will be installing energy efficient LED lights at airports, buildings and facilities owned by the Airports Authority of India (AAI) across India.

March, 2018

Syska, a home-grown brand specialising in LED lighting solutions, has invested around INR 170 Crore (USD 26.37 Million) to boost manufacturing capacities.

Growth Drivers for LED Manufacturing

Unnat Jyoti by Affordable Lighting for All (UJALA)

UJALA
Unnat Jyoti by Affordable LEDs for All

UJALA is the world's largest LED distribution program.

Objective: To rectify India's high cost of electrification and the increased emissions from inefficient lighting.

Targets Under UJALA

770 Million LEDs to be distributed by March 2019 across 100 cities	**105 Billion KWh** Expected to be annual energy savings	**20,000 MW** Expected reduction of peak load	**INR 8000 Crore (USD 1.2 Billion)** Estimated capital investment (excluding O&M)	**79 Million Tons** of CO_2 Annual estimated greenhouse gas emission reduction

Targets Achieved (As of April 2018)

296 Million LEDs have been distributed	**Approx. 38,540 Million KWh** Energy saved per year	**Approx. 7716 MW** Peak load reduced	**Approx. INR 15,415 Crore (USD 2.39 Billion)** Cost saving per year	**Approx. 31.2 Million Tons** CO_2 reduced per year

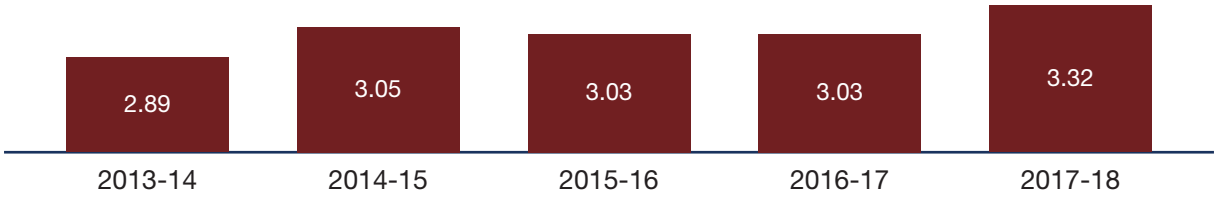
Benefits of UJALA

There has been a 4-fold increase in India's LED domestic manufacturing capacity	India's share in the global LED market has increased from 0.1% to 12%	Penetration of LEDs across India increased from 0.4% to 10% in the domestic market	India is now the 2nd largest LED market in the world, with annual revenues worth INR 21.4 Billion	The program has created around 12 Million USD of additional tax revenue and around 60,000 new jobs

- Favorable reforms have been introduced, such as reduction in excise duty to 6% on LED lamps and LEDs that are required for manufacturing of such lamps. Reduction in Special Additional Duty (SAD) from 4 percent to nil in import would also help LED manufacturers.
- Government has launched-Deen Dayal Upadhyaya Gram Jyoti Yojna (DDUGJY) program for rural electrification. Under this scheme, the government has electrified 597,459 (99.9%) villages out of 597,464 census villages. The program aims to distribute 27.3 million LED bulbs to BPL households.
- Street Lighting National Program (SLNP) has been launched, which aims to replace conventional streetlights with LED streetlights. Till date, around 3.5 million conventional streetlights have been replaced with LED lights.
- Increased usage of LEDs in automobiles, communications, signage, signaling, architecture and entertainment sectors is leading to the overall growth in manufacturing of LEDs.
- With the rapid expansion of residential and commercial buildings, the opportunity for LEDs in the general space illumination segment is expanding on a fast pace.

4. Computer Hardware

Manufacturing of Computer Hardware (in USD Billion)



*Source: MeitY, NECTI Analysis

- Economic digitization and the continuously evolving IT sector has led to the growing production of computer hardware industry.
- Manufacturing of Computer Hardware has grown from approx. INR 17,484 Crore (USD 2.89 Billion) in 2013-14 to approx. INR 21,401 Crore (USD 3.32 Billion) in 2017-2018

Major Segments

Desktops	Notebooks	Tablets	Monitors
Servers	Storage Flash Memory Card	USB Drives	Printers

Major Computer Hardware Players In Indian Market

INDIAN BRANDS

HCL | Micromax

GLOBAL BRANDS

Compaq | Dell | IBM | Apple | Acer | Hewlett-Packard | Toshiba | Lenovo

Major Investment in Computer Hardware Market in India

June, 2017

Hewlett-Packard plans to expand its operation in India by opening 1000 HP exclusive retail stores, by December 2018, which were earlier 490 stores.

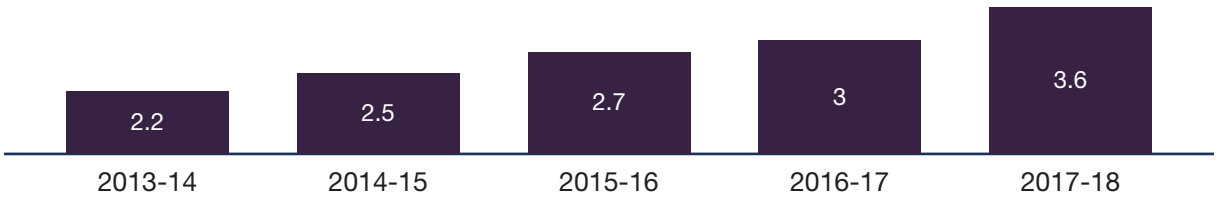
Growth Drivers

- India is one of the fastest growing market in IT services and hardware sector.
- The Server market, catering to smaller to medium businesses, is rapidly expanding in smaller cities.

5. Strategic Electronics

Strategic Electronics is a key area of Defense technologies, while being a vital component of nearly all the weapon systems, platforms and equipment that are designed and developed for Defense purpose.

Manufacturing of Strategic Electronics (in USD Billion)



Source: MeitY, NECTI Analysis

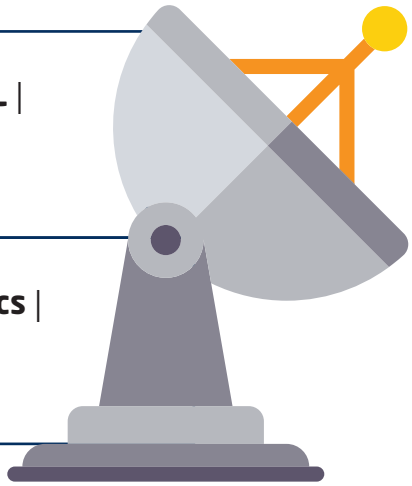
- The production of strategic electronics has grown from INR 13,800 Crore (USD 2.2 Billion) in 2013-2014 to INR 23,562 Crore (USD 3.6 Billion) in 2017-2018.
- India's aerospace and defense industry is expected to consume electronics worth USD 70-72 Billion in the next decade.

Strategic Electronic Segment consists of

- Military Communication Systems
- Radars and Sonars
- Network Centric Systems
- Electronic Warfare Systems
- Weapon Systems
- Satellite Based Communication
- Navigation and Surveillance Systems
- Navigational Aids
- Underwater Electronic Systems
- Infra-Red (IR) Based Detection and Ranging System
- Disaster Management System
- Internal Security System, etc.

Major Strategic Electronic Players In Indian Market

INDIAN BRANDS (Large Scale)	**Tata** | **Larsen & Toubro** (**L&T**) | **Wipro** | **HCL** | **Hindustan Aeronautics Limited** (**HAL**) | **Bharat Electronics Limited** (**BEL**)
INDIAN BRANDS (Small and Medium Scale)	**Rangsons Electronics** | **Centum Electronics** | **Kaynes Technology** | **Data Patterns India Pvt. Ltd.**



Major Investments in Strategic Electronics Market in India

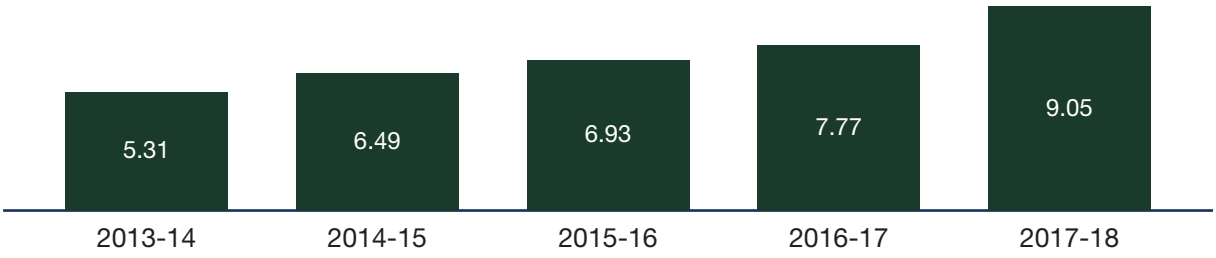
The Kerala government, in its 2018-19 State Budget, announced that it would be investing around INR 100 Crore (USD 15 Million) in Satellite based communication system to connect fishing vessels with villages.

Growth Drivers for Strategic Electronics

- Large scale modernization of India's Defense sector is helping to carve an exponential growth in the strategic electronics sector.
- There have been additional budgetary allocations from the Ministry of Home Affairs for paramilitary and state police force requirements, which has led India to become an attractive strategic electronics market.
- The Defense sector has got a policy boost through the amendment of the Defense procurement policy (DPP 2016). This includes a special category called '[Buy Indian – IDDM (Indigenously Designed, Developed and Manufactured)]' that will get the highest priority in the Defense procurement process. Inclusion of this new procurement category will provide a greater thrust to domestic manufacturing.
- The government has launched programs and schemes, such as Technology Development Fund (TDF) and also, opened Army Design Bureau to facilitate R&D activities in this field.
- The government has removed the 49% FDI limit in Defense sector, opening avenues for significant investment. The liberalised FDI regime permits up to 100 per cent (up to 49 percent through the automatic route and beyond that through the Foreign Investment Promotion Board or FIPB route) foreign equity in the Defense sector.

6. Electronic Components

Manufacturing of Electronic Components (in USD Billion)

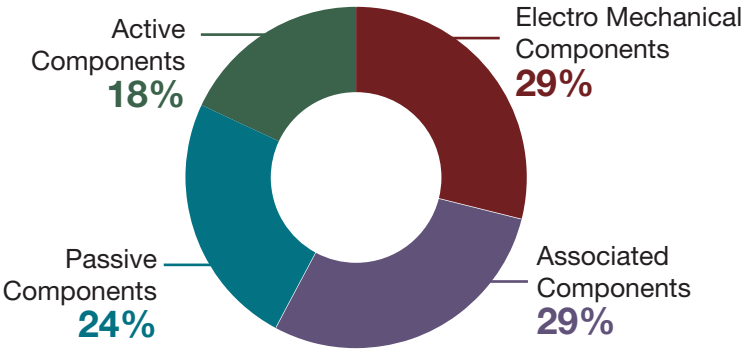


Source: MeitY, NECTI Analysis

Manufacturing of Electronic Components has increased from INR 32,102 Crore (USD 5.31 Billion) in 2013-2014 to around INR 58,351 Crore (USD 9.05 Billion) in 2017-2018.

Electronic Components' Categorization

Electronic Components are classified into the following categories:



Electro Mechanical Components include Printer Circuit Boards, Connectors, etc.

Active Components include Integrated Circuits' Diodes, Transistors, Picture Tubes, etc.

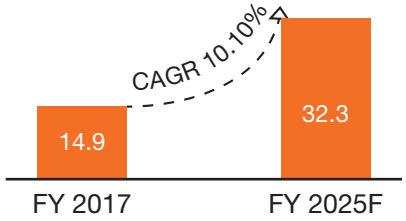
Passive Components consist of Wound Components, Capacitors, Resistors, etc.

Associated Components consist of Optical Discs, Magnets, RF Tuners, etc.

Semiconductors and Printed Circuit Boards are More Popular Electronic Components

Semiconductor Design

Market Size of Semiconductor (in USD Billion)



The Indian semiconductor component market is expected to reach USD 32.35 Billion by 2025, growing at a CAGR oft approx. 10.10% between 2018 and 2025.

Source: ELCINA, NECTI Analysis

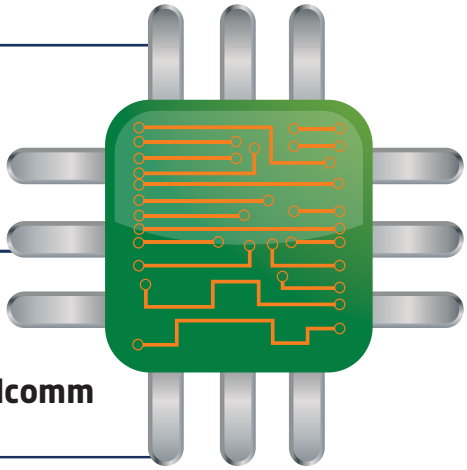
Major Semiconductor Players In Indian Market

INDIAN BRANDS

Adroit IC Design | Ineda Systems Pvt. Ltd. | Infineon Technologies India Pvt. Ltd. | Masamb Electronics Systems | Semtronics Microsystems Pvt. Ltd.

GLOBAL BRANDS

STMicroelectronics Pvt. Ltd. | Intel | Samsung | Flextronics International Ltd | NXP Semiconductors | Cisco Systems | Qualcomm



Major Investments in PCB Market in India

June, 2017

Venture capital firm Next Orbit Ventures is planning to invest around USD 10 Billion in three semiconductor fabrication units or wafer fabs (one for manufacturing of digital integrated chips, the second for analog integrated chips, and the third for manufacturing solar cells).

February, 2018

According to the India Electronics and Semiconductor Association (IESA), the ESDM industry, under the Make in India campaign, is projected to obtain investment proposals worth USD 1.5 Billion over the next two years.

April, 2018

ISRO launched navigation satellite system, which used ISRO semiconductor laboratory's digital chips for cell phones and Wi-Fi recievers.

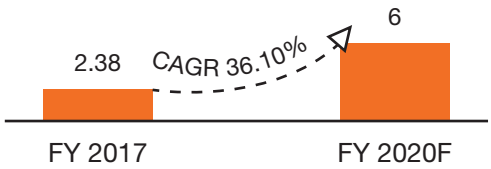
Growth Drivers

- India Electronics and Semiconductor Association (IESA) has signed a memo with Taiwan Electrical and Electronic Manufacturers' Association to promote cooperation and investment between the two countries in electronic system design and manufacturing sector.
- IESA has signed an MoU with Singapore Semiconductor Industry Association (SSIA) to develop trade and technical cooperation ties between the electronics and semiconductor industries of both the countries.
- German semiconductor firm, Infineon Technologies has partnered with National Skill Development Corporation (NSDC) to impart training to youth on semiconductor/chip technology

PCB

PCB market is reaching new heights and a prime reason for the same is the 'Make in India' program. PCB, because of its usage, forms the backbone in almost all of the electronic products, ranging from consumer gadgets, such as PCs, tablets, smartphones and gaming consoles to industrial and even high-tech products in the strategic and medical electronics domains.

Market Size of PCB (in USD Billion)



Current demand for PCBs (including both Bare Board PCBs and the Populated PCBs) is around USD 2.38 Billion. It is forecasted to reach approx. USD 6 Billion by 2020, growing at a CAGR of approx. 36.10%.

Source: ELCINA, NECTI Analysis

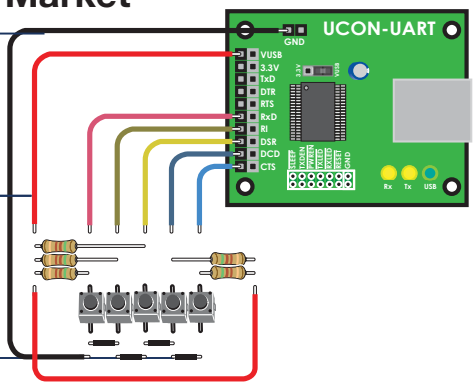
Major PCB Brands Present In Indian Market

INDIAN BRANDS

AT&S India Pvt. Ltd. | Shogini Technoarts Pvt. Ltd and many others

GLOBAL BRANDS

Samsung | Qualcomm | Panasonic and many others



Major Investments in PCB Market in India

February 2018

Wistron, one of the leading Taiwanese contract manufacturers is planning to relocate a Printed Circuit Board (PCB) manufacturing plant from China to Bengaluru, involving an investment of around USD 1 Billion (about INR 64 Billion)

April, 2018

Xiaomi is setting up a new PCB assembly unit in partnership with Foxconn

May, 2018

Mobiistar, a Vietnamese handset brand, is planning to enter India and set up SMT (Surface-Mount Technology) for PCB assembling

Growth Drivers

As PCBs are used in almost all the electronic products, the growth in the PCB industry is largely dependent on the demand for other electronic products:

- It is projected that growth in the PCB market will be driven by the growth in consumer electronics segment, followed by requirements from the automotive, industrial and LED lighting segments.
- Advancement in technology, such as High Density Interconnection (HDI), enables more interconnection functions per unit area and positively impacts the market for advanced level applications. It is expected to indirectly propel demand for PCBs in future also.
- Government's recent push towards indigenisation in strategic electronics manufacturing is expected to boost the demand for high-grade multi-layered PCBs.

2 Government Initiatives: To Boost Demand & Manufacturing

The Government of India is promoting Electronics Manufacturing in the country with a target of NET ZERO Imports by 2020. There are various government initiatives working towards turning this into a reality.

2.1 Initiatives to Boost Manufacturing

2.1.1 Make in India

The government is driving reforms in IT and Electronics Manufacturing sector through initiatives like 'Make in India' and creating favorable policies to enable an investor-friendly environment. Electronic System Design and Manufacturing is one of the major sectors of 'Make In India'.

Target to Achieve for Electronics Sector

Net Zero Import By 2020

Achievements Under Make in India

- Mobile industry has emerged as the top most category under Make in India initiative.
- Around 120 manufacturing units of Mobile handsets and components have been set up in India from 2015 to 2017.
- India has become the second largest mobile phone manufacturing country in 2017.
- India manufactured electronic goods worth USD 60.12 Billion in 2017-2018.

Initiatives Under Make in India

Public Procurement (preference to Make in India) order was passed in 2017 by Ministry of Electronics and Information Technology to promote manufacturing of goods and services in India. Under public procurement order, the government targeted 10 domestically manufactured electronic products for providing preference on the basis of prescribed domestic value addition, ranging from 40% to 70%.

The category comprises the following 10 products:

Desktop | Laptop | Tablet | Dot Matrix Printer | LED Products

Contact and Contactless Smart Cards | Biometric Access Control | Biometric Finger Print Scanner | Biometric Iris Sensors | Biometric Iris Servers

Major Government Policies Supporting Make In India

- FDI Policy
- Electronic Development Fund (EDF)
- Modified Special Incentive Package Scheme (M-SIPS)
- Electronic Manufacturing Clusters (EMC)
- Support for International Patent Protection
- Merchandise Export from India Scheme
- Support for International Patent Protection in E&IT (SIP-EIT) - II

2.1.2 Digital India

The Digital India program is a flagship program of Indian Government to transform India into a digitally enabled society. The program was launched in 2015.

- Electronics manufacturing is one of the 9 pillars of Digital India, which focuses on encouraging the production of Electronics in India.
- The focus areas comprise fab-less design, set top boxes, VSATs, mobiles, consumer & medical electronics, smart energy meters, smart cards and micro-ATMs.

Target To Achieve For Electronic Sector Under Digital India

Net Zero Import By 2020

Achievements Under Digital India

- National Informatics Centre (NIC) has created a mobile development center which has created approximately 230 mobile apps for various e-Governance projects.
- 115 mobile handset and component manufacturing units established during the past three years (FY 2014-15 to FY 2017-18).

Major Government Policies Supporting Digital India

- Modified Special Incentive Package Scheme
- Electronic Manufacturing Cluster Scheme
- Electronic Development Fund Scheme
- Incubator

2.2 Major Initiatives and Schemes

- Policy Initiatives
- Patent Initiatives
- Innovation and R&D
- Skill Development

2.2.1 Policy Initiatives

1. National Policy on Electronics (NPE)

The vision of NPE is "to create a globally competitive electronics design and manufacturing industry to meet the country's needs and serve the international market". Indian government has completely aligned itself with NPE goals and is dedicated to achieve its vision by 2020.

These goals will help India to become one of the major leaders in the manufacturing of electronic goods.

Goals of National Policy on Electronics 2020

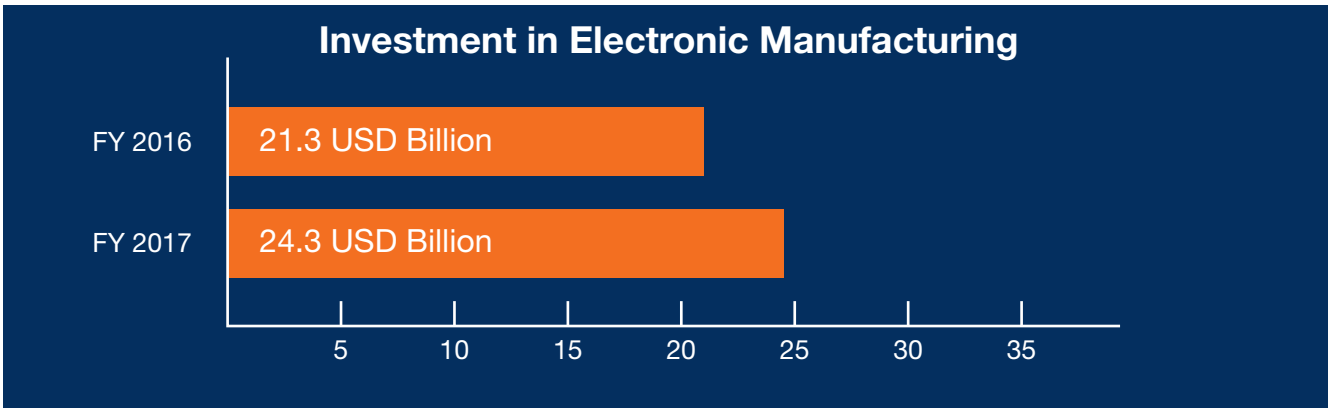
- Attract an investment of USD 100 Billion
- Reach a turnover of USD 400 Billion
- Grow the chip design/ embedded software industry to USD 55 Billion
- Create an employment for 28 Million
- Enhance exports to USD 80 Billion

Goals and Their Current Status

Attract An Investment of USD 100 Billion

Investment in the electronic manufacturing increased to USD 24.3 Billion (INR 1.57 Lakh Crore) in FY 2017 from USD 21.3 Billion (INR 1.43 Lakh Crore) in FY 2016.

- The production of Mobile Phones witnessed a steep rise of almost 60% from FY 2016 to FY 2017.
- Around 17.5 Crore mobile units were produced in 2017 as compared to 11 Crore units produced in 2016.



Reach A Turnover of USD 400 Billion

The government has targeted the turnover of USD 400 Billion, which is to be achieved by 2020.

- Indian Electronics market was worth USD 122.1 Billion in 2017-18.
- To boost the manufacturing of Electronics under the Make in India initiative, Indian government has increased the import duty on products, such as smartphones, LED and microwave ovens.

Grow The Chip Design/Embedded Software Industry to USD 55 Billion

With wide usage of semiconductors or chips in almost every electronic product, the scheme focuses on boosting this sub sector of Electronics.

- India is a hub of 120 companies in chip designing. Around 30,000 engineers are employed in embedded software and chip testing industry, including 20,000 for chip designing alone.
- As of 2017, Indian semiconductor industry generates annual revenue of USD 35 Billion.

Create An Employment of 28 Million

As per Ministry of Skill Development and Entrepreneur, the Electronics and IT Hardware Industry provided employment to 6.2 Million people in 2017.

Mobile phone industry alone generated 450,000 jobs during the past three years (2014-15 to 2017-18).

India's exports of electronic goods were valued at USD 5.9 Billion in 2016-17.

Special Economic Zones (SEZs) have been set up to ease out manufacturing and trading for export purposes. The Electronics Hardware Technology Park (EHTP) units are the major contributors to exports.

The Government provides following income tax benefits to SEZ Units:
- 100% exemption on export profits up to 5 years
- 50% for next 5 years
- 50% of ploughed back profits for 5 years thereafter

2. Modified Special Incentive Package Scheme (M-SIPS)

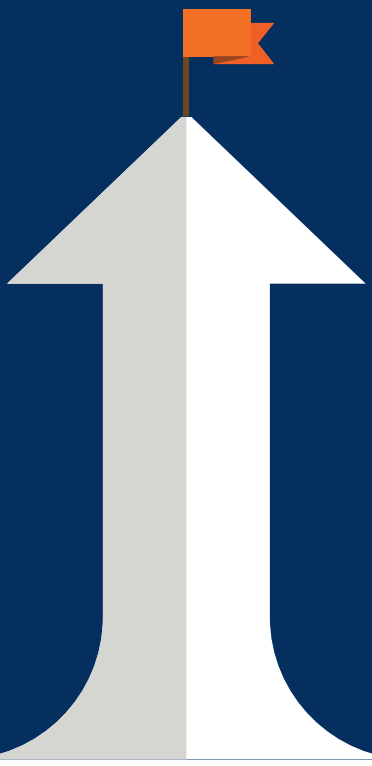
M-SIPS was announced in the year 2012 and amended in 2015 to promote large scale electronic manufacturing in India. This scheme covers 29 verticals of electronic manufacturing.

Objective - The aim of this scheme is to attract investments in Electronic Manufacturing and provides a capital subsidy of 20% in SEZ (25% in non-SEZ) for units engaged in electronics manufacturing and reimbursement of CVD/excise for capital equipment in non SEZ units.

Achievements

As of February 2018, 322 applications have been received with the investment of INR 133,861 Crore
- 148 applications have been approved with the investment of INR 27,460 Crore.
- 19 applications have been recommended for approval by the Appraisal Committee with the investment of INR 12,253 Crore.
- 80 applications have been closed for not meeting the criteria with the investment of INR 42,193 Crore.
- 73 applications are under appraisal involving investment of INR 14,378 Crore.

2 mega projects have been proposed with investment of more than USD 1 Billion
- Twinstar Display Technology to manufacture Display Fab with an investment of INR 23,951 Crore.
- Mundra Solar PV Limited to manufacture Solar Panels with an investment of INR 13,985 Crore.



January, 2018

In Rajasthan, Havells announced to invest INR 360 Crore to set-up a new manufacturing facility.

February, 2018

The Central Government approved the investment of INR 67.74 Billion from Samsung and OPPO under the M-SIPs policy for Uttar Pradesh.

3. Electronic Manufacturing Clusters (EMC)

Electronic Manufacturing Clusters is an initiative which was taken by the government in October 2012. It has helped India to create a strong position for Electronic Manufacturing in the world.

- India is developing various Electronic Manufacturing Clusters to achieve the vision of 'Net Zero Import By 2020'.
- As of February 2018, government has received 50 applications under EMC scheme including 46 applications for setting up Greenfield Clusters.

Objective - The scheme targets to establish a world-class infrastructure for attracting investments in the ESDM sector.

Achievements

As of February 2018, financial assistance of INR 251.85 Crore for 12 EMC projects has been granted by the government as an aid.

1. Greenfield EMCs

In the Greenfield EMCs, the assistance for projects is restricted to 50% of the project cost, subject to a maximum of INR 50 Crore for every 100 acres of land.

Total number of Greenfield EMC (final approved)	20
Total number of Greenfield EMC (in principle approved)	03

States to host Greenfield EMCs:

Final Approved Greenfield EMCs
- Andhra Pradesh
- Assam
- Chhattisgarh
- Goa
- Gujarat
- Jharkhand
- Kerala
- Madhya Pradesh
- Odisha
- Rajasthan
- Telangana
- Uttar Pradesh
- West Bengal

Principle Approved Greenfield EMCs
- Andhra Pradesh
- Bihar
- Gujarat

2. Brownfield EMCs

In the Brownfield EMCs, the 75% of the infrastructure, subject to a ceiling of INR 50 Crore, is provided as grant.

Total number of common facility centers in Brownfield EMC (final approved)	03

States to host Brownfield EMCs:

Final Approved common facility centers in Brownfield EMCs
- Karnataka
- Maharashtra

4. Merchandise Export from India (MEIS)

MEIS was launched under Foreign Trade Policy (2015-2020) of India in 2015. Under this scheme, the government focuses on increasing the exports by providing subsidy under MEIS, which is payable as a percentage (2, 3, 4, 5 or 7%) of realized FOB value (in free foreign exchange).

Objective - To boost the export of domestic products.

Achievements

MEIS had the highest number of issued scrips (66.5%) among other export promotion schemes. MEIS is applicable on export of 237 electronic products.

5. Preferential Market Access (PMA)

The scheme was launched in December 2013. Under this policy, the government provides the quota of minimum 30% for domestic players in procurement of electronic goods by government.

Objective - The objective of PMA is to provide preference to domestically manufactured electronic goods that are procured by the government for its own use.

Salient Features of PMA

- The Policy is applicable to all Ministries (except Ministry of Defense) and the Electronic products made under any scheme announced by the government.
- This Policy is applicable to the products that are manufactured by the companies registered in India.
- All the registered companies in India that are involved in manufacturing of electronic products and are the sole selling agents of the domestic manufacturers of electronic products, are eligible under this Policy.
- The electronic products should meet the graded domestic value-addition (25% in year 1 going up to 45% in year 5) in terms of Bill of Material (BOM) from domestic manufacturers, in order to be notified under this Policy.
- The Policy is valid for 10 years (from 2013) and will be reviewed in regular intervals of time.

Achievements

The policy was applied in the year 2017-18 by several State Governments to resolve Right of Way (RoW) issues for easy implementation of BharatNet 2.0 (a government project to provide broadband connectivity to 1.5 Lakh Gram Panchayats).

2.2.2 Innovation and R&D

Various initiatives have been launched for the growth of innovation in the electronic manufacturing sector.

1. Electronic Development Fund (EDF)

EDF was set up in February 2016, as a part of the Government's focus to achieve 'Net Zero Imports' by 2020 in ESDM sector. The government focuses on creating an ecosystem of innovation, and research and development (R&D), with an active industry involvement.

The primary focus of Electronic Development Fund (EDF) is to set up a 'Fund of Funds' to participate in professionally-managed 22 'Daughter Funds', which will provide risk capital to companies for developing new technologies in Electronics and other related sectors.

Objective - To provide cumulative assurance of EDF to 22 Daughter Funds is INR 1,227 Crore with a total targeted corpus of around INR 10,900 Crore.

Achievements

As of February 2018,
contributors provided financial assistance of INR 56.99 Crore, which includes INR 51.24 Crore by MeitY.

MeitY also invested INR 16.38 Crore in two Daughter Funds.

In February 2017,
Union Government announced to invest INR 2,200 Crore in startups related to Electronics Technology under the EDF by 2019, which will help in mobilizing INR 22,000 Crore for the 'Daughter Funds'.

2. Technology Incubation Development of Entrepreneurs (TIDE) Scheme:

The scheme was launched in 2008 and is valid upto 2020.

- Financial assistance is provided to various higher learning institutions to strengthen their Technology Incubation Centers. Each TIDE center would be given a financial support of up to INR 155 Lakh as grant-in-aid, payable in installments.
- Under this scheme, 27 TIDE centers and 2 virtual TIDE Centers are being supported at Institutes of Higher Learning that are located across the country.

Objective - To promote startups for Information Technology, Communication & Electronics sectors.

Achievements (As of February, 2018)

Total startup benefited **207**	Total entrepreneurs benefited **384** (including 34 women)	Investment through Venture Capitalists **INR 172.39 Crore** in 52 startups	Total startups graduated **95** (out of 207 startups)
Total products patented by these startups **74**	Jobs created by 27 TIDE centers **2,846**	Total products developed by these startups **243**	

Recent Incubators

August 2017

Telangana government announced to set up a Defense Incubator in Hyderabad.

February 2018

IIT-Hyderabad launched the incubator in chip design with the support of MeitY.

February 2018

The Karnataka government proposed to establish an Incubation Center in Kalaburagi at a cost of INR 5 Crore.

March 2018

Telangana government launched the first incubator exclusively for women, named 'WE Hub'.

March 2018

Uttar Pradesh government to build the largest Incubator in India with a fund of INR 1,000 Crore

March 2018

Cisco announced to collaborate with 'Maker Village', Kerala - India's largest hardware electronic incubator to familiarize it with Cisco's ecosystem and provide equipment worth INR 1 Crore.

2.2.3 Patent Initiatives

1. Support for International Patent Protection in Electronics & Information Technology (SIP-EIT)

SIP-EIT has enhanced the recent innovations and technological advancement in the Electronics manufacturing industry. The scheme was launched in 2014 for 5 years (till November 2019).

Under this scheme, the reimbursement is limited to a total of INR 15 Lakh per invention or 50% of the total expenses incurred in filing and processing of the patent application up to the grant, whichever is lesser in terms of value.

Objective - To facilitate Micro, Small and Medium Enterprises (MSMEs) and Technology Startup units with financial support for international patent filing, in order to encourage innovation and recognize the value and capabilities of global IP.

Achievements

As of February 2018, 30 applications from startups and MSMEs have been supported since the beginning of the scheme.

2. Intellectual Property Awareness (IP Awareness)

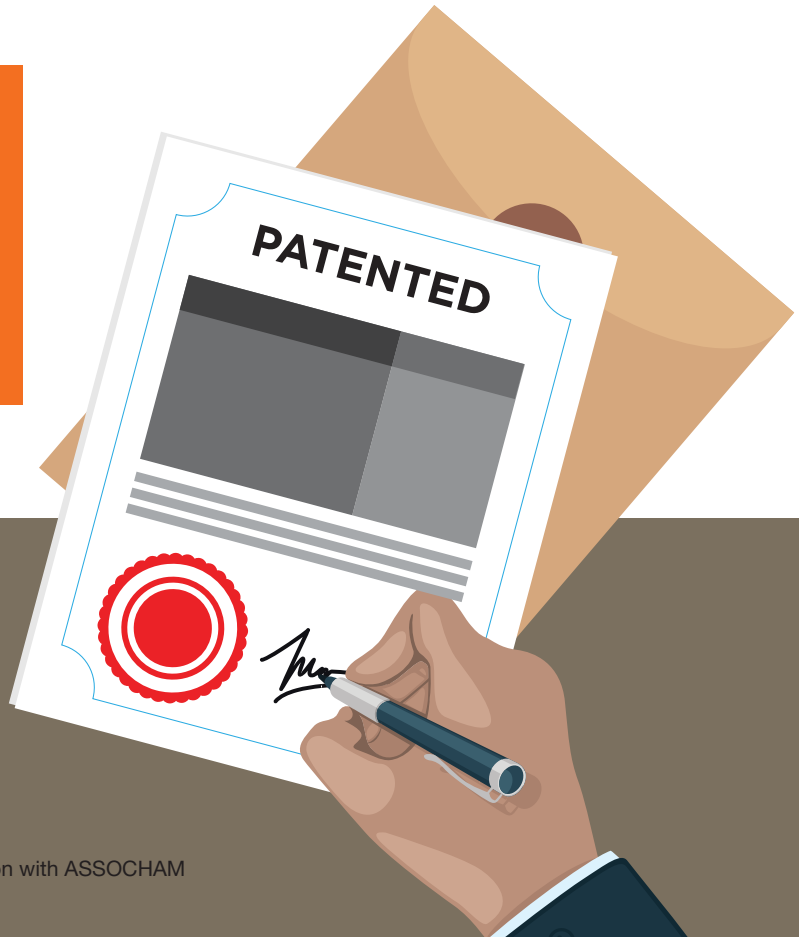
The scheme provides Intellectual Property Awareness workshops, seminars and funding to the startups. The scheme was launched in 2014 and is valid up to 5 years (till November 2019). The funding will be restricted as follows:

- Awareness programs in educational institutes - limited to INR 2 Lakh/program.
- Awareness programs to be organized by industry bodies - limited to INR 3 Lakh/program.
- Workshops organized by MeitY and involving international experts - INR 5 Lakh.

Objective - The aim of this scheme is to create a sustainable model for creating IPR awareness among various stakeholders.

Achievements

Under this scheme, 56 IPR awareness workshops have been supported, out of which 16 workshops have been supported in the year 2017.



2.2.4 Skill Development

1. Schemes for Skill Development in Electronic System Design Manufacturing (ESDM) Sector

Following are the two schemes that were launched under ESDM sector:

1.1 Skill Development in ESDM for Digital India

Objective - The purpose of this scheme is to provide skill development for 328,000 individuals at an expenditure of around INR 411 Crore by March 2019.
This platform was launched in 2014, under Digital India, to facilitate progress of ESDM sector and cover all states and UTs.

This scheme is classified into 5 levels for the enrollment of candidates on the basis of their education:

Levels	Entry At	Targets
Unskilled L1 – L2	VIII Pass	82,000
Semi Skilled L3	X Pass	82,000
Supervisor L4	X and ITI (Industrial Training Institute), XII Pass Other Graduate (Non Science)	1,14,800
Trainer L5	Diploma B.Sc.	49,200

1.2 Financial Assistance to select States/UTs for Skill Development in (ESDM) sector

Objective - To provide skill development to 90,000 candidates in ESDM sector with the grant of INR 100 Crore by March, 2019.
This scheme was approved by government in 2013. This scheme is under execution for eight states: Andhra Pradesh, Telangana, Karnataka, Kerala, Jammu & Kashmir, Punjab, Uttarakhand and Uttar Pardesh at 5 levels.

In this scheme, 5 levels for the enrollment of candidates on the basis of education are:

Levels	Entry At	Targets
Unskilled L1 – L2	VIII Pass	22,500
Semi Skilled L3	X Pass	22,500
Supervisor L4	X and ITI XII Pass Other Graduate (Non Science)	31,500
Trainer L5	Diploma B.Sc.	13,500

Achievements

Training has been provided in 59 National Standard Qualification Framework aligned courses at 1,885 training institutes.

As of February 2018, 238,000 candidates have been registered under these two schemes, out of which 176,000 have been certified.

2. Schemes for Post Graduate and Doctorate Level (Visvesvaraya PhD Scheme)

This scheme was launched in 2014 with a total estimated cost of INR 466 Crore.

Objective - To support 3,000 PHDs for promoting innovation and new product development including 1,000 full-time and 2,000 part-time PHDs in ESDM and IT/ITES, over the period of 5 years.

Achievements

Supported Institutions (2017)	94
Approvals for Fellowships (till February, 2018)	128
Offered Full-time PHDs in ESDM (till February, 2018)	970
Supported Part-time PHDs in ESDM (till February, 2018)	190

3. Financial Assistance for Electronics and Information & Communication Technologies (ICT) Academics

The objective of this scheme is to set-up seven Electronics & ICT academies as a unit in IITs, NITs and IIITs, with a target to train 4,000 faculty members under category A academics (at IIT Kanpur, IIT Guwahati, NIT Patna, NIT Warangal and IIITDM, Jabalpur); and 1,600 under category B per annum (IIT Roorkee and MNIT, Jaipur), with the total cash outlay of INR 148.47 Crore.

Objective -

- To focus on improving the quality of faculty in institutes and colleges in respective states/UTs by organizing faculty training programs.
- To develop state-of-the-art facilities like technical labs, well-equipped library, interactive virtual learning facility, etc.

Achievements

As of February 2018, 347 faculty Development Programs (FDPs) covering 13,220 participants have been conducted by these academies.

3 Impact of GST and Union Budget Announcement

3.1 Goods and Service Tax (GST)

'One Nation, One Tax'

- From April 2018 to December 2018, the deficit generated from electronic goods is estimated to be around USD 49 Billion, which is 24% higher as compared to USD 37 Billion of April-December, 2017.

- GST was implemented on July 1st, 2017 to boost the Indian economy by limiting the fiscal deficit, which was generated through the trade differences prevailing in different states across India.

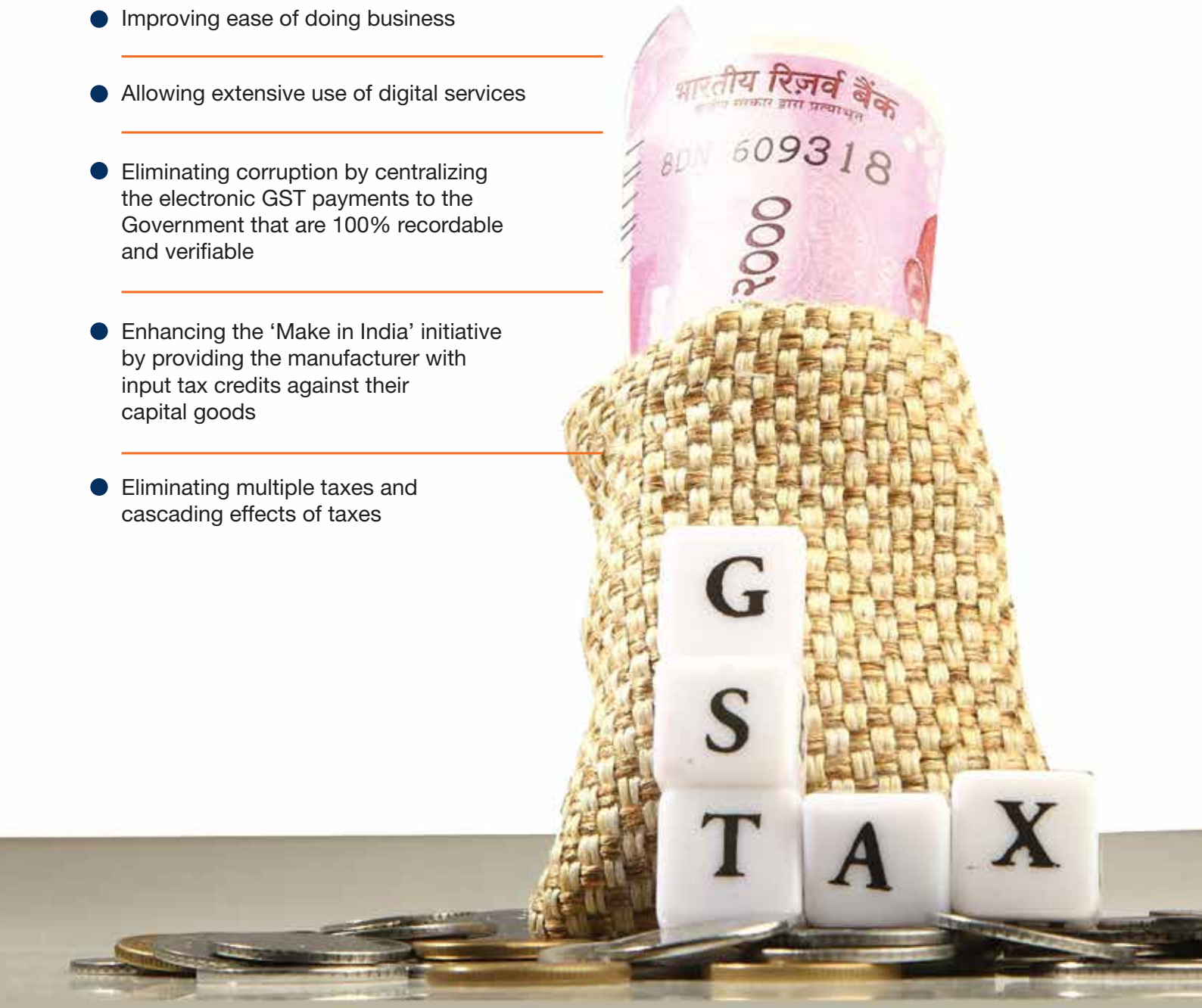
- For each type of product, the amount of tax was defined separately.

Impact of GST on Major Electrical and Electronic Products

Segment	Products/Components	Current GST Rates		Outcomes
 Computer Hardware	Monitor (< 17 Inch)	18%		Laptops and Desktops have become costlier (pre GST rates 14-15%)
	Server			
	Notebook and Laptop			
	Printer			
 Communication And Broadcasting Equipment	DTH	18%		Resulted in ease of working capital management and optimization of cash flow for operators.
	Set Top Box			
	Router			
	Telephone (Wired/Wireless)			
 Consumer Electronics	Mobile Phone	12%		• The cost for smart phones have remained unaffected. • Other consumer electronics have become costlier by a margin of 2-3%.
	Television	28%		
	Air Conditioner			
	Washing Machine			
	Refrigerator			
 Strategic Electronics	Satellite Based Communication	18% (Domestic)	0% (Exports)	The demand for Indian Satellite Communication Services in international market has increased.
	Radar	18%		
 Industrial Electronics	Automation System	18%		Price of commercial electrical machinery has remained neutral.
	Process Control Instrument			
	UPS System			
	LED (Industrial)			
 Electronic Components	PCB	18%		The prices of electronic components have reduced due to cost savings in warehousing and logistics.
	Semiconductor			
	Resistor and Capacitor			
	Primary Cell and Battery			

Overall Impact of GST

- Decreasing cost of production
- Free movement and supply of goods in every part of the country
- Decreasing cost of electronic goods
- Increasing transparency in the system
- Increasing demand for electronic goods
- Better competitive domestic retail pricing
- Improving ease of doing business
- Allowing extensive use of digital services
- Eliminating corruption by centralizing the electronic GST payments to the Government that are 100% recordable and verifiable
- Enhancing the 'Make in India' initiative by providing the manufacturer with input tax credits against their capital goods
- Eliminating multiple taxes and cascading effects of taxes



3.2 Union Budget 2018-19

- This year's budget was the first, after the introduction of GST.
- There have been a lot of amendments in the basic custom duty for electronics and electrical products to promote the 'Make in India' initiative.

Products Covered	Old Rate	New Rate	Expected Outcomes
Specified parts/accessories of motor vehicles, motor cars and motor cycles	7.5%/10%	15%	An increase in demand and supply of locally manufactured automobile parts
CKD imports of motor vehicle, motor cars and motor cycles	10%	15%	Impact on luxury car manufacturers who have set up assembly plants in India
Solar tempered glass or solar tempered glass for manufacture of solar cells/panels/modules	5%	Nil	Manufacturing solar panels would become cheaper
Ball screws, linear motion guides and CNC systems for manufacture of all types of CNC machine tools	7.5%	2.5%	To support the increase in the rate of manufacturing all over the country
Cellular Mobile Phones	15%	20%	• No major increase in prices since high volume of mobile phones are already manufactured in India • Increase in domestic value addition
LCD/LED/OLED panels and other parts of LCD/LED/OLED TVs	7.5% / 10%	15%	• TV sets to become costlier • Promote job creation in the country
Specified parts and accessories of cellular mobile phones (including lithium ion battery, wired headset, microphone, die cut parts, etc.)	7.5% / 10%	15%	• Pushing manufacturers towards 'Make in India' initiative • Increase in indigenous manufacturing • Reduced wastage and increased manufacturing efficiency • Increase in demand for locally manufactured goods • Cheaper and competitive pricing • Promote job creation
Printed Circuit Board Assembly (PCBA) and molded plastic for charger/adaptor of cellular mobile phone	Nil	10%	
Smart watches/wearable devices	10%	20%	
Lithium-ion batteries (except those for cellular mobile phones)	10%	20%	

4 E-waste

E-waste includes all forms of waste products containing circuitry (or electrical/electronics) as a manufacturing component that run on either battery or power supply. It may include general consumer electronics, such as TV appliances, computers, laptops, tablets, mobile phones, white goods and also, industrial grade electronics, such as telecommunication systems, instrumentation systems and electronic machinery.

Reasons Behind Staggering Growth Rate of E-waste are:

Growing Speed of ICT Industry

Rapid Technological Advances

Increasing Number of Users

Increasing Demand for Superior Innovation and Efficiency

Social and Economic Growth

Shorter Replacement Cycles of The Electronics and Electrical Equipment

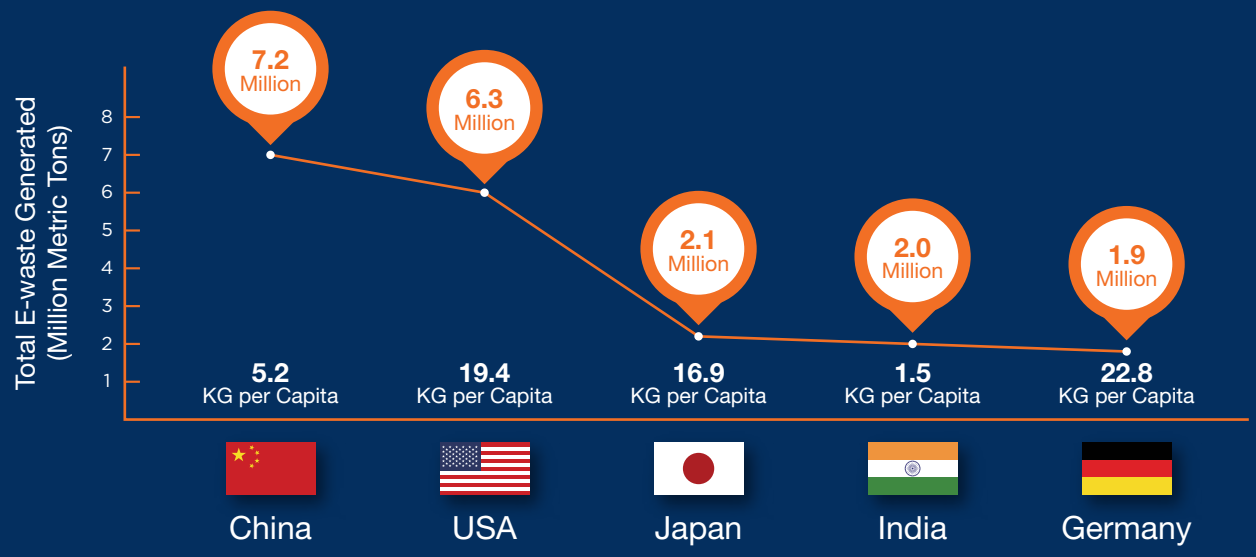
Dumping of Used and Waste EEE (Electronics and Electrical Equipment) into Developing or Under Developed Countries by the Developed Countries

4.1 Current Worldwide Scenario Of E-waste

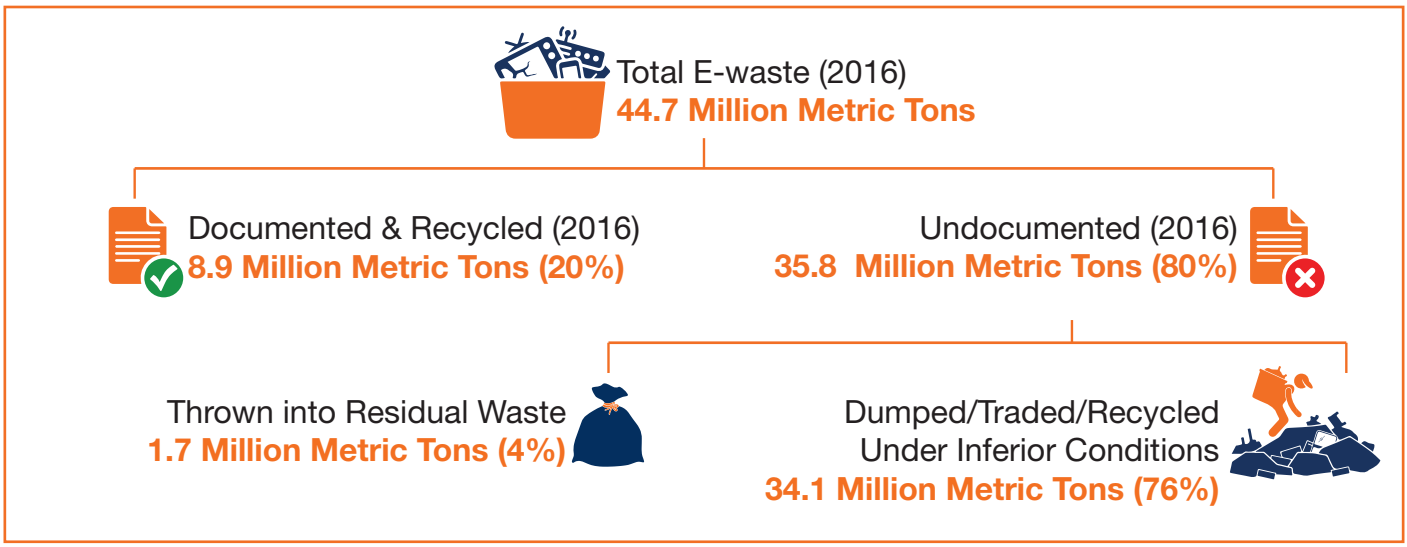
Electronics and Electrical Equipment (EEE) are manufactured and disposed worldwide. In 2016, 44.7 Million Metric Tons (MT) of e-waste was generated worldwide (equivalent to 6.1kg/inhabitant). Following the current growth rate of rising e-waste, it is estimated that by 2021, e-waste will rise to 52.2 Million Metric Tons or 6.8 kg/inhabitant.

Top 5 countries in terms of e-waste production

The total value of all raw material present in e-waste is estimated at approximately USD 61.05 Billion in 2016, which is more than the GDP of most countries in the world.

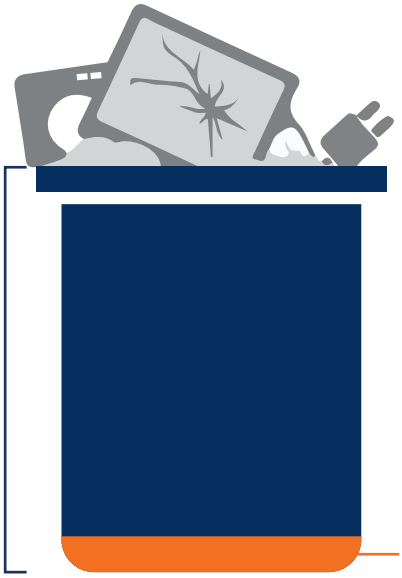


Out of the total e-waste produced in 2016, only 20% (8.9 MT) is documented to be collected properly and recycled, while there is no record of the remaining e-waste. The quantity of e-waste generated worldwide is expected to grow at a rate of 3.15% (CAGR), due to which the estimate for the year 2018 has risen to 47.55 MT.



4.2 Indian scenario: E-waste

E-waste Generated in 2016 (MT)



Total e-waste of the world (2016) **44.7 Million Metric Tons**

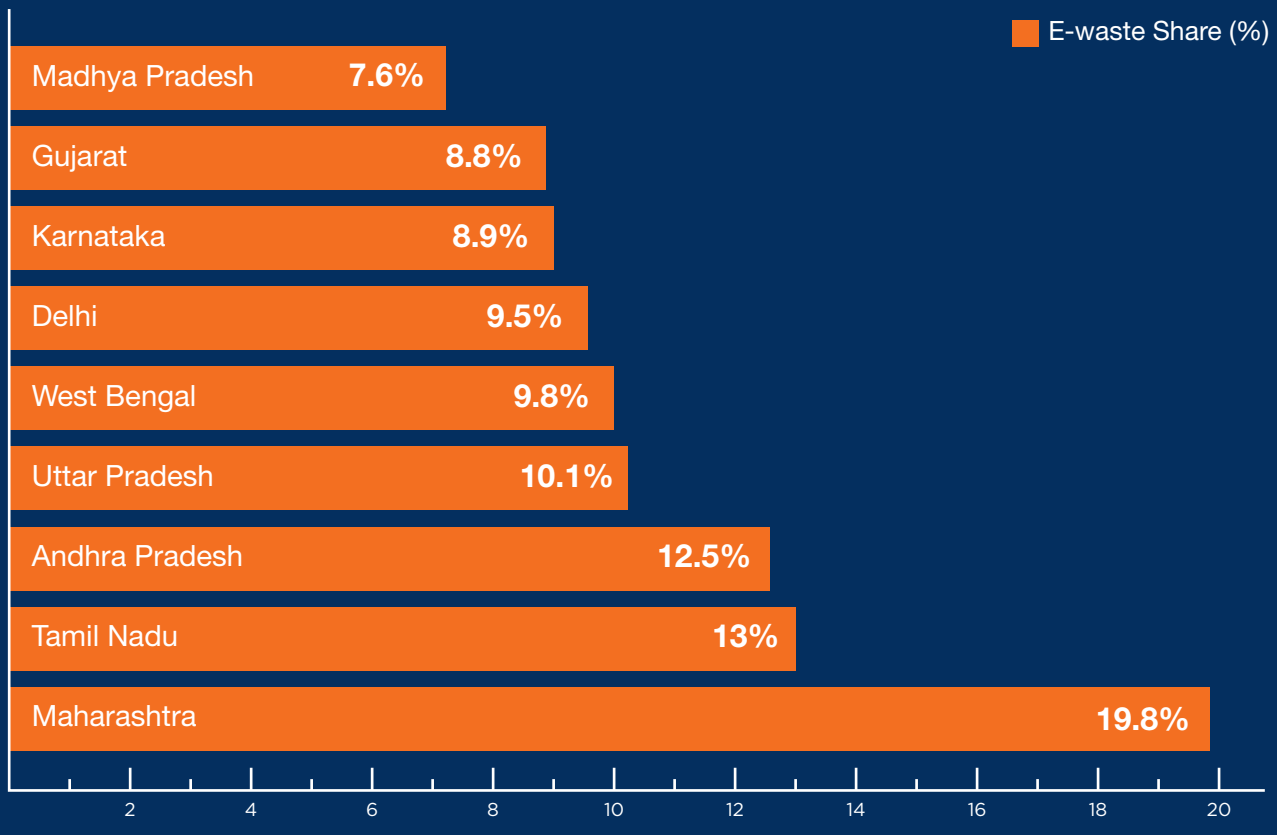
Total e-waste of India (2016) **2 Million Metric Tons**

Unorganized **79%** **1.58 Million Metric Tons**

Organized **21%** **0.42 Million Metric Tons**

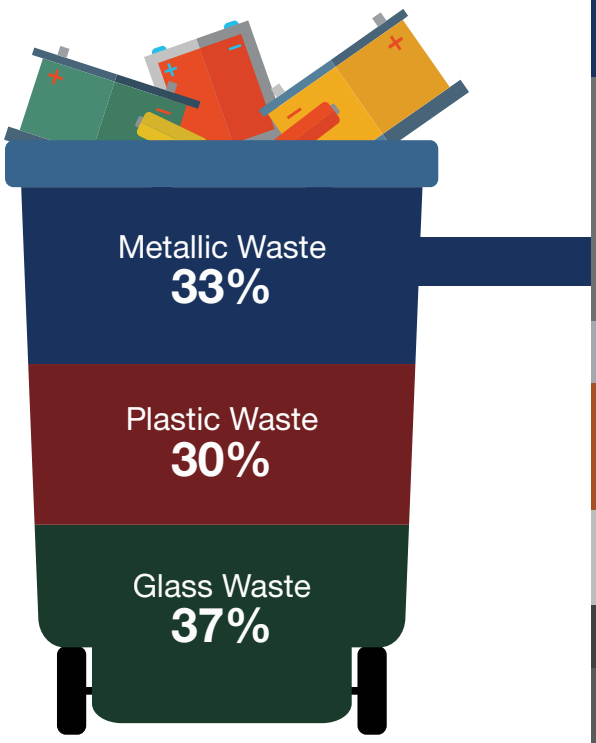
Future Growth of E-waste in India (2018) — **3 Million Metric Tons** (Estimated)

Top E-waste Generators (State-wise)



Resources embedded in E-waste

Components of E-waste



Constituents of Metallic Waste in E-waste

- Iron 52%
- Zinc 3%
- Copper 18%
- Aluminum 12%
- Lead 3%
- Others 12%

E-waste Management in India: Unorganized v/s Organized sector

	Unorganized	Organized
Percentage of E-waste Processed	**90-95%**	**5-10%**
General Practices of E-waste Processing	Rudimentary methods: Incineration, breaking, dismantling, dumping, etc.	Industrial recycling/dismantling using technically advanced methods
Current Stakeholders	Dealers/Retailers, unorganized recycling sector (local pawn shops, recyclers, dismantlers, etc.) contractual labors, localized vendors (Kabadis)	Government, consumers, retailers, industries/organizations, registered processing units, NGOs and manufacturers
Binding Laws	Not bound by any laws and regulations	Environmental laws, E-waste rules, labor laws, etc.
Major Functions	Collection, disassembly, extraction and dumping	Disassembly, extraction, recycling, treatment and segregation

State Wise Number of E-waste Recyclers and Their Capacity (As of December, 2016)

States	No. of Units	Capacity (in metric tons per annum)
Karnataka	57	44,620.50
Maharashtra	32	47,810.00
Uttar Pradesh	22	86,130.00
Haryana	16	49,981.00
Tamil Nadu	14	52,427.00
Gujarat	12	37,262.12
Rajasthan	10	68,670.00
Telangana	4	11,800.00
Uttarakhand	3	28,000.00
Madhya Pradesh	3	8,985.00
Chhattisgarh	2	1650.00
Punjab	1	150.00
West Bengal	1	600.00
Total	**177**	**438,085.62**

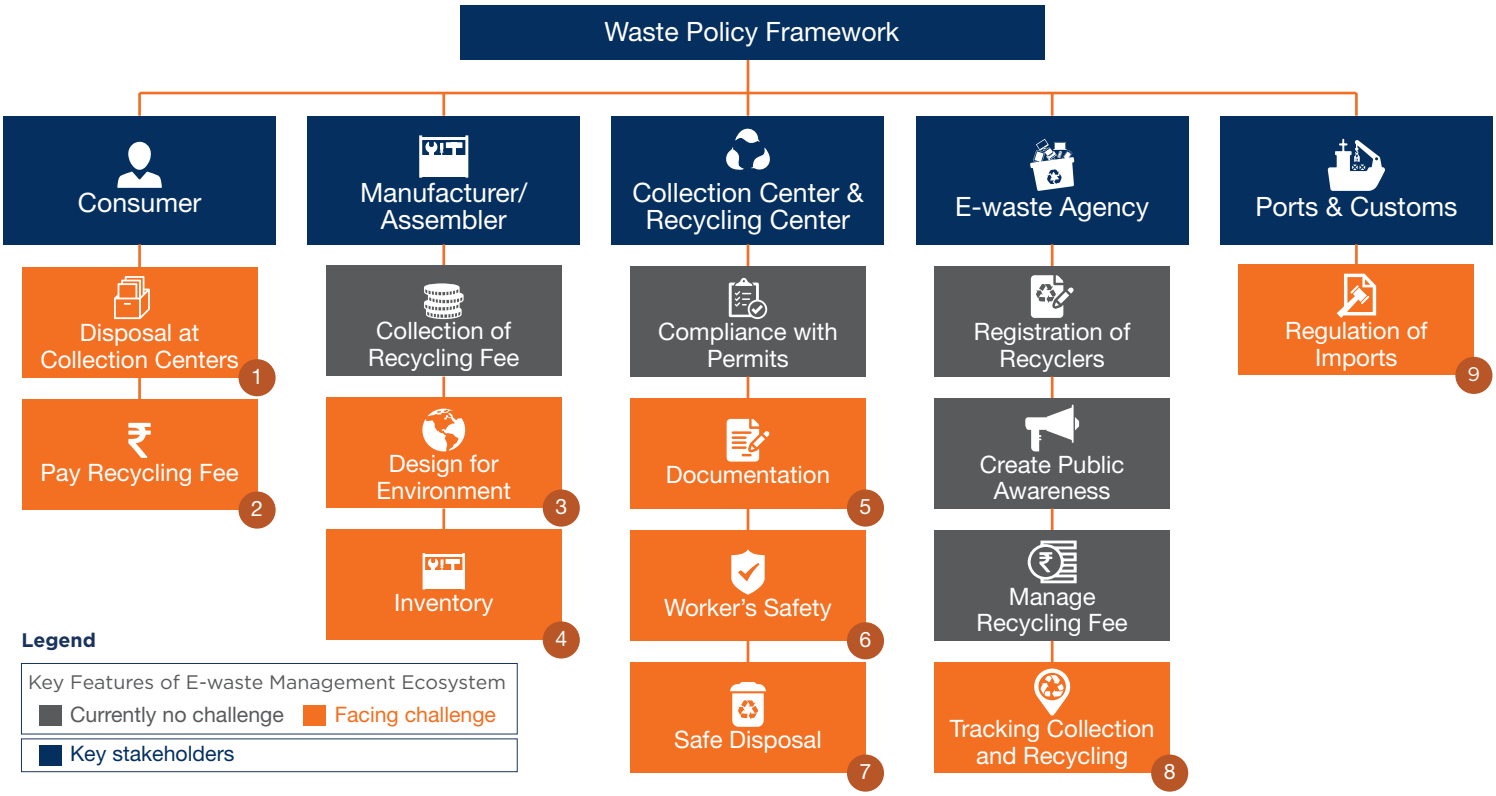
The current rate of e-waste generation in India is 4.56 times greater than the annual e-waste processing capacity offered by the nation, which leads to improper and illegal dumping/disposal of the hazardous e-waste, which further leads to environmental and health hazards.

General Recycling Practices of E-waste and the Hazards Associated with Unorganized Sector

Component	Process	Occupational Health Hazards	Potential Environmental Hazards
Plastic	Shredding and low-temperature melting	Exposure to hydrocarbon, brominated dioxin and PAH	Emission of brominated dioxins, heavy metals and hydrocarbons
Chips and other gold-plated compounds	Chemical stripping, using nitric and hydrochloric acid along the riverbanks	Acid contact may result in permanent injury, inhalation of mists and fumes of acids	Discharge of hydrocarbons, heavy metals, brominated substances, etc. directly into riverbanks
Cathode Ray Tubes (CRT)	Breaking or removal of copper yoke and dumping	Silicosis Cuts from CRT glass, inhalation or contact with phosphor, containing cadmium or other metals	Lead, barium and other heavy metals, leaching into ground water and releasing toxic phosphor
Secondary steel or copper and precious metal smelting	Furnace: Recovers steel or copper from waste	Exposure to dioxins and heavy metals	Emission of dioxins and heavy metals

Component	Process	Occupational Health Hazards	Potential Environmental Hazards
Wiring	Open burning to recover copper	Brominated and chlorinated dioxin, and PAH exposure to workers living in the burning work area	Discharge of hydrocarbon and ashes, including PAHs into air, water and soil
Printed Circuit Boards	De-soldering and removing computer chips	Inhalation of tin, lead, brominated dioxin, beryllium, cadmium and mercury inhalation	Air emission of hydrocarbon and ashes, including PAHs

4.3 Present E-waste Management in India: The Ecosystem



Issues & Challenges	Government Rules & Guidelines in India
1 Illegal & Improper Dumping	E-waste generated by the consumer has to be continuously channelized through collection center/dealer of authorized producer/dismantler/recycler through the designated take back service provider of the producer, to authorized dismantler or recycler.
2 Non-compliance of Recycling Fee Policies	Awareness has to be created through media, publications, advertisements, posters and product user documentation, accompanying the equipment to regulate the flow of e-waste.
3 Non-Compliance of Environmental Laws	Any producer targeting e-waste recycling has to obtain authorization from the CPCB (Central Pollution Control Board) for EPR (Extended Producer Responsibility).
4 Unregulated Material Consumption	Manufacturers of any electrical and electronic equipment have to collect e-waste generated during manufacturing and channelize it for recycling or disposal.
5 Dominance by 8 Unorganized Sector	Collection/Recycling centers and e-waste agencies have to maintain a record of e-waste collected, dismantled and recycled in FORM-2 format (form for maintaining record of e-waste handled).

Issues & Challenges	Government Rules & Guidelines in India
6 Non-Compliance of Labor Laws	Collection/Recycling centers have to obtain authorization from the concerned State Pollution Control Board to ensure that the dismantling/recycling processes do not have any adverse effect on the health of workers and the environment around.
7 Illegal and Unregulated Dumping/Disposal	Collection/Recycling centers have to ensure that no damage is caused to the environment during storage, transportation and disposal of e-waste and to maintain the facilities as per SPCB guidelines.
9 Excessive EEE (used and waste) Dumping by Developed Countries	CBIC (Central Board of Indirect Taxes and Customs) has to regulate import of used and refurbished electronics in accordance with the Import Policy of India and the e-waste management rules.

4.4 Case Study: E-waste Management in Japan

Nearly 16.9 kg
of e-waste per capita is produced by Japan every year. One of the highest rates in the world.

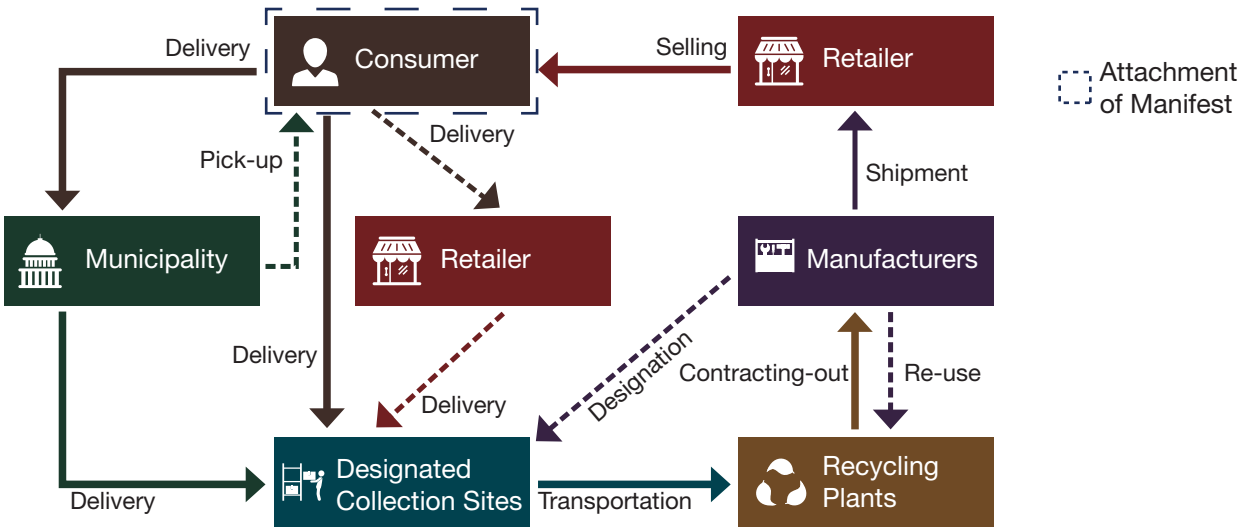
More than 50%
of the generated e-waste can easily be processed by Japan.

For Olympics 2020,
Japan is planning to use precious metals, extracted from e-waste.

Manifest System: Japan Use-Case for E-waste Management

- To overcome the issue of e-waste management in the household appliances segment, Japan has a Manifest System which permits tracking and recording every piece of equipment associated with the e-waste.
- Each and every piece of e-waste is tagged by a manifest (as shown), which helps the key stakeholders to document and recycle various types of e-waste individually.

E-waste Disposal in Japan for Home Appliances: Current Ecosystem



Steps involved in recycling procedure of household appliances in Japan

Stakeholders	Procedural Responsibilities
Retailer	• Selling the refurbished or new products to the consumers • Issuing Recycling Manifest (with the retailer's information) to manufacturers and the designated collection sites, along with sending copies to the consumers • Taking back used home appliances, sold by themselves, from their customers • Displaying openly the costs for collecting and transporting used home appliances
Consumer	• Using the product as per manufacturer's guidelines • Delivering or requesting collection of the e-waste • Filling up and attaching Recycling Manifest to the e-waste • Bearing costs for collection and recycling
Municipality	• Collecting the e-waste and recycling fee from the consumer • Delivering the e-waste to recyclers
Collection Sites	• Dismantling and segregating e-waste (manufacturer designated)
Recyclers	• Recycling or disposing of e-waste as per the rules & guidelines and extracting reusable resources from the e-waste (contracted by manufacturers)
Manufacturer	• Recycling the collected used home appliances by investing in establishing a proper recycling infrastructure • Determining and publishing the recycling fee for the used home appliances • Using the recycled or refurbished components as well as the resources to promote e-waste management

Learning Outcomes from Japan's E-waste Policies and Practices

- Explicit identification of specific Electrical and Electronic Equipment (EEE) and components under E-waste management.
- Clear description of roles and responsibilities of each stakeholder
- Transparent and fair system design
- Prevention of illegal dumping and disposal
- Efficient collection of e-waste and recycling fee
- Determination of the precise recycling cost

5 Recommendations

The Government of India has taken an initiative-centric approach to promote the Electronics Industry in the country. In order to make the industry self sustainable, there are some issues that require more attention.

Even though the value of imports for Electronics from 2014-15 to 2016-17 has increased at a CAGR of 7.88%, there has been a steady increase in the rate of manufacturing that stands at a CAGR of 23.28% over the same period. The exports have remained constant at around USD 6 Billion. Hence, to achieve the government's target of USD 400 Billion Electronics market, clearly there lies a huge opportunity for the manufacturers as well as foreign companies to invest in India's Electrical and Electronics Manufacturing.

India lags in component manufacturing, which is the most fundamental block in electronic devices. To encourage India as the manufacturing hub, the country should focus on reducing component imports and increasing local value addition.

Phased Manufacturing Plan

As domestic value addition has increased for mobile phones, the government should focus on other electronic components. For instance, the government decided to promote manufacturing of PCBs, Camera Modules and Connectors in 2018-19. However, in the recent Union Budget, the focus is towards the Printed Circuit Board Assembly (PCBA) of chargers/adaptors for mobile phones.

Therefore, similar plans are needed to encourage manufacturing of components which are the core ingredients in the overall increase of domestic value addition.

Seizing the Export Market

India holds a very small share in the global electronics market. The manufacturers should aim to capture a larger piece of the global market by focusing more towards the export.

For instance, there has been a significant increase in the value of imports for Electronics, such as computer hardware and Light Emitted Diode (LED). The value of computer hardware's imports have increased from USD 6.89 Billion in 2016-17 to USD 7.41 Billion in 2017-18, an increase of 7.5% year-on-year.

Due to unfavorable scale factor in establishing commercial viability, component ecosystem has not taken foothold. Limited fresh investments are coming into the country, due to which existing plants are running at sub-optimal capacity.

The government should increase export incentives for sectors such as computer hardware and peripherals, and LED to make India's manufacturing globally competitive and facilitate domestic component ecosystem growth.

The E-waste Challenge

In 2016, India generated 2 Million Metric Tons of E-waste. The dumping of e-waste into India from developed countries has further complicated the problems with the management of e-waste.

Majority of the e-waste is handled by untrained workers who work without protective equipment's during recycling. Hence, there should be training programs and effective methods to improve the job quality and satisfaction level of workers in the recycling industry.

Similar to Japan and Taiwan, the producers can be mandated to take-back the electrical appliances, regardless of where the appliances were sold, to decrease the overall content of e-waste in the country.

REFERENCES

01 Ministry of Electronics & Information Technology (MeitY) Annual Reports

02 IBEF Reports

03 Make in India Website

04 Ministry of Commerce and Industry Website

05 Energy Efficiency Service Limited (EESL) Website

06 Electronics System Design & Manufacturing and Skill Development Website

07 Digital India Website

08 Department of Industrial Policy & Promotion (DIPP) Website

09 ELCINA Website

10 Central Pollution Control Board Website

11 Japan International Cooperation Agency (JICA) Website

12 Ministry of Environment, Forest and Climate Website

13 News Articles (Business World, Economic Times, Business Standard and others)

About ASSOCHAM

ASSOCHAM
The Knowledge Architect of Corporate India

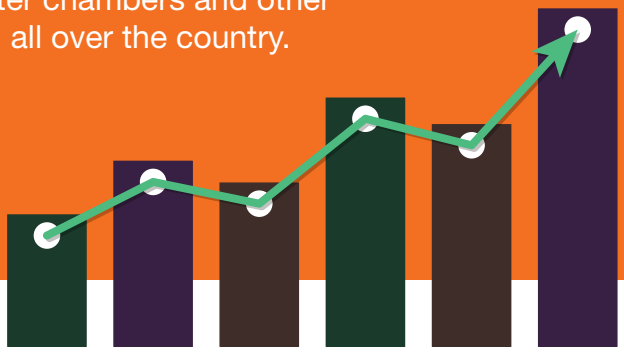
Evolution of Value Creator

ASSOCHAM initiated its endeavor of value creation for Indian industry in 1920. It has more than 400 Chambers and Trade Associations in its fold, and is serving more than 4.5 Lakh members from all over India. ASSOCHAM has witnessed upswings as well as upheavals of Indian Economy, and contributed significantly by playing a catalytic role in shaping up the trade, commerce and industrial environment of the country.

Today, ASSOCHAM has emerged as the fountainhead of knowledge for Indian industry, which is all set to redefine the dynamics of growth and development in the technology driven cyber age of 'Knowledge Based Economy'.

ASSOCHAM is seen as a forceful, proactive and forward looking institution, equipping itself to meet the aspirations of corporate India in the new world of business. It is working towards creating a conducive environment in Indian business scenario to compete globally.

ASSOCHAM derives its strength from its promoter chambers and other industry/regional chambers/associations spread all over the country.



Vision

Empower Indian enterprise by inculcating knowledge that will be the catalyst of growth in the barrierless technology driven global market and help them upscale, align and emerge as formidable player in respective business segments.

Mission

As a representative organ of Corporate India, ASSOCHAM articulates the genuine, legitimate needs and interests of its members. Its mission is to impact the policy and legislative environment so as to foster balanced economic, industrial and social development. We believe education, IT, BT, health, corporate social responsibility and environment to be the critical success factors.

Members – Our Strength

ASSOCHAM represents the interests of more than 4.5 Lakh direct and indirect members across the country. Through its heterogeneous membership, ASSOCHAM combines the entrepreneurial spirit and business acumen of owners with management skills and expertise of professionals to set itself apart as a chamber with a difference.

Currently, ASSOCHAM has more than 100 National Councils covering the entire gamut of economic activities in India. It has been especially acknowledged as a significant voice of Indian industry in the field of Corporate Social Responsibility, Environment & Safety, HR & Labour Affairs, Corporate Governance, Information Technology, Biotechnology, Telecom, Banking & Finance, Company Law, Corporate Finance, Economic and International Affairs, Mergers & Acquisitions, Tourism, Civil Aviation, Infrastructure, Energy & Power, Education, Legal Reforms, Real Estate, Rural Development, Competency Building and Skill Development to mention a few.

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ASSOCHAM has been a significant contributory factor in the emergence of new-age Indian corporates, characterized by a new mindset and global ambition for dominating the international business. The chamber has addressed itself to the key areas, like India as investment destination, achieving international competitiveness, promoting international trade, corporate strategies for enhancing stakeholders value, government policies in sustaining india's development, infrastructure development for enhancing india's competitiveness, building indian MNCs and role of financial sector as the catalyst for India's transformation.

ASSOCHAM derives its strengths from the following Promoter Chambers: Bombay Chamber of Commerce & Industry, Mumbai; Cochin Chambers of Commerce & Industry, Cochin: Indian Merchant's Chamber, Mumbai; The Madras Chamber of Commerce and Industry, Chennai; PHD Chamber of Commerce and Industry, New Delhi and has over 4 Lakh direct/indirect members.

Together, we can make a significant difference to the burden that our nation carries and bring in a bright, new tomorrow.

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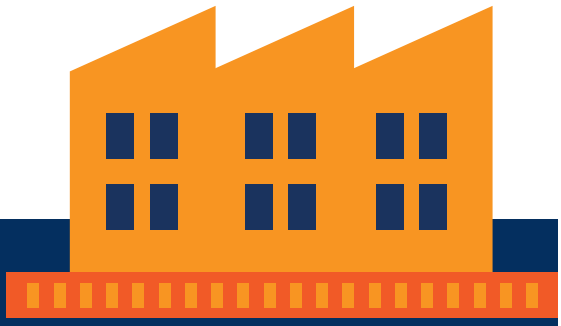

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NEC is a leader in the integration of IT and network technologies and brings more than 100 years of expertise in technological innovation to provide solutions for empowering people, businesses and society.

Headquartered in Japan, NEC started operations in India in the 1950s, accelerating its growth through the expansion of business to global markets. NEC in India expanded its business from telecommunications to public safety, logistics, transportation, retail, finance, unified communication and IT platforms, serving across governments, businesses as well as individuals. With its Center of Excellence for analytics platform solutions, big data, biometrics, mobile and retail, NEC in India offers innovative new services and solutions for India and global markets. NEC operates across India with offices in New Delhi (head office), Noida, Mumbai, Chennai, and Bengaluru.

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The team has successfully conducted over 100 market research, strategic consulting & advisory, marketing & business support services across 25 geographies worldwide. Guided by NEC Corp's globalization goal, the team works closely with NEC, enabling them to expand their services globally.

For further information, please visit: www.in.nec.in

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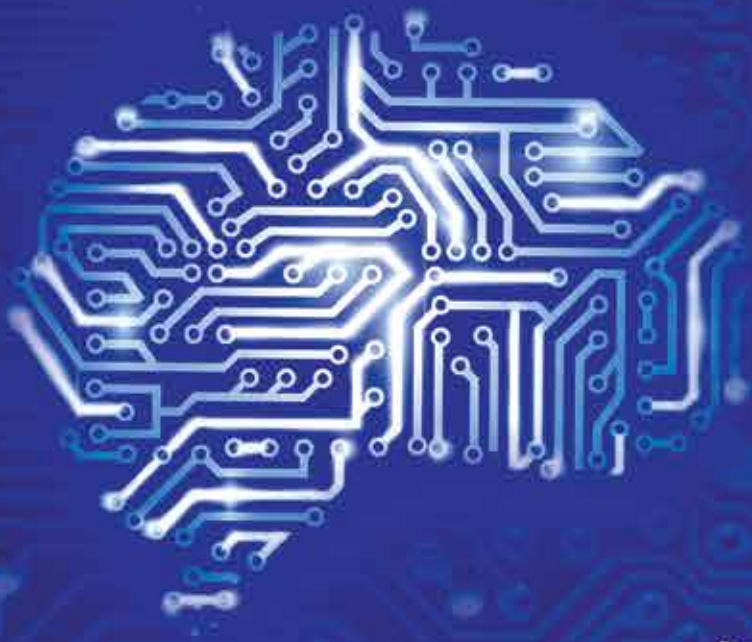

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