



The Study on Role of the Hardware Sector in India

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Abstract:

Hardware sector is one of the major components of Information technology and so the growth of the hardware sector is very important for the growth of the Indian economy. As well as the software sector there are also various companies exist in Hardware sector in India which contribute their share in economy of the country. The history of the hardware sector is very broad and encompassing the rapid and good growth of the sector In India. Hardware sector is classified mainly in five components. This study is descriptive in nature; try to highlight the role of the Hardware sector in India. In addition Hardware sector plays important role in demand growth, Employment Growth and Industry Growth. Various government policies are described in the paper to point out the potentials of hardware sector in the country. These policies are in support to boom the demand, growth and importance of the Hardware sector.

Keywords: *Hardware Sector, Information technology, Software, Electronics*

1. Introduction

In our country, India Information technology is recognized as one of the major industries. Information technology has three major components namely Computer Hardware, Computer Software, and Data. Software as well as Hardware sector plays very crucial role on Indian economic growth. Hardware sector also plays major role in the development of IT and ITES sectors in India. Hardware and electronics are also huge and important components of various industrial sectors likewise Automobile sector, telecommunication sector, Electronic Appliance sector, information technology sector and medical equipment sector also. Friendly Government policies in India makes hardware sector very important and helps in growth of the hardware industries in India. The manufacturing semiconductor is the most important area of the hardware sector. India has the potentials to come up as the next hardware destinations because of the growth in demand for the electronics and Hardware. There are also existing hardware companies in India which contributes in growth of Indian economy. It becomes important to study the Classification of hardware sector, Evolution of hardware sector, History of the hardware sector and important role of hardware sector in India.

2. Objectives of Study

1. To study the role of Hardware sector in India.
2. To highlight properly the hardware sector potential in India.
3. To understand various government policies related to hardware sector in India.

3. Research Methodology

The proposed study mainly is descriptive in nature. The study is based on secondary data collected from reputed articles of research journals, books, prominent sites, document of various departments and organizations.

4. Reviews of Literature

G. V. Vijyasri (2013)¹, the main purpose of the study were to analyse the performance of India's software and Hardware industry, to analyse the changes in the direction of India's computer Software and Hardware exports, to examine the trends in computer software and computer Hardware production and exports of India. The study found that over the years the software industry has been growing at high rate of over 45% and the share of the software export in total export and its contribution to GDP has steadily increased over the years. Researcher shows that India is one of the fastest growing IT system and Hardware market in the Asia Pacific region. The study revealed that IT is the foreign exchange earner and generator of large scale employment. Finally the study found that IT software and Hardware industry is very important for Indian Economy.

Gaurav Batra, Zach Jacobson, Siddarth Madhav, Andrea Queirolo, and Nick Santhanam (2018)², the said article defined artificial intelligence as the ability of a machine to perform cognitive function associated with human minds. AI application share one common feature: a reliance on hardware especially for logic and memory function. This article examined opportunities for semiconductor companies across the entire technology stack. The said article also examined specific opportunities within compute, memory, storage and networking. The article discussed the new strategies for semi conductor companies to gain advantage in AI market.

5. Meaning and History of Hardware Sector

5.1 Meaning

Computer hardware refers to the physical parts of a computer and related devices. Internal hardware devices include motherboards, hard drives, and RAM. External hardware devices include monitors, keyboards, mice, printers, and scanners.³

The internal hardware parts of a computer are often referred to as components, while external hardware devices are usually called peripherals. Together, they all fall under the category of computer hardware. Software, on the other hand, consists of the programs and applications that run on computers. Because software runs on computer hardware, software programs often have system requirements that list the minimum hardware required for the software to run.³

6. History of Hardware sector

The history of the hardware sector is described very briefly below:

The history of the Hardware sector starts from simple devices which used for calculations and end up to the Modern computers. Most of calculations were done by humans before 20th century. Earlier humans used abacus, also called a counting frame is a calculating tool that was in use. Then machines and calculators were in used. The first aids to computation were purely mechanical devices which required the operator to set up the initial values of an elementary arithmetic operation, and then manipulate the device to obtain the result. Later, computers represented numbers in a continuous form. Numbers could also be represented in the form of digits, automatically manipulated by a mechanism. Although this approach generally required more complex mechanisms, it greatly increased the precision of results. In the history of the hardware sector transistor computer was developed and then modified in integrated circuit computer. This development caused replacement of Digital computers to analog computers. Metal-oxide-semiconductor and then large scale integration enabled the semiconductor memory and then the microprocessor which developed in personal computer.

In the 1990s, the cost of computer gradually becomes so law than that of 1970s. And then mobile computers, smart phones and tablets are becomes so popular in 2000s.⁴

7. Classification of Hardware Sector

The Hardware sector is classified mainly in five components namely,⁵

1. Electronic component and semiconductor design: This segment includes sub segment like fabrication, assembly test mark pack, design and passive components.
2. Consumer Electronics: this segment encompassing the smart phones, DTH, Set top box and other household electronic appliances.
3. Communication and broadcasting: Fiber optics and routers, switches and hubs.
4. Computers and peripherals: Laptops, Notebooks, storage servers, Tablets and office automation.
5. Other Electronics: Automotive Electronics, Medical Electronics, Strategic Electronics, Industrial Electronics, solar panels and LED products.

8. Government Policies related to Hardware Sector

Some of the important Government policies are discussed as under:

1. National policies on Electronics 2012

National policy on Electronics was introduced on 25th October 2012. This policy is expected to create an indigenous manufacturing ecosystem for electronics in the market. As India is the fastest growing market in electronics in the world, the said policy aimed to transform India into a premier Electronic System design and manufacturing Hub. NPE 2012 had a wide range of scheme but due to procedural complications resulted in limited success and new electronic policy improves on the NPE 2010 initiatives to promote domestic manufacturing and exports across the entire value chain of the electronics system and design manufacturing (ESDM) industry.⁶

NPE 2019 aims to make India a global leader in the field of ESDM by promoting a gradual increase in value addition in the production of the electronics. Green processes and e-waste management by promoting research and innovation and localizing the design and manufacturing of microchips.

2. Modified Special Incentive Package scheme

By this scheme the central government has offered a set of incentives for electronics and hardware industry. The main features of the scheme encompassing that if the manufacturing unit is in the SEZ, a subsidy equivalent to 20% of capital expenditure and if the manufacturing unit is not located in SEZ 25% of capital expenditure subsidy provided if the investments made within 10 years from the date of the approval of the project. To promote the large scale manufacturing in the country, the said scheme was announced by the government in July 2012.⁷

3. Electronic Manufacturing Cluster Scheme

This scheme was notified vide notification number.252 dated 22nd October, 2012. This scheme was introduced to make India a global player in the field of Electronics manufacturing and to offset reliable infrastructure disabilities faced by industries. This scheme provides support for creation of world class infrastructure for attracting investment in the Electronic System Design and Manufacturing Sector. A cost advantage of 5 to 8 % received by a unit located in the developed cluster, and this advantage received because of various reasons such as increased supply chain responsiveness, consolidation of suppliers, decreased time-to-market, and superior access to talent and low logistics costs. The cost of land and buildings for individual units do not bear by the scheme.⁸

4. Preferential Market Access Policy

In February 2012, government introduced this policy. The motive of the policy is to increase the share of domestically manufactured Electronics products. The extent of government procurement from domestic manufacturers will not be less than 30 percent of the total procurement value of that electronic product(s). The policy is expected to strengthen the cyber security ecosystem in the country as well as provide a boost to the domestic manufacturing.

9. Role of Hardware sector on Indian Economy

The role of Hardware sectors described in three contexts: 1. Growing Demand, 2. Employment Growth, 3. Growth of the Industry.

1. Growing Demand

Consumer and business demand for electronic and IT hardware products are increased and touch 24 lakh crore in 2020. The import of electronic products touch 18 lakh crore therefore the government is making concerted efforts to encourage domestic manufacturing in the sector. Infact the Central and state governments are among the largest demand drivers for the electronics industry as their spending touch 2620 crore in FY13. For these motives the government introduced the key programs like the 'Aakash' tablet, the UIDAI project, the National Knowledge Network and the National Optic Fiber Network. To promote domestic manufacture in the hardware sector government launched various schemes like The Electronic Manufacturing Cluster Scheme, Modified Special Initiatives Package Scheme and Preferential Market Access Scheme. Rapid growth in the demand for electronics, clubbed with a sluggish domestic production, has widened the demand supply gap in the industry. While demand for electronics stood at INR 6 lakh crore in FY13, goods worth INR 216,000 crore were produced in India. The top five players are responsible for about 15 percent of the sector's revenue, reflecting the largely fragmented nature of the sector in the country.

2. Employment Growth:

The role of the Electronics and IT hardware sector in employment growth is very crucial. Hardware sector employed 4.3 million workforces in 2013 and is expected to reach 8.9 million by 2022 in manufacturing, sales and marketing and repair- maintenance segments. Among these repair and maintenance segment would contribute to the maximum growth in employment. The employment growth is tabulated as below:

Segment	Employment in million			Employment Growth 2013-17	Employment Growth 2017-22	Employment Growth 2013-22
	2013	2017	2022	In millions	In millions	In millions
Design & manufacturing	1.45	1.75	2.06	0.30	0.31	0.61
Sales & Marketing	1.58	2.33	3.34	0.75	1.01	1.76
Repair, installation and Maintenance	1.30	2.16	3.54	0.86	1.38	2.24
Total	4.33	6.24	8.94	1.91	2.70	4.61

Source: Report of KPMG Advisory Service Pvt Ltd.

Data in above table described that in 2013, sales and marketing segment employed higher workforce in compare to other segments. The same situation in the year 2017, but in the year 2022 it is expected that the employment will be higher in the segment repair and maintenance.

The growth in electronic manufacturing and design sectors have the requirement of employee who have operating skill in manufacturing plant and also have computer knowledge. To match up with a rapid growth in manufacturing sector Indian machine makers will be required to not only invest capital but also build a strong design and innovation manpower pool. The study found that there is rapid growth in demand for Smart phones, tablets, consumer electronic products and this increment creating job for installation, sales, after sales and repair services. And for sales communication skills also required. New technological hardware products also generate employment in the country. These new technologies such as cloud computing and mobility transforming the IT hardware sector, and for this

purpose companies required the professionals skills. In the next decade demand for skilled employees increased due to the trend towards wearable computing devices.

3. Growth of the industry

Rapid growth in demand for smart phones and tablets are key growth drivers of the overall electronics market. The demand for IT hardware products is increased due to rise in BPM industry. The health care and defence sectors are leading the demand for electronic products. The hardware industry provides a variety range of products which includes items used in homes, schools and businesses. These items includes desktop computer, laptop, printer, scanner and industrial items such as Webcams, ATM machines and data storage devices used by large and small corporations. This industry includes the companies that research, develop, design, assemble, test, manufacture and sale a range of variety of devices. Technological advances enhance the growth of the hardware industry very fast. The hardware industry applied technical advances such as the production of smaller and more compact devices by produce complex microchips in smaller size. The innovation of the industry also encompassing flat screen monitors, thinner and lighter laptop and tablet.

The hardware industry helps to lead the growth in the industries like medical and healthcare industries, telecommunication industry and automotive industry. This industry plays very vital role in the employment growth because this industry employs workers of all education and skill levels such as Computer scientists and engineers; development, design, and production engineers; system analysts and set-up specialists; service technicians; quality assurance specialists; and computer sales representatives.

10. Conclusions

The study paper reveals that India is one of the fastest growing Hardware market in the world. The history of the Hardware sector shows that it starts with simple devices and by applying researches and innovations this industry ends up with modern computers. Central and State Government are making fabulous efforts for the growth of the hardware sector. The Government introduced various schemes and policies for the support of the manufacturing and Hardware sector. The study also reveals that the government also reintroduced the policies with improvements to gain more advantages from the sector. Hardware and manufacturing sector plays a vital role in the growth of the nation's economy and growth in the industry and employment growth. The study shows that there is rapid growth in demand of the hardware devices which helps to boom the hardware sector.

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