

Industry Sector Profile Report

(Automotive, Electrical Equipment, Heavy Machinery and ICT)



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SESEI – Dinesh Chand Sharma

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1. Executive Summary

The Indian economy has grown at an average rate of around 9 percent for six years during 2005-06 to 2010-11 before it slowed down to 6.2 and 5% in 2011-12 and 2012-13. During 2013-14, it is estimated to have declined to below 5 %. Even at this rate, it has been growing faster than many developed economies. The prospects for growth in medium term for India are strong given revival in global demand and the new government taking over that has a clear growth agenda. Given India's huge untapped domestic market on account of a large middle class and 'potential demographic dividend' coupled with the concerted efforts to put the economy back on growth track, the future growth prospects appear positive and strong.

Successive governments have realized importance of well developed infrastructure sector to facilitate faster and higher GDP growth. Infrastructure sectors like energy, power, communication, transport, etc. are being provided growth impetus through slew of measures. Growth in these sectors is likely to give a multiplier effect in other related sectors like ICT, electronics, heavy machinery, automobiles, mining and construction etc.

Indian **automobile** industry has emerged as the fastest growing sector over last few years. Currently it accounts for 7% share in GDP and employs more than 19 million people. The outlook for the industry is very strong with India expected to become 3rd largest automobile manufacturing country after China and USA by 2030. Industry experts believe that India will overtake European automobile manufacturing countries by 2015 and USA by 2035. The sector even defied recent economic slowdown. With rising income levels and aspirations of younger generation to own a vehicle, this sector will definitely be on an upswing.

Indian **electronics** industry, especially consumer electronics, has been growing in recent years at a brisk pace of over 25-30% CAGR and is estimated to have currently reached over \$125 billion. Considering huge domestic demand in the country and high potential for exports, the industry is expected to be worth US\$ 158 billion by 2015. Recognizing its high growth potential in coming years, the government has formulated a 'Vision 2022' for the industry and has approved a National Policy on Electronics envisaging increasing investment to \$100 billion, production to US\$ 400 billion, employment to 28 million and exports from US \$8 billion to US\$ 80 billion by 2020.

The engineering sector or **heavy machinery** industry is the largest of the industrial sectors in India. It comprises of electrical machinery, transport equipment, mining and earthmoving machinery, oil & gas, solar energy equipment, machine tools plus machinery for all industry sectors. It is among the top two contributors to the total Indian export basket with total shipments of US\$ 56.7 billion in 2012-13. Engineering exports from India include transport equipment, capital goods, other machinery/equipment and light engineering products like castings, forgings and fasteners. The engineering sector is expected to contribute about US\$ 65 billion to the overall export shipments of US\$ 326 billion, as targeted by the government in the current year.

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The government's thrust on manufacturing sector is likely to enhance capacity building as well as competence in the sector. However, there is an urgent need to build capacities in the heavy machinery sector and encourage R&D in engineering designs for various types of machines and equipment. India's earthmoving and construction equipment (ECE) sector has enjoyed strong growth over the last several years till recently as a result of rapid economic development in the country. The organized construction sector in India (e.g. roads, urban infrastructure) accounts for approximately 55 percent of the ECE industry; Mining, irrigation and other infrastructure segments (e.g. Power, railways) account for the rest. These sectors have also been growing strongly leading to the expansion of construction-related industries. Between 2004 and 2007, the Indian earthmoving and construction equipment (ECE) industry's revenues and volumes have grown at over 40% per year, reaching \$2.3 billion in 2007 and with an estimated potential to grow to \$22 billion by 2020.

Heavy electrical industry is an important manufacturing sector, catering to the needs of energy sector and other industrial sectors. Major equipment like boilers, turbo generators, turbines, transformers, condensers, switch gears, relays and related accessories are manufactured by heavy electrical equipment manufacturers. Major end user industry for this sector is the power industry. Rapid development of a robust and healthy domestic electrical equipment (EE) industry, supporting the complete value chain in power generation, transmission and distribution, is not only crucial for the economy, but is also of strategic importance for India. The Indian EE industry has grown close to Rs 110,000 Cr (US\$18 billion) in 2010-11. The industry has a diversified, mature and established manufacturing base, which has the potential to meet the current as well as future domestic and export demands. Electricity generation is expected to double in the world between 2002 and 2025. The strongest growth in electricity consumption is projected in the emerging economies. As per the estimates of the International Energy Outlook, investments in the power sub-segment in the developing countries in Asia are expected to be the fastest growing in the world in the next two decades. Global electricity consumption is expected to reach 29000 TWh by 2030, growing at an average rate of 2.4% per annum. To fulfill this demand, US\$ 13.7 trillion worth of investments are required in the power sector — US\$ 7.2 trillion in generation, US\$ 2 trillion in transmission and US\$ 4.5 trillion in distribution. Driven by this increasing demand for electricity, the global electrical equipment market is expected to reach US\$ 6,600 billion during the period 2016-30, growing at a long term average rate of 2% during the period 2008–2030. Given India's low per capita electricity consumption and growing domestic and global demand for electricity, growth prospects for Indian EE industry appear strong.

The **Information and Communication Technology (ICT)** sector in India has demonstrated excellent growth over last two decades. Today, India is recognized as a global leader in ICT sector on account of its low operation cost, availability of large talent pool and remote delivery model. ICT industry can be broadly divided into two sectors, information technology (IT) and Communications. India is one of the fastest-growing IT markets in the world. The rapid emergence of Indian IT sector has transformed Indian economy as well as its image from a slow moving low technology-highly bureaucratic economy to a high-tech land of innovative entrepreneurs.



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According to International Data Corporation (IDC), the market size of IT in India is expected to touch US\$ 44.8 billion in 2014 as compared to US\$ 35.1 billion in 2012. According to Confederation of Indian Industry (CII), India's IT-business process outsourcing (BPO) industry revenue is expected to cross US\$ 225 billion mark by 2020. And India is expected to become world's second-largest online community after China with 213 million internet users by December 2013 and 243 million by June 2014, according to a report by Internet and Mobile Association of India (IAMAI) and IMRB International. Similarly, the telecom sector in India has registered a phenomenal growth during the past few years and has become the second largest telephone network in the world, only after China. With more attractive and investor-friendly industrial policies and foreign direct investment (FDI) policies, India has become one of the favorite destinations for ICT investment portfolios.

The contribution of these four industries to the growth of Indian economy has been quite significant. Looking at the growth agenda of the new government, the future seems even more promising.

2. Automobile Industry

The Indian auto industry is recognised as a 'sunrise industry' as it has emerged as one of the fastest growing sector over last few years and has also been making significant contribution to India's gross domestic product (GDP). The industry currently accounts for almost 7 % of the country's GDP and employs about 19 million people both directly and indirectly.

As stated in KPMG report, India is home to a vibrant automobile industry of more than 40 million passenger vehicles in circulation. It has been one of the few worldwide markets which saw growth in passenger car sales during the recession of 2009-10 and 2010-11. In fact, in 2009-10 it has recorded its highest volumes ever. It is believed this upward trend will be sustained in the foreseeable future due to a strong domestic market and increased thrust on exports.

India is likely to benefit from emerging 'demographic dividend' which should help in sustaining higher economic growth and per capita income. This is predicted to drive an increase in the percentage of the Indian population able to afford vehicles. India's car per capita ratio (expressed in cars per 1,000 population) is currently among the lowest in the world's top 10 auto markets. The twin phenomena of low car penetration and rising incomes, when combined with increasing affordability of cars, are expected to contribute to an increase in India's automobile demand. The rise in per capita income will lead to higher vehicle ownership, making India 'fulcrum' of future growth in the automobile industry.

The outlook for the industry is very strong with India expected to become 3rd largest automobile manufacturing country after China and USA by 2030. Industry experts believe that India will overtake European automobile manufacturing countries by 2015 and USA by 2035. Nevertheless, the industry will also be facing challenges of increasing use of greener and cleaner technologies, fuel efficient vehicles, affordability and lack of good road infrastructure in the country. Accordingly, it would be required to continuously invest in technological development to take care of the emerging environment issues like greener and cleaner technologies and emission levels while also developing new prototypes to meet customers' expectations in terms of affordability and comfort.

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2.1 Current Profile of the Industry

India's automobile market has grown steadily since 1991 and has registered high growth rate of 17% and above consecutively for seven to eight years till 2006-07. It has maintained its growth momentum even afterwards with the exception of the previous two years where the effects of the global downturn were felt, primarily in sales of commercial vehicles. However, even during the downturn, the two-wheeler and three-wheeler segments, which were until then experiencing low growth or losing volumes, bucked the trend.

2.2 Current Status

Trends in Domestic Sales

According to data released by the *Society of Indian Automobile Manufacturers (SIAM)*, total vehicle sales across categories registered an increase of 6.96% to 15,69,670 units from 14,67,472 units in April 2013 while domestic passenger car sales declined by 10.15% to 135,433 units in April 2013 as compared to 150,737 units in the same month a year-ago. Motorcycle sales in the same period grew by 8.06% to 911,908 units from 843,909 units in the year-ago period. Total two-wheeler sales in April grew by 11.67% to 13,04,447 units as against 11,68,100 units in the same month last year. However, sales of commercial vehicles declined by 24% to 43,080 units in April 2013.

Category	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Passenger Vehicles	1,549,882	1,552,703	1,951,333	2,501,542	2,618,072	2,686,429
Commercial Vehicles	490,494	384,194	532,721	684,905	809,532	793,150
Three Wheelers	364,781	349,727	440,392	526,024	513,251	538,291
Two Wheelers	7,249,278	7,437,619	9,370,951	11,768,910	13,435,769	13,797,748
Grand Total	9,654,435	9,724,243	12,295,397	15,481,381	17,376,624	17,815,618

Source: SIAM

According to SIAM, the year 2013 marked the longest period of slump in India's automobile market, with sales either growing marginally or declining for a second straight year, leading to production cuts and loss of about 2,00,000 jobs. As is evident from the above table, domestic sales of all the vehicles registered an increase of only 2.5%, while that of two-wheelers and passenger cars grew by over 2.6%. Sales of commercial vehicles declined by over 2% during the year and only three-wheeler sales grew highest at over 4.87 % during 2012-13.

Trends in Domestic Production:

Category	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Passenger Vehicles	1,777,583	1,838,593	2,357,411	2,982,772	3,146,069	3,233,561

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Commercial Vehicles	549,006	416,870	567,556	760,735	929,136	831,744
Three Wheelers	500,660	497,020	619,194	799,553	879,289	839,742
Two Wheelers	8,026,681	8,419,792	10,512,903	13,349,349	15,427,532	15,721,180
Grand Total	10,853,930	11,172,275	14,057,064	17,892,409	20,382,026	20,626,227

Source: SIAM

Against domestic sales of vehicles, trends in production of various types of vehicles are a better indicator of performance of the automobile industry in a given year. Trend in production of vehicles during 2012-13 indicate a widespread slump across the industry. As indicated by the above table, total production increased marginally by 1.2% while that of passenger vehicles and two-wheelers by 2.8% and 1.9% respectively. In contrast, production of commercial vehicles declined drastically by more than 10.48% and that of three-wheelers by 4.5%.

Experts believe that the Indian economy has bottomed out and along with anticipated revival of global markets; the economy will be looking up. Also, the interim budget for 2014-15 has reduced excise duties on automobile sector to boost demand for all types of vehicles. Although, its impact is yet to be felt, the uptake in production seems to have started as is clear from the figures for April 2013 – February 2014 made available by SIAM. The auto industry produced a total 1.81 million vehicles, including passenger vehicles, commercial vehicles, three wheelers and two wheelers in February 2014 as against 1.73 million in February 2013, registering a growth of 4.41% over the same month last year. The increase continues to be on account of growth in two wheelers production. Moreover, the overall domestic sales during April 2013 –February 2014 grew marginally by 2.685 over the same period last year. Passenger vehicles, three wheelers and two wheelers registered growth at 6.445, 16.40% and 5.41% respectively, compared to the same period last year.

Trends in Exports

Automobile Exports Trends

(Number of Vehicles)

Category	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Passenger Vehicles	218,401	335,729	446,145	444,326	507,318	554,686
Commercial Vehicles	58,994	42,625	45,009	74,043	92,663	79,944
Three Wheelers	141,225	148,066	173,214	269,968	362,876	303,088
Two Wheelers	819,713	1,004,174	1,140,058	1,531,619	1,947,198	1,960,941
Grand Total	1,238,333	1,530,594	1,804,426	2,319,956	2,910,055	2,898,659

Source: SIAM

Global economic slowdown of previous two years resulted in a marginal decline (0.39%) in exports of Indian automobile vehicles during 2012-13. Though exports of commercial vehicles (13.7%) and three-wheelers (16.4%) fell substantially, exports of passenger cars registered a significant increase of 9.33 %.

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In a sign of its growing stature in car manufacturing, India is emerging as an export hub of global auto firms not just for small cars but also for big cars such as mid-size sedans and utility vehicles (UVs). Export of big vehicles has been on the rise as an increasing number of global brands are now selling India-built sedans and UVs in other markets.

According to newspaper reports, during April-November 2013, exports of sedans reported a growth of 29% at 77,987 units when compared with 60,512 units in a year-ago period. Share of big cars in total car exports has increased to 21% from about 9% in March 2012.

Export of entry-level sedans (include Hyundai Accent, Maruti Swift Dzire and Toyota Etios sedan) and mid-size sedans (Nissan Sunny, Volkswagen Vento and Ford Fiesta, among others) grew by 28% and 31%, respectively, during the period.

In 2012-13, exports of these vehicles more than doubled at 91,478 units when compared with 43,903 units in the previous year, according to statistics of Society of Indian Automobile Manufacturers (SIAM).

Experts believe that it is little early to say that India has started establishing itself as a manufacturing base for high-end cars, but they expect current strong growth in sedan and UV exports to continue. The same factors that have made India an attractive small car manufacturing hub – huge size of the domestic market giving economies of scale in manufacturing, strong growth potential and ample availability of labour and engineers – make India a potent force in the exports of high-end cars as well.

The biggest start was provided by Nissan when it started exporting India-built premium sedan Sunny in January 2012. Nissan has been shipping Chennai-built both hatchback Micra and Sunny to various markets. Europe's largest car maker Volkswagen has also been selling 'Made in India' Vento across three continents. Recently it started shipping the cars to Mexico, which will become the single largest export market for Volkswagen India.

Along with sedans, exports of UVs are also on a rise. Both Renault and Ford have drawn up major export plans for their premium compact SUVs Duster and EcoSport, respectively. Chennai-built Ford EcoSport is being sold in 10 markets. It is expected that increasing number of car makers would get into exports of high-end cars from India in the future as focus on exports would help manufacturers to better manage downturns in the domestic market.

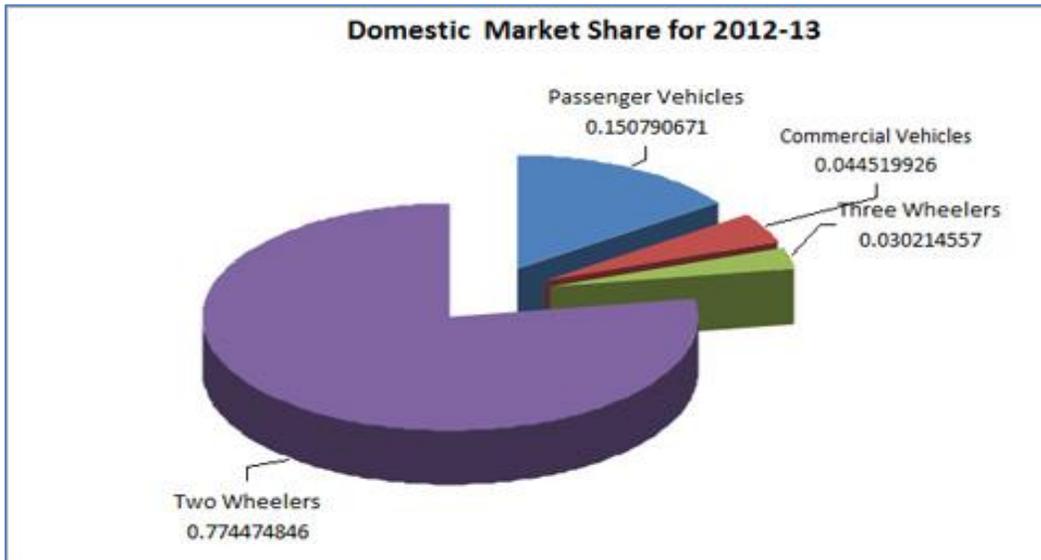
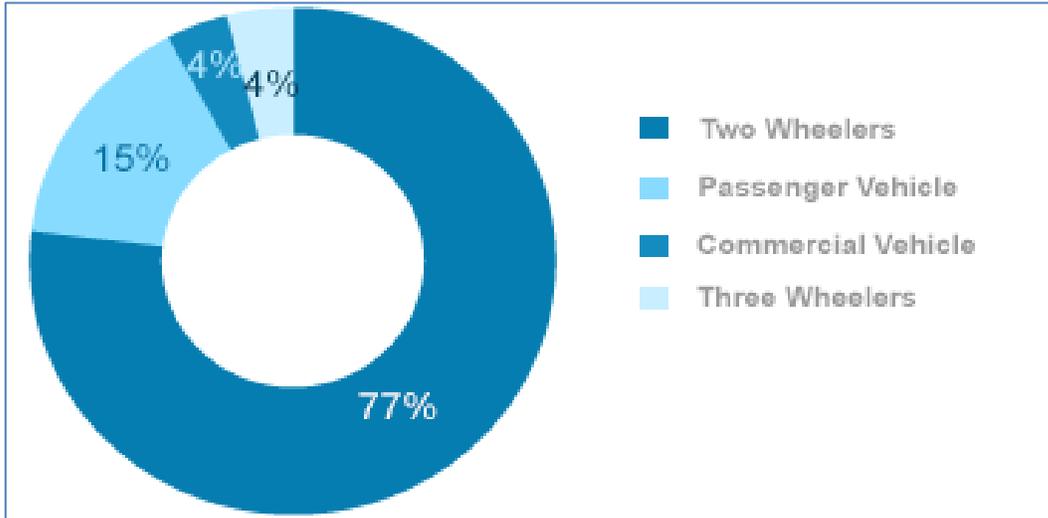
India's emergence as an important production hub for automobiles has also resulted in increase in FDI flows to the sector. As per the data published by Department of Industrial Policy and Promotion (DIPP), Government of India, the cumulative foreign direct investment (FDI) inflows into the Indian automobile industry during the period April 2000 to January 2014 was recorded at US\$ 9,344 million. This amounts to an increase of 4% to the total FDI inflows in terms of US dollar.

2.3 Market Segments

India's vehicle demand is quite different from other top automobile markets – with the exception of China – in that two-wheelers constitute a significant portion of vehicle demand (more than 3/4th of the Indian

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market is in two-wheelers). Two wheelers segment accounted for about three quarters of the total automotive production in the country during financial year 2013 while passenger vehicles came second with 15 % share in production and commercial vehicles and three wheelers both with 4 %.



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2.4 Players in Indian Automotive Market

Indian automobile industry is clearly dominated by 2 to 3 players in every vehicle category. Given below is the market share of automobile companies in India 2013 according to *currentweek.com*. The market share is mainly for top players in each segment based on vehicle production for the period Apr'13 to Nov'13.

Cars & Utility Vehicles: Company wise Market Share

Company	Market Share (%)
Maruti Suzuki	36
Hyundai	21
Toyota	5
Tata	7
M&M	9
Others	22

Source: Current Week.com

India has produced more than 3.2 Million cars & utility vehicles in FY 12-13. Maruti Suzuki, Hyundai, Mahindra & Mahindra, Tata Motors and Toyota companies stands in top 5 In terms of market share, followed by Nissan, Ford, Honda, General Motors, Volkswagen, Renault, Skoda, Fiat, etc.

Light Commercial Vehicle, Medium & Heavy Commercial Vehicle (LCV, M&HCV): Company wise market share

Company	Market Share (%)
Tata	53
M&M	24
Ashok Leyland	12
Eicher	5

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Force	3
Others	3

Source: Current Week.com

India has produced more than 800K LCV, M&HCV vehicles in FY 12-13. Tata, Mahindra & Mahindra, Ashok Leyland, Eicher and Force companies stands in top 5 In terms of market share, followed by Swaraj Mazda, Piaggio, AMW, etc.

Three Wheelers: Company wise Market Share

India has produced around 840K Three wheeler vehicles in FY 12-13. Bajaj Auto, Piaggio, TVS, Mahindra & Mahindra and Atul Auto companies stands in top 5 In terms of market share, followed by Scooters India, Force.

Company	Market Share (%)
Bajaj Auto	54
Piaggio	23
TVS	10
Mahindra	7
Atul Auto	4
Others	2

Source: Current Week.com

Motorcycles: Company wise Market Share

Company	Market Share (%)
Hero Motor Corp	45
Bajaj	28
Honda	14
TVS	6

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Yamaha	4
Others	3

Source: Current Week.com

India has produced more than 11.9 Million motorcycles in FY 12-13. Hero MotoCorp, Bajaj, Honda, TVS and Yamaha companies stands in top 5 In terms of market share, followed by Royal Enfield, Mahindra & Mahindra, Suzuki, etc.

Tractors: Company wise Market Share

Company	Market Share (%)
M&M	40
TAFE	24
Escorts	10
Int. Tractors	10
John Deere	8
Others	8

Source: Current Week.com

India has produced around 580K tractors in FY 12-13. Mahindra & Mahindra, TAFE, Escorts, International Tractors and John Deere companies stands in top 5 In terms of market share, followed by New Holland, VST, Same Deutz, Force, HMT and Punjab Tractors.

2.5 Demographic Distribution of Automobile Industry

The majority of India's car manufacturing industry is based around three clusters "south, west and north". The southern cluster consisting of Chennai is the biggest with 35% of the revenue share. The western hub near Mumbai and Pune contributes to 33% of the market and the northern cluster around the National Capital Region contributes 32%. Chennai, houses the India operations of Ford, Hyundai, Renault Mitsubishi, Nissan, BMW, Hindustan Motors Daimler, Caparo, Mini, and Datsun. Chennai also accounts for 60% of the country's automotive sector. Gurgaon and Manesar in Haryana form the northern cluster where the country's largest car manufacturer, Maruti Suzuki, is based. The Chakan corridor near Pune,

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Maharashtra is the western cluster with companies like General Motors, Volkswagen, Skoda, Mahindra and Mahindra, Tata Motors, Mercedes Benz, Land Rover, Jaguar Cars, Fiat and Force Motors having assembly plants in the area.

As part of western cluster Nashik, Maharashtra has a major base of Mahindra and Mahindra with a SUV assembly unit and engine assembly unit. Aurangabad with Audi, Skoda and Volkswagen also forms part of the western cluster. Another emerging cluster is in the state of Gujarat with manufacturing facility of General Motors in Halol and further planned for Tata Nano at their plant in Sanand, Ford, Maruti Suzuki and Peugeot –Citroen plants are also set to come up in Gujarat.

Kolkata with Hindustan Motors, Noida with Honda and Bangalore with Toyota are some of the other automotive manufacturing regions around the country.

2.6 Development in Policy Regulations

The Indian Automobile Industry embarked on a new journey upon economic liberalization in 1991 with delicensing of the sector and subsequent opening up for 100 % FDI through automatic route. Since then almost all the major global players have set up their manufacturing facilities in India. Consequently, total vehicle production in India went up from 2 million in 1991 to 9.7 million in 2006 and further to over 40 million in 2013-14.

The favourable policy stipulations helped the Indian Automobile Industry grow at more than 17 % per annum since liberalization till 2006, making it one of the 'Sunrise Sector'. Recognizing the potential for higher growth and its ability to make greater contribution to the GDP and generate substantial employment, the Government decided to formulate an action plan in 2006 for next 10 years in order to accelerate and sustain growth in the automobile sector.

To maintain the high growth momentum and to retain the attractiveness of Indian market and for further enhancing the competitiveness of Indian automobile companies, the government through Development Council on Auto mobile and Allied Industries constituted a Task Force to draw a 10 year Mission Plan 2006-16. The Automotive Mission Plan 2006-2016 was formulated to present futuristic plan of action and remove impediments in the growth of the industry. Through this Plan, the government envisaged to provide a level playing field to all players and steer the industry towards a desirable growth path.

The Automotive Mission Plan envisaged a vision of India 'emerging as the destination of choice in the world for design and manufacture of automobiles and auto components with output reaching a level of US \$145 accounting for more than 10 % of GDP and providing additional employment to 25 million people by 2016. The growth of Indian middle class with increasing purchasing power along with strong growth of economy over last one decade has attracted major auto makers to Indian market. High potential domestic demand, availability of raw materials and skilled manpower at competitive costs on one hand and near stagnation in auto sector in USA, EU and Japan on the other hand have worked as a push factor for shifting of new capacities and flow of capital to the Indian automotive industry. The increasing competition among automobile companies has not only resulted in multiple choices for consumers at

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competitive cost but has also ensured improvement in productivity by almost 20% a year in the first half of the previous decade which is highest in Indian manufacturing sector.

2.7 Future Prospects

As stated in KPMG report, demographically and economically, India's automotive industry is well-positioned for growth, servicing both domestic demand and increasingly, export opportunities. A predicted increase in India's working-age population is likely to help stimulate the burgeoning market for private vehicles. Rising prosperity, easier access to finance and increasing affordability is expected to see four-wheelers gaining volumes, although two wheelers will remain the primary choice for the majority of purchasers, buoyed by greater appetite from rural areas, the youth market and women.

Automotive sales are destined to resonate with global economic shift: India is the place to be for the global OEMs

1980	2009	2020
Market size: 60 M units	Market size: 102 M units	Market size: 205 M units
Asia & Japan: 7%	Asia & Japan: 45%	Asia & Japan: 65%
Europe: 42%	Europe: 32%	Europe: 20%
North America: 41%	North America: 18%	North America: 15%

Source: KPMG

Given its deep backward and forward linkages, automobile industry has a strong multiplier effect and acts as a key driver of economic growth. Therefore, the Indian automobile industry is set to continue its growth trajectory, in the medium term, on the back of steady economic growth. Current low car penetration, rising prosperity and the increasing affordability of private vehicles offer a healthy prognosis for the Indian automotive industry.

Some consolidation or alliances could possibly be expected, driven by the need for access to technology, manufacturing facilities, service and distribution networks. Some evidence of this has already been seen with Fiat's diesel engine being used in Suzuki's vehicles, as well as Tata vehicles and Tata managing the service and distribution facilities for Fiat India.

While the medium term outlook indicates positive and stable growth prospects, the long term would be conditional to two interesting and emerging scenarios of greater demand for green vehicles and increasing possibility of alternative mobility solutions like mass transit systems in view of rising fuel costs, lack of adequate road infrastructure and growing congestion.

The passenger vehicles production in India is expected to reach 10 million units by 2020–21. The industry is estimated to grow at a compound annual growth rate of 13% during 2012–2021. According to *Automotive Component Manufacturers' Association (ACMA)*, the industry is projected to touch US\$ 30 billion by 2020–21.

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The used cars market in India is anticipated to grow at a CAGR of 16% during 2013–17, highlighted by the RNCOS report titled, 'Booming Used Car Market in India Outlook 2017'. Furthermore, India is expected to emerge as a centre for producing compact superbikes. Several global and Indian bike makers plan to utilise India's mass production base of 16 million two wheelers to roll out sports bikes in the 250cc capacity.

The future challenge for Indian automobile industry would be to develop a supply base with emphasis on lower costs and economies of scale, develop technical and human capabilities, overcome infrastructural bottlenecks, stimulate domestic demand and exploit exports and international business opportunities.

2.8 Major Developments & Investments

- German auto maker Volkswagen is planning to expand production capacity and introduce a slew of new models. The group is looking at investing Rs. 1,500 crore (US\$ 248.55 million) over the next five years to set up a diesel engine manufacturing facility.
- Amtek Auto signed an agreement to buy Germany's Kuepper Group of companies for about Rs. 16.78 billion (US\$ 277.97 million) in December 2013, which was its second big European acquisition in 2013.
- Jaguar Land Rover (JLR) will scale up its production capacity to hit 700,000 units by FY 2017 riding on its joint ventures (JV) in China and Brazil, as per analysts. JLR's capacity for 2014 is pegged at 450,000 units.
- Infosys has signed a multi-year contract with Volvo Cars to provide application development services to the latter's global operations.
- JCB announced plans to relocate production of compaction equipment to factories in the UK and to Pune, India, and close the Gatersleben site in Germany.
- Piaggio Vehicles Pvt Ltd, scooter and light commercial vehicle manufacturer, is planning to assemble its super bikes locally, which it sells under the brand Aprilia.

2.9 Standardisation Bodies & Uptake in the Automotive Sector

In the Indian Automotive sector the main bodies to engage in the standards formulation is the **Transport Engineering Division Council (TEDC)** of Bureau of Indian Standards. Standardization in the field of transport engineering including air, water, road and rail transport; diesel engines for stationery application and ISO freight containers, transport packaging etc. falls under the purview of TEDC. This division council of BIS has issued nearly 1097 standards of which 33% are harmonised with the



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international ISO /IEC standards. To be precise nearly 145 Indian standards are dual numbered [identical] and 212 are technically equivalent to the ISO/IEC standards.

Automotive Research Association of India (ARAI) is a co-operative industrial research association established by the automotive industry with the Ministry of Industries, Government of India. ARAI provides technical expertise in R&D, testing, certification, homologation and framing of vehicle regulations. Its Automotive Industry Standards Committee (AISC) is set up under Central Motor Vehicles Rules -Technical Standing Committee (CMVR - TSC) by Ministry of Road Transport & Highways, Dept. of Road Transport & Highways (MoRT&H, DoRT&H) in the year 1997 to review the safety in the design, construction, operation and maintenance of motor vehicles. Technical Secretariat to WP.29 was entrusted to ARAI in the year 2003, and its National Standing Committee on WP.29 establishes national policy and guidelines on the subject of harmonization of automotive regulations. India is also a signatory to 1998 agreement, under which, the country is committed to participate in formulation of Global Technical Regulations. ARAI has 6 GR groups (subsidiary technical bodies of WP.29) are:

- GRPE (India) : Working Party on Pollution and Energy
- GRSG (India) : Working Party on General Safety Provisions
- GRRF (India) : Working Party on Brakes and Running Gear
- GRE (India) : Working Party on Lighting and Light-Signaling
- GRB (India) : Working Party on Noise
- GRSP (India) : Working Party on Passive Safety

The Indian working groups consist of experts from the industry, test agencies and other organizations and deliberate on various subjects / regulations falling within their purview and submit their recommendations to the national secretariat for further actions. List of Published standards by ARAI are available at https://www.araiindia.com/Publish_AIS_Standards.asp and Draft Standards are available at https://www.araiindia.com/Draft_AIS_Standards.asp

For more information on the sectors standardization please refer information available at project website <http://eustandards.in/indian-standardization/automotive/> and our earlier published report "Indian Landscape around Standardizations Policy R&D and Innovation July 2013".

3. Electrical Equipment including Consumer Electronics

Presently, the domestic electrical equipment (EE) industry size exceeds ₹ 1.20 lakh crore (US\$ 25 billion) with the share of generation equipment (boilers, turbines, generators - BTG) being about one-fourth and that of T&D being three-fourth of the total. The domestic EE industry contributed 1.4% to the nation's GDP in 2011-12 and 10.0% to the manufacturing GDP. The industry provides direct employment to about 0.5 million persons and indirectly to about 1 million persons. The entire value chain would account for a total employment of over 5 million persons.

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The demand for electrical equipment in India is expected to witness significant expansion on the back of the growth of the power sector. The government is likely to add around 78 GW and 100 GW, respectively, under its Twelfth and Thirteenth Five Year Plans. Investment required for the Twelfth Five Year Plan period in the generation and T&D segment is expected to be US\$ 85 bn in generation, US\$ 45 bn in transmission and US\$ 70 bn in distribution. Based on investment estimates and capacity addition targets, it is expected that the domestic demand for generation equipment will be in the range of US\$ 25-30 bn by 2022, while that of the T&D equipment industry will be US\$ 70–75 bn14.

India's electrical equipment industry is expected to grow steadily and witness growth opportunities as a result of government focus on capacity augmentation across generation, transmission and distribution. The government has stipulated — Power to all under its National Electricity Policy (NEP), with a target of achieving 1,000 KWh per capita consumption of electricity. Significant infrastructure investments have been planned across the generation, transmission and distribution segments to realize this target. Government in its "Indian Electrical Equipment Industry Mission Plan 2012-2022" plans to increase power generation capacity from 200 GW in 2012 to about 400 GW by 2022 with commensurate T&D capacity enhancement, Indian EE manufacturers not only have to meet demand of such huge capacity addition, but also that of metros, airports, railways, other infrastructure projects and increase in domestic consumer demand too. Per capita electricity consumption in India in 2011-12 was 879 kilowatt hour (kWh), less than one-fourth the global average.

Vision 2022 for the Indian electrical equipment industry is to make India the country of choice for the production of electrical equipment and reach an output of US\$ 100 billion by balancing exports and imports.

The electronics industry, especially consumer electronics emerged in the 20th century and has now become a global industry worth billions of dollars. Indian electronics industry in recent years has been growing at a brisk pace of over 25-30% CAGR and is estimated to have currently reached over \$125 billion. Considering huge domestic demand in the country and high potential for exports, the industry is expected to be worth US\$ 158 billion by 2015. Among many sub-sectors comprising electronics industry, consumer electronics segment is the largest in terms of production and consumption while components account for being largest export segment.

Recognising its high growth potential in coming years, the government has formulated a 'Vision 2022' for the industry and has approved a National Policy on Electronics envisaging increasing investment to \$100 billion, production to US\$ 400 billion and employment generation to 28 million and increase exports from US\$ 8 billion to US\$ 80 billion by 2020. Accordingly, policy orientation has been changed to making policies and procedures conducive and industry friendly. However, the industry also faces formidable challenges of growing competition from foreign companies increased imports, ever changing technological dimensions and quality standards.

3.1 Current Status



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India has the fifth-largest generation capacity in the world with an installed capacity of over 211 GW, as on 31st January, 2013 and is also the sixth largest electricity consumer, accounting for 3.4% of total global consumption. India's per capita consumption of electricity was 879 kWh in 2011-12.

Over 300 million people in India have no access to electricity. Over one third of India's rural population lacked electricity, as did 6% of the urban population. Of those who did have access to electricity in India, the supply was intermittent and unreliable. Since 1990, India has been one of the fastest growing markets for new electricity generation capacity. India's electricity generation capacity has increased from 179 TW-h in 1985 to 1053 TW-h in 2012. Rural areas in India are electrified non-uniformly, with richer states being able to provide a majority of the villages with power while poorer states still struggling to do so. The Rural Electrification Corporation Limited was formed to specifically address the issue of providing electricity in all the villages across the country. Poverty, lack of resources, lack of political will, poor planning and electricity theft are some of the major causes which has left many villages in India without electricity, while urban areas have enjoyed growth in electricity consumption and capacity. The central government is increasingly trying to improve the dire conditions by investing heavily in bio-gas, solar as well as wind energy. It is also initiating programs such as, Jawaharlal Nehru National solar mission, Pradhan Mantri Gram Vidyut yojna to fasten the pace of electrification and diversify the procedure. The work is also ongoing for reducing wastage, providing better equipment and improving the overall infrastructure for electrical transmissions in villages. Currently, some 60% of villages in India have been electrified with a further goal of providing complete electrification by 2025. India's Power Finance Corporation Limited projects that current and approved electricity capacity addition projects in India are expected to add about 100 GW of installed capacity between 2012 and 2017. India's installed capacity growth rates are still less than those achieved by China, and short of capacity needed to ensure universal availability of electricity throughout India by 2017.

The Indian electronics industry has shown an upward trend during the 11th five year plan, growing from ₹ 5400 Crore (~US\$ 885 Million) in 2007-2008 to ₹ 7948 Crore (US\$ 1.3 Billion) in 2011-12 and was projected to cross ₹ 10000 Crore (US\$ 1.63 Billion) during 2012-13. It is estimated that the defense electronics purchases alone will be about ₹ 6,00,000 Crore (US\$ 98.3 Billion) in the next ten years. This offers an immense growth opportunity for domestic electronics manufacturers.

Despite the global economic slowdown, growth of Indian electronics industry in 2009 was on par with the previous year at 9.9%, although this was lower than the double-digit growth achieved in 2006 and 2007. In 2010 output grown by 13.6% and in the medium to long-term India is likely to show strong growth driven by a large, fast growing domestic market, significant foreign investment and an improving regulatory environment. The production and growth trend of the Indian Electronics and IT-ITeS industry since 2004-05 has been as follows;

Year	Production (In Rupees Crore)	Growth (In %)
2004-05	152,420 (US\$ 24.98 Bn)	28.9

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2005-06	190,300 (US\$ 31.19 Bn)	24.9
2006-07	244,000 (US\$ 40 Bn)	28.3
2007-08	295,820 (US\$ 48.49 Bn)	21.2
2008-09	372,450 (US\$ 61.05 Bn)	25.9
2009-10*	411,220 (US\$ 67.41 Bn)	10.4

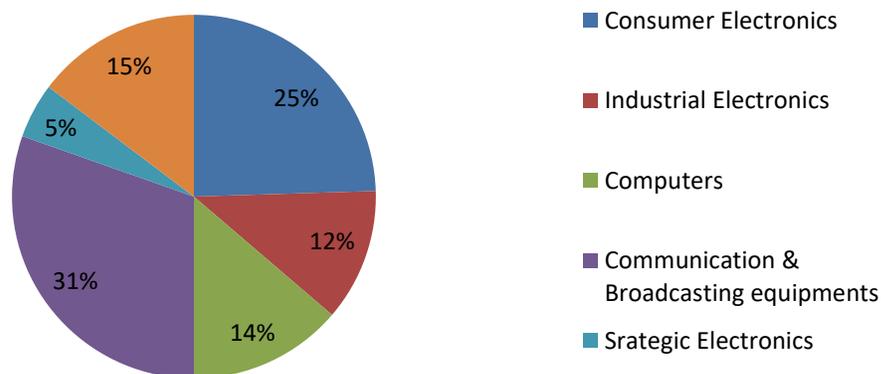
*Provisional

Source: Department of Electronics and IT, Ministry of Commerce and IT, GOI

In view of continuing adverse global economic climate over last few years leading to sharp contraction in Indian GDP growth in 2012-13 and 2013-14, the government decided to formulate a 'National Policy on Electronics 2012'. The Policy aims at addressing the huge gap which is estimated at Rs.15.31 lakh crore (\$300 billion) between locally manufactured electronics and the consumer demand for electronics that we expect to see by 2020. Another reason for introducing this policy has been the fear that if the gap between demand and production of electronics is not met by 2020 then electronics imports may far exceed oil imports. Diverse areas such as manufacturing, R & D, IP creation, manpower and training, standards, e-waste management, investment and the setting up of a National Mission are the immediate requirements for a growth in the Indian electronics scenario.

3.2 Market Segments in Indian Electronics Industry

There are six major segments in the electronics industry. Share of these segments in total production of electronics goods is as follows (as of 2012-13):



As is evident from these figures, consumer electronics is the largest segment while components form the largest export segment.

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3.3 Demand Drivers for Future Growth

The demand for electronics is expected to be fuelled by the growth of:

- Huge middle-class population, estimated to be over 150 million; plus growing share of young generation in total population;
- Increasing per capita income fuelling demand for personal electronics products;
- Telecommunications (250 million subscribers by the next few years)
- PCs and Notebooks (5 million every year)
- Broad-Band connectivity reaching rural areas

3.4 Future Prospects

According to a recent report presented by Ernst & Young, the Indian domestic demand for electronics products is expected to have reached \$125 billion by 2014 from \$40 billion in 2010 and further grow to \$158 billion by 2015. The primary demand drivers for the Indian Electronic Industry are sectors like telecom, defence, IT and e-governance, automotive, consumer electronics, and energy. To meet these demand levels India needs to create its own high-tech, modern and competitive electronics industry. Otherwise, the imports of these products will create the single largest trade deficit item, which would even be larger than petroleum products. On the other hand, if this particular unique opportunity is utilized, it can create a large electronics industry catering to domestic consumption, which will help achieve self-reliance in strategic sectors like telecom and defence, while leading to large exports as well.

Over last few years, many foreign companies have set up base in India while imports from other countries have been on a rise. Electronics imports may thus, exceed oil imports and add drastically to the deteriorating fiscal deficit. Hence promotion of domestic manufacturing is the key for future growth. This is possible only with high scale of investments and as a nation.

The Rs 70,000 crore Indian IT Hardware industry was recently hit very badly by Rupee Devaluation, resulting in heavy losses, cash flow challenges and blocking investments. Almost 85% of the entire industry has import content and more than 50% of industry's consumption is government-centric. The only long-term solution to such problems lies in enhancing domestic manufacturing capabilities.

3.5 Policy Regulations: Electronic System Design & Manufacturing

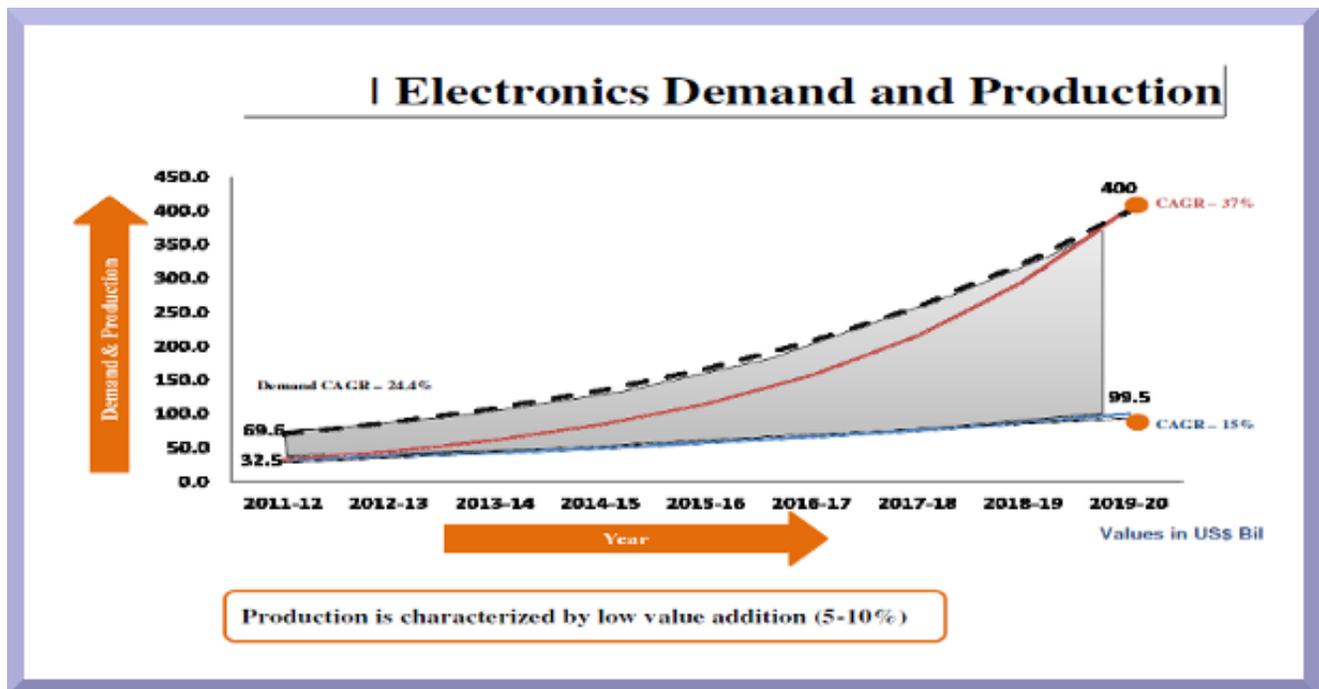
Over the last couple of decades India has been the epicenter of consumer demand fuelled by a phenomenal GDP growth. While demand increased across all sectors, demand for high technology products, specifically electronic products has registered significant growth and going by current estimates,



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the demand for electronics hardware in the country is projected to increase from US\$ 45 billion in 2009 to US\$400 billion by 2020 (Source: Government Task Force Report).

The estimated production will reach US\$ 104 billion by the year 2020, creating a gap of US\$ 296 billion in demand and production. This creates a unique opportunity for companies in the ESDM (Electronic System Design & Manufacturing) sector to look at India as their next destination to cater to the domestic Indian demand as well as act as an exports hub.



Source: ESDM Policy, GOI

Accordingly, the Government has initiated several initiatives for the development of electronics sector in the country. The Government has recently approved National Policy on Electronics (NPE).

3.6 National Policy for Electronics 2012 (NPE)

NPE VISION

“To create a globally competitive electronics design and manufacturing industry to meet the country’s needs and serve the international market”.

NPE Goals for 2020



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- Attract an investment of US\$ 100 bn;
- Reach a turnover of US \$ 400 bn;
- Create an employment of 28 mn;
- Enhance exports from US\$ 8 bn to US\$80 bn;
- Grow the chip design/embedded software industry to US \$ 55 bn.

One of the important objectives of the NPE is to achieve a turnover of about US\$ 400 billion by 2020 involving investment of about US\$ 100 Billion and employment to around 28 million by 2020. This interalia, includes achieving a turnover of US\$ 55 billion of chip design and embedded software industry, US\$ 80 billion of exports in the sector. Moreover, the policy also proposes setting up of over 200 Electronic Manufacturing Clusters. Another important objective of the policy is to significantly upscale high-end human resource creation to 2500 PhDs annually by 2020 in the sector.

As part of the policy, the government has also decided to set up a semiconductor wafer Fab in the country. India has become the hub for semiconductor design with nearly 2000 chips being designed per year and more than 20000 engineers are working in various aspects of chip design and verification. Annually India is generating nearly USD 2 Billion in revenues for the chip design services. This provides an enabling environment for the semiconductor wafer Fab which will come up in India.

Several other policy initiatives have been approved in last few months. These include providing very attractive financial investment in electronics manufacturing and providing preference to domestically manufactured electronic goods in all Government procurement as well as all those electronic goods whose use has security implications for the country. The financial incentives are available not only for new units but also for units relocating from abroad. The incentives are available to not only electronic hardware products relating to IT and office automation, telecom, consumer electronics, electronic components, etc., but also to a wide range of products relating to verticals like solar photovoltaic, automotive electronics, medical electronics, avionics, LED etc. To address the issue of infrastructure, a scheme for Electronics Manufacturing Cluster provides 50% of the cost of upgrading infrastructure and logistics as grant in aid from Government.

3.7 Challenges

The Indian Electronic industry constitutes less than 1% of the global market. However, demand for these products is growing rapidly and investments are flowing in to augment manufacturing capacity. Today India remains a major importer of electronic materials, components and finished equipment. The country imports electronic goods mainly from China.

The growth in demand for telecom products has been high, with India adding two million mobile phone users every month, which serves as one of the main reasons for the growth in production of electronic goods. This growth is expected to continue over the next decade, too.



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To attract foreign investment the government has adopted Chinese style Special Economic Zones with the aim to provide islands of excellence where the infrastructure is world standard. Fifteen-year tax breaks given to foreign investors and SEZs are treated as foreign territories for the purpose of trade operations, duties and tariffs.

3.8.1 Effect on Environment

Another major challenge for Indian electronic industry is to minimize effects of its growth and products on the environment. Electrical waste contains hazardous but also valuable and scarce materials and up to 60 elements can be found in complex electronics.

3.8.2 Electronic waste

The biggest challenge of a consumerist society is generation of electronic waste. The United States is the world leader in producing electronic waste, tossing away about 3 million tons each year. China already produces about 2.3 million tons (2010 estimate) domestically, second only to the United States. And, despite having banned e-waste imports, China remains a major e-waste dumping ground for developed countries. The UNEP estimate that the amount of e-waste being produced - including mobile phones and computers - could rise by as much as 500 percent over the next decade in some countries, such as India.

This waste contains significant level of hazardous substances which pose danger to environment as well as health of people, and thus needs careful handling. International agencies like World Bank are increasingly working towards reducing this waste and also for careful handling of it in order to protect environment.

3.9 Sustainable electronics

Increasing environmental awareness has led to changes in electronics design to reduce or eliminate toxic materials and to reduce energy consumption. The landmark Restriction of Hazardous Substances Directive (RoHS) and Waste Electrical and Electronic Equipment Directive (WEEE) were released by EU in 2002. Globally, the electronic industry is encouraged to adhere to mandatory and voluntary quality standards. Indian electronic industry is also required to meet these standards in various countries if it wants to increase its exports.

3.9.1 Strategies to be adopted:

To convert emerging opportunities in the electronics industry over next one decade, there is a need to urgently:

- ▶ **Enhance competitiveness**



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Enhancing competitiveness of the domestic industry is vital to achieving the NPE 2020 goals. The Indian electronics industry should be so equipped that it competently meets any competition in the domestic as well as export markets.

For this, some strategic initiatives that may be needed include:

- Upgrade technology levels to bring it at par with global benchmarks;
- Develop manpower skills to support industry's future requirements;
- Secure supplies of critical input materials;
- Enhance customer centricity;
- Introduce policy changes to provide a level-playing field to Indian electronics manufacturers;
- Develop and strengthen support infrastructure.

► Increase market share in export markets

India currently accounts for less than 1% of global trade in electronics exports. With the demand from developed countries stagnating and that from developing nations seeing significant increase, there exists substantial potential for India to tap the export markets. To increase the share of exports, specific actions need to be taken by the Indian government and electronics manufacturers, such as:

- Identify target markets and develop country-specific export strategies;
- Introduce policy changes to support electronics exporters;
- Use the support of Indian diplomatic offices and electronics industry association like ELCINA, CEAMA, MAIT, IEEMA, etc. to promote electronics exports and Brand India.

3.10 Conclusion

India has been a great success story in the IT services industry and the next great opportunity is to create our own electronics product industry, which will help to move up the value chain and create global technology brands. Today the market is at the threshold of a decisive phase in our growth where, if the government and entrepreneurs take concrete steps it can create a \$100 billion electronics product industry from India in the next 10 years.

The mantra of the industry today is convergence - whether of technologies or products or markets. Digitalization, miniaturization and mobility are driving this change. Further, intense competition is leading to commoditization of the industry, pressurizing margins.

Against the backdrop of the global recession, cost competitiveness, technological innovations and emerging markets are the key drivers of the industry's transformational growth. Indian electronics industry has to use strategic planning to move ahead and capture a larger share in global market.

3.11 Standardisation Bodies in the Electronics and Electrical Equipment Sector



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Formulation of standards in the Electronic and Electrical equipment sector is being taken care of by the Department of Electronics and Information Technology (DeitY) which is the department dealing Electronics & Information Technology - Information Technology Enabled Services (IT-ITeS) Industry, providing support for creation of Innovation / Research & Development (R&D), building Knowledge network and securing India's cyber space.

The another main division of the BIS (Bureau of Indian Standards) responsible for this sector is **Electrotechnical Division Council (ETDC)** the Electronic Division Council of BIS Standardization in the field of electrical power generation, transmission, distribution and utilization equipment; and insulating materials, winding wires, measuring and process control instruments and primary and secondary batteries. There are 1440 standards issued by ETDC of which 52% are harmonized with international ISO/IEC standards (343 standards are identical to ISO/IEC and 399 are technically similar to ISO/IEC).

From the industry IEEMA is the national representative organisation of manufacturers of electrical, industrial electronics and allied equipment. IEEMA works closely with government agencies, utilities, standardization bodies, research & development organisations and testing institutes for formulating Indian standards for electro-technical industry and developing energy efficient products.

4 Heavy Machinery

The engineering sector is the largest of the industrial sectors in India and can be broadly categorised into two parts, namely, heavy engineering or heavy machinery and light engineering. It has emerged as the largest contributor to the country's total merchandise exports. The sector has a comparative advantage in terms of low manufacturing costs, skilled and trained manpower, relatively cheaper labour, market knowledge, technology and creativity.

To realize its goal of achieving higher sustainable and inclusive growth, the government has been formulating conducive regulatory policies and sector-specific mission and vision for capacity creation in sectors such as infrastructure, power, mining, oil and gas, refinery, steel, automotive, and consumer durables. The engineering industry has been de-licensed and enjoys 100 % foreign direct investment (FDI). Dedicated sector-specific policies like National Manufacturing policy, National Electronics Policy, National Automotive Policy etc. are expected to propel growth of manufacturing sector and thus of heavy machinery sector.

Heavy machinery industry comprises of electrical machinery, transport equipment, mining and earthmoving machinery, oil & gas and solar energy equipment, machine tools plus machinery for all industry sectors like textiles, sugar, cement, rubber etc. The major end-user industries for heavy machinery are power, infrastructure, steel, cement, petrochemicals, oil & gas, refineries, fertilisers, mining, railways, automobiles, textiles, etc.

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4.1 Current Status

Industrial growth has been volatile across all sectors including heavy machinery over last two years from 2011-12 and 2012-13 with manufacturing sector, most dominating sub-sector within the industry sector witnessing sharp decline to 2.7 % and 1.9 % in 2011-12 and 2012-13 respectively from 11.3 % and 9.7 % in 2009-10 and 2010-11. There was a sharp pickup in growth in October 2012 with manufacturing growth improving to 9.8 %, highest since June 2011. However, it turned negative in November and December 2012. Capital goods sector, of which heavy machinery is a part, has sustained negative growth for six consecutive quarters starting from Q2 of 2011 to Q3 of 2012-13. The moderation in industrial growth, particularly in the manufacturing sector, has been largely attributed to sluggish growth of investment, slowdown in domestic economy and fragile global economic recovery.

Industrial sector registered a growth of 5.8% for the period April-July 2011-12 as compared to 9.7% in the corresponding period of 2010-11. The growth in the manufacturing, mining and electricity sectors during April-July, 2011-12 over the corresponding period of 2010-11 have been 1.1%, 6.0% and 9.4% respectively, which moved the overall growth in the General Index to 5.8%.

4.1.1 Export

The engineering sector is among the top two contributors to the total Indian export basket with total shipments of US\$ 56.7 billion in 2012-13. Engineering exports from India include transport equipment, capital goods, other machinery/ equipment and light engineering products like castings, forgings and fasteners. During February 2014, the sector's exports stood at US\$ 5.02 billion. The engineering sector is expected to contribute about US\$ 65 billion to the overall export shipments of US\$ 326 billion, as targeted by the government in the current year.

During the last five years, engineering exports achieved a CAGR of 12%. India's engineering goods grew at 25.2 % CAGR during 200-01 to 2007-08. In 2008-09, the growth moderated to 18.7 % and in 2009-10, it declined by 19.6 % because of global recession, with its share in total exports falling to 18.2 %. Engineering exports touched \$56.7 bn in 2012-13.

The United States (US) and Europe account for over 60% of India's total engineering exports. However, engineering exports to India's Free Trade Agreement (FTA) partners such as Japan, South Korea, Sri Lanka and the Association of Southeast Asian Nations (ASEAN) bloc have witnessed robust growth recently. Shipments to Japan grew 17 % during April-November, 2013-14 to US\$ 568 million as compared to the same period last year. Exports to South Korea increased by over 13 % to US\$ 739 million during the period.

4.1.2 Market Segment

The heavy engineering sector can be classified into two broad segments – capital goods (which is further classified as electrical machinery and non-electrical machinery), and equipment segments. Electrical



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machinery includes the following: power generation, transmission and distribution equipment such as generators and motors, transformers and switchgears. Non-electrical machinery includes machines used in various other sectors such as textile machinery, cement machinery, sugar machinery, rubber machinery etc. Equipment segment is comprised of equipment such as material handling equipment (earth moving machinery, excavators, cranes, etc.), oil field equipment like onshore and offshore drilling equipment etc.

The Indian machine tools industry manufactures almost the complete range of metal-cutting and metal-forming machine tools. Customized in nature, the products comprise conventional machine tools as well as computer controlled machines. The machine tool industry is a strategic industry and determines the manufacturing competitiveness in important sectors such as automobiles, heavy electrical equipment, defence, aerospace and consumer goods and other sectors.

4.1.3 Major Players

Some of the prominent heavy industry companies operating in public sector are Bharat Heavy Electrical Limited, Bharat Earth Movers Ltd., HMT Limited, Bharat Pumps and Compressors Limited, Andrew Yule and Company Limited, Hindustan Cables Limited, Triveni Structures Limited, Heavy Engineering Corporation Limited and Cement Corporation of India Limited. Many sub sectors in heavy industry like the heavy engineering sector require a high level of capital investment and so have almost nil presence of small and unorganized companies.

The Indian machine tool industry has around 450 total players. Out of these, there are about 25 mid-size large units, 250 units manufacturing complete machine tools and 200 units making accessories / components of machine tools.

4.1.4 Government Initiatives

The National Manufacturing Policy aims at enhancing manufacturing sector's share in gross domestic product (GDP) to 25 % within a decade and creating 100 million jobs by 2022.

According to a report by NASSCOM and Booz & Co, the government plans to give an impetus to engineering in India through investments in infrastructure development in 2012-17 in telecom, energy and construction sector. The government would also provide 15 % tax exemption to manufacturing companies that invest more than US\$ 18.4 million in plant and machinery over FY14-15.

Simultaneously, the government has formulated sector-specific National policies for enhancing production as well as exports of those sectors like manufacturing, electronics, automobile, energy, electricity, equipment manufacturing etc.



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4.1.5 Investment Policy

The nodal department for heavy industry sector in India is the Department of Heavy Industry (DHI) under the Ministry of Heavy Industries and Public Enterprises. The DHI strives to have a modern, healthy and robust domestic heavy engineering industry like Machine Tool Industry, Heavy Electrical Industry, Industrial Machinery, Auto Industry and all sub sectors of Capital Goods Industry. DHI also strives to position India prominently on the global automotive map and to drive India into the future of global automotive excellence.

The FDI is allowed up to 100% in the Indian machine tools industry, under the automatic route. Technology collaboration is also freely allowed. In 2011, the DHI proposed a scheme for enhancement of competitiveness in the capital goods sector including machine tools, whereby the Scheme will provide total Government Support of about Rs. 10,000 million for the various sub-sectors of capital goods industry.

According to the Department of Industrial Policy and Promotion (DIPP), the miscellaneous mechanical and engineering industries' sector-wise FDI inflows during April 2000-December 2013 were calculated at US\$ 2,588.09 million.

4.1.6 Sector Prospects

The key growth drivers for this sector are Power, Oil & Gas, Mining, Steel, Refinery, Construction, Railways, Infrastructure and Auto & Auto Component industries. India being preferred by global companies as an outsourcing destination for lower labor cost and better designing capabilities would also provide impetus to growth of heavy machinery industry in years to come.

Thus the prospects of the heavy industry sector are very promising in India. For instance, as its vision for 2020, DHI plans that Indian machine tools industry should secure a domestic market share of 67% by 2020 growing from 30% in 2011. This presents immense opportunities for growth of the domestic sector to both public and private players, including foreign companies.

Additionally, DHI aims that India becomes one among the top 10 machine tool producing nations of the world by 2020. It also aims to raise heavy industry exports to a significant level, with the present exports from the sector being insignificant.

The analysts forecast the automotive engineering service market in India will be growing at a CAGR of 18.22 % during 2012-2016. Low-cost labour, inexpensive manufacturing capabilities, availability of a technical education infrastructure that provides an increasing number of technically-trained human resources each year are the key attractions boosting the market growth.

Engineering research and development (ER&D) sector is currently valued at US\$ 14 billion and has a growth potential of US\$ 44 billion in the coming years. With India home to 750 ER&D companies at



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present, the number of people engaged in this sector will also grow from four lakh to three times during the period.

4.1.7 Road Ahead

There is an urgent need to build capacities in the heavy machinery sector and encourage R&D in engineering designs for various types of machines and equipment. The government's thrust on manufacturing sector is likely to enhance capacity building as well as competence in the sector.

The Engineering Exports Promotion Council (EEPC) has asked the commerce department to strongly take up the issue of duty drawbacks with the revenue department to keep the momentum going. Engineering exports posted a 37% growth in January 2014. The council estimates government has held back drawbacks worth Rs 9,000 crore (1.28B Euro) in the run up to the budget, which is affecting the working capital requirements of the exporters.

4.2 Indian Earthmoving and Construction Industry

India's earthmoving and construction equipment (ECE) has enjoyed strong growth over the last seven years till recently as a result of rapid economic development in the country. The organized construction sector in India (e.g. roads, urban infrastructure) accounts for approximately 55 percent of the ECE industry; Mining, irrigation and other infrastructure segments (e.g. Power, railways) account for the rest. These sectors have also been growing strongly leading to the expansion of construction-related industries.

Between 2004 and 2007, the Indian earthmoving and construction equipment (ECE) industry's revenues and volumes have grown at over 40 percent per year, reaching \$2.3 billion in 2007 and with an estimated potential to grow to \$12-13 billion by 2013-14 and over \$22 billion by 2020. Industry experts expect Earthmoving & CE market to grow to \$ 22.7 bn by 2020.

4.2.1 Current Market Profile

Earthmoving equipment constitutes the biggest segment in construction equipment. This is due to the uptake of a wide range of products across diverse sectors – infrastructure construction, power, building construction and mining. Its first-mover advantage is a key reason for earthmoving equipment holding a place of prominence in the Indian construction equipment market. Crawler excavators, one of the major equipment in the segment, are also amongst the first few machines that kick started mechanisation in the construction industry.

Earthmoving equipment comprises about 65 % of the overall Rs. 20,000 crore (2.85B Euro) worth of construction equipment market. Crawler excavators account for the highest chunk in value terms. Around

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18,000 crawler excavators are demanded annually. With an annual demand of about 34,000 units, backhoe loaders top sales in volume terms. Together, these two machines dominate the segment. Wheel loaders hold the third position, although there is plenty of scope to expand this market which presently stands at only around 3,500 units per annum.

The Indian earthmoving equipment market has significantly evolved in recent years. Design is now India-centric, largely because of the peculiarities of the domestic demand and applications as end-users in India put machinery to greater use than in any other part of the world.

Recognizing the scope of the local market, a number of MNC vendors are shifting production to India as well. Terex's backhoe loader (TLB series) is totally indigenized. It is a top selling machine on account of excellent performance output, reliability and fuel efficiency. Other products like crawler excavators, wheel loaders, etc., are partially manufactured in India and partially imported. Players like Doosan, Caterpillar, etc. are still importing these machines and selling them in India. Telcon, Hyundai, L&T Komatsu, etc. are manufacturing most of the heavy line earthmoving equipment in India.

Earlier European and Japanese companies posed competition and recently China has become very active in Indian ECE market. As more and more foreign companies come to India in view of huge demand for infrastructure and thus earthmoving and construction equipment, the market is likely to expand further. Given strong market potential, foreign players are developing India as a sourcing and manufacturing hub.

Nevertheless, Indian companies are gearing up to face competition from their MNC counterparts. Escorts launched its own series of backhoe loaders under DigMax brand in 2010, eight years after parting ways with JCB. Escorts is also focusing on the growing demand for wheel loaders, which is miniscule in comparison to neighbouring China. "We are distributing wheeled loaders from XGMA, a company which designed and built the first Chinese Loader in 1964 and is known as the mother company of all Chinese wheel loaders. The market for wheeled loaders in China ranges around 200,000 units, vis-à-vis our paltry 3,500 units. There is plenty of headroom for demand for this product to grow in India.

As per industry inputs, the excavator market is growing fast and there has been a shift from a generic backhoe segment to bigger and specialised equipment while mini-excavators, wheeled loaders and backhoe loaders are still in great demand. There have been tremendous technological advances in these equipment to reduce wear- and- tear, improve performance levels and tailor-made to suite requirements.

As per the inputs from Off-Highway Research, the maximum sale is expected in the excavator, (including crawler / wheeled and mini excavator) segment, which is expected to grow around 115 %, from the estimated 10,605 units in 2010 to 22,905 units by 2014. Close on its heels are motor graders with a projected sale of hundred %, from 450 units to 900 units. Then is the wheel loader with a projected growth of 88 %, from 2,500 units to 4,700 units, pavers and compactor from 4,050 units to 6,400 units, a growth of 58 %, and dozers from 700 units to 1050 units, and back hoes from 23,000 units to 30,000 units, a growth of 30 %.

Quality, speed and costs of executing the project are increasingly becoming more focused areas for every customer in the industry. The differentiator for the user is technology and high quality product support. Technology will play an important role in bringing a paradigm shift in the industry.

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4.2.2 Overall market in terms of numbers and value for medium-sized equipment:

Equipment	2010	2014
Excavators	10,605	22,905
Dozers	700	1,050
Wheel loaders	2,500	4,700
Backhoes	23,000	30,000
OHT	700	1,100
Motor graders	450	900
Paver/Compactor	4,050	6,400

* Forecast Source: Off-Highway Research

4.2.3 Future Prospects

After the downturn that followed the period of sustained growth due to sluggish global and domestic growth, the ECE industry showed remarkable resilience and turned around sharply, underlining the very strong demand drivers that propel the industry.

It is estimated that India would need around a trillion \$ investment in infrastructure during the 12th FYP (2012-2017). Huge investments have been earmarked for the key infrastructure projects in India during the period 2009-2015 which include \$100 billion in Road sector, \$30 billion in mining, \$20 billion in urban infrastructure, \$110 billion in oil & gas, \$300 billion in residential & commercial construction, \$200 billion in power generation and \$ 85 billion in irrigation projects.

Major trends anticipated also include a greater degree of urbanization requiring substantial investments in urban infrastructure and a huge demographic dividend (a 45% increase in working age population) needing significant increase in infrastructure facilities.

This would lead to great opportunities in the variety and range of equipment and machines as well as in training and deployment of labour force. This boost in infra spend would have a direct impact on the

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growth of the ECE industry. It is estimated that a 6% economic growth generally leads to about 12 % growth in infrastructure and 20 % growth in construction equipment.

Though the construction industry is experiencing a slowdown due to sluggish economic conditions over last two years, mid-term prospects appear positive given the country's huge infrastructure needs. Estimates by various research organizations and industry association suggest that the earthmoving equipment segment will grow at a CAGR of 13-14 % to Rs. 20,000 crore by 2015. Growth is expected to come mainly from infrastructure development (especially roads) and general construction with mining expected to make a comeback once clearer policies emerge post-new government at the Centre.

The strong growth in the Earthmoving and Construction Equipment industry has also seen the advent of a slew of new players. This has added to the variety of choices that are available to the discerning Indian customer.

Local manufacturing capacities have been added and imports of machinery also continues. The advent of a multiplicity of players in the industry to feed the growing market have led to challenges in availability of distribution channels, vendor capabilities and capacities and skilled manpower.

The Indian earthmoving and construction equipment (ECE) market has significant growth potential. As per a CII-IECIAI report, from total revenues of \$3.3 billion in 2010, it has potential to grow to \$22.7 billion by 2020 and grow from over 60,000 units in 2010 to 330,000 in 2020. Though there is a slowdown in the market, we expect it to pick soon.

India's infrastructure industry has the biggest potential for growth and opportunities for investment. Some demand-driving factors for construction equipment in India include heavy investments in various infrastructural projects by public and private enterprises in areas like road construction and maintenance, ports, power plants, telecommunication sector, urban infrastructural developments etc. Additionally, the entry of international and domestic players has led the market to open up, indicating a positive trend in equipment purchase.

4.2.4 Major Players in ECE Industry

The major players in this industry include:

- **Ashok Leyland Ltd.**
- **Bharat Earth Movers Ltd.**
- **Caterpillar Commercial Pvt. Ltd.**
- **Escorts Construction Equipment Ltd. GMMCO Ltd.**
- **Greaves Cotton Ltd.**
- **Ingersoll Rand India Ltd.**



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- **JCB India Ltd.**
- **L&T Komatsu Ltd. Larsen & Toubro Ltd. (Construction Equipment Division)**
- **Mahindra & Mahindra Ltd.**
- **Schwing Stetter India Pvt. Ltd.**
- **Tata Trucks India Ltd.**
- **Telco Construction Equipment Co. Ltd.**
- **TIL Ltd**
- **Voltas Ltd.**
- **Volvo India Pvt. Ltd.**
- **Wirtgen India Pvt. Ltd.**
- **Apollo Industrial Products**
- **Braithwaite & Co. Ltd.**
- **Godrej & Boyce Mfg. Co. Ltd.**
- **Gujarat Apollo Equipment Ltd.**
- **Heavy Engineering Corporation Ltd.**

4.2.5 Conclusion

The ECE industry in India is poised at the cusp of exciting growth in coming years. A study on the industry (ECE Vision 2015) predicted a period of unprecedented growth and opportunities. The demand for construction equipment is co-related with the development of road infrastructure, growth in the real estate sector, development of ports, pipelines, airports, power and other infrastructure projects, mining, building and material handling. This is expected to attract an investment of more than \$ 500 billion over the next five years; from \$ 2.5 billion dollar infrastructure industry in 2011 to \$ 12-13 billion industry by 2015. It is generally believed a 6 % economic growth leads to 12 % growth in infrastructure, which in turn fuels 20 % growth in construction equipment industry.

According to various sources, India will need an infusion of nearly \$ 1 trillion investment during 12th Five Year Plan (2012 – 2017) to build more airports, seaports, highways, power plants, railways, and dedicated freight corridors, etc. Hence, there is a lot of opportunity for capital equipment manufacturers. The ECE industry in India is expected to grow by at least 10-15 % over the next five years.

Development of infrastructure will play a major role in India's GDP growth in the next ten years as there is a huge gap in demand and supply. The government is well on its track and has put greater emphasis on

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implementation of various infrastructure projects in a time-bound manner. This sector will continue to grow in the coming years exponentially. Growth transforming initiatives required would include development of India specific products and features and cost competitiveness, while growth enablers would address skilled workers, operator availability, incentivizing local manufacture and defining regulatory and safety norms.

4.3 Mining Equipment Industry

Mining equipment industry in India has been in the forefront for last few decades and has a well-matured technology base. As mining becomes intensive with time, the demand for 33mechanization and highly productive, safe, efficient and cost-effective machineries are increasing. There is a lot of scope to usher in this technology in India, but this will happen in future as the sector grows.

4.3.1 Growth Drivers

Abundant unexplored coal reserves and the perpetual power deficit in the country require substantial growth in the coal mining sector, resulting in regular demand for mining equipment. However, with international commodity prices declining despite increase in input costs, there has been a substantial decline in the demand for equipment from the Indian metal mining segment. With no solution in sight for the various private mines closed in Karnataka and Goa region, mining equipment makers are focusing on state-run entities and mega infrastructure projects. Commodity prices will play a key role in demand for mining equipment in the long run.

Hence, coal mining would be a major growth driver for the mining equipment sector in India. The capacity expansion plans of the existing mines and the imminent opening up of new mines provide abundant scope for the growth of mining equipment business.

4.3.2 Industry Status

India is lagging behind in mechanisation of the mining sector which in turn is leading to large demand-supply gap. Mechanisation cost, due to total dependence on the imported machinery, is very high and making miners adopt conventional methods. India still does not have its own tunnel boring machine or a high-speed shaft sinking machine. The full-fledged mining equipment manufacturer like BEML Limited has diversified into other highly lucrative ventures, leaving a big void which is being filled by either renting or leasing these special purpose machines from other countries.

However, things are improving currently as most of the foreign mining machinery manufactures are establishing production centres in India and preparing to share their technologies. Due to high competition, overall technology and machinery cost is going to come down in due course.

The National Mineral Policy 2008 for non-fuel and non-coal minerals envisions to make, indigenous industry stronger for manufacture of mining equipment and machineries by encouraging foreign technology and participation, and states that import of such equipment and machineries will be freely



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allowed. Automation and robot assisted mining is the future in mining, especially to meet the objective of safety and economic production. Deep mining and transportation to surface can be achieved by the development of robots and automated systems for mining.

4.3.3 Future Prospects

There is a great scope for the mining machinery in coming years given India's infrastructural needs. Mine exploration possibilities in various sectors are immense. Once there is clarity with regard to Government policy and guidelines in context of environmental clearances, land acquisitions and method of awarding contracts in transparent manner, both mining and mining equipment industry will grow significantly.

4.4 Heavy Electrical Industry in India

Heavy electrical industry is an important manufacturing sector, catering to the needs of energy sector and other industrial sectors. Major equipment like boilers, turbo generators, turbines, transformers, condensers, switch gears, relays and related accessories are manufactured by Heavy Electrical Equipment manufacturers. Major end user industry for this sector is the power industry. The per capita consumption of electricity in India was 704 kWh in 2008 and the target was to increase it to 1000 kWh by 2012. Demand for the power generation and transmission equipment is closely linked to the power generation capacity addition program of the country.

An efficient power supply system is a key requirement for a nation's economic growth and good quality life of its citizens. Assured availability of quality power at a reasonable cost will not only act as a catalyst in the socio-economic development of the country, but also enhance the global competitiveness of the industrial sector. It will also lead to enhanced employment generation and per capita income levels. Rapid development of a robust and healthy domestic electrical equipment (EE) industry, supporting the complete value chain in power generation, transmission and distribution, is not only crucial for the economy, but is also of strategic importance for India. The Indian EE industry, which comprises around 90% SMEs, has grown close to Rs. 110,000 Cr in 2010-11. The industry has a diversified, mature, and established manufacturing base, which has the potential to meet the current as well as future domestic and export demands.

4.4.1 Contribution of the electrical machinery industry to the economy

More than 95 % of the electrical machinery successfully installed in operation in India has been produced, installed and commissioned indigenously by the Indian electrical machinery industry itself. India has developed strong capabilities in manufacturing top-end and high technology products like transformers, turbines and generators that are at par with international standards. Key strength of the industry is in being able to customize manufacturing of products. Industry experts believe that Indian manufacturers

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are highly capable of being able to customize effectively to the benefit of the buying companies unlike China which is considered 'a readymade manufacturer' whereas India is the tailor. Other than cost, delivery time is also key to performance. Recently a state electricity board disqualified a Chinese supplier because of a project delay of 2 years.

4.4.2 Key Statistics

The heavy electrical machinery segment contributes more to the economy than the light electrical machinery segment. Turbines and boilers are two sub-segments that have continuously shown robust increases in growth since the year 2004–2005. The boilers sub-segment is the largest sub-segment in the industry. However, the switchgear and control gear sector has shown spectacular growth.

Production of sub-segments in the heavy electrical machinery segment (in Rs. crore)

Sub-segment	2008-09	2009-10	2010-11
Turbines	4193.00	5428.00	6990.00
Generators	1778.10	2116.73	2580.00
Boilers	10,153.94	12763.00	17018.45
Transformers (Mn. KV _a)	71.86	85.23	96.62
Switchgear & Control gear	17805938 (in number)	18119497 (in number)	23123776 (in number)

Source: Compiled from Annual Report of Ministry of Heavy Industries and Public Enterprises

4.4.3 Size and structure of the heavy electrical machinery segment

Heavy electrical machinery covers machinery for power generation, transmission, distribution and utilization. This includes generators, boilers, various types of turbines, transformers, switchgears and other allied items. These are used in multicore projects for power generation including nuclear power stations, petrochemical complexes, chemical plants, integrated steel plants and metal units.

The government has an ambitious mission of addition in generation of power named 'For All 2012'. A capacity addition of 72 000 MW would be required to achieve power for all in India. This scale of expansion in capacity is expected to stimulate demand in a big way for heavy electrical machinery. The technology available in India is almost at par with that in the international market.

The industry has been upgrading the existing technology and is now capable of taking up turnkey contracts for export markets as well. The industry has been de-licensed and foreign collaborations are allowed with 100 percent FDI. The country is planning to add 150 000 MW to the power generation capacity in the next 10 years. This will generate substantial demand for heavy electrical machinery.

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4.4.4 Major Players in the Industry

- ABB
- Crompton Greaves
- BHEL
- Kirloskar Electric
- L & T
- Alstom
- Havells
- Thermax

4.4.5 Growth Prospects of the electrical machinery industry

Electricity generation is expected to double in the world between 2002 and 2025. The strongest growth in electricity consumption is projected in the emerging economies. As per the estimates of the International Energy Outlook, investments in the power sub-segment in the developing countries in Asia are expected to be the fastest growing in the world in the next two decades.

Global electricity consumption is expected to reach 29000 TWh by 2030, growing at an average rate of 2.4% per annum. To fulfil this demand, US\$ 13.7 trillion worth of investments are required in the power sector — US\$ 7.2 trillion in generation, US\$ 2 trillion in transmission and US\$ 4.5 trillion in distribution. Driven by this increasing demand for electricity, the global electrical equipment market is expected to reach US\$ 6,600 bn during the period 2016-30, growing at a long term average rate of 2% during the period 2008–2030.

India is not far behind with significant impetus being given to the power sector. In the Twelfth Five Year Plan, around 78 GW of power generation capacity is expected to be added, while another 100 GW is expected in the Thirteenth Five Year Plan.

India's per capita energy consumption is very low. With the growing economy, changing lifestyles, increasing electrification of rural and semi – urban areas, the consumption of electricity is expected to increase, leading to higher per capita electricity consumption. As per the Ministry of Power and the Central Electricity Authority (CEA), per capita electricity consumption is set to increase from 704 units in 2007–2008 to 1000 units by 2011–2012.

In the US typical household power consumption is about 11,700 kWh each year, in France it is 6,400 kWh, in the UK it is 4,600 kWh and in China around 1,300 kWh. The global average electricity consumption for households with electricity was roughly 3,500 kWh in 2010. It is clear that in comparison to these figures,



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electricity consumption in India is considerably lower. However, demand for electricity is set to increase substantially in line with India's growth path.

The nuclear deal with the United States of America (USA) is expected to generate a large amount of demand for the electrical machinery industry. This is because nuclear power projects require similar kind of machinery and equipment that thermal power projects require with some modifications. The deal could prove to be highly beneficial to many companies involved in producing heavy electrical machinery like ABB, Larsen & Toubro, BHEL and EMCO etc.

4.4.6 Development of ultra-mega power projects driving development

The Ministry of Power has launched an initiative for development of coal based Ultra Mega Power Projects (UMPP) in India each with a capacity of 4 000 MW and above. Major sites have been identified in 5 states along the coast in Eastern and Western India, and 3 states in central India.

These power projects are going to be developed on the basis that all machinery and equipment required will be manufactured domestically. This move has been made to provide impetus to the domestic manufacturing sector, and is aimed at restricting imports of electrical machinery. The government is promoting development of the industry by enabling foreign and domestic manufacturers to produce electrical machinery indigenously in India. The large scale power generation and expansion programme through UMPPs will help domestic manufacturing and lead to growth of the industry.

4.4.7 Issues and Challenges in growth of the Indian electrical machinery industry

Although India has certain significant advantages that are helping the industrial sector overall and the electrical machinery industry also, there are bottlenecks that can inhibit the growth potential. Big challenges cited by industry experts are timely availability of raw materials and infrastructural deficiencies. The government has set ambitious plans to increase the power generation capacity in the country. However, there are doubts about whether these targets will be achieved due to sluggish growth of the power sector. This would also have adverse effect on the electrical machinery industry. At the same time, power remains a high priority concern in India and development of the sector is necessary if the country has to achieve higher sustainable growth. Therefore, there is a high probability of increase in demand for electrical machinery once the power sector grows and bottlenecks are removed.

The government is planning to create hubs for each segment of the industry to boost production. Recently, India's largest power generation company National Thermal Power Corporation (NTPC) and Bharat Heavy Electrical Limited (BHEL) formed a joint venture for manufacturing electrical machinery to make up for the gap in demand and supply of electrical machinery.

The industry is working on initiatives including technology and process up-gradation for its overall development. Companies are in the process of upgrading their present range of products since a new range of products with the latest technologies catering to gas based and nuclear power projects will be in



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greater demand. Large scale enhancement of facilities is also being done to fill up the gap between supply and demand of electrical machinery in the country.

However, a survey conducted by CII and McKinsey indicates that the level of capital expenditure being planned for the expansion is inadequate and is only being done by the industry leaders. Thus imports will continue to form a substantial part of the electrical machinery industry in the upcoming years. The levels of technology currently in use barring exceptions like high voltage technology are at par with international norms. India has the advantage of availability of highly skilled manpower at relatively low cost and this can certainly help to shape technology growth and development of this sector especially in the context of expansion in global markets.

The sector is experiencing difficulties in technology transfer since foreign companies can now directly participate in infrastructure projects. An increasing number of global majors are reluctant to transfer technology to Indian companies since they want to sell the equipment directly. Thus the Indian electrical machinery industry needs to be able to augment its technology levels to international standards.

Companies need to continue focusing on operational excellence, cost optimization and exports to be profitable in the face of ever increasing competition. Improving processes by benchmarking with the best in the business for faster delivery of superior quality products/ services will be the only factors that can help companies gain a foothold in export markets as well as enhance their position domestically.

4.4.8 Standardization Bodies in the Heavy Industry Sector

The standards are formulated by two division councils of BIS in the Heavy Industry sector are **Production and General Engineering Division Council (PGEDC)** which covers the Machinery Standardization in the field of basic and production engineering such as engineering drawings, screw threads, fasteners, transmission devices, weights and measures, engineering metrology, bearings, gears, horology, machine tools, hand tools, cutting tools, pneumatic tools and fluid power system including automation in manufacturing and robotics. PGED has issued 2053 standards of which 559 are identical to the ISO / IEC standards and 107 are technically similar. A total of 32 % are harmonized with the International standards.

Mechanical Engineering Division Council (MEDC) in the field of mechanical engineering including mining, boilers, pressure vessels, refrigeration and air conditioning, material handling, chemical engineering and other general engineering such as compressors, gas cylinders, oil and gas burners, water well drilling, pump sets educational instruments and equipment. MEDC has issued a total of 1136 standards till date of which 24% are harmonized with ISO/ IEC standards (212 standards are identical to ISO/IEC and 63 standards are technically equivalent).

The demand for electrical equipment in India is expected to witness significant growth against the backdrop of growth in the power sector. During the Twelfth Five Year Plan, investments are expected to be worth around US\$ 85 bn in generation, US\$ 45 bn in transmission and US\$ 70 bn in distribution. Based on investment estimates and capacity-addition targets, it is estimated that the size of the domestic market in generation equipment is expected to reach US\$ 25-30 bn by 2022 (from US\$ 5.7 bn in 2011),



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while that of the T&D equipment industry is estimated to grow to US\$ 70-75 bn (from US\$ 18.5 bn in 2011). This translates into a CAGR of around 14%.

Although the market is expected to grow at a healthy rate, the domestic electrical equipment industry is facing challenges in leveraging this growth due to competitive pressures and low focus on technology development and up-gradation. Furthermore, India's share in global export of electrical equipment is less than 1%.

The Ministry of Heavy Industry and Public Enterprises has set Vision 2022 for Indian EE industry which aims **to make India the country of choice for the production of electrical equipment and reach an output of US\$ 100 bn by balancing exports and imports.** To achieve this vision, concerted efforts by all stakeholders including government, industry and industry association, needs to be deployed. Also, the mission plan needs to be aligned to the Five Year Plans in order to avoid duplication and to channelize the efforts in the right direction.

5 ICT including Services

The Information and Communication Technology (ICT) sector in India has demonstrated excellent growth over the last two decades. Today, India is recognized as a global leader in ICT sector on account of its low operation cost, availability of large talent pool and remote delivery model. ICT industry can be broadly divided into two sectors, information technology (IT) and Communications.

India is one of the fastest-growing IT markets in the world. The rapid emergence of Indian IT sector has transformed Indian economy as well as its image from a slow moving low technology-highly bureaucratic economy to a high-tech land of innovative entrepreneurs. According to International Data Corporation (IDC), the market size of IT in India is expected to touch US\$ 44.8 billion in 2014 as compared to US\$ 35.1 billion in 2012.

Similarly, the telecom sector in India has registered a phenomenal growth during the past few years and has become the second largest telephone network in the world, only after China. With more attractive and investor-friendly industrial policies and foreign direct investment (FDI) policies, India has become one of the favorite destinations for ICT investment portfolios.

5.1 Opportunities and Growth Prospect of ICT Sector in India

According to Confederation of Indian Industry (CII), India's IT-business process outsourcing (BPO) industry revenue is expected to cross US\$ 225 billion mark by 2020. (Source: CII report, 'The SMAC Code-Embracing New Technologies for Future Business').

And India is expected to become world's second-largest online community after China with 213 million internet users by December 2013 and 243 million by June 2014, according to a report by Internet and Mobile Association of India (IAMAI) and IMRB International.

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According to recently released data, the IT infrastructure market of India is expected to touch US\$2 billion by 2013. The market is mainly driven by consolidation efforts, optimization and hardware refresh. The development of new data centres which are mostly driven by service providers are also offering additional advantage to the ICT sector of India.

In the domestic market, a huge business opportunity awaits the ICT sector. The National Statistical Survey Organization (NSSO) data shows that about 73% of farm households, 45.9 million farmer households, in the country have no access to credit, either from institutional or non-institutional sources. Only 27% of total farm households are indebted to formal sources (of which one-third also borrow from informal sources). This means that these over 45 million households are the next opportunity for the ICT sector in India. Indian ICT industry can make a significant contribution by adopting an innovative and radical approach to make technology services cost effective, reliable and secure. This would require a fresh approach to the technology architecture for offering network compression software for poor bandwidth, economical database to handle large volumes, software application with a transaction based architecture, compression techniques for storing biometric information, new and affordable solution for securing the data and transactions, multi-lingual support, etc.

5.2 Investment Opportunities in Indian ICT Sector

The ICT sector of India has been attracting significant amount of foreign investment in the last few years. Investment is being done in four key sectors of software merchandise, information technology based services, information technology services and online businesses. With highly attractive industrial and investment policies, the ICT sector of India has become the preferred choice for Foreign (NRIs and PIOs) and domestic investors.

Some significant growth drivers in ICT sector include:

- The constant rise in investment by Small and Medium Enterprises (SMEs) in the ICT Sector of India demonstrates the increase in the maturity levels in Indian businesses. The investment inflows from mid-market segment have been rising at a constant rate of 17%.
- In the last one year, the data consumption by 3G users has increased drastically which demonstrates the constant rise in mobile data consumption in the country. This indicates the need for good quality and efficient mobile broadband services with enhanced speed in order to satisfy internet users. This will help many foreign and domestic players to penetrate into the market to create their presence in the ICT sector of India.
- Government envisages to create Information Technology Investment Regions with effective policy environment and superior infrastructure across the country. As per new reforms, all the Indian states including Union Territories will be allowed to establish integrated township to encourage the growth of IT, BPO, KPO and sunrise industries through top class infrastructure.
- Availability of highly skilled –English speaking, relatively cheaper manpower is one of the key drivers attracting foreign investment in India. A number of reputed information technology

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companies from across the world have opened their branches in India in order to outsource most of their technical work. Indian ICT sector is also well known across the world for its export-led software segment.

- One more growth driver of Indian ICT sector is its diversification in new verticals, pricing model and utilization rate. India is also one of the most sought after destination by the foreign organizations which are planning to offshore their back-office and IT functions.

5.3 Government Initiatives to Encourage Investment in ICT Sector

One important reason for rapid growth of ICT sector and especially of SME sector in ICT has been substantial growth in R&D and Infrastructure segments in ICT industry over last few years through government initiatives and Public Private Partnership (PPP) models. In recent time, R&D promotion has been encouraged by the Indian government in very aggressive and efficient way. Some key highlights include encouraging start-ups which mainly focus on innovation and technology. Apart from the current scheme of financing R&D projects, the government has also put in place two more schemes – Multiplier Grants Scheme (MGS) and Support International Patent Protection in Electronics & IT (SIP-EIT).

5.4 Major policy initiatives for encouraging investment in ICT also include:

- 100% FDI in Indian IT sector under automatic route. The important fiscal incentives offered by the Indian government in this sector are Software Technology Parks (STP), Export- Oriented Units (EOUs) and Special Economic Zones (SEZ).
- 100% FDI in Indian telecom sector has been recently allowed.

5.5 Development in Policy Regulations

In order to promote further growth of ICT industry, the government has recently approved **National Policy on Information Technology 2012**. The objectives of the policy include:

- To transform India into a global hub for the expansion of language technologies.
- To develop a pool of 10 million skilled manpower in the Indian ICT sector.
- To achieve significant market share in global technologies and services.
- To offer fiscal benefits to foreign investors and Small Medium Enterprises (SMEs).
- To promote adoption of ICTs in strategic and economic sectors to enhance the productivity and competitiveness of ICT.



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5.6 Indian IT and ITeS Industry

5.6.1 Introduction

The Indian Information Technology (IT) and Information Technology enabled Services (ITeS) sectors go hand-in-hand in every aspect. The industry has emerged as a 'sunrise industry' and has fuelled economic growth by energizing productivity in Indian industry. Today Indian firms largely depend on the IT & ITeS service providers to make their business processes efficient and streamlined. Indian manufacturing sector has the highest IT spending followed by automotive, chemicals and consumer products industries. **IT is seen as a change enabler and a source of business value** creation for organizations. Not only this, the industry has employed almost 10 million Indians and hence, has contributed a lot to social transformation in the country.

5.6.2 Background (IT)

According to Gartner, the Indian IT infrastructure market (comprising servers, storage and networking equipment) was projected to grow to US\$ 2.1 billion in 2013, an increase of 9.7 % as compared to 2012. The market is driven by hardware refresh, optimization and consolidation efforts. New data centre build out, primarily driven by service providers, is providing added impetus to this market.

5.6.3 Market Size

India's total IT industry's (including hardware) share in the global market stands at 7 %; the share of IT segment alone is 4 % while that of ITeS is 2 %, indicating huge potential for increasing its market share. According to NASSCOM, India's IT and BPO sector exports are expected to grow by 12-14 % in FY14 to touch US\$ 84 billion - US\$ 87 billion. Moreover, India plans to spend around US\$ 3.9 billion on cloud services during 2013-2017, of which US\$ 1.7 billion will be spent on software-as-a-service (SaaS).

The enterprise software market in India was expected to have reached US\$ 3.92 billion in 2013, registering a growth of 13.9 % over 2012 revenue of US\$ 3.45 billion.

5.6.4 Current Status

The Indian IT industry, including the domestic market, is currently pegged at \$118 billion (NASSCOM). After global headwinds of last few years adversely impacting the Indian IT industry returned to the higher growth trajectory in 2013 and is hoping to gain momentum in the ensuing year for a greater share of the global multi-billion dollar outsourcing market. After turbulent 2012, the industry seems to have consolidated its position with its four top IT companies registering a healthy 12-14 % growth in 201-14 as against 10 % in the previous year.

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5.6.5 Market Segments

India is the only country that offers a wide range of products and services like IT services, Business Process Management (BPM) services, engineering, R & D, internet and mobility and software products.

The internet and mobile platforms are enabling the development of low-cost products and thus fuelling further penetration. The industry is also investing in technology and HR development to explore emerging business opportunities like smart computing, anything-as-a-service and SME businesses.

The IT industry continues to generate large scale employment opportunities for growing Indian young generation. It added 1.88 lakh jobs in the previous year taking the total jobs in the sector to over 3 million.

5.6.6 Top Ten IT Players:

- Tata Consultancy Services
- Infosys
- Wipro
- HCL Technologies
- Tech Mahindra
- iGate Patni
- Mphasis
- L & T Infotech
- Suntel
- CSC India

5.6.7 Investments

Indian IT's core competencies and strengths have helped it in attracting investments from major countries. According to data released by the Department of Industrial Policy and Promotion (DIPP), the computer software and hardware sector has attracted foreign direct investment (FDI) worth Rs. 54,347.88 crore (US\$ 8.77 billion) between April 2000 and September 2013. IT spending by the Government of India is projected to reach US\$ 6.4 billion in 2013, a growth of 7% year-on-year.



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5.6.8 Road Ahead

Globalisation has been having a profound impact in shaping the Indian IT industry over the years with India capturing a sizeable chunk of the global market for technology sourcing and business services. Over the years the growth drivers for this sector have been the verticals of manufacturing, telecommunication, insurance, banking, finance and of late the retail revolution. Experts believe that the future growth of IT and ITeS will be fuelled by the verticals of climate change, mobile applications, healthcare, energy efficiency and sustainable energy. It is also expected that new markets would be explored and more and more of SMEs will go for IT application and services. Demand from emerging countries is expected to show strong growth going forward. Tax holidays are also extended to IT sector for software technology parks of India (STPI) and special economic zones (SEZs). The country's cost competitiveness in providing IT services, which is approximately 3-4 times cheaper than the US continues to be its USP in the global outsourcing market.

Nasscom has projected that the Indian IT industry would grow to about \$300 billion by 2020. NASSCOM has forecasted a 13-15 % increase in software exports in 2014-15 to \$99 bn from about \$86 billion estimated for 2013-14. It also expects Indian IT industry to add incremental revenues of \$13-14 billion in 2014-15.

The higher forecast for exports comes amid a recovery in macro economic conditions in North America, which is the largest market for Indian Software services exporters. Demand from Europe, where companies have increased outsourcing to save costs amid a tough economic environment, is also expected to boost the fortunes of India IT firms.

For 2013-14, Nasscom estimates point to about 13% increase. It had earlier forecast a 12-14% range for exports in fiscal 2013-14. For the domestic market, however, Nasscom forecast slower-than-expected growth of 9-12% at Rs.125-128 crore in 2014-15, mainly due to uncertainty in spending by the government.

App modernization and transformation, as well as cloud and infrastructure management should drive most of the growth. At least 78% of the clients feel confident of spending more on technology projects in 2014.

5.7 Indian Telecom Sector:**5.7.1 Background:**

Telecom has become one of the most powerful engines of GDP growth, socio-economic development and harbinger of inclusive growth ever since it opened up for private participation over 20 years ago. It became the poster boy of the economic reforms India initiated in 1991. Today India is the second largest telecom mobile network in the world only after China. The sector has evolved from 2-player to multi



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player in each service area. Forward looking policies during the decade 2000-2010 fuelled the growth that established strong correlation between tele-density increase and GDP growth e.g. it is assessed that every 10% teledensity rise leads to 1.2% rise in GDP growth rate. The acceleration in growth for emerging economies is pegged even at a higher rate. Increase in broadband penetration can further accelerate this growth rate. The sector today offers possibly the lowest tariffs in one of the most competitive markets globally, while delivering the following:

KPIs	Status
Tele-density	➔ 71% (overall)
Internet	➔ Approx. 200 million (>85% on mobile)
Significant Investments	➔ Rs. 450000 Cr already invested during 10th and 11th Plan ➔ 3rd highest FDI contributor last decade – almost Rs.59,000 crore (Apr'00 till Oct'13)
Contribution towards Exchequer/ Employment	➔ 6.9% contribution to annual GDP ➔ Employment (direct and indirect) to > 1.5 Crore citizens ➔ Approx. Rs. 14500Cr annual contribution in LF (including USO levy) and SUCs (sector specific levies) ➔ Equal or more through spectrum auctions ➔ Various other taxes and levies (e.g. service tax, state taxes, corporate taxes etc.)

Source: Assocham Paper “Telecom Agenda for next few months”

However, the Poster Boy of Reforms, the Flag bearer of Liberalization and privatization is mired in deep difficulties as mentioned below:

KPIs	Status
Rural-Urban Divide	➔ Rural Teledensity at 41% trails the Urban Teledensity (144%) by wide margins ➔ The internet and broadband penetration in rural areas is still a dream ➔ More towers and fiber rollouts needed in rural areas
No Spectrum Roadmap	➔ Sector gasping for Spectrum – allocations here almost 1/5 th or even lower than other telecom regimes ➔ No roadmap of future allocations – the sector needs continuous replenishment to serve ever increasing usage and to also plan for impending data explosion due to new services
Stressed Financials -	➔ Heavy Debt of over 2.08lakh Cr (without accounting for potential new debt that may be needed to service current auctions) ➔ Despite being designated as “Infrastructure” sector - reeling under multiple

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Further woes due to multiple levies/taxes	<p>levies:</p> <ul style="list-style-type: none"> • License Fee @ 8% of AGR (including 5% of USO levy) • Spectrum Usage Charges (SUCs) of 5% (for auctioned spectrum) and higher for administratively allocated spectrum are exceptionally high compared to international standards • Service tax - ultimately adds to end consumer's cost of ownership • The levy of excise duty and NCCD on handset manufacturers - a double blow not only to the manufacturers, but consumers also – potentials risk of massively increasing the handset grey market • All these add to the ultimate price to the end consumer <p>➔ Definition of AGR – The current definition of the Adjusted Gross Revenue (AGR) as is being applied, includes income from non-telecom activities like interest on FDs, Dividends, Forex gains etc. for purpose of levying LF/SUCs etc. This issue has been mired in litigation for over 10 years.</p>
Impediments in Infrastructure Rollout	<p>➔ Exorbitant & Non-uniform RoW charges - different States, municipalities within States hamper timely Rollouts of telecom networks through heavy RoW charges on Telecom towers,</p> <p>➔ Inadequate and erratic availability of grid power leads to greater reliance on diesel, which besides adding to costs, is also going against objectives of green telecom;</p> <p>➔ Lack of awareness and misperceptions leading to growing concerns around EMF safety hindering tower rollouts near schools/colleges, Hospitals – critical in case of any emergency</p>
Manufacturing	<p>➔ Even after so many years India hasn't seen any Fab unit - establishing a Fab unit a sophisticated task with significant investments – requires continuous, good quality reliable power supply - any voltage fluctuation can destroy an entire lot</p>
Falling FDI/Weakening Investor Confidence	<p>➔ Lack of policy stability and certainty has shaken the confidence of the investing community significantly</p> <p>➔ FDI in last 2 years has fallen on an average more than 80% Y-o-Y</p> <p>➔ As per GSMA's Report on India Mobile Economy – India, 2013, we Rank at:</p> <ul style="list-style-type: none"> • 98th out of 144 for burdensome Government Regulations • 99th out of 144 in irregular payments i.e. bribes • 65th out of 144 in Transparency of Policy Making <p>We need to urgently address this and restore investor confidence in the sector.</p>
Significant Investments still Required	<p>➔ The Government has set several ambitious targets like</p> <ul style="list-style-type: none"> • 100% Teledensity, 600mn broadband connections by 2020 • National Optic Fiber Network (NOFN) – to bring high quality broadband access

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	<p>to all village panchayats</p> <p>➔ As per Planning Commission’s 12th plan projections – Telecom sector being an infrastructure sector is expected to invest Rs. 943,899 Cr during this 5 year plan – and 92% of that is expected to come from the private sector</p>
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Source: Assocham Paper “Telecom Agenda for next few months”

Telecommunication as a sector has delivered an amazing transformation to the society, the common man and India’s overall socio-economic development. It has been made possible through the entrepreneurial spirit of the nation coupled with an enabling policy framework that has been fine-tuned and adapted from time to time to facilitate timely course corrections and incentivize growth and development.

However, in recent times, the financial downturn in the economy coupled with increased policy and regulatory uncertainty, have led to severely deteriorated fundamentals and have hampered the sector in performing to its true potential. Considering the role of telecom as the backbone of economic and social development, there is an urgent need to take corrective measures to put back the sector on track. As mentioned above some critical areas requiring immediate attention are rationalisation of levies, making more spectrum available and conducive policy for the consolidation.

5.7.2 Major contributors in the sector:

The Indian telecom sector has mix of Indian and foreign telecom companies. Major players are:

- Bharti Airtel
- Vodafone
- Idea
- Reliance Communications
- Tata Teleservices
- Aircel
- Reliance Jio
- Government owned BSNL and MTNL

Besides, there are clutch of smaller players who do not have pan-India operations. The market share of major players in the mobile subscription and broadband service is as follows:

Operator	Mobile Subscription (%)	Broadband Subscribers (%)
Bharti	22.71	20.30
Vodafone	18.41	11.54
Idea	15.01	11.87
Reliance Communications	12.26	11.85

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BSNL	10.46	27.54
Aircel	7.76	16.88 (Others)
Tatas	6.97	

Source: TRAI

The wireless market is mainly dominated by the GSM service providers and three top players (Bharti, Vodafone and Idea) account for over 55 % of the total market.

5.7.3 Investment Scenario

The telecom sector of India has received FDI of US\$ 12,500 million in last 13 years which contributes 7% of overall FDI inflow. However, the FDI in segments like radio paging, telephone and cellular mobile services has declined by more than 80% because of strict regulatory environment and economic slowdown in the country.

5.7.4 Government initiatives to Encourage Foreign Investment in Indian Telecom Sector

- 100 percent FDI has been allowed in telecom sector, out of which 49 percent can be done through automatic route and in order to raise further stake, permission from Foreign Investment Promotion Board (FIPB) will be required. The key objective behind increasing FDI cap in telecom industry is to help the sector to get fresh investment inflow in order to lower its financial burden.
- In order to provide a transparent policy framework and clear roadmap in telecom sector, the government has reviewed all telecom policies through consultative process and released the National Telecom Policy (NTP) in year 2012.
- NTP endeavors to produce an investor friendly environment for attracting foreign investment in telecom sector and offers clear guidelines to address all the regulatory and policy issues for the betterment of the sector.
- A separate policy named Preferential Market Access (PMA) is also being revised. The policy will make it obligatory for telecom companies in India to utilize all the equipments which are made indigenously.
- The Government of India has offered better growth opportunity to foreign telecom companies by permitting them to do business in India without any domestic partner and this decision will tempt foreign players to invest in India.
- In order to perform consolidation and attract new foreign players in the telecom sector, the Indian government has delivered a comprehensive framework which offers clarity on key regulatory issues.

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- Earlier there was no pricing policy and lack of clarity in terms of the allotment of spectrum among telecom companies. But since the spectrum allotment and pricing issues are already being resolved, there will be major impetus for fresh foreign investment.

5.8 Standardization Bodies in the ICT Sector

Telecommunications Standards Development Society, India (TSDSI) is the recognized Telecommunications standards development organization in India founded in Nov 2013, mainly intended to develop standards that are suitable to Indian market. TSDSI aims at developing standardized solutions for meeting Indian requirements. It aims also at contributing to the international standards landscape, by being involved in global standardization initiatives in the field of telecommunications. TSDSI will maintain technical standards and other deliverables of the organization, safe-guarding the related IPR and helping create manufacturing expertise in the country, providing leadership to developing countries (such as in South Asia, South East Asia, Africa, Middle East, etc.) in terms of their telecommunications-related standardization needs.

BIS is also actively involved in the ICT area through its Information Technology Division Council (LITDC) who is in charge of electronics and telecommunications including information technology. To date BIS has developed a total of 1436 standards of which 76% are identical or technically equivalent to the ISO and IEC standards (528 similar to ISO/IEC and 563 technically identical).

5.9 Conclusion

Indian ICT industry as a whole and IT and Telecom sub-sectors have become catalysts of higher GDP growth and harbinger of prosperity over the last two decades in the Indian economy. The future holds promise of even higher growth and rapid consolidation on account of growing domestic demand and anticipated return of global economy to growth path. The fact that more and more business organizations in the world are relying on IT and communication infrastructures for enhancing their competitiveness and business prospects bode well for Indian IT and telecom companies. Besides, low penetration in domestic market itself provides immense growth opportunity for the sector. The government has reoriented its policies favoring greater investment and remaining irritants in telecom sector are also being addressed. .

6 Glossary

Sl. No.	Acronym	Expansion
1	SIAM	Society of Indian Automobile Manufacturers
2	ACMA	Automotive Component Manufacturers' Association
3	RoHS	Restriction of Hazardous Substances Directive

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4	WEE	Waste Electrical and Electronic Equipment Directive
5	ESDM	Electronic System Design & Manufacturing
6	NPE	National Policy on Electronics
7	EEPC	Engineering Exports Promotion Council
8	ECE	Earthmoving and Construction equipment
9	FTA	Free Trade Agreement
10	ASEAN	Association of Southeast Asian Nations
11	DHI	Department of Heavy Industry
12	DIPP	Department of Industrial Policy and Promotion
13	CEA	Central Electricity Authority
14	NTPC	National Thermal Power Corporation
15	BHEL	Bharat Heavy Electricals Limited
16	UMPP	Ultra Mega Power Projects
17	ICT	Information and Communication Technology
18	FDI	Foreign Direct Investment
19	IDC	International Data Corporation
20	CII	Confederation of Indian Industries
21	BPO	Business Process Outsourcing
22	KPO	Knowledge Process Outsourcing
23	NSSO	National Statistical Survey Organization
24	SME	Small and Medium Enterprises
25	PPP	Public Private Partnership
26	MGS	Multiplier Grants Scheme
27	SIP-EIT	Support International Patent Protection in Electronics & IT
28	STPI	Software Technology Parks of India
29	EOUs	Export Oriented Units

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30	SEZ	Special Economic Zones
31	ITeS	Information Technology enabled Services
32	SaaS	software-as-a-service
33	FIPB	Foreign Investment Promotion Board
34	AGR	Adjusted Gross Revenue
35	NTP	National Telecom Policy
36	PMA	Preferential Market Access

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