Abstract: Electronics, a USD 1.75 trillion industry, is one of the largest and fastest growing industries in the world. Indian Electronics Industry can become one of the top performing industries based on its huge potential and big aims towards delivering higher performances. Presently, the size of Indian Electronics Industry is about USD 84 bn (Rs. 5,04,000 Cr) and is likely to reach USD 94.2 bn (Rs. 5,65,000 Cr) in 2015 with expected growth rate of 9.9% which is more than twice the growth rate of global electronics market. Currently, Indian Electronics Industry fulfills its 65% of demand from imports and only 35% demand is catered by local market. The demand for electronics hardware and goods is expected to reach up to approx. USD 400 bn (approx. Rs. 24,00,000 Cr) by the year 2020. But, electronics hardware production in the country is projected to reach USD 104 bn by the year 2020, creating a massive gap of USD 296 bn (approx. Rs. 17,76,000 Cr) between supply and demand. To cope up with the potential electronics crisis, government of India is constantly modernizing and upgrading certain policies which include various policies like National Policy on Electronics (NPE), Electronics Development Fund, ‘Digital India’, ‘Make in India’ ‘Made in India, Made for World’, etc. Massive employment initiatives for 2.8 Cr workforce to boost Indian electronics industry, under NPE over the period of next 8 years, etc. This research paper takes an overview of Indian electronics industry and the outcome of this research should be useful for business organizations, industry and government institutions operating in Indian electronics industry.

Keywords: Electronics Industry, Hardware Production, Supply and demand, Imports, Policies

I. INTRODUCTION

Objectives of the research paper:

- The objectives of the research paper are as follows.
  - To study present global scenario of Electronics Industry.
  - To take an overview of Indian Electronics Industry.
  - To conduct SWOT analysis of Indian Electronics Industry.

1] Present global scenario of Electronics Industry

1.1 The electronics industry is a comparatively younger industry. It has emerged in recent decades and has now become a global industry. According to various studies, the global electronics industry is estimated at USD 1.75 trillion (approx. Rs. 1,05,00,00,000 Cr) which is one of the largest and fastest growing manufacturing industries. It comprises of sub-sectors like consumer electronics, industrial electronics, healthcare electronics, defence electronics, automotive electronics, etc. Consumer electronics sector has established itself as the largest sector in electronics market which includes design, Research and Development (R&D) and production of electronics equipment like mobile phones, televisions, digital cameras, laptops, desktops, set-top boxes, etc. Highly talented workforce, strong economic base, constantly innovative, modernising and developing trends and technology, ever-increasing demands and overall satisfactory production environment are the major driving forces behind the encouraging growth of global electronics industry.

1.2 According to the report by Videocron Company, currently size of the global electronics industry vis-à-vis other major industries is as follows. Total size of global electronics industry is 4.40 times Oil, Petrol and Minerals industry, 2.75 times Chemical and Plastics industry and 2.44 times Transportation industry.

1.3 Despite of its gigantic global size, the industry is looked to be concentrated in some countries in East Asia, US, and few European Countries only.

Chart 1: Leading Countries in Electronics Manufacturing Industry Based on Market Size (2012)

[Source: statista.com and Researcher’s Study] The global electronics landscape is exploring new sky-highs and its size is becoming larger and larger. The electronics industry is proving itself as one of the largest revenue generating as well as employment generating industries in the world.

2] An Overview of Indian Electronics Industry

2.1 Indian Electronics industry is one of the fastest developing industries in the country. Indian
Electronics industry started its functioning from 1960s onwards. The industry is relatively younger industry, and was initiated when R&D in Germanium(Ge) and Silicon(Si) Technologies was commenced. In those days, electronics industry was restricted only to the development and maintenance of fundamental communication systems. Few Multi National Companies (MNCs) like Texas Instruments and Indian companies such as British Physical Laboratories Group (BPL) were amongst the opening players in Indian electronics market in the initial stages of Indian electronics industry.

The electronics industry witnessed its first sunrise after economic reforms initiated in 1991and rampant growth of IT-ITeS (Information Technology and Information Technology Enabled Services) started in 1995-2000. According PVG Menon, cited in his research paper related to future of chip design industry, post 2005 period is referred as an innovation phase in electronics industry.

2.2 Today, the Indian electronics industry is divided into sectors such as telecom equipment, automotive electronics, consumer electronics, industrial electronics, medical or healthcare electronics, defence electronics, etc. The Indian electronics industry was estimated to be at USD 68.31 bn (approx. Rs. 4,10,000 Cr) in 2012. The impressive performance in 2011-12 has registered a CAGR of 9.88%. Moreover, the growth rate is twice the growth rate of global electronics market. The corresponding size of the industry by 2015 is expected to be USD 94.2 bn (approx. Rs. 5,65,000 Cr).

Chart 2: Growth of Indian Electronics Industry with respect to market size

[Source: IESA, Frost & Sullivan Report, Base Year: 2011]

According to market size comparison, India accounts for only 3.5% of the global electronics industry. The contribution to the global electronics manufacturing market is very meagre at around 1.3%.

2.3 Electronics hardware manufacturing in India comprises of manufacturing of electronic components, integrated chips, electronics systems, intermediate and final products in sectors such as telecom equipment, consumer electronics (mobile phones, tablets, set top boxes, etc.), industrial and healthcare electronics products. The electronics hardware production is expected to reach from USD 42 bn (approx. Rs. 2,52,000 Cr) in the year 2014 to USD 102 bn (approx. Rs. 6,12,000 Cr) in 2020.

3) SWOT Analysis of Indian Electronics Industry

SWOT analysis of Indian electronics industry is as follows.

3.1 Strengths:
A) Huge market consumption and rising demand: Indian electronics industry has a huge domestic market with continuously rising demand. Demand for hardware components, intermediate products, high-end technology and automotive products and especially consumer electronics products have registered a significant growth. According to estimates by several government reports, the demand for electronics hardware in the country is projected to increase from USD 45 bn in 2009 to USD 400 bn by the year 2020.

B) Increasing Government’s support for the electronics sector: Indian Government and Department of Electronics and Information Technology (DeitY) with their strategic vision, have initiated number of farsighted policies, reforms, and incentives, for the growth of Indian Electronics Industry.

i) National Policy on Electronics (NPE):
Government of India has initialized National Policy on Electronics (NPE), in 2012, with an ambitious vision- “To create a globally competitive electronics design and manufacturing industry to meet the country’s needs and serve the international market”. Various objectives set through NPE are:

a) To create a sustainable ecosystem for a globally competitive electronics sector by attracting heavy investments of around $100bn.

b) To generate employment of over 28mn (2.8 Cr) workforce in electronics sector over the next few years.
c) To set up 200 Electronic Manufacturing Clusters (EMCs) with world class logistics and Infrastructure as well as easy-to-do business facilities.
d) To set up semiconductor wafer facilities for the fabrication of electronic chips and chip components.

ii) Electronic Manufacturing Clusters (EMCs):
The schemes under EMCs would aim to support setting Greenfield EMCs (in undeveloped or underdeveloped geographical areas) by assisting them upto 50% and Brownfield EMCs (where significant number of existing electronic market units are located) by assisting them up to 75% of the project cost.

iii) Semiconductor Fabrication Units:
Semiconductor is at the heart of any electronic product and contributes for around 25% to 60% of its total cost. To promote semiconductor fabrication, various incentives are being offered by the government such as 25% subsidy on capital expenditure and growth capital expenditure, reimbursement on Countervailing Duty (CVD) and excise duty, 200% deduction on R & D activities, etc.

iv) Electronic Development Fund (EDF):
The EDF aims to create strong ecosystem of Research & Development (R&D) activities in electronics sector in our country which will promote Intellectual Property (IP) generation and large scale indigenous manufacturing while simultaneously exploring the growth of electronics sector through development of Small and Medium-sized Enterprises (SMEs).

v) Initiatives in Human Resource (HR) Development:
a) Under HR initiatives, the government is planning to set up ‘Electronics and Telecommunication Skill Development Council’.
b) Mass level dedicated skill development programme for over 10 lakha aspiring candidates to create electronics industry-ready workforce.
c) Special Manpower Development Program for VLSI and Chip Design Sector for aspiring students.
d) The Ph.D Scheme: Large scale Ph.D. scheme has been approved in February 2014 with budget of Rs. 450 Cr to encourage the dedicated research activities in this sector. The scheme will aim to create around 1,500 Ph.D research scholars in coming period of 5-6 years in the electronics sector.

c) Substantial Contribution of global players:
With top 25 global semiconductor companies, top 10 VLSI and embedded systems companies, and top 10 global cable companies working in some or the way in India, in next few years, India is set to emerge as a new and powerful electronics hub in the world.

3.2 Weaknesses:
While Indian electronics industry is developing rapidly, it is facing some challenging weaknesses.

A) Less attention towards production and manufacturing: India’s presence in the global manufacturing sector of electronics (according to market size) is very meagre at around 1-2%. Further, the share of electronics sector in Gross Domestic Product (GDP) of India is about 2%. Instead of focussing too much on design services, the industry should take efforts on manufacturing and production sector in a bigger manner.

B) Physical infrastructural issues:
As electronics industry is manufacturing and design industry, physical infrastructural inadequacies, power shortages, shortages of basic utilities are significantly inhibiting the growth of the electronics industry. Also, these issues are creating hurdles for start-ups to establish, develop and to attract funding and investments.

C) Supply chain and logistics constraints:
Electronics market and manufacturing units are facing glitches of insufficient or in some places underdeveloped supply-chain and logistics connectivity. High transportation costs, high cost for raw materials and difficulties due to efficient transportation are hampering manufacturing capabilities in the industry.

D) Constraints in development of new products:
Unsatisfactory atmosphere and limited focus on development of products are derailing the indigenous manufacturing potential and the setting up of new manufacturing plants. Instead of only initial or intermediate stages, we have to develop and own whole product chain.

E) Lack of Government support in some areas:
Higher import duties, additional state-level taxes, non-uniform duties, and inverted duty structure are proving themselves as huge barriers against the indigenous manufacturing in the country.

F) Lack of dedicated research work:
There is a serious lack of dedicated research work at every level of education. Further, Ph.Ds, Post Graduate Programs, value added courses in electronics and its applications are not being encouraged enough. This is getting reflected through lesser number of IP generations and patent holders.

3.3 Opportunities:
Following are the opportunities related to Indian electronics industry.

A) Vision set by Government of India:
As Indian companies are developing themselves as far as the value chains and manufacturing are considered; it is the time to build ‘Brand India’ and present it to the world. Visionary goals stated by Government of India include ‘Digital India’, ‘Made in India, Made for World’, ‘Make in India’ and several plans of developing smart cities offer the huge opportunities for electronics sector. India is targeting a quantum jump of increasing the share of electronics sector from 2% to 10% in India’s GDP in near future. Also, increasing digitalized teaching pedagogy is another huge opportunity for Indian manufacturers of consumer electronics products such as smartphones, tablets, laptops, etc.

b) Rising export trends and new emerging markets:
Due to several encouraging policies healthy export atmosphere is being developed. Export of electronics goods during the year 2012-13 is estimated to be Rs. 44,000 Cr. Indian electronics industry has to consider new emerging export destinations such as North Africa, South America, etc.

C) India a strong investment destination:
Several global MNCs are enhancing their plans of heavy investments and are establishing captive tech-centres in our country. As per prime objectives of NPE, investment target of USD100bn is to be achieved in near future. Recent budget includes announcement of Rs. 10000 Crore ‘Start-up Fund’ with allow greater incentivization into R&D and incubation centres. Moreover, due to rapidly rising cost of manufacturing and labour in China in last few years, Indian electronics market is budding as an excellent alternative investment destination.

D) Wide scope for R&D activities:
Existing capabilities of our research activities can be encouraged and enhanced on the platform of several policies in R&D sector. Convinced focus on R&D sector in industry will provide strong support to IP generation in our country. A wide scope is observed to increase the participation of educational institutes and universities to drive research activities. Further, considerable share of these research actions should be aligned to industry or demand-oriented research and new product development.

3.4 Threats:
Indian electronics industry may face following possible threats.
A) Discouraging heavy import statistics:
Currently, Indian scenario in electronics industry is that, 65% of the demand for electronics products in the country is met by imports. We are relying on the imports for almost all critical electronics components like LCD panels, semi batteries, etc.

B) Possible supply-demand gap:
According to several reports, the demand for electronics hardware in the country is projected to increase from USD45 bn in 2009 to USD400 bn by 2020. The estimated production of Indian electronics industry will reach USD104 bn by the year 2020. This may create massive supply-demand gap of around USD 296 bn (approximate Rs. 17,70,000 Cr).

C) Tough Competition from Global Players:
The Indian Electronics industry possesses major threat of established manufacturing ecosystems in China, Japan, Taiwan, South Korea, etc. Also, the emergence of low cost manufacturing destinations, like Vietnam, has created the tough competition. Inadequate testing facilities, delayed policy implementations are some of the major inhibitors of our competitiveness in global manufacturing sector of electronics.

D) Infrastructural inadequacy:
Infrastructural and other facilities in our country are inadequate to cater the demands of electronics industry. We are lacking in building and developing indigenous manufacturing plants, semiconductor fabrication units, and adequately equipped laboratories for testing and measuring facilities. These barriers are diverting the business related to electronics industry to other destinations rather than from India.

II. SUGGESTIONS

1) As electronics industry is manufacturing industry, it is necessary to provide required infrastructure, ultra-modern technological supplies, power, etc.
2) Cost of raw materials, contribution of taxes and various duties and other constraints should be considered so as to encourage and promote the indigenous manufacturing of electronics components, products and entire product chains.
3) Govt. should encourage small and medium scale enterprises engaged in electronics manufacturing sector and most importantly assist them with necessary financial aids and subsidiaries to sustain and grow substantially.
4) It has been observed that very minimal research related to electronics industry is being conducted and the available data is also in un-organized format. There is a need to conduct a comprehensive research in Indian electronics industry.
5) The visibility of Electronics department should be increased to attract the talented young workforce. The Department of Electronics and Information Technology (DeitY) should enhance the awareness towards this sector through various activities like conducting national level essay, project and research paper competitions. These actions should develop and motivate young researchers and scholars in electronics sector.
6) Every central and state university should establish a chair dedicated to improve industry-academia interface, training and development in electronics industry to create skilled, and electronics industry-ready workforce.
7) Public Sector Undertakings (PSUs) and Defence organizations in India are facing several challenges in
manufacturing process. Only one Navratna Central Public Sector Enterprise (Navratna CPSE), Bharat Electronics Limited (BEL), is actively operating in electronics sector. These issues have to be considered seriously.

8) Top business groups in India like Tata, Reliance, Aditya Birla, Mahindra, Adani etc. should involve, directly or indirectly, in electronics manufacturing industry in a bigger manner.

9) IP creation, increased number of patent holders and ownership of entire product chain should be encouraged which will generate higher revenues and larger employment opportunities.

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