



ECO-SYSTEM OF INDIAN SEMICONDUCTOR INDUSTRY WITH SPECIFIC REFERENCE TO COMPANIES IN BANGALORE

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Abstract

This paper focuses on the need of ecosystem in India. This paper explains about various product segments of semiconductor industry, key drivers of ecosystem, and impact of ecosystem. This paper tells about the schemes that promote domestic production. It suggests free trade agreements, import substitution strategy, setting domestic standards and ending tax uncertainty for local semiconductor companies.

Keywords: Ecosystem, Domestic Market

1. Introduction

Eco system: Semiconductor chips are inside every electronic equipment which we use in our daily life, say cell phones, televisions, refrigerators, automobiles etc. India is importing electronic items and our import bill is estimated to increase that of petroleum imports by 2020. So we should build FAB; s in India. The cost incentives may be high. There should be focus on local semiconductor design and product companies along with FAB.

1.1 Indian Semiconductor Industry

The Indian Semiconductor Industry, comprises of VLSI design, Board design and Embedded Software Development, Chip design, ATMP(Assembly, Testing, Marking, Packing), Manufacture of LEDs, OLEDs, Storage devices, Plasma display panels, , Photo Voltaic Cells ,Solar Cells etc. The history of the semiconductor industry in India dates back to the mid-1980s, when multinational leaders from the United States started outsourcing chip design and software development to India to take advantage of technical talent pool and low labor cost. India's semiconductor market has seen remarkable growth over the period of years, which is less than 5% of the global semiconductor market. Currently, there are more than 160 semiconductor companies in India which work in the areas of chip design, board design and embedded software development.

1.2 Semiconductor Industry -Bangalore

With Make-in-India achievement in space technology, there is another Make-in-India achievement in electronics industry , where a Bangalore based company , Navika Electronics makes GPS/ GNSS semiconductor chipsets for receiving the GPS data. This is important because there are only very few Indian companies which design and sell semiconductor chips in their own brand name. Navika has offices both in Bangalore and Singapore. To support startup semiconductor companies, STPI along with Government of Karnataka started semiconductor test facility in Bengaluru. Union Communication and IT minister inaugurated a new lab in Bengaluru. The new lab is SMART. It is at the premises of Tessolve Semiconductor Ltd., a chip packaging company based out of Bengaluru. STPI in Bengaluru also supports startup companies in electronics field with plug and play office and also monitors business at its incubation Centre.

MediaTek, a Bangalore based company wants to investment of over 12 crore rupees for the next few years. Company will to appoint 100 VLSI design engineers, and expected to increase the engineers count above 500 in future. The new company is at Tech Park, along the Outer Ring Road in Bangalore.

2. Need of Ecosystem

Imports of electronics increased more than that of gold and silver in the first six months of the current financial year, estimates based on government data showed, adding up to over INR 1900 Crores. While there is decline in gold imports, there is a rapid rise in demand for electronic goods. Domestic production of electronics is a major focus for India in the present context. We need to create an ecosystem that can encourage the start - up ecosystem and local product development

3. Research Methodology

The present study is mainly based on the secondary data which has been collected from books, journals, websites, research papers, and other documents of the organization.

4. Product Segments

The product segments of Semiconductor industry are

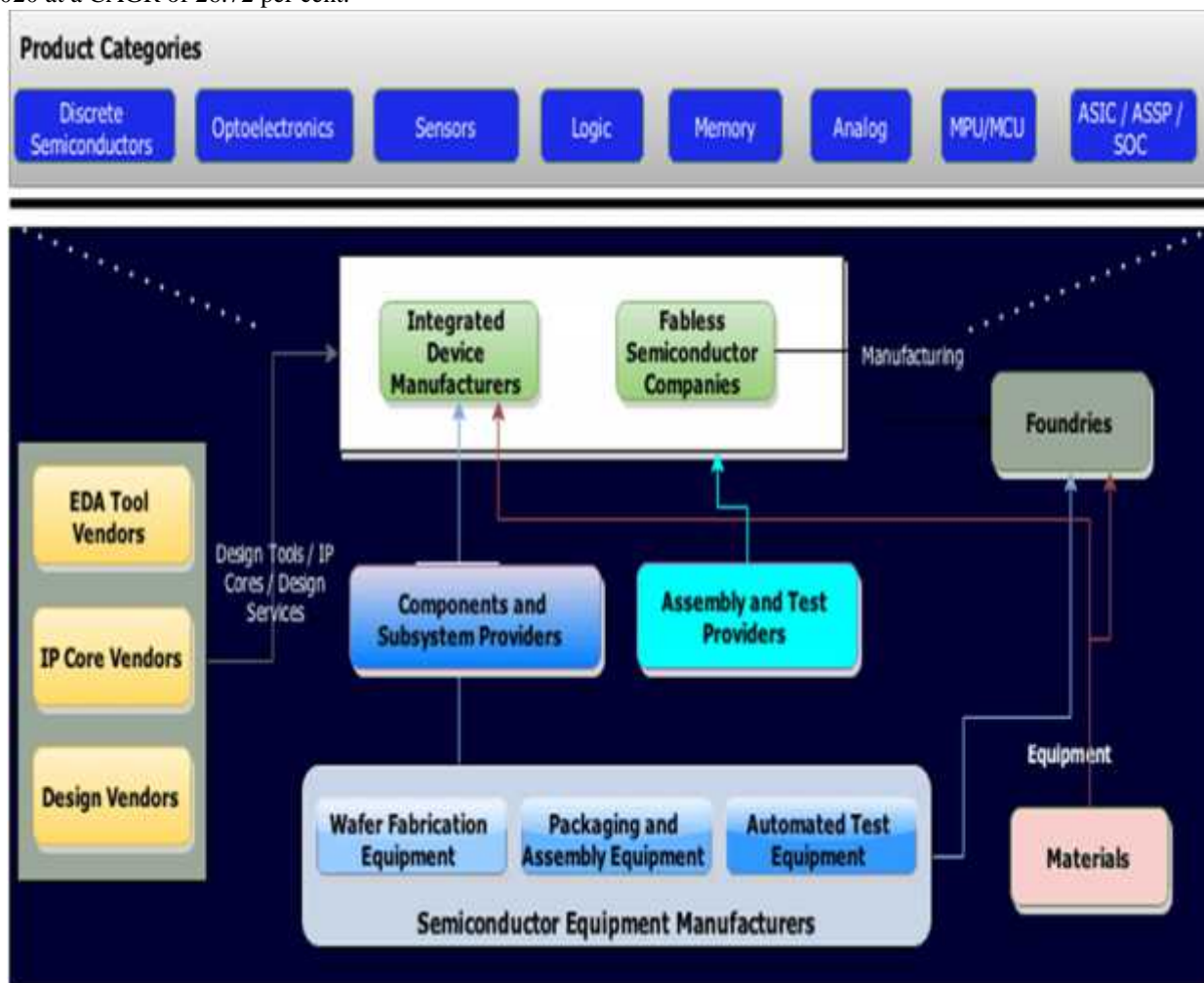
- **Discrete Semiconductors:** Transistors, Diodes, Thyristors etc. These are basic semiconductor devices.

- **Sensors:** Chemical Sensors, Thermal sensors, Gas Sensors etc.
- **Analog IC's:** Filters, power management devices, Amplifiers
- **Optoelectronic Devices:** LED's, Photo Diodes, Laser Diodes etc.
- **Logic:** ASIC and SOC
- **Memory IC's:** NOR, NAND, SRAM, DRAM
- **Processors & Controllers:** CPU's, GPU's

It is estimated that, DRAM in ultramobiles , ASSP's in smartphones and NAND flash in Solid State Drives (SSD's) will become the growth drivers of the industry. The key application areas for semiconductor devices are communication and navigation, computing , instrumentation and medical devices, robotics ,image processing, avionics systems ,and automotive systems.

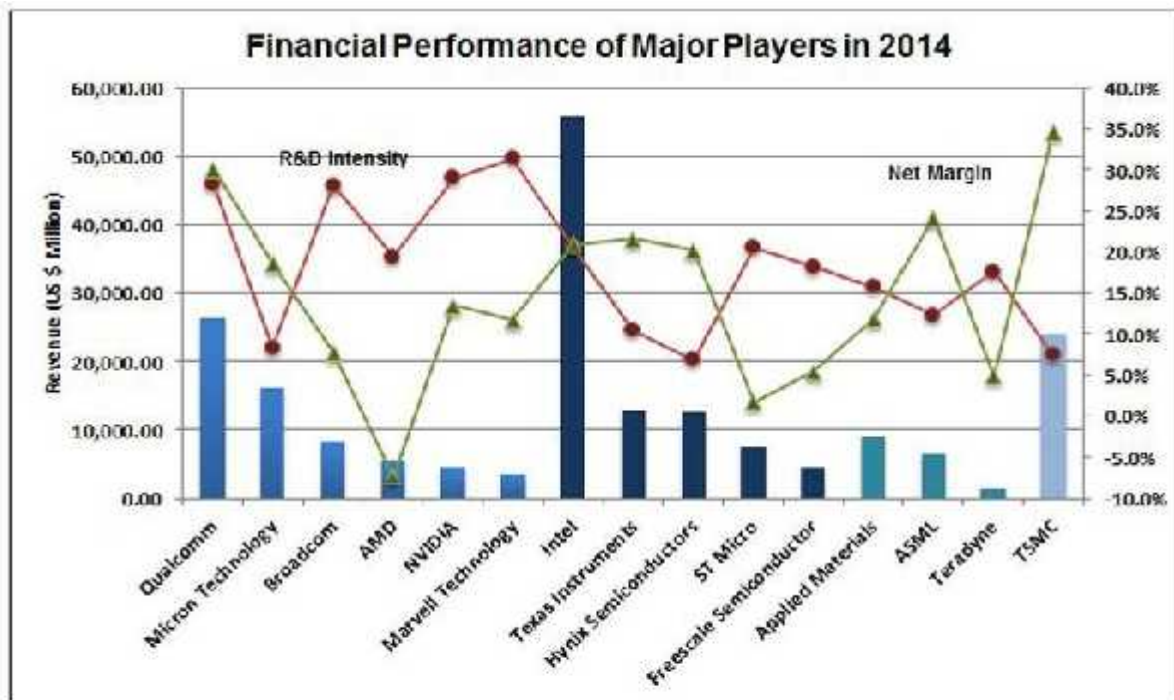
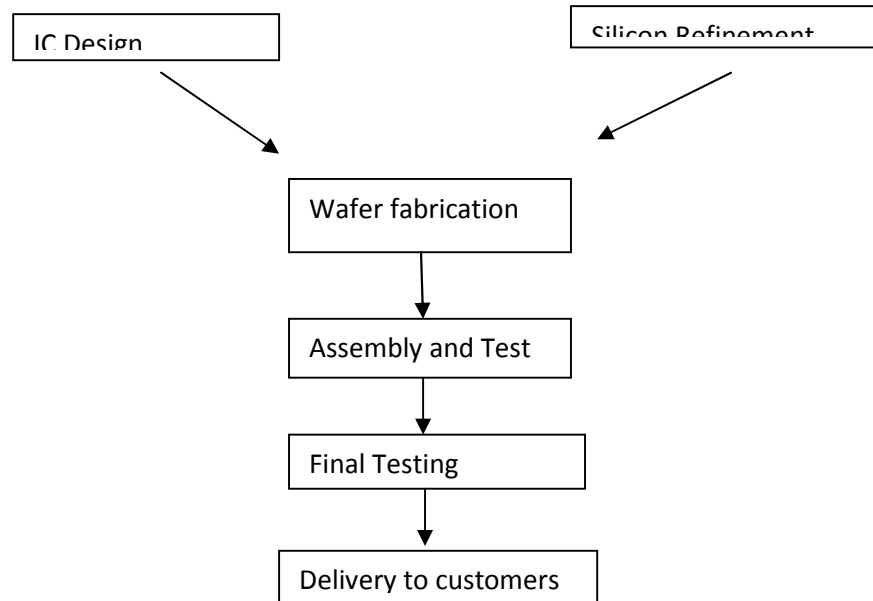
According to DeitY (Department of Electronics and Information Technology), nearly 2,000 chips are designed every year in India and more than 20,000 engineers work on different aspects of chip design and verification. The government focusses in development of the ESDM ecosystem in India. Many incentives and other subsidies are offered for setting up electronics manufacturing units in India.

According to the IESA, the Indian ESDM (Electronic System Design and Manufacturing) market will raise from US\$ 76 billion in 2015 to US\$ 400 billion by 2020. Consumption of semiconductors, also progressively increased. According to a report by NOVONOUS, the semiconductor industry is expected to grow from US\$ 10.02 billion in 2015 to US\$ 52.58 billion in 2020 at a CAGR of 26.72 per cent.



Source: <http://i2.wp.com/rvantage.net/wordpress/wp-content/uploads/2015/03/Semi-Ecosystem.png>

Semi Conductor Value Chain



- From the small sample of the companies in the semiconductor industry, the fabless companies invest more in R&D relative to their revenues [20% – 30%] as compared to IDMs [10% – 20%].
- Semi Equipment makers invest 15% – 18% of revenues in R&D. Investment of TSMC (foundry) is 7.45%.
- Qualcomm is at the top with net margins of 30%.
- INTEL is the biggest spender on R&D [\$ 11 Billion] and also the biggest revenue grosser [\$56 Billion]

Data Source: WSTS Forecast & Blogs on WSTS

Semiconductor design market in India (US\$ billion)



Source: Department of Electronics & Information Technology; Indian Semiconductor Association; E-Estimated; CAGR - Compounded Annual Growth rate

5. Impact of Ecosystem in India

- The semiconductor wafer design industry contributed much to the Indian economy.
- It generated employment in India.
- There are FDI flows.
- Both men and women are employed in the industry.

6. Key Drivers of Ecosystem in Semiconductor Industry

- Availability of engineers: In India there are many engineering colleges and every year large number of engineers pass out from the colleges. So these companies and make use of these engineers talent.
- Cost effectiveness: In India the working capital, salaries of the employees cost less when compared to US.
- Working in India: Many engineers instead of shifting to US for jobs after their education can work in their own country, which gives mutual benefit.

6.1. Production , Exports and Imports of electronics hardware by India, 2014-15

S.No	Parameter	Value (US \$ billion)
1	Production (Revenues)	32.7
2	Exports	6.0
3	Imports	36.9

Source: CII & ESC

6.2 Indian Electronics industry Revenues by segment 2014-15

Segment	\$ Billion	Percent
Consumer Electronics	9.1	28
Electronic components	5.1	16
Industrial Electronics	5.6	17
Computer Hardware	1.7	5
Communication & Broadcast Equipment	9.5	29
Strategic Electronics	1.7	5
Total	32.7	100

Source : Make in India strategy for electronic products, NITI Aayog, Govt. of India, May 2016.

7. Schemes That Promote Domestic Production

1. MSIPS: Modified Special Incentive Package Scheme provides monetary incentives to compensate disability and attract investments in the electronics hardware manufacturing as well as chip manufacturing. The scheme provides financial assistance for investments in capital expenditure – 20% for investments in SEZs and 25% in non SEZs.



Subsidy rate is lower in SEZs as there are many other concessions available there. From 2014-15, 40 proposals value Rs. 9538.24 crore in investment have been approved under the scheme. (<http://www.msips.in/MSIPS/>).

2. EMCs: This scheme provides financial aid for creating world class infra structure for electronic manufacturing units. The aid for the projects for setting up of Greenfield Electronics Manufacturing Clusters is 50% of the project cost subject to a maximum amount of Rs. 50 crore for 100 acres of land. For setting up Brown field Electronics manufacturing cluster, 75% of the cost of infrastructure, subject to a maximum amount of Rs. 50 crore is provided. (<http://indianaffairs.tv/make-in-india-strategy-for-electronic-products/>).
3. Investment allowances and deductions: investment allowances at the rate of 15% to electronics manufacturing companies investing more than Rs. 250 million in machinery and plants is provided. This assistance will be offered for 3 years.

9. Suggestions

a) Ending Tax Uncertainty

Because multi nationals, at present primarily invested in China, have the latest technologies and links to worldwide markets, any policy aimed at connecting Indian electronics industry to international markets must identify the importance of bringing them to India.

b) Free Trade Agreements

FTAs approach is protective because we are larger importer of electronic products than exporter. But a change to export oriented policy would convert FTAs into an opportunity.

c) Import Substitution Strategy

We should try to extend the share of the firms located within India in the domestic market. we should provide 10 year tax holiday on investments of \$ 1 billion or more than that and also create 20,000 jobs.

d) Ecosystem

With the the same ecosystem, local firms will remain largely handicapped in foreign markets comparative to their foreign counter parts. And they would fail to become globally competitive, which means that they would mainly serve the domestic market. If we want rapid revolution, we must implement an export-oriented strategy and work to create an ecosystem in which the industry can be internationally competitive without import protection.

e) Issue of Setting Domestic Standards

If our ecosystem allows us to be amongst the lowest-cost producer, of the same product using our standards, and convince other countries to accept our standards, then only we would be able to go through the world markets. Before we force our standards in the domestic market, we should create a business-friendly ecosystem and grow larger.

10. Conclusion

- India should tax anti dumping charges for low priced flash cards from china.
- End reversed duty structure which enhances production at the same time improving overall efficiency of the system.
- Introduction of 10 year tax holiday, for the companies which invest \$1 billion and create more than 15000 jobs.
- First choice in the Govt. procurement, mainly in the area of defense.