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ELECTRONIC HARDWARE EXPORTS OF INDIA

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ABSTRACT

The Electronic Hardware exports have been widely studied. We also examine the trends in Electronic Hardware production, Changes in the direction of Electronic Hardware Exports and also study the stately wise Exports of Electronic Hardware. . To assess the status of the Exports, relevant data and information have been collected from secondary sources. EU countries remain the top destination of export for Electronic Hardware during the year 2010-211. Tamil Nadu is the top export state and Karnataka is the 2nd export state of Indian Export of Electronic Hardware during the years 2008-09 to 2010-11, Uttar Pradesh has maintained 3rd position in all the years. It is shown that the Electronic Hardware sector not only contributes significantly to export earnings and GDP but also emerges as a major source of employment generation in the country. While the Electronic sector in India is currently small, there are several advantages that India offers that can be effectively leveraged to achieve higher growth.

Keywords: Electronic Hardware Exports, Destination, Information Technology, Role of Electronic Hardware Exports, Components

INTRODUCTION

The Information Technology (IT) industry has shaped up as a major success story in India’s economy. The liberlaized policy initiatives of the Government of India in the last decade have propelled the Indian IT industry on to a path of development and prosperity. Over the last decade, the India IT industry has been growing by leaps and bounds. Electronics and Information Technology is proving to be the growth engine in the current day economies of the world.

The Electronics Hardware and Computer Software/ Services industry, a comparatively new entrant in Indis’s export horizon, has emerged as a fore-runner among all industries and has been consistently trading on a high growth path in recent years. Over the years, the Electronics Hardware Industry has evolved to offer several innovative products for the convenience of the mankind. Electronics devices have become integral part of human life and are playing a major role in their everyday routine activities. The electronics hardware industry is identified as one of the fastest growing segment in terms of international trade.

Today, India is a large, vibrant and one of the fastest growing economies in the world. As a result of impressive growth of the economy, steadily increasing purchasing power of the people and aspirations of the young, India is one of the fastest growing markets for electronic gadgets. The domestic demand for electronic hardware is estimated at US$ 400 billion by 2020.

Electronic hardware consists of interconnected electronic components which perform analog or logic operations on received and locally stored information to produce as output or store resulting new information or to provide control for output actuator mechanisms. Electronic hardware can range from individual chips/circuits to distributed information processing systems. Well designed electronic hardware is composed of hierarchies of functional modules which inter-communicate via precisely defined interfaces.

OBJECTIVES

- To analyse the Indian Electronics Industry.
- To examine the Major items of export of Electronic Hardware industry of India.
- To examine the trends in Electronic Hardware production of India.
- To examine the changes in the direction of India's Electronic Hardware Exports.
- To analyse the selected state wise exports of Electronic Hardware Exports of India.

A multi-pronged approach has been adopted for the study on Electronic Hardware Exports of India. To assess the status of the Exports, relevant data and information have been collected from secondary sources. This secondary data was collected from Electronics and Computer Software Export Promotion Council of India (ESC). This paper makes an attempt to delineate various dimensions of Electronic Hardware export from India.

Definitions

- Electronic Hardware Industry for the purpose of application of this Electronic Hardware Policy 2012-2017 includes, Industrial Electronics, Computers and peripherals, communication, Electronic Manufacturing Services and broadcast equipment strategic electronics and components. The broad classification of the products and services covered under this policy for the Electronic Hardware sector is as at Annexure-I to the Electronic Hardware Policy 2012-2017.
- Electronic Hardware Micro, Small Medium Enterprises (MSMEs) are as defined under the MSME Policy of the Govt. of India.
- Electronic Hardware Start-up units are as defined under ICT Policy 2010-2015.

Role of Major Industries in India GDP

The Gross Domestic Product popularly known as GDP of an economy requires contribution from major industries to be healthy. India is largely an agrarian economy; so agriculture makes the major contribution to the GDP. Role of major industries in India GDP is important as based on this only the total GDP is calculated. In terms of US Dollar exchange rate India's economy is the twelfth largest. Despite witnessing a slowdown, due to the global recession, India's economy has huge potential of expansion.

There are various sectors that contribute to India's GDP. Some of the major sectors are Automobile Industry, Steel Industry, Real Estate Industry, Tourism Industry, Energy Sector, Textile Industry, Airlines Industry, Medical Industry, Biotechnology Industry, Electronics and Hardware and the power industry. Besides these industries, there are several other sectors that are important contributors to the GDP of India.

Role of Electronics and Hardware Industry in India GDP

The Role of Electronics and Hardware Industry in India GDP is to ensure the growth of the other industries and contribute to the growth of the Indian economy. The Electronics and Hardware Industry depends on the manufacturing of the semiconductors. Role of Electronics and Hardware Industry in India GDP is crucial for the development of the IT and ITES sector in India. Electronics and hardware are major components of several industrial sectors such as Information Technology sector, Telecommunication sector, Automobiles sector, Electronic appliances sector, Special Medical equipments sector etc.

The Indian Electronics Industry

India is the fifth largest economy in the world and has the second largest GDP among emerging economies. Owing to its large population, the potential consumer demand is almost unlimited and consequently under appropriate conditions, strong growth performance can be expected. In fact, the liberalization of the economy in 1991 has led to rapid growth. The electronics industry, in particular, is emerging as one of the most important industry in the Indian market.

The electronics industry in India dates back to the early 1960s. Electronics was initially restricted to the development and maintenance of fundamental communication systems including radio-broadcasting, telephonic and telegraphic communication, and augmentation of defense capabilities. Until 1984, the electronics sector was primarily government owned. The late 1980s witnessed a rapid growth of the electronics industry due to sweeping economic changes, resulting in the liberalization and globalization of the economy. The economic transformation was motivated by two compelling factors - the determination to boost economic growth, and to accelerate the development of export-oriented industries, like the electronics industry.

The electronics industry has recorded very high growth in subsequent years. By 1991, private investments - both foreign and domestic - were encouraged. The easing of foreign investment norms, allowance of 100 percent foreign equity, reduction in custom tariffs, and delicensing of several consumer electronic products attracted remarkable amount of foreign collaboration and investment. The domestic industry also responded favorably to the politic policies of the government. The opening of the electronics field to private sector enabled entrepreneurs to establish industries to meet hitherto suppressed demand.

Improvements in the electronics industry have not been limited to a particular segment, but encompass all its sectors. Strides have been made in the areas of commercial electronics, software, telecommunications, instrumentation, positioning and networking systems, and defense. The result has been a significant trade growth that began in the late 1990s.

Despite commendable achievements in the sphere of electronics, considerable infrastructural improvements remain a priority. Water, power, telecommunications, and transportation sectors must still be augmented so that high economic growth can be sustained.

The total Electronics Equipment Production of the world during the year 2009-10 is estimated to be US$ 1800 billion. The maximum production is that of Computer Systems and Peripherals (30.2 per cent) follwoed by communication equipment (23.5 percent), Consumer Electronics (11.80 percent), Equipment for Government / Military (9.40 percent) and industrial equipment (9.20 percent).

India's total electronics hardware production estimated at 20.59 billion during the year 2008-09 accounts for a share of 1.21 percent in world electronic equipment production. India's total electronics hardware production estimated at US$ 23.17 billion during the year 2009-10 accounts for a share of 1.36 percent in world electronic equipment production. India's total electronics hardware production estimated at US$ 27.61 billion during the year 2010-11 accounts for a share of 1.54 percent in world electronic equipment production. Japan dominates world's production of electronic equipment with a share of 20 percent followed by China with a share of 18 percent. Europe and North America each accounts for a share of 15 percent. Rest of the world including India accounts for 32 percent.

Regional Spread of Indian Electronic Units

India's electronic hardware industry in concentrated in 3 main regions --- the Northern Region around Delhi, the National Capital of India which accounts for 37% of the output. The Western Region around Mumbai and Pune accounts for 25% and the Southern Region, which is mainly around Bangalore, Hyderabad and Chennai, accounts for 32% of the output Bangalore has much concentration of public sector units and organised private sector players, partly linked to the presence of Indian defence establishments in the city.

The annual average growth during the past five years in the production of Electronics Hardware has been 16.67 percent. Maximum production is seen in the communication and broadcasting sector followed by consumer electronics sector.

India-Hub of Electronics and Hardware Manufacturing

- India has become one of the favored destinations pertaining to the electronics and hardware
- The growth of the Electronics and Hardware Industry in India due to the favorable conditions for the electronics industry
- The Government policies are also helping the growth of the electronics and hardware industry
- The Policies pertaining to investments are attracting foreign players in this industry.
- The manufacturing of the semiconductor is the most important area pertaining to the electronics and hardware industry
- The semiconductors are used in all kinds of electronic equipments such as cell phone, personal computers, laptops, other implementations in automobile sector, medical equipments, etc

- India Semiconductor Association (ISA) is the apex agency pertaining to the semiconductor companies and chip design firms in India

Advantages of Indian Electronics and Hardware Industry

- Multinational corporations can provide to the growing electronics market in India at lower costs by manufacturing semiconductors in India
- India has the potential to come up as the next electronics and hardware destination in the world.
- The chip design and other complex components electronic device can be acquired from the Indian companies at low cost.
- India is growing up to be one of the biggest markets for electronic instrumentations. The main factor pertaining to the success of the Indian Electronics and Hardware Industry is the growth in the market demand.
- The growth in the manufacturing of semiconductor is the key driver in the emergence of India as one of the leaders.
- The advantages pertaining to the taxes and duties, the access to technical and engineering expertise, proper manufacturing facilities, lucrative investment offers, etc.

Structure of Indian Electronics Hardware Industry

- Indian Electronics Hardware industry supplies primarily to the domestic market. Exports are limited to passive components like capacitors, resistors, wound components, CD-ROMs, colour picture tubes, etc.
- In the areas of consumer electronics and telecom equipment, India is fast becoming a manufacturing base. Almost all major global players, such as Siemens, Texas Instruments, Matsushita, Alcatel, LG, Samsung, Sharp and Lenovo have already set up manufacturing operations in India. Many more have R&D centers.
- Flextronics, Solectron, Jabil Circuit and other international contract manufacturers have already set up base in India.

Electronic Hardware and Components Industry in India

The electronic hardware and components industry has emerged as one of the dynamic, vibrant, diversifying and expending manufacturing sectors in India. There has been a significant rise in the disposable surplus income with the middle class families in India. Their growing tech-savy culture, passion for the latest fashion and purchasing power is fuelling a high demand for hi-tech high-end consumer electronic products, particularly home entertainment systems, high resolution LCD/Plasma TVs, audio-video equipment, telecom products including mobile phones, IT Hardware, domestic white goods etc. As a result, the India electronic industry has been diversifying its product range, and expanding its manufacturing base in India.

India now offers a huge potential and opportunity as a market as well as a manufacturing base to cater not only to the growing domestic market but also to the global market. The total electronic hardware and components market in India is estimated US$ 363 billion, according to Frost and Sullivan. By 2015, the TAM (Total Available / Accessible Market) for the local Indian manufacturing industry is US$ 158 billion. Historically, the Indian electronics industry dates back to the 1960s, when it was initially focused on the development and maintenance of fundamental communication systems. Main players in India were public sector giants. During 1980s and 1990s, Indian electronics industry witnessed a steep growth due to the liberalization, mainly in the consumer electronics are, driven primarily by the growing middle class with a higher disposable income. The 1980s saw growth rates in excess of 30 percent.

The emergence of a business-friendly economic environment in India has attracted almost all major consumer electronics players from South Korea, Japan, USA, Germany, UK and China etc. They import as well manufacture locally to sell in the large domestic Indian market. India's burgeoning software sector is generating huge demand for IT hardware and components in the domestic market.

Export of Electronics goods and components from India during the year 2008-09 registered a growth of 137 percent (107 percent in US$ terms) over the year 2007-08. In value terms, export of electronics goods during the year 2008-09 is estimated to be Rs. 31226 crore (US$ 6790 million) up from Rs. 13200 crore (US$ 3279 million) estimated in the year 2007-08. During the year 2008-09 export of Telecom equipment registered a very high growth and is estimated to reach a value of Rs. 12276 crore (US$ 2669 million) up from Rs. 625 crore (US$ 155 million) estimated in the year 2007-08. Export of Consumer electronic goods, Electronic component and computer hardware also registered good growth during the year 2008-09. Export of Consumer Electronic Goods increased from Rs. 1600 crore (US$ 397 million) to Rs. 2600 crore (US$ 565 million) during the year 2008-09. Export of Electronic components is estimated to Rs. 10500 crore (US$ 2283 million) during the year 2008-09 up from Rs. 6100 crore (US$ 1515 million) registering a growth of 72 percent (51 percent in US$ terms) in the year 2007-08. Export of Computer Hardware increased from Rs. 990 crore (US$ 246 million) estimated in 2007-08 to Rs. 1650 crore (US$ 359 million) in the year 2008-09.

Export of Electronics goods and components from India during the year 2009-10 registered a decline of 17 percent (20 percent in US$ terms) over the year 2008-09. In value terms, export of electronics goods during the year 2009-10 is estimated to be Rs. 25900 crore (US$ 5460 million) down from Rs. 31226 crore (US$ 6790 million) estimated in the year 2008-09. During the year 2009-10, the only sectors under electronics hardware which registered growth are consumer electronics and Computer hardware.

Export of Electronics goods and components from India during the year 2010-11 registered a high growth of 56 percent (62 percent in US$ terms) over the year 2009-10. In value terms, export of electronics goods during the year 2010-11 is estimated to be Rs. 40400 crore (US$ 8867 million) up from Rs. 25900 crore (US$ 5460 million) estimated in the year 2009-10.

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Major Items of Export

Table 1. Top Items of Electronics Hardware Export during (2007-08 to 2009-10)

Items	2007-08 Export (Lacs)	2008-09 Export (Lacs)	%Age Growth during 2008-09 Over 2007-08 (Rs. Term)	Items	2009-10 Export (Lacs)	2010-11 Export (Lacs)	%Age Growth during 2010-11 Over 2009-10 (Rs. Term)
1.Telephone Sets/ Mobile Phones	12088	1114211	9117.40	1. Mobile Phone	611497	1199599	96.17
2. Solar Cells	104717	260563	148.83	2.Printed Circuits	44648	451159	910.48
3.Parts of Switches	140908	233630	65.80	3.Distribution Panels	215421	356882	65.67
4. Rectifiers	98631	126642	28.40	4. Solar Cells	151912	249868	64.48
5.Television	30669	113877	271.31	5.Parts of Telephones	77388	169284	118.75
6.Recorded video tapes of educational nature and news/views	81	109565	135032.24	6.X-Ray Equipments	81384	125770	54.54
7. Parts of Computers	73053	74698	2.25	7. Rectifiers	100336	116060	15.67
8.Other Equipment(For Communication Jamming Equipment)	59379	59995	1.04	8.Television Reception Apparatus	81663	99893	22.32
9.Transformers	46854	54947	17.27	9.Parts of PC	27012	70399	160.62
10. DVD Drive	42097	49833	18.38	10.Transformers	48863	63663	30.29

Source: Electronics and Software Export Promotion Council, Statistical Year book, different Years.

The above table indicates that the Export of Telephone sets including mobile telephone has emerged as the top item of export under the electronics hardware category during the year 2008-09. Export of Telephone sets increased from Rs. 121 crore (US$ 30 million) estimated in 2007-08 to Rs. 11142 crore (US$ 2423 million) during the year 2008-09. Telephone sets have been majorily exported to UAE (17 percent), Taiwan (16 percent), South Africa (15 percent, China (7 percent) and France (5 percent), Export of Solar cells also registered a very high growth during the year 2008- 09. In value terms export of solar cells increased from Rs. 1047 crore (US$ 260 million) estimated in 2007-08 to Rs. 2606 crore (US$ 566 million) during the year 2008-09 registering a growth of 149 percent (118 percent in US$ terms. Solar cells were mainly exported to Germany (44 percent) and Italy (13 percent). The other major items of export during the year 2008-09 are parts of switches, rectifiers, recorded video tapes, Television sets, Computer parts, Communication equipments, Transformers, DVD Drives etc.

Despite of decline of 42.64 percent (44.39 percent in US$ terms) Mobile phones remains the top item of export during the year 2009-10 as well. In value terms export of mobile phones during the year 2009-10 is estimated to be Rs. 6192 crore (US$ 1305 million) down from Rs. 10794 crore (US$ 2347 million) estimated in 2008-09. Boards, panels, consoles, desks, cabinets for various electronic equipments etc. have emerged to be the 2nd top item of export under electronics hardware during the year 2009-10. The value of export of this item during 2009-10 is estimated to be Rs. 2154 crore (US$ 454 million). Export of Solar Cells also registered a steep decline of 41.7 percent (43.48 percent in US$ terms). Medical Instruments, Television sets, rectifiers, populated PCB's, Recorded Video Cassettes, Transformers and DVD drives are the other major items of export under Electronics hardware category. Export of populated PCB's registered a growth of 143 percent (136 percent in US$ terms).

Export of Mobile phone registered a growth of 96 percent (104 percent in US$ terms) during the year 2010-11. There has been a very high growth in export of printed circuits making it the 2nd top item of export during 2010-11. The other major items of export under Electronics hardware during 2010-11 are distributions panels, Solar Cells, Parts of Telephones, X-Ray Equipments, Rectifiers, and Television Reception Apparatus etc.

Production of Electronics Hardware

Table 2 indicates that the Electronic Hardware production of India estimated to be Rs. 43800 crore during the year 2003-04. India's Production of Electronic Hardware during the year 2008-09 is estimated to be Rs. 94690 crore (US$ 20.58 billion). The production during the year 2008-09 registered a growth of 12.18 percent (-1.8 percent in US$ terms) over the year 2007-08 when the total production of Electronics hardware was estimated to be Rs. 84410 crore (US$ 20.96 billion). The annual average growth during the past five years in the production of Electronics Hardware has been 16.67 percent. Maximum production is seen in the communication and broadcasting sector followed by consumer electronics sector.

Table 2. Trends in Electronic Hardware Production

Year	Rs Crores	US $ Million
2003-04	43800	9522
2004-05	50500	11247
2005-06	56600	12785
2006-07	66000	15260
2007-08	84410	20966
2008-09	94690	20589
2009-10	109940	23175
2010-11	125790	27610

Source: Electronics and Software Export Promotion Council, Statistical Year book, different Years.

India’s Production of Electronic Hardware during the year 2009-10 is estimated to be Rs. 109440 crore (US $ 23.9 billion). The production during the year 2009-10 registered a growth of 16.1 per cent 12.55 per cent in US $ terms) over the year 2008-09 when the total production of Electronics hardware was estimated to be Rs. 94690 crore (US $ billion). The annual average growht during the past five years in the production of Electronics Hardware has been 16.83 per cent (15.55% in US$ terms).

India’s Production of Electronic Hardware during the year 2010-11 is estimated to be Rs. 125790 crore (US $ 27.61billion). The production during the year 2010-11 registered a growth of 14 per cent (19 per cent in US $ terms) over the year 2009-10 when the total production of Electronics hardware was estimated to be Rs. 109940 crore (US $ 23.17 billion). The annual average growht during the past five years in the production of Electronics Hardware has been 17.31 per cent (16.79% in US$ terms).

Country wise Export of Electronic Hardware Exports

During the last 10-15 years, countries such as China, Korea, Taiwan, Singapore and Malaysia have emerged as leading global IT hardware and electronics manufacturer/exporters and has contributed significantly to the growth of their economies. Indian electronics Industry has failed to keep pace with these countries and it is still in a nascent stage of development, though the country's software industry is well developed and highly competitive in the global market. To ensure quantum jump in the production and export of electronic hardware, the performances of factors of production like human resource, infrastructure, capital and technology needs to be enhanced through policy changes and managerial action to boost the competitiveness of this sector.

Table 3. Changes in the direction of Electronic Hardware Exports (Rs Crores)

Destination	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Singapore, Hongkong & other South Asian Countries	1428.56 (25.51)	1825.5 (23.71)	1926.2 (24.08)	2199.87 (22.86)	2640.86 (21.13)	2822.44 (21.38)	7775.9 (24.9)	6049.9 (23.26)	6362 (15.75)
Europe (EU countries)	1467.76 (26.21)	2002.8 (26.01)	1959.1 (24.49)	2339.44 (24.31)	3187.82 (25.5)	3768.23 (28.55)	7457 (23.88)	5647.7 (21.81)	13478 (33.36)
North America	1328.88 (23.73)	1845.7 (23.97)	2023.6 (25.3)	2682.61 (27.87)	3410.94 (27.29)	2871.26 (21.75)	4446.5 (12.73)	3929 (15.17)	5730 (14.18)
Middle East countries	636.13 (11.36)	984.18 (12.78)	1075.3 (13.44)	1083.43 (11.26)	1360.46 (10.88)	1654.51 (12.53)	4624.9 (14.81)	4003.5 (15.46)	5803 (14.36)
Japan Korea&other Far East Countries Australia & Other Ocean Countries	407.68 (7.28)	540.68 (7.02)	432.49 (5.41)	550.31 (5.72)	710.19 (5.68)	707.15 (5.36)	1101 (3.53)	1881.3 (7.26)	1838 (4.55)
African countries	140.56 (2.51)	220.35 (2.86)	327.42 (4.09)	370.2 (3.85)	512.42 (4.1)	757.24 (5.74)	3975.4 (12.73)	2718.1 (10.49)	3942 (9.76)
Russia and C.I.S countries	51.52 (0.92)	84.03 (1.09)	108.45 (1.36)	115 (1.19)	274.47 (2.2)	114.45 (0.87)	163 (0.52)	259.28 (1)	720 (1.78)
Australia & Other Ocean Countries	66.08 (1.18)	80.11 (1.04)	71.01 (0.89)	87.05 (0.9)	90.51 (0.72)	86.13 (0.65)	155 (0.5)	220.55 (0.85)	314 (0.78)
Latin America	20.16 (0.36)	39.23 (0.51)	45.34 (0.57)	144.12 (1.5)	242.94 (56.17)	370.37 (2.81)	463.5 (1.48)	385.99 (1.49)	1005 (2.49)
Europe (Non EU Countries)	52.64 (0.94)	77.42 (1.01)	31.01 (0.39)	52.98 (0.55)	69.39 (16.04)	48.22 (0.37)	1062.5 (3.4)	804.68 (3.11)	1208 (2.99)
Total	5599.97	7700	7999.92	9625.01	12500	13200	31224.7	25900	40400

Note: Figures in brackets show the Percentage of Sectoral Total

Source: Electronics and Software Export Promotion Council (ESC), Statistical Year book, different Years

Table 3 indicates that the Singapore, Hong Kong and other South East Asian countries which was at the 3rd position during the year 2007-08 has emerged to be the top destination for India's Electronics Hardware exports during the year 2008-09 Export to this regions registered a growth of 175 percent (141 percent in US$ terms) during the year 2008-09 over the year 2007-08. In value terms export to this region has increased from Rs. 2822 crore (US$ 701 million) estimated in 2007-08 to Rs. 7776 crores (US$ 1691 million) during the year 2008-09. Share of export to EU countries has come down from 28.55 percent estimated in 2007-08 to 23.88 percent in 2008-09 losing its top position to Singapore, Hong Kong and South Asian countries which accounts for a share of 24.90 percent. Export to Middle East countries also registered a high growth of 179.53 percent (145 percent in US$ terms) during the year 2008-09 over the year 2007-08. In value terms the export of electronics hardware to Middle East countries during 2008-09 is estimated to be Rs. 4625 crore (US$ 1006 million) up from Rs. 1655 crore (US$ 411 million) estimated in 2007-08. Middle East countries which were at a 4th position during the year 2007-08 gained the 3rd position during the year 2008-09. Share of Export of North America which was at the 2nd top position during the year 2007-08 has come down from 21.75 percent estimated in the year 2007-08 to 14.24 percent during the year 2008-09 shifting it to 4th position. Export to all other regions registered growth during the year 2008-09.

Singapore, Hongkong and other South East Asian countries remains the top destination of exports for electronic hardware during the year 2009-10 as well. In value terms the export to this region has fallen from Rs. 777.59 crore (US $ 1691 million) estimated in 2008-09 to Rs. 6050 crore (US $ 1275 million) in 2009-10. During the year 2009-10 the only regions to have registered growth in exoports of Electronics Hardware are Japan, Korea and other Far East countries, CIS countries and Oceanic Countries. Export to Japan, Korea and other Far East countries registered a growth of 71 per cent (66 per cent in US $ terms) during the year 2009-10 over the year 2008-09. Export to all other regions such as Europe, Middle East countries, North America, Africa and LAC registered decline in Export.

This Table 3 also indicates the there has been high growth of 138.65 percent (148.49 percent in US$ terms) in export of Electronics products from India to EU countries during 2010-11 making this region the top destination. In value terms export of electronics goods to EU countries is estimated to be Rs.13478 crore (US$ 2958 million) during 2010-11 up from Rs. 5648 crore (US$1190 million) estimated in the year 2009- 10. Export to Singapore, Hong Kong and other South Asian countries registered a small growth export to Middle East, North America and Africa registered a growth of 45 percent or above.

State wise Export of Electronic Hardware

To spread the geographic base of the electronics hardware industry states were encouraged to establish electronics development corporations for promotion and development of electronics in their respective states. Special incentives like sales tax concessions, creation of separate industrial areas for electronics, subsidy for setting up units in backward areas, financial participation either as joint sector or assisted sector, etc are also being provided by many of the states. This action, combined with the dispersion of additional public sector units, encouraged the emergence of several secondary electronics centers.

The electronics industry in India had initially grown around three major centers, Bangalore, Mumbai/Pune and Delhi. Bangalore not only has major public sector units in defence and telecommunication but also has a very fast-growing, organised private sector firms in computer and industrial products. Bombay /Pune have been always a preferred destination for private sector firms and MNCs. However, eastern India remained underdeveloped in electronics and IT hardware production. The secondary electronics centers include Hyderabad, Hosur, Thiruvananthapuram, Chennai, Kolkata, Vadodora, Mohali, Ahmedabad and Aurangabad. Uttar Pradesh has emerged as the leading state in the production of electronics and IT hardware since 2001. Delhi also occupies a significant place due to large concentration of small scale units making consumer electronic products and computers.

Table 4. Selected State wise Export of Electronics Hardware (Rs. Crores)

States	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
East Region									
1.West Bengal	94.2 (1.68)	105 (1.36)	60 (0.75)	111.84 (1.16)	125 (1)	135 (1.02)	210 (0.67)	200 (0.77)	400 (0.99)
2.Orissa	1.42 (0.02)	0	14.73 (0.18)	0	0	0	0	0	0
3.Bihar	0	1 (0.01)	0.72 (0.01)	1.22 (0.01)	3 (0.02)	3 (0.02)	4 (0.01)	3 (0.01)	10 (0.02)
North Region									
4.Haryana	53.49 (0.95)	143 (1.857)	110 (1.38)	52.25 (0.54)	95 (0.76)	115 (0.87)	275 (0.88)	250 (0.97)	300 (0.74)
5.Uttar Pradesh	1000.62 (17.86)	1915 (24.87)	1815 (22.69)	2455.3 (25.51)	3250 (26)	3414 (25.86)	4200 (13.45)	4300 (16.60)	5500 (13.61)
6. Punjab	4.65 (0.08)	0.75 (0.009)	150 (1.88)	81.28 (0.84)	90 (0.72)	95 (0.72)	185 (0.59)	150 (0.58)	175 (0.43)
7.Rajasthan	37.66 (0.67)	75 (0.97)	85 (1.06)	188.17 (1.96)	80 (0.64)	90 (0.68)	275 (0.88)	292 (1.13)	350 (0.87)
8. Madya Pradesh	1.56 (0.027)	1.23 (0.015)	1.30 (1.63)	11.98 (0.12)	15 (0.12)	18 (0.14)	25 (0.08)	24 (0.09)	48 (0.12)
9.Himachal Pradesh	5.37 (0.09)	6 (0.08)	25 (0.31)	11.5 (0.12)	32 (0.26)	40 (0.30)	150 (0.48)	175 (0.68)	290 (0.72)
South Region									
10. Karnataka	1980.27 (35.36)	1998 (25.94)	2600 (32.50)	2929.94 (30.44)	3475 (27.8)	3570 (27.05)	6200 (19.86)	6200 (23.94)	6850 (16.96)
11. Tamil Nadu	395.65 (7.06)	155 (0.02)	160 (2)	223.96 (2.33)	600 (4.80)	640 (4.85)	13200 (42.27)	8000 (30.89)	18500 (45.79)
12. Andhra Pradesh	15.34 (0.27)	45 (0.58)	380 (4.75)	110.32 (1.15)	120 (0.96)	175 (1.33)	310 (0.99)	280 (1.08)	400 (0.99)
13.Kerala	33.16 (0.59)	180 (2.33)	350 (4.38)	382.89 (3.98)	500 (4)	575 (4.36)	865 (2.77)	850 (3.28)	1000 (2.48)
West Region									
14. Maharshtra	1300 (23.21)	2355 (30.584)	1895 (23.69)	2694.79 (28)	3400 (27.2)	3500 (26.52)	4100 (13.13)	4000 (15.44)	4975 (12.31)
15.Gujarat	173.98 (3.106)	120 (1.55)	95 (1.19)	196.12 (2.04)	200 (1.60)	250 (1.89)	425 (1.36)	400 (1.54)	600 (1.49)
Total (Above States)	5097.37	7099.98	7632.02	9451.56	3256.65	12620	30424	25124	39398
Total (India: Including all States)	**5600**	**7700**	**8000**	**9625**	**12500**	**13200**	**31226**	**25900**	**40400**

Note: Figures in brackets show the States wise Export Percentage of India's Total.

Source: Electronics and Software Export Promotion Council, Statistical Year book, different Years.

We selected only 15 states from total states of Electronic Hardware exports of India. The Table 4 represents the Karnataka is the top export state and Maharashtra is the 2nd export state of India's Export of Electronic Hardware during the years 2002-03 and 2004-05 to

2007-08. Only in the year 2003-04 Maharashtra is the top position and Karnataka is the 2nd position in the Export of Electronic Hardware. Tamil Nadu is the top export state and Karnataka is the 2nd export state of India's Export of Electronic Hardware during the years 2008-09 to 2010-11. Uttar Pradesh has maintained its 3rd position in all the years.

There has been high growth of 131.25 percent in export of Electronic Hardware from Tamil Nadu during 2010-11. In 2003-04 the percentage growth of Tamil Nadu is -60.8. In value terms export of electronic goods from Tamil Nadu is estimated to be Rs. 18500 crore during 2010 up from RS.395.67 crore estimated in the year 2002-03. The percentage share of total exports of Tamil Nadu is also increased from 7.06 to 45.79 percent during the years 2002-03 to 2010-11.

In the 2010-11 Karnataka percentage share of total was decreased compare with before years. The percentage share of total exports of Karnataka is estimated to be 35.36 percentage in 2002-03 and 16.96 percentage in 210-11.This indicates that the Karnataka percentage share of total was continuously decreased. In value terms export of electronic goods from Karnataka is estimated to be Rs. 6850 crore during 2010 up from RS.395.67 crore estimated in the year 2002-03.

The other top export states are Maharashtra, Kerala, Gujarat, AP, West Bengal, Rajasthan, Haryana etc. The Electronic Hardware exported a small growth from these states.

Challenges of Electronic Hardware Industry

Major challenges facing the Indian electronic manufacturing market are an infrastructure that needs to be improved at the earliest possibility, easing of foreign investment procedures, which are underway, and a restructured government tariff that now makes domestically manufactured goods more expensive than imported goods with zero tariffs.

There are also other problems, which are hampering the growth of the Indian electronics industry. Some of them are:

- Lack of World-class infrastructure.
- Lack of clear-cut government policy for the industry.
- Very little expenditure in Research and Development area
- Power of Marketing not harnessed to the maximum.

Opportunities

While the Electronic sector in India is currently small, there are several advantages that India offers that can be effectively leveraged to achieve higher growth. These can be categorised under three heads.

- Man power
- Market Demand
- Policy and Regulatory Support

India has set Rs. 300 billion worth of incentives and subsidies to encourage firms to set up electronics manufacturing in the country. Startups interested in creation of apps for mobile phones, tablets and other electronic hardware will also benefit, as a package of Rs 100 billion is in the offing for them. About Rs 200 billion has already been approved. The fund will also be used for providing incentives to the tune of 20-25% as subsidy for capital expenditure incurred. Firms such as Nokia. Samsung. LG, Dell, Lenovo, who are already maunufacturing in India, will also benefit from the new fund. The Government also approved Rs 100 billion, as financial support for the development of electronic manufacturing clusters.

RECOMMENDATIONS

A few of the Recommendations emanating from the study are:

- Since technology is critical to the sector, to develop electronics and IT hardware products built on latest available technology there needs to is continuous R& D leading to innovation and product differentiation based on technology. The right mix of unique and innovative products that are acceptable to the consumers is critical to sustain and augment profits in the long run. Government should strengthen Research and Development in Electronic Hardware sector especially the applied research like product development through special grants to leading Research Institutes /Universities and Technical Institutes like IITs.
- However, base models of an electronic product with some key features may be placed on the shelves at lower rates than the similar available products of the competing firms. This will help firm in capturing the market sentiments of the India's vast population. Simultaneously, to target the rich and elite class, exclusive models/ products need to be designed with advanced technology. Such products may be priced at high premium, as they would give the owner a sense of pride.
- Strengthening the global supply chain network as the industry is highly dependent on the import of raw materials which would affect the competitiveness. The cost of the supply network or logistic management network also needs to be assessed through value chain analysis.
- Development of technical institutes according to the requirement of Industry will ensure proper skill development and would help in solving the problem of unavailability of technical manpower.
- Availability of quality manpower is declining and there is shortage of skilled and trained personnel. The attrition rate is also high as the industry salary packages are not competitive with ITES sector. The current educational system in the IT sector is skewed towards Software rather than Hardware. Curriculum of ITIs should be redesigned and continuously updated to meet the changing requirement of Hardware & IT industry. Industry Associations may be involved in developing course curriculum and in plant training be made compulsory part of course curriculum. Industry/corporate bodies may be encouraged through tax benefits/ payment of management fee to adopt government run ITI or diploma colleges for effective and efficient management.
- Indian entrepreneurs or companies may explore the opportunities of undertaking contract manufacturing as Electronics manufacturing services (EMS) companies to larger Original Equipment Manufacturers (OEMs)

- The manufactures of IT hardware and Electronics products are generally dependent on imported raw material. Weak supply chain network and lack of vendor support also affects the quality, productivity and competitiveness of the products. Government should ensure hassle free import of raw material and components by streamlining the import policy and systems and through simplification of import procedures.
- It is recommended that the government should promote modernization of units through a special scheme with fiscal incentives and minimum import duties. Depending on the needs and performance of existing manufacturers, special loans may be granted for technology up gradation, infrastructure building or expansion of business.

CONCLUSION

From the foregoing analysis, it is clear that the Electronics Industry in India took off around 1965 with an orientation towards space and technologies. The period between 1984 and 1990 was the golden period for Electronics during which the industry witnessed continuous and rapid growth. In recent years the electronic industry is growing at brisk space. The demand in the Indian market is expected to touch US$ 400 billion by 2020. The largest segment is the consumer electronics segments is components. The Indian electronics industry has displayed upward trend in the 11th Five Year Plan, rising from Rs. 54 million during the fiscal 2007-08 to Rs. 79.48 billion during 2011-12. India's production constitutes only about 1.3% of the global electronics Hardware Production of $1.7 trillion. Hence it is miniscule by international comparison. However the demand in the Indian market is growing rapidly and investment are following in to augment manufacturing capacity.

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