

Chapter 3

OVERVIEW OF INDIAN IT INDUSTRY

3.1 THE IT INDUSTRY

Technology has continued to take the world by surprise, enabling an industrial revolution, economic change as well as social transformation. Information technology is no exception – its evolution, advancements and results continue to spread at a rapid pace, as does humanity's dependence on technology in general [133].

Information Technology essentially refers to the digital processing, storage and communication of information of all kinds. IT can be defined as computing and telecommunication technologies that provide automatic means of handling information. Information Technology has made information access at our disposal and discretion. It has revolutionized our daily lives through internet with possibilities of e-government measures. Today, whether it's booking a gas connection or paying taxes online or executing a fund transfer, it is just a few mouse clicks away [134].

The Information Technology industry is one of the world's largest and fastest growing industries. IT is increasingly finding applications in all sectors of the economy and thus is accepted as a key enabler in development [135]. In last two decades, the Information and

Communication Technology (ICT) sector in India has emerged rapidly on the global stage [24]. India's IT potential is on a steady march towards global competitiveness, increasing energy efficiency and meeting environmental challenges amongst others [134].

The IT sector is broadly categorized into IT services and software, Information technology enabled services (ITeS) and IT hardware products segment. [24]. IT Hardware segment includes personal storage devices, printers, servers, Personal Computers (PCs), supercomputers, data processing equipment and peripherals such as monitors, keyboards, disk drives, plotters, SMPS, modems, networking products and add-on cards [136]. Global hardware production is concentrated in the Asia-Pacific and the North American region. Singapore, Taiwan, China, Thailand and Korea are the largest producers and exporters of computer hardware and peripherals in the world. Branded personal computer majors such as Hewlett Packard, IBM and Dell outsource their production to Asian countries and focus on marketing and services.

3.2 PROFILE OF THE IT INDUSTRY IN INDIA

Information technology (IT) industry in India has been instrumental in making India a major player in the global horizon. IT has transformed India from an agriculture-based economy to a knowledge based economy [134]. 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 buying power of the people and aspirations of the young, the consumption of electronic gadgets in the country is growing fast. India is one of the world's fastest growing electronics hardware markets. The domestic demand of electronics hardware is estimated at US\$ 400 billion by 2020. This provides a huge opportunity for India to become an electronics hardware manufacturing hub to meet its domestic requirements as well as the global requirements. Therefore, the Government has accorded high priority to this sector [135]. The industry has played a significant role in transforming India's image as a global player in providing high-end technology solutions and business services.

After the opening up of the Indian economy during reforms of 1991-92, incentives provided by the government in form of lower value added tax (VAT) on software and elimination of

duties on imports of information technology products, and investments made for IT and ITES services, IT industry has flourished and India is playing a major role as a technology provider to the world economies. Setting up of Software Technology Parks (STP), and Special Economic Zones (SEZ) has encouraged entrepreneurs to utilize their skills and expertise and increase export of software services many-fold [134].

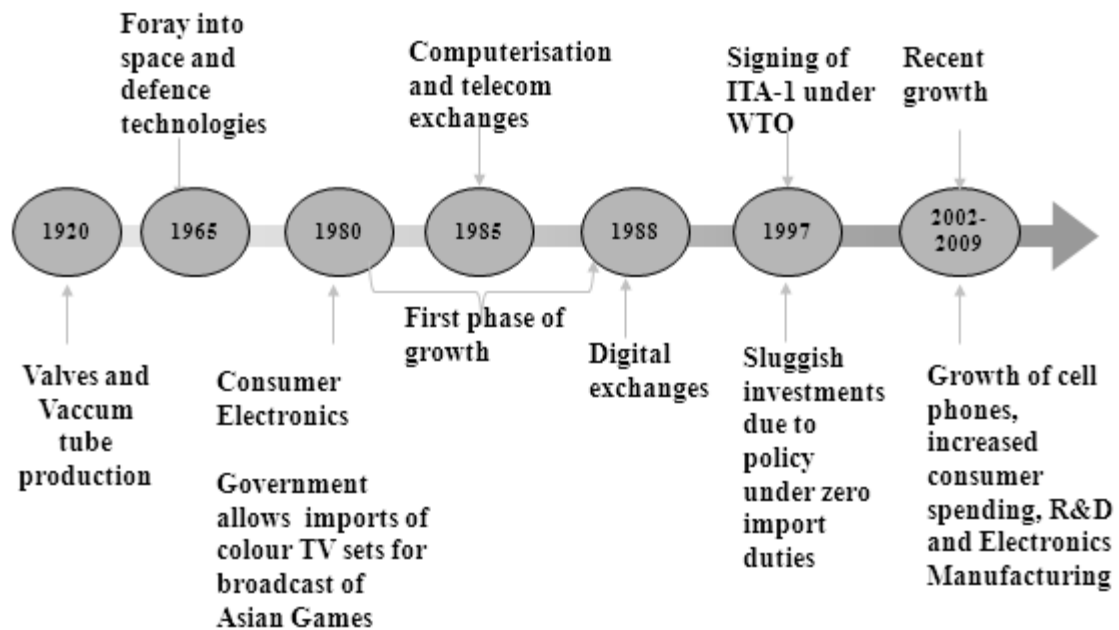


Figure 3-1 Evolution of Indian Electronics and IT Hardware Industry

The Government of India has identified growth of IT hardware manufacturing sector as a thrust area and has taken a number of steps for promotion of this industry in the country. Setting up of a mission to implement schemes and policies in a focused and targeted manner, incentivization, eco-system development and attracting investment in electronics hardware manufacturing sector are amongst the major initiatives which are under consideration of the Government to take advantage of this opportunity.

BFSI (Banking, Financial Services and Insurance), telecom, ITeS (Information Technology enabled Services), manufacturing verticals, Small and Medium Enterprises (SMEs), e-Governance and households are the key drivers for Indian IT and hardware market [135]. The small city growth is largely fuelled by the larger organizations strengthening their base in smaller cities on account of cost advantages. The SMB growth is largely fuelled by the adoption of nontraditional businesses like education, retail, healthcare and hospitality, etc

This phenomenal growth of the Indian IT sector has had a perceptible multiplier effect on the Indian economy as a whole. The sector has grown to become the biggest employment generator and has spawned the mushrooming of several ancillary industries such as transportation, real estate and catering [135]. The IT industry has created career opportunities for the youth, provided global exposure and offered extensive training and development. Furthermore, the industry has been a front-runner in bridging the gender divide in the Indian workforce [135].

India has witnessed remarkable success in the field of information technology and business process outsourcing (IT-BPO) over the two decades. Total export revenues earned by IT-BPO sector have grown to USD 69 billion in FY12, with the overall sector (including hardware) touching revenues of USD 100 billion [133] (NASSCOM Strategic Review 2012). The domestic hardware market comprising desktops, laptops, servers, printers, storage, networking peripherals is the largest segment within the domestic IT-BPO market. This segment is expected to reach revenues of nearly USD 13 billion (NASSCOM Strategic Review 2012) [133].

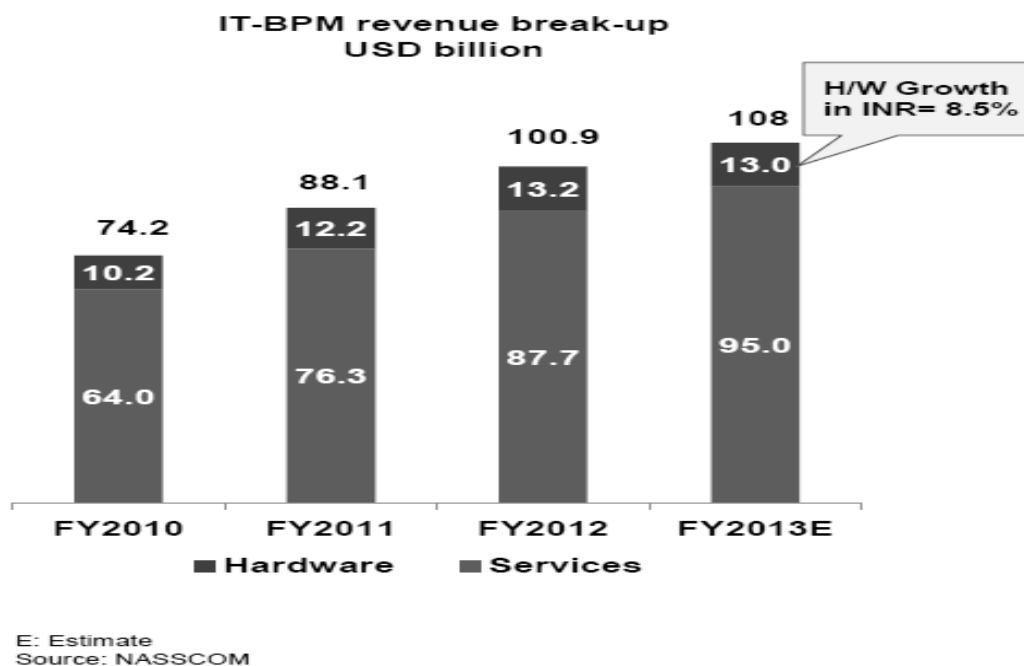


Figure 3-2 IT-BPM revenue break-up (Billion USD)

BMI forecasts the India IT market will grow by 12.8% in local currency terms in 2013 to reach a total value of INR 1,064 bn. This is a slightly faster rate of growth than that

experienced in 2012 as India's potentially vast IT market continues increased towards its potential. They expect robust growth will continue over the medium term, with CAGR of 12.1% 2013 to 2017. The growth of tablets and notebooks will be the key growth driver in the hardware market, as recovery continues from a deceleration in shipments in Q112. However, there are also factors limiting growth in the market including inflations and the weakness of the rupee [137].

Information technology (IT) industry in India has been instrumental in making India a major player on the world map. Indian organizations in the industry have become global multinationals — with over 400 delivery centers (overseas), the industry has presence in 52 countries, with more than 10 organizations listed on overseas stock exchanges and serving more than 400 Fortune 500 customers [135].

Table: India IT Industry - Historical Data And Forecasts (INRMn)								
	2010	2011	2012e	2013f	2014f	2015f	2016f	2017f
IT Market Value	714,954	846,594	943,332	1,064,456	1,196,022	1,339,186	1,497,344	1,668,411
o/w Hardware	353,187	410,386	458,082	522,648	581,745	641,470	704,201	782,151
- PC	286,082	333,234	375,627	432,752	481,685	531,137	583,078	647,621
- Servers	31,787	36,935	41,227	47,038	52,357	57,732	63,378	70,394
o/w Software	85,795	102,650	106,030	105,381	114,340	127,223	143,296	148,822
o/w Services	275,972	333,558	379,219	436,427	499,937	570,493	649,847	737,438
IT Market, % of GDP	1.00	1.03	1.01	1.01	1.01	1.00	1.00	0.99

e/f - BMI estimate/forecast. Source: BMI.

Figure 3-3 Indian IT Industry Market Value

India has invited investors to boost foreign technology induction both through FDI and through foreign technology collaboration agreements and has established greater transparency in policies and investor friendly procedures. A foreign company can hold equity in Indian companies up to 100% [134]. IT sector in India has witnessed high inflow of FDI which has boosted the Indian economy in recent years. FDI inflow rose by more than 100 per cent to

US\$ 4.66 billion in May 2011, up from US\$ 2.21 billion a year ago, according to the latest data released by the Department of Industrial Policy and Promotion (DIPP) [134].

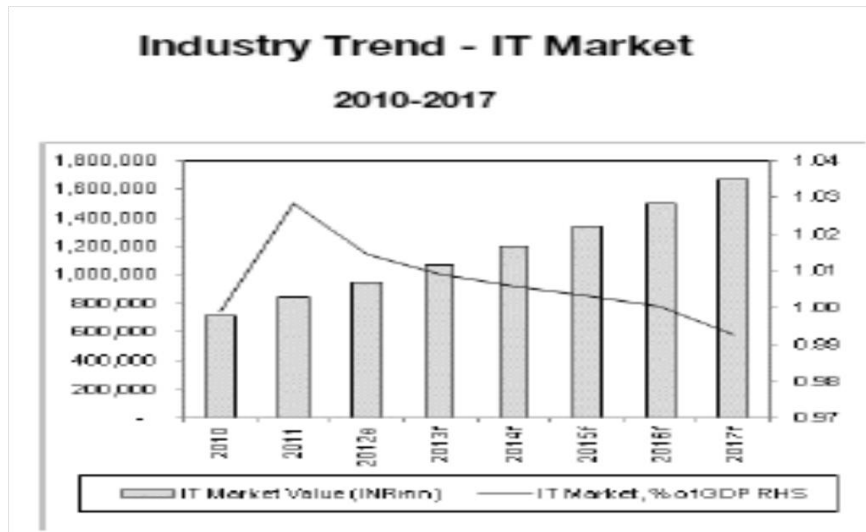


Figure 3-4 Industry Trend: IT Market

Despite huge growth potential, The IT hardware industry in India has long way to go and make its presence felt in the global industry. This industry has immense potential, but it has its own set of challenges in form of lack of favorable government policies, and low domestic penetration. Nearly all the prominent global vendors have set up manufacturing and assembly units here [138], however, the Indian hardware companies are struggling to compete with them.

3.3 INDIAN IT HARDWARE INDUSTRY: AN OVERVIEW

The IT hardware industry can play a big role in providing products and solutions to aid the India growth story. It has the potential to leapfrog India to next generation of technology adoption and holds immense transformational potential for various industry verticals [139].

The Indian IT sector is broadly categorized into IT services and software, Information technology enabled services (ITeS) and IT hardware products segment. [24]. IT hardware products have been classified as Computing products, viz. desktop PCs, notebooks, servers; Printing and Imaging products, and Peripherals, viz. UPS , keyboard and mice, compact

discs/DVD, monitor and displays, networking products, storage products and components [24].

The Indian desktop PC market can be divided into two segments, unbranded assembled PCs and branded PCs. In the branded PC market, multinational as well as Indian brands are present. Assembled PCs account form the largest chunk of total PC sales. This is because these are substantially cheaper than the branded products and the consumer of hardware and peripherals is extremely price sensitive. Servers can be further divided into high, medium and low end servers. In the case of printers, the market can be segmented on the basis of type of printer ie laser, inkjet and dot matrix. The monitors market can be sub-divided on the basis of size ie 14 inch, 15 inch, 21 inch monitors, etc.

As per the 'BMI India IT report, 2012' [140], the share of hardware in total IT spending is expected remain above 50% during the 2012-2016 forecast period. PC forecasts will grow at a CAGR of 22% between 2012 and 2016. Overall, the hardware market is predicted to grow from an estimated US\$9.3bn in 2012 to US\$16.0bn in 2016, with PC sales including accessories projected to rise from an estimated US\$7.6bn to US\$13.0bn over the same period. In 2011, annual PC sales were estimated at 11.8mn units and are expected to increase to more than 30mn by 2016.

The computer software and hardware sector received foreign direct investment (FDI) inflows of US\$ 11,640.37 million during April 2000 to January 2013, according to the Department of Industrial Policy and Promotion (DIPP) [141]. This growing market, which is currently sized at USD 13 billion, has been led by BFSI, Manufacturing and Government, which have the maximum share in hardware spend in India [142]. Factors such as infrastructure requirement in public sector, capital-intensive nature of manufacturing firms and increasing need or modernization of banks has been driving the spending of these three verticals. While these three verticals lead the market in the current scenario, sectors such as Communications and Media, Financial Services and Healthcare are expected to ride the next wave of growth witnessing growth rates of 12 percent, 11.6 percent and 11.4 percent respectively [142].

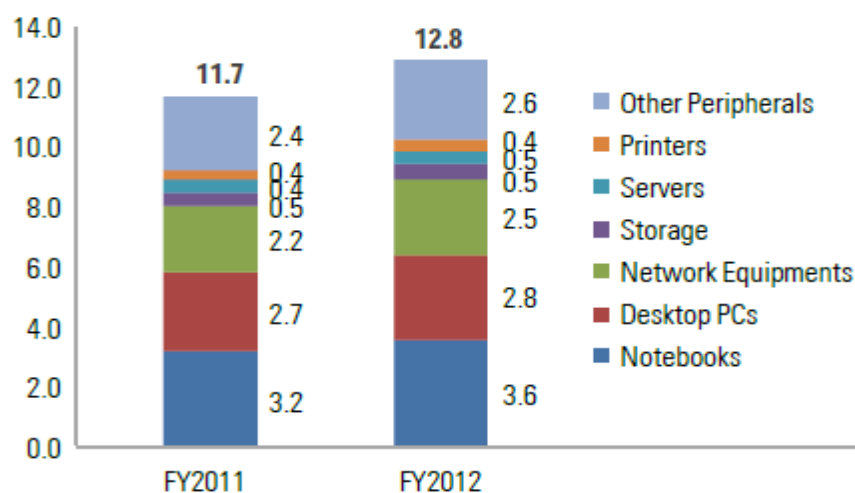


Figure 3-5 Domestic Hardware Market in India

Although the segment is promising and has immense potential, the increasing demand-supply gap remains to be a cause of concern. While the demand for hardware was estimated to be USD 13 billion in FY12, the production of goods stood merely at USD 6 billion [138].

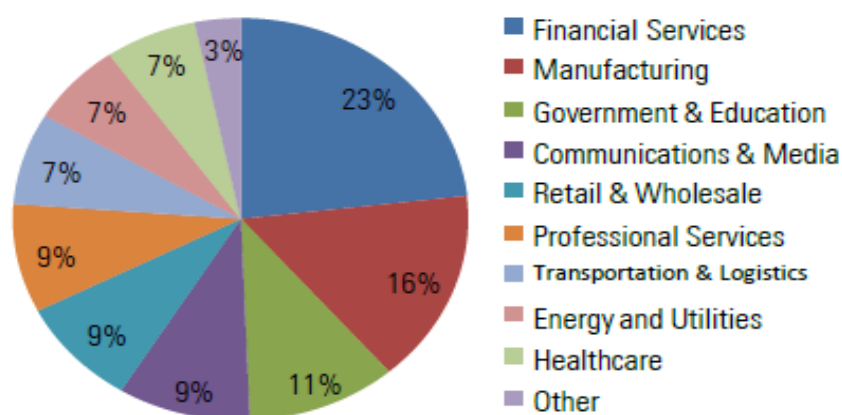


Figure 3-6 Vertical Split of Domestic Hardware Market – FY 2012

Growing demand for hardware fuelled by modernization across verticals, clubbed with the slow rate of increase in domestic production, is widening the demand-supply gap. While this is seen as a challenge, it also unveils a plethora of opportunities for hardware manufacturers, be it global or India, who can gain significantly while bridging this chasm [139].

3.3.1 Dynamics of the IT hardware segment

The dynamics of IT hardware segments have changed in an unprecedented manner in the last decade. Brands are transitioning from being an Original Equipment Manufacturers (OEM) to an Original Device Manufacturer (ODM). There is a shift from manufacturing to managing consumers and maintaining brands. It has resulted in some of the leading EMS (Electronics Manufacturing Services) companies to setup their operations in India. Moreover, with key PC-manufacturing firms expanding their market in India, narrowing the price gap and providing excellent after-sales support, consumers are opting for branded PCs over assembled ones. Notebook sales growth has surpassed that of PCs. Virtualization creates a virtual version of a server or a platform. There has been a dramatic increase in the number of organizations moving from real to virtual by adopting virtualization, which enhances utilization and significantly reduces costs. Open standards' computing is a philosophy of building IT systems. In hardware, open computing involves the standardization of plug and card interfaces and allows for considerable flexibility in the modular integration of the functions. It also helps in vendor independence. These multiple advantages are the contributing factors for the increasing demand. There is a growing demand for green data centers as these are energy-efficient, high-performance data centers in which power and cooling are far less expensive and environment-friendly. These features make green data centers more viable and eco-friendly.

3.3.2 Growth drivers for Indian IT Industry

The key drivers of the Indian IT hardware ecosystems are:

- Awareness and affordability of technology: The increasing purchasing power of the Indian population has significantly boosted PC penetration in the country. Growth in per capita income and corporate spend on hardware: Nearly 10 million households now have income levels above USD 10,000 per annum in 2012 [138]. Transformation of IT hardware from an aspiration to a utilitarian need has made these products more affordable for people.
- Increasing notebook sales: Next growth drivers are expected to be lower costs of Notebooks and their penetration among SMB and lower-income segments.

- Increasing spending from IT services industry: IT and ITES industries continue to drive the demand for the IT equipment. With Indian firms adopting automation, the demand for IT equipment is increasing.
- Need for innovative products at low cost: Innovative low cost products like the Aakash tablet are also driving demand from both consumers as well as the government.
- Government focus on digital education: Various state governments in the country, like Tamil Nadu and Uttar Pradesh, have mandated laptops for all school children. This is driving a massive spike in the demand for laptops and other computer hardware.
- Growth in telecom infrastructure: Increased broadband penetration is also expected to drive PC sales even in smaller towns and rural areas.
- Small and medium businesses segment: SMBs in India are expected to invest approximately USD 4 billion on IT systems and hardware in FY10. Notebook PC spending rose at 43% among Indian SMBs in FY07.

3.3.3 Challenges

The IT hardware industry has its own set of challenges which are specific to them and require an enormous amount of resources to manage them. Challenges faced by Indian are in terms of taxations, inadequate infrastructure, low broadband penetration increased competitiveness in the global market and government incentives for the industry.

- Taxation – In comparison with other Asian low cost destinations, complex taxation policies in India makes the IT Industry less competitive [139]. Frequent changes in taxation have resulted in companies not being able to firm up their long-term business plans, let alone make sizeable investments. It is only in the last two years that there have been no changes in the central levies. The issue is further complicated with state governments, at times, imposing new taxes or changing product classification at their own will.
- Limited incentives for investment: With no natural advantage for manufacturing and with uniform taxation across the value chain, sizable investments, especially at the components and sub-assembly level have evaded the segment. Further, due to various reasons, some of the current schemes have been unable to enthruse fresh investments in the segment.

- Inadequate infrastructure/logistics: The country's lack of infrastructure, coupled with insufficient international quality logistics, lack of power, land acquisitions issues poses a challenge to the growth of the segments [139].
- Low broadband penetration: India has 6.8 million broadband connections and only 60 million internet users. Further, the quality of broadband remains much below the desired levels. This has hampered the development of a vibrant content industry, which has led to the absence of a virtuous cycle. Thus, the market for PCs/devices, without a pull factor, continues to remain limited.
- Slowing growth in domestic consumption: PCs recorded a negative growth of about of 7% in 2008–09. The sales of notebooks that had been growing over 100% for the last consecutive four years declined by 17%. As of now there are no preferential laws or incentives in place which enforce usage of domestic products to some extent (KPMG, 2012).
- Employment generation: Given the right impetus, growth in the segment holds the potential to triple the country's current employment base by FY14.
- Increased competitiveness in the global market: A technologically advanced manufacturing ecosystem in India prospectively offers an international platform to Indian manufacturers. Thus, Indian players can expect to compete globally with established manufacturers in the long run and make their own mark in foreign markets [138] .

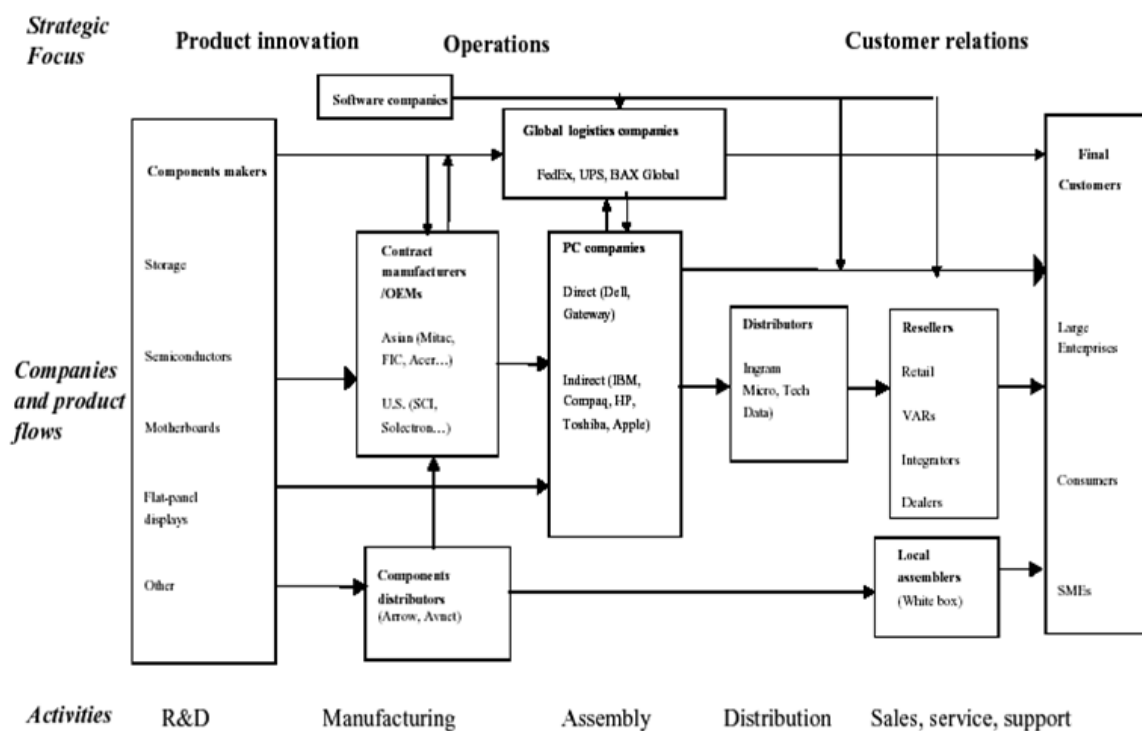
Despite being strong in areas such as product design and research and development, India has not been able to make much headway in the manufacture of computer hardware. HCL Infosystems, Wipro, Vintron Informatics, Zenith Computers, DLink (India), TVS Electronics and PCS Industries are some of the company's manufacturing computer hardware and peripherals in India. In order to drive high growth in the industry, it is imperative for the government to provide impetus to the domestic IT manufacturing industry [138] [139].

While India has the fastest growing Hardware market, the absolute size of the market is still small when compared to leading countries such as China and Japan in Asia Pacific. Other economies such as China, Malaysia and Vietnam have been taking significant steps to enhance manufacturing capabilities. China has become the world's manufacturing hub,

Vietnam has turned into an attractive destination for Electronic Manufacturing Services (EMS), and semiconductors and Original Device Manufacturing (ODM), and Malaysia has also transformed into an industrialized market [139].

3.4 SUPPLY CHAINS OF INDIAN IT INDUSTRY

Indian industries were not unaffected by the rapid developments in the area of supply chain management. Sahay et al., (2003) in their survey on Indian industries, have reported that corporate recognition of supply chain is rapidly growing [143]. After the liberalization of Indian economy, Indian consumers became demanding of specific product, quality and services thereby forcing firms to enhance product quality and improve services to remain competitive. However, Indian industries found that existing supply chain systems were not configured to meet the increasing requirements of consumers in a newly liberalized economy [144].



Source: Adapted from Curry and Kenney, 1999.

Figure 3-7 PC Industry Supply Chain

As per the OECD Digital economy reports (2010), growth in Indian IT industry in the world market is primarily dominated by IT software and services. In contrast, the IT hardware segment has lagged and has focused very largely on the domestic market. The domestic IT hardware companies are heavily dependent on imports of components and finished IT goods [24]. Due to large number of small and medium size manufacturers and assemblers, IT products market is fragmented and lacks a component base. It has infrastructural barriers with high cost of finance and high technological obsolescence. India's customer base – government, large enterprises, micro, small and medium enterprises and household consumers – represent unique set of requirements [133]. A shift is taking place and firms are rethinking existing capabilities, developing new ones, strengthening their relationships with upstream suppliers, downstream sales channels and extending relations with customers and other go-to-market partners [133].

The IT product supply chain partners are similar to any other product supply chain. However, it differs a bit in the nomenclature of some partners. For example, the distributor in a supply chain is broken up into 'Channel Partner' and a 'Dealer' or 'Reseller'. The channel partner has a long term strategic agreement with the manufacturer and is responsible for the distribution of products via a network of dealers (also referred as resellers), who in turn deliver it to the retail stores and outlets.

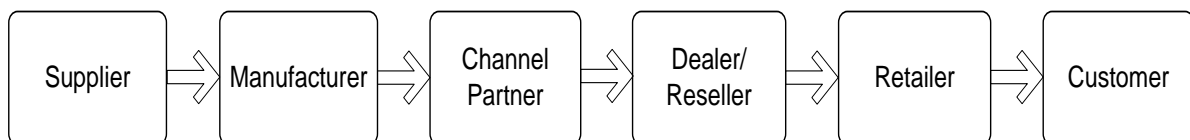


Figure 3-8 Supply Chain for IT Products

The forward flow of goods as depicted in Figure 3-8 is from the supplier to the customer. The reverse flow of goods under end-of-life management is from the customer to different partners is shown in Figure 3-9.

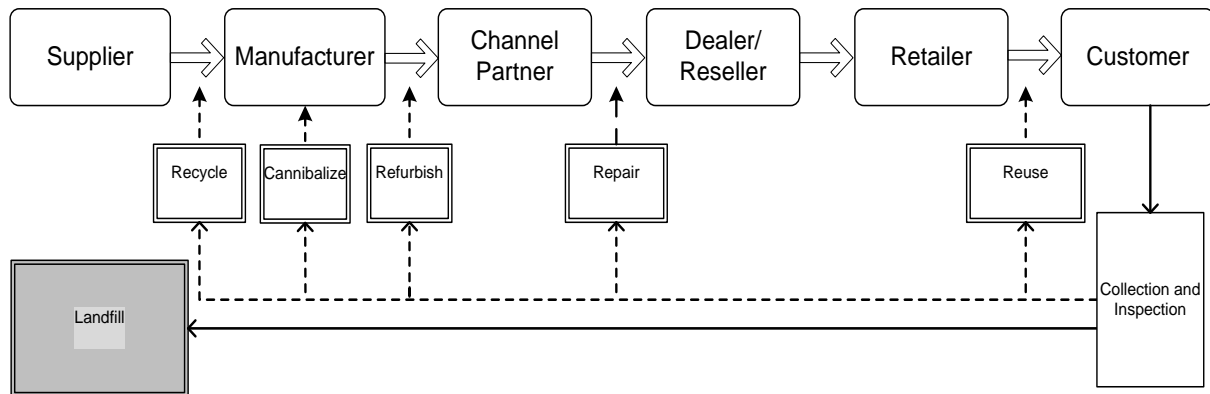


Figure 3-9 Reverse Logistics in supply chain for IT Products

The stages in the reverse logistics process are reuse, repair, refurbish, cannibalize and recycle; if none is possible only then dump to landfill.

3.5 E-WASTE MANAGEMENT IN INDIAN IT INDUSTRY

Management of electronic waste has been an issue of serious environmental concern in India since over a decade [145]. E-waste is growing in India at the rate of 10%. Consumption trend in IT hardware equipments is growing at a brisk pace. Rapid technology upgrade and designed for obsolescence of products drives further consumption and shorter product life leading to generation of huge quantities of this complex waste. India currently is estimated to generate 8 lakh tones of E-waste annually [145].

Considering the growth rate, the volume of e-waste will reach nearly 0.7 million MT by 2015 and 2 million MT by 2025 [146]. A scrutiny of about 1000 of compounds that go into the making of electronic and electrical components makes the need for their scientific disposal quite evident. Among a number of toxic elements, electrical and electronic gadgets contain lead, lithium, arsenic, antimony, mercury, cadmium, selenium; hexavalent chromium, flame retardants are classified as hazardous waste. On the other hand, electrical and electronic equipment also contain valuable materials. Printed circuit boards contain precious metals such as gold, silver, platinum and palladium. Both these aspects necessitate organized and scientific approach in the collection, dismantling, recycle, recovery and disposal of WEEE [145].

In the absence of scientific and organized processing of WEEE, it is recycled by ill-equipped and ill-informed unorganized sector making the process hazardous and causing serious adverse impacts on environment and human health. In India about 95% e-waste recycling still happens in the informal sector that employs children and women in large numbers, who use most hazardous processes in the recovery of recyclable parts and material [145].

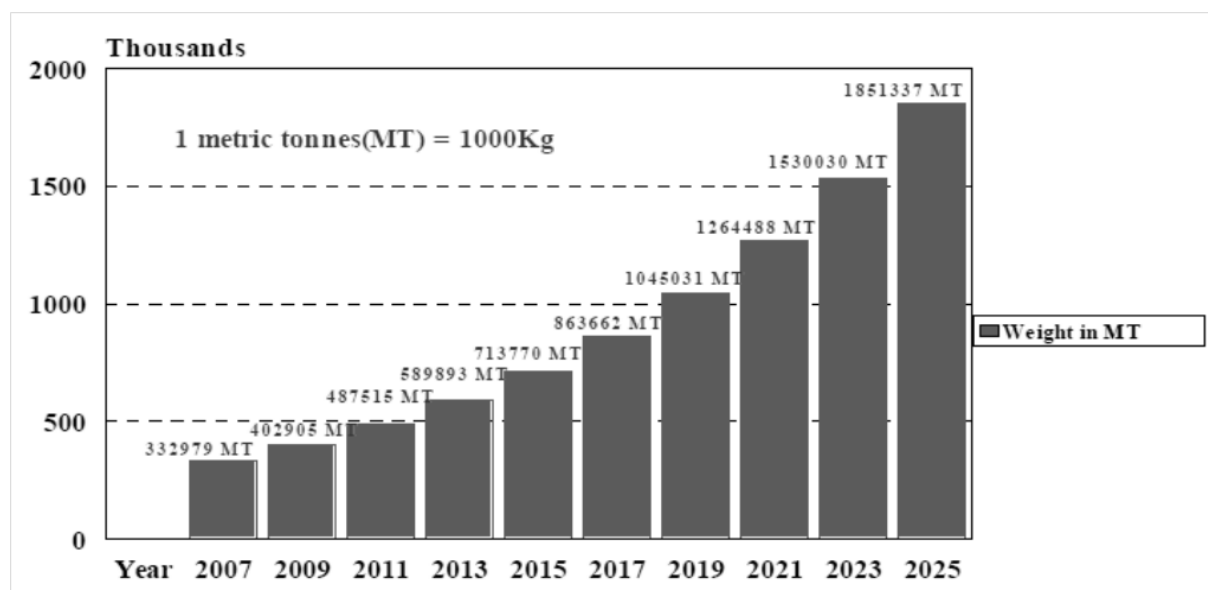


Figure 3-10 Growth of E Waste in India

When remnants of e-waste are disposed of in landfills, its toxic elements leach into the surrounding soil, water and the atmosphere, while it's unscientific and unguarded processing exposes waste handlers to a number of health and occupational hazards and release toxins in the environment [145].

The basic objective of the organized processing of e-waste is therefore protection of the health and environment in WEEE recycle/ dismantling/ disposal [145]. Major recycling of e-waste is carried out in the non-formal sector using primitive and hazardous methods. Adequate legislative measures and cost-effective, environmental friendly, technological solution would be needed to address the issue [146]. It was a result of much sustained campaign that the government finally announced regulation in 2011 aptly called the e-waste management and handling rules 2011. These rules were published by the Union Ministry of Environment and Forests on 14 May, 2010 and shared with the stakeholders for obtaining their objections and suggestions. After the review of stakeholders' suggestions, the final rules were notified by the

Central Government as E-waste (Management and Handling) Rules 2011, which came in force from 1st May 2012. The rules have incorporated the principle of Extended Producers Responsibility and made the manufacturers responsible for dealing with post consumer waste of their respective product range [145].

The 'E-waste (Management and Handling) Rules, 2011' are applicable to all supply chain partners including manufacturers, distributors, retailers, consumers or bulk consumer involved in the manufacture, sale, and purchase and processing of IT and electronic equipments or components. The rules also cover the operations of collection agents, dismantlers and recyclers of e-waste. The policy also addresses financing of collection-storage-recycle-dismantling units [145].

The current rules have been in force since May 2012 but there has been very little change on ground and the current situation suggests that it is 'business as usual'. Informally many stakeholders have pointed out the bottlenecks in implementation of the rules. Also there is inadequacy and lack of any serious efforts from the producers and the regulators to bridge the gaps and ensure compliance. The first year of its force, the rules have presented many implementation gaps. Though there are 77 recycling companies in the country with collective recycling capacity of 2,30,000 tonnes of e-waste, in contrast to the estimated 8 lakh tonnes of e-waste generated in 2012, still the units are running below full capacity. It's amply clear that there is a huge gap in take back and collection systems. If these gaps are not addressed in right earnest this rule also could go down with making any impact in delivering on its intended objectives. This trend will need to be reversed immediately [145].

IT industry in India has been one of the most significant growth contributors for the Indian economy. After the economic reforms of 1991-92, government has accorded high priority to this sector. Setting up of Software Technology Parks (STP), and Special Economic Zones (SEZ) has encouraged entrepreneurs to utilize their skills and expertise and increase export of software services many-fold [134]. Indian organizations in the industry have become global multinationals. The domestic demand of electronics hardware is estimated at US\$ 400 billion by 2020.

However, dynamics of IT hardware segments have changed in an unprecedented manner in the last decade. The key growth drivers of the Indian IT hardware ecosystems are awareness and affordability of technology, increasing spending from IT services industry, need for innovative products at low cost, government focus on digital education, growth in telecom infrastructure and untapped small and medium businesses (SMB) segment. Though it has its own set of challenges in taxation, limited of incentives for investment, inadequate infrastructure/logistics, low broadband penetration, slowing growth in domestic consumption and increased competitiveness in the global market. The IT product supply chain differs a bit in the nomenclature of ‘distributor’ which is broken up into ‘Channel Partner’ and a ‘Dealer’ (or ‘Reseller’). Both the forward flow of goods and services and the backward flow of products after end of their useful life constitute the supply chain of IT products.

Management of electronic waste has been an issue of serious environmental concern in India since over a decade. E-waste is growing in India at the rate of 10%. With the enhanced emphasis on ‘e-waste’ management, the Government of India formulated “E-Waste (Management and Handling) Rules 2011” which are in force from May 1, 2012, and Restriction of Hazardous Substances (RoHS) provisions which have been enforced from May 1, 2014. However, there seems to be an inadequacy and lack of enough serious efforts from the manufacturer’s and the enforcing bodies to ensure compliance. However, with the legislation in force and willingness of organizations to take the responsibility, focus in context of IT industry is slowly shifting towards sustainability initiatives across their supply chains. The succeeding chapter provides the research methodology applied in this study to fulfil the research objectives.

