

INFORMATION TECHNOLOGY INDUSTRY IN INDIA: AN EX-POST STUDY

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Abstract

Information Technology (IT) industry has generated 4 million jobs with an indirect employment to 10 million people and Foreign Direct Investment (FDI) to the sum of \$44.91 billion between April 2000 and March 2020 and attained second rank in FDI inflow. The IT industry in India has accentuated its development by concentrating on the export of software and IT enabled services. Rajiv Gandhi has actually brought the electronics and telecommunications revolution to our country and his New Computer Policy (NCP-1984) gave the momentum for this industry. Further, the New Economic Policy (NEP) was implemented as part of sweeping economic reforms in our country. The IT industry has stimulated transformation of the urban middle classes people of India.

Keywords: Information Technology, electronic revolution, export of software, employment, New Economic Policy. ITES, BPM, FDI.

Introduction

Information Technology (IT) industry contains two major sectors viz., software and hardware. In India, the software has emerged as the major industry during 1990s with its humble beginning during 1970s as a quintessence of electronic revolution in the country. This sector has generated 4 million jobs with an indirect employment to 10 million people. It attracted Foreign Direct Investment (FDI) to the sum of \$44.91 billion between April 2000 and March 2020 and

attained second rank in FDI inflow as per the report the Department for Promotion of Industry and Internal Trade. The Indian IT sector serves to Europe and the US and forming as the biggest markets with 85 per cent of revenues to the country. The IT and Business Process Management (BPM) contributes 7.9 percent of India's GDP with 41 lakh IT professionals and a total of 31,922 registered Information Technology (IT) companies functioning in the country (Samrat Sharma, 2020). With these an attempt is made in this article to analyse the ex-post situation of Information Technology (IT) industry in India.

Indian Information Technology (IT) industry-Historical perspective

India is a main player in the software development and also the most preferred destination for IT services among the countries of the World. To achieve this status India has crossed many obstacles with ups and downs in the business. The history of growth of Indian Information Technology (IT) industry can be classified in to the following three phases:

1. Phase I – (1970 – 1980)
2. Phase II – (1980 – 1990)
3. Phase III – (1990 onwards)

Phase I – (1970 – 1980)

In India, the first IT Company was established in 1960s. By focusing on exporting software and IT-enabled services, the IT industry in India has accentuated its growth. With significant ties to local, regional and national economies, this industry has connected the Indian economy to the global economy. The IT industry has produced social and cultural ramifications in the country. It has brought global image to India and prepares it as a rising economic power in the world. In 1973, the software export zone SEEPZ was established in Mumbai and recorded 80 percent of software exports from our country. EVS EM computers imported from the Soviet

Union during 1980s were used in large companies and research laboratories. Talented Indian graduates have moved to USA, USSR, European countries etc., and started working in research facilities in these countries. Accordingly USA also relaxed its immigration rules during 1965. In India, The National Informatics Centre was established in March 1975 and the Computer Maintenance Company (CMC) was also started in October 1976. The Information Technology companies like the Tata InfoTech, the Patni Computer Systems and Wipro were established during 1977-1980.

Phase II – (1980 – 1990)

This phase was responsible for creating base for the growth of the Indian Information Technology (IT) industry. Shri. Rajiv Gandhi has actually brought the electronics and telecommunications revolution to our country. His New Computer Policy (NCP-1984) gave the momentum for this industry. This policy gave industry status to this software industry, which enabled it to get incentive like any other industries of the country. Shri. Rajiv Gandhi reduced import tariffs to compete globally and to enhance software exports. The IT industry was freed from licensing from industrial policy to attract foreign companies; export-dedicated units were permitted to start and establishment of software parks were enunciated to provide infrastructure facilities for this industry. INDONET, NICNET Education and Research Network (ERNET) were formed during 1986-87. To attract FDI the World Market Policy and the Software Technology Parks of India (STP) were established during 1988. This policy permitted 100 percent foreign equity and duty free import on all inputs and products.

Phase III – (1990 onwards)

The New Economic Policy (NEP) was implemented as part of sweeping economic reforms in our country. The Software Technology Parks of India (STPI) was permitted in 1991 to

VSAT communications without moving away from its monopoly and the STPI to set up software technology parks in different cities. Further, in year 1993 the government permitted individual firms to establish a dedicated links on their own to transmit abroad directly. In India, many states like Karnataka, Tamil Nadu, Maharashtra, Andhra Pradesh etc., have invested a lot to provide infrastructure facilities to this industry. Bangalore has become the Silicon Valley of India and contributes around 33 percent of Indian IT Exports. The global SEI-CMM Level 5 Companies, European Union-India group of scholars was established to promote joint research and development. India occupied observer status at CERN.

According to the New York Times “the Indian software industry is breaking new ground, with the Indian operations of Motorola achieving world-class quality certification of SEI level 5. Worldwide, only the IBM project at NASA has achieved this unique distinction. The maturity of the Indian software industry in terms of quality can be measured from the fact that already 50 Indian software companies have acquired ISO 9000 certification and about 97 more companies are in the pipeline. The Indian software industry has the maximum number of ISO 9000 certified companies in the world for the software sector ” (NirupamBajpai and VanitaShastri, 1998).

The IT industry has accelerated the transformation of India's urban middle classes. In terms of: the e-enablement of enterprises; greater engagement between consumers and marketing channels; rapid convergence of IT, telecommunications and entertainment media, the Indian information technology industry affects global business. Numerous mobile devices are proliferating, resulting in a gradual decrease in personal computers; higher cost reduction programmes and business de-risking will lead to a proliferation of outsourcing activities; application service providers will revolutionise the software industry by changing the dynamics

of pricingThe growth in the storage segment will be driven by the rapid generation of data and the growing importance of it (SCOPE, 2001).

More than 158 companies out of 500 companies have outsourced their tech requirements to India, according to Nasscom. IBM, Microsoft, Novell, Oracle, Fujitsu, Motorola, Wireless and Hewlett Packard are multinational companies working in India.The tech companies in India are used by manufacturers such as Philips, General Electric, IBM, Reebok, Fujitsu, British Aerospace, General Motors and Sears because of the world's second largest English-speaking scientific labour pool (NirupamBajpai and VanitaShastri, 1998).

The IT sector is selected as the crucial career option by young educated Indians. IT workers employed as engineers, BPO workers, and others employed in India or abroad in IT-related occupations are highly educated, well-paid, mobile, and closely linked to the global service economy.The IT industry has changed its lifestyles, family structure, self-identity, and that is related to people employed in this industry's upward socio-economic growth. This sector is an essential part of India's growth agenda and relies on state-supported investment in higher education.

During 2010-11, India's GDP grew at a huge rate of 8.9 per cent. The IT / ITES industry's share of this GDP is estimated to be 6.1 per cent as opposed to 1.2 per cent in 1998. India's GDP has increased by an average of 6-7 percent per year over the past 10 years.India's IT / ITES revenue for 2010 stands at USD 71.3 billion , compared to USD 6 billion in 2000. Over the past ten years, the increase in the number of workers has been 26 percent, making it the largest employer in the integrated private sector. This sector has a direct employment rate of 2.3 million. In total exports, the share of this sector for 2010 is 26 percent compared to 4 percent in India in 1998.

The IT industry contributed Rs.63 billion to India's GDP in 1994-95 and grew to Rs.1276 billion in 2004-05. Since 2001-02, the IT / ITES industry has been rising at an excellent rate. Total IT / ITES exports and sales from the domestic industry in 2001-02 are expected to be US\$ 10.2 billion. In 2008-09, it reached US\$ 58.7 billion, with a CAGR of about 26.9 percent. Indian software and services industry revenues from IT / ITES contributed from 74.5 percent in 2001-02 to 78.9 percent in 2008-09. They are expected to be US\$ 7.6 billion in 2008-09 to US\$ 46.3 billion with a 28.6 percent CGAR. The contribution of ITES / BPO exports increased by approximately 39.2% from US\$ 1.5 billion in 2001-02 to US\$ 12.7 billion in 2008-09 to CGAR. BPO currently accounts for nearly 27 percent of total exports. However, software products are the fastest growing category. At a CGAR of 48.5 percent, it is rising. The share of the overall revenue of the IT industry to the domestic market is also important. It is projected that revenues from the domestic software and services industry have risen from US\$ 2.6 billion in 2001-02 to US\$ 12.4 billion in 2008-09, with a CGAR of approximately 22.2%.

Around 2 million qualified Indian youth are employed by India's IT industry. Many other positive changes in the Indian economy have been brought about by the growth of India's IT sector. The purchasing power of a significant segment of the Indian population has significantly increased. This has contributed to an improvement in the average living condition of the majority of the country's population. The growth rate of other sectors of the economy has also been fuelled by the rise in the buying power of the common people. The amount of funds available for venture capitalism and equity funding has seen a substantial rise. The home of a number of its giants is now India. The development of the Indian IT sector has also been augmented by the ITES sector (NASSCOM, 2010).

The Government of India and the State Governments give priority to the sectors of IT and ITES that make this sector flourish and also allow the country to gain an outstanding place in the world's offshore services. Via developing Export Focused Units (EOU), Software Technology Parks (STP), and Special Economic Zones (SEZ), the Government of India provides fiscal incentives to this industry.

The Indian economy has benefited a lot from the IT / ITES sector's growth. It is noted that 4 additional jobs are created indirectly out of each job created in this sector, 75% for those who are SSC / HSC or less skilled, 15.85 billion spent in the domestic economy by this sector provided an additional production of 15.5 billion. India is in competition with the global market and high quality standards have been adopted by IT / ITES firms.

Major IT Hubs in India

Ranking	City	Description
1	Bangalore	Popularly regarded as the city of India's Silicon Valley, India currently leads the IT industry in India. In the world, The pack of outsourcing destinations leads it. Recently, the city has also become an international centre for R & D applications.
2	Chennai	It is the second largest exporter of software in India (city-wise). Chennai is the largest centre for TCS, Cognizant, HCL, L&T Infotech and the second largest for Infosys and Wipro. In India, almost every big software firm has a presence in Chennai.
3	Hyderabad	The name of Hyderabad is Cyberabad. Microsoft India and several multinational corporations are headquartered in Hyderabad. After Bangalore and Chennai, the city is currently the third largest exporter of software.
4	Pune	Pune, India's largest manufacturing site. It is often referred to as India's Education Centre. It was recently named a Gamma-Global City. As one

		of the largest cities in India, as a result of its many colleges and universities, Pune is emerging as a prominent location for IT and manufacturing companies to expand.
5	Kolkata	The state of West Bengal has facilitated foreign direct investment, primarily in the field of software and electronics. For the IT (Information Technology) industry in India, Kolkata is a big hub. With the New Town at Rajarhat being developed and the Sector-V extension of Salt Lake, Kolkata is increasingly becoming a favoured IT / BPO destination.

Source: Nasscom, 2010.

The major IT hubs in the country with their ranking given in the table shows that Bangalore, Chennai, Hyderabad, Pune and Kolkata have occupied first, second, third, fourth and fifth places respectively. The growth of this industry has not been limited to Tier-I cities such as Bengaluru, Chennai, and the growth of this sector has not been limited to Tier-I cities such as Bengaluru, Chennai, Hyderabad or NCR. In Tier-II or III, it goes deep into cities. In Bhubaneswar, a Tier-III region, all four key Indian IT companies are present: Infosys, Satyam, TCS and Wipro. The ratio of technical to non-technical workers is 80:20, 4 percent are from the economically backward class, while 58 percent are from the economically backward class.

The current situation of IT hub of Indian cities is given in the following table. It shows that Chennai has fallen down to third place from second place over a period of time.

Table 1: India's Top Tech Cities

Ranks	Cities	Total Score
1	Bangalore	66.2
2	Hyderabad	58.7
3	Mumbai	58.7
4	Chennai	58.6
5	Delhi	57.8
6	Pune	53
7	Nagpur	48.9
8	Kolkata	47.1

9	Lucknow	44.3
10	Coimbatore	42.7
11	Kochi	42.3
12	Ludhiana	40.3
13	Vadodara	37.7
14	Jamshedpur	37.7
15	Allahabad	35.9
16	Nashik	35
17	Agra	34.6
18	Madurai	34.4
19	Jaipur	33.6
20	Visakhapatnam	33.6

Source: India's Top Tech Cities, <https://www.dqindia.com/india-s-top-tech-cities/>

Production by IT/ITES industry

Table 2

Production and Growth Trend of IT/ITES industry in India

Year	Production (Rs. Crore)
2004-05	152420
2005-06	190300
2006-07	244000
2007-08	295820
2008-09	372450
2009-10	411220
2013-14	114784
2014-15	128940
2015-16	140833
2016-17	160800
2017-18	173800

Source: Nasscom, various issues.

Table 2 portrays that the production by Indian IT/ITES industries was Rs.152420 crores in 2004-05 and it has increased to Rs.411220 crores in 2009-10 which is more than two times

over the periods. It has reached Rs.173800 crores in 2017-18. The growth trends indicate that it was high during 2004-05 (28.9 percent), 2006-07 (28.3 percent) and in 2008-09 (25.9 percent).

Software Exports

As the most consistent growth engine for the economy and service, software exports and BPO are the key industry pillars, the IT / ITES industry has continued to perform its role. IT / ITES exports rose to a whopping US\$ 46.3 billion in 2008-09, and most of the fortune 500 and global 2000 companies are sourcing IT / ITES from India and are the world's leading IT / ITES sourcing destination, accounting for 55 percent of the global demand for offshore IT services and receiving 35 percent of ITES / BPO market.

The Indian IT / BPO industry continues to grow from strength to strength, including the domestic and export segments, experiencing high levels of onshore and offshore activity. Companies continue to step up the value chain to deliver higher-end research and analytics services to their customers. In the global IT and BPO sectors, India's leadership position is primarily focused on the following benefits.

India accounts for about 28 percent of IT and BPO talent out of 28 low-cost countries. It has an increasingly growing urban infrastructure that serves many IT centres in the country. Exports, which account for two thirds of the Indian IT-BPO industry 's revenue, are one of the most significant foreign currency trading outlets in the world. IT-BPO exports grew faster than total Indian exports over the 2005-2009 period and accounted for 14 percent of total exports. IT-BPO exports were also instrumental in shifting the export composition of India from traditional products to services. The amount of IT-BPO exports is higher than that of traditional export sector exports.

IT and ITES Revenue in India

The revenues generated by the Indian software and services industry are increasing in terms of exports over time. The Indian software and services industry's export strength (IT / ITES exports to total IT / ITES revenue) has risen from 74.5% in 2001-02 to 78.9% in 2008-09.

Table 3

Revenue from IT and ITES Industry from 2001 to 2009 (in USD bn.)

Year/ Item	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	CAGR
IT-ITES Exports	7.6	9.5	12.9	17.7	23.6	31.1	40.4	46.3	28.6
IT-ITES Domestic	2.6	3.0	3.8	4.8	6.7	8.2	11.7	12.4	22.2
Total	10.2	12.5	16.7	22.5	30.3	39.3	52.0	58.7	26.9

Source: Nasscom, 2011.

Table 3 shows that the total IT/ITES exports are estimated to have grown from US \$ 7.6 billion to US \$ 46.3 billion in 2008-09 and the CAGR is 28.6 percent. With regard to the domestic market it has increased from US \$ 2.6 billion to US \$ 12.4 billion in 2008-09 with a CAGR of 28.6 percent.

Table 4: Revenue from IT and ITES Industry from 2013-14 to 2016-17

Year/ Description	2013- 14	2014- 15	2015- 16	2016- 17	2017- 18(E)	CAGR % (2013-18)
Exports	87.3	97.8	107.8	117.0	126.0	10.49
Domestic	19.0	21.0	21.7	24.0	25.0	5.42
Total	106.3	118.8	129.5	141.0	151.0	9.55

Source: NASSCOM SR-2018, E: Estimate

Table 4 shows that the IT-ITeS industry revenue was USD 151.0 billion in FY2017-18 as compared to USD 141.0 billion in FY2016-17, with a growth of 7.0%.

Table 5

Segment Wise Export Revenue of IT and ITES Industry from 2001 to 2009

Year/ Item	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	CAGR
IT Service	5.8	5.5	7.3	10.0	13.3	17.8	23.1	26.5	23.2
ITES-BPO	1.5	2.5	3.1	4.6	6.3	8.4	10.9	12.7	39.2
Software Products, Engineering Services	0.3	1.5	2.5	3.1	4.0	4.9	6.4	7.1	48.5
Total IT-ITES	7.6	9.5	12.9	17.7	23.6	31.1	40.4	46.3	28.6

Source: Nasscom, 2010

Table 5 shows that the overall exports of IT services grew from US\$ 5.8 billion in 2001-02 to US\$ 26.5 billion in 2008-09, with a CAGR of approximately 23.2%. Around 27 per cent of total exports are accounted for by the ITES / BPO market. With a CAGR of about 39.2 percent, the Indian ITES / BPO sector increased from US\$ 1.5 billion in 2001-02 to US\$ 12.7 billion in 2008-09. However, the fastest growing category is software devices. It is rising at a 48.5 per cent CAGR.

Table 6

Segment Wise Export Revenue of IT and ITES Industry from 2013 to 2018

Year/ Segment	2013- 14	2014-15	2015-16	2016 -17	2017- 18 (E)	CAGR % (2013-18)
IT Service	49.2	55.3	61.0	66.0	69.3	10.07
ITeS-BPO	20.4	22.5	24.4	26.0	28.4	9.19
Software Products, Engineering Services, R&D	17.7	20.0	22.4	25.0	28.3	13.09
Total IT-ITeS	87.3	97.8	107.8	117.0	126.0	10.32

Source: NASSCOM SR-2018, E: Estimated

Table 6 shows that in FY2017-18, IT-ITeS exports were US\$ 126.0 billion, a rise of 7.7 percent over FY2016-17. Export sales in 2017-18 were US\$ 69.3 billion, compared to US\$ 66.0 billion in 2016-17. In 2017-18, the ITeS / BPO segment produced export income of ~ US\$ 28.4 billion, compared to US\$ 26 billion in 2016-17. Engineering R&D and product production increased exports by approximately 12 percent and reached US\$ 28.3 billion in 2017-18, compared to US\$ 25.0 billion in 2016-17.

Export Destinations

Table 7

Export of Indian IT Software and Services from 2005 to 2008 (in Percent)

Market	2005	2006	2007	2008
America	68.30	67.18	61.40	60
Europe (incl. UK)	23.10	25.13	30.10	31
Rest of the World (incl. APAC)	8.60	7.69	8.50	9

Source: Nasscom, 2010.

Table 7 indicates that the key markets for exports of Indian IT software and services are the USA and the UK. In this context, the US share decreased from 68.3% in 2005 to 60% in 2008, while Europe's share rose from 23.1% to 31% over the same period. Significant growth is also seen in markets in Continental Europe and the Asia Pacific. This trend towards a wider exposure to the geographic market is positive for the industry, not only as a de-risking measure, but also as a means of accessing new markets to accelerate growth.

Table 8

Software Services Exports – Major Destination

Activity	2017-18		2018-19		
	₹ crore	US \$ billion*	Share (%)	₹ crore	US \$ billion*
	(1)	(2)	(3)	(4)	(5)
USA & Canada	4,33,084	66.6	61.4	5,04,273	72.1
Europe	1,69,512	26.1	24.0	2,11,007	30.2
of which, UK	81,020	12.5	11.5	96,766	13.8
Asia	59,584	9.2	8.5	56,131	8.0
of which, East Asia	48,510	7.5	6.9	47,064	6.7
West Asia	5,922	0.9	0.8	6,347	0.9
South Asia	5,152	0.8	0.8	2,720	0.4
Australia & New Zealand	23,900	3.7	3.4	27,612	3.9
Other countries	19,040	2.9	2.7	25,222	3.6
Total	7,05,120	108.4	100.0	8,24,245	117.9
					100.0

Source: RBI, Survey on Computer Software and Information Technology-Enabled Services Exports: 2018-19.

Table 8 shows that the share of software exports has increased from Rs.7,05,120 crore in 2017-18 to Rs.8,24,245 crore in 2018-19. The major destination is USA and Canada with more than 60 percent as shown in the above table.

Table 9
Software Business by Foreign Affiliates of Indian Companies during 2018-19 Country Distribution(amount in ₹ crore)

Country	Share in Total Software business by foreign affiliates (%)	Software business by foreign affiliates		
		Locally	To India	Other Countries
		(1)	(2)	(3)
USA	48.3	55,525	14,374	4,431
United Kingdom	11.4	11,614	354	5,568
Canada	4.8	6,754	93	577

Germany	5.3	6,863	68	1,196
Singapore	3.5	4,023	231	1,065
Netherlands	5.0	6,546	39	1,059
Other Countries	21.7	25,192	2,417	6,009
Total	100.0	1,16,517	17,576	19,905

Source: RBI, Survey on Computer Software and Information Technology-Enabled Services Exports: 2018-19.

Table 9 shows that software Business by Foreign Affiliates of Indian Companies during 2018-19. The major share goes to USA with 48.3 percent followed by UK with 11.4 percent, Germany with 5.3 percent, Canada 4.8 percent etc.

Employment

Total jobs in IT software and services was 2.20 million in 2008-09, compared with 0.52 million in 2001-02. This represents a net addition to the employee base of the sector of 1,68 million since 2001-02. The indirect jobs attributed to the sector in 2008-09 amounted to 8,0 million. This represents the creation of around 10.20 million job opportunities due to the growth of this industry.

In 2010-11, about 2.40,000 workers were added to Its software and services, increasing the number of direct jobs to 2.5 million, a rise of 10.4 percent year on year, while the indirect employment attributed to the sector is almost 8.3 million. With 45 percent of overall direct jobs, IT services are the biggest employer. The contribution of the IT-BPO industry to GDP was 6.4 percent in 2010-11, compared to 6.2 percent in 2009-10. In 2011, estimated 1.6 million jobs were generated during the year, but the real figure stood at 1.4 million. Approximately 0.36 million jobs were produced in 2011, compared to an estimate of 0.33 million, which suggests optimistic growth towards the end of the year.

Table 10

Employment in IT and ITES Industry from 2001 to 2009 (in percent)

Year/ Item	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
IT Services & Exports	0.17	0.21	0.30	0.39	0.51	0.69	0.86	0.92
BPO Exports	0.11	0.18	0.22	0.32	0.42	0.55	0.70	0.79
Domestic Market	0.25	0.29	0.32	0.35	0.38	0.38	0.45	0.50
Total Employment	0.52	0.67	0.83	1.06	1.29	1.62	2.01	2.21

Source: Nasscom, 2011.

Table 10 shows that IT / ITES is the main source of jobs in this sector and its share has risen over the years. The IT software and services industry's overall jobs rose from 0.52 percent in 2001-02 to 22.1 percent in 2008-09. In comparison, the IT Software & Services Industry's share of the domestic market in total jobs decreased from 0.17 percent in 2001-02 to 0.92 percent in 2008-09. Chart 4.5 shows jobs in India's IT / ITES industry from 2001 to 2008.

Table 11

Employment in IT and ITES Industry from 2013 to 2018 (in percent)

Year/ Segment	2013- 14	2014- 15	2015- 16	2016- 17	2017- 18(E)
IT Services & Exports	1.6	1.74	1.846	1.921	1.984
BPO Exports	0.989	1.03	1.086	1.152	1.191
Domestic Market	0.699	0.745	0.758	0.790	0.793
Total Employment	3.267	3.485	3.690	3.863	3.968

Net Addition	0.301	0.218	0.203	0.173	0.105
Source: NASSCOM SR-2018, E: Estimated					

Table 11 portrays that Indian IT/ITeS workforce is 4.0 % reaching with an addition of 1,05,000 employees during the year 2017-18 to the total of 3.96 million. It shows that it is one of the major industries providing employment more people and also generates rich foreign exchange to our country.

IT-BPO Industry of India

In the global market climate, the Indian IT-BPO industry weathered uncertainties, this is also the year when the industry is set to hit a major aggregate revenue milestone for 2012 to cross USD 100 billion. Revenue from aggregated IT software and services is valued at USD 88 billion.

Embedded Systems Development in India

The development of embedded systems deals with the growth of the Indian IT-R&D ecosystem. In the 2000s, Indian and multinational companies began their embedded services practise in industries such as telecommunications, consumer electronics, semiconductors, setting up their own centres at different locations across India. It is noted that by 2015, the software portion, a conventional strength field of the Indian IT-R&D industry, will be the focus of about 70 percent of product development effort in embedded systems. By 2015, the production of embedded systems will hit USD 90 billion. With its conventional ability to manage services and

build software, the Indian IT industry is able and ideally placed to tap into this major opportunity.

The major constraints for India are “the absence of a mature electronic prototyping and electronic manufacturing ecosystem is a fundamental constraint. Import laws around hardware are also quite restrictive and this affects turnaround time for components and prototypes. Similarly, the absence of well-developed infrastructure for product testing and the limited certification lab infrastructure affects the ability to engage in end-to-end product engineering out of India. Limited maturity of work and niche talent availability is also a concern area; the rapidly evolving embedded ecosystem in China and Taiwan is also a competitive threat. These geographies have a highly evolved component supply, electronic prototyping and electronic manufacturing ecosystem which offer quick turnaround time. Competition from other locations such as Eastern Europe is also heating up in the embedded R&D off shoring space. The OEMs are also increasingly looking for partnerships with ODMs and EMS in countries such as China in the commodity product space which is a competitive threat for India” (NASSCOM, 2012).

Tax contributions

IT-BPO enterprises and workers contribute to the government of India's tax collection. With Rs. 8,000 crore from IT / BPO companies and the remaining Rs. 7,000 crore from direct employees in the industry, this sector contributes almost Rs.15,000 crore to direct taxes. In terms of lower effective tax rates and tax holidays for selected units, the sector enjoys benefits and also contributes Rs. 10,000 crores to the government.

Regional Development across India

The benefits of the IT-BPO industry's economic growth have spread from Tier 1 cities to Tier 2/3 cities, and the benefits earned by these employees have percolated and contributed to their hometowns' production. In addition to the metropolitan areas, IT-BPO companies are established in the local economies of Tier 2/3 cities. Therefore, the economic growth triggered by this sector is holistic in nature and the industry has a positive effect on the development of Tier 2/3 cities and drives them to world-renowned business hubs. In addition to contributing to the collection of taxes and the creation of jobs in these cities, the industry has also funded the growth of talent pools and physical and social infrastructure, either separately or in partnership with the government. Moreover, the sector is now moving to rural areas, creating employment and prosperity, raising standards of living, having a positive impact on career and personal development, empowering women and building social infrastructure.

Tier 1 cities

The IT-BPO industry had a huge influence in Tier 1 and generated 92 percent of industry revenues in 2009. This sector accounts for 14 % of the total GDP of Tier 1 countries and these countries are among India's most economically strong, accounting for 34% of their national GDP. Moreover, by FY 2009, the IT / BPO sector had produced 1.9 million direct industry jobs and 7.3 million indirect jobs. The IT-BPO industry has played a key role in improving the educational system in Tier 1 areas. 58 percent of the total number of engineering colleges and 62 percent of the total intake of technical graduates in India account for Tier 1 fields. In addition, in Tier 1 cities, the industry has led to the development of over 180 million sqft of office space. Along with 70 percent of all operational IT SEZs, 77 percent of all STP units are in such regions.

Tier 2/3 cities

USD 4.1 billion was generated by Tier 2/3 cities, which was 7 percent of industry revenues in 2009. In the last two years , the contribution has tripled. In 2009, almost 25 percent of India's national IT / BPO industry revenues were accounted for by these cities. Office room of over 20 million sq. in Tier 2/3 locations. The ft is designed. In Tier 2/3 cities, 23 per cent of all operational STPs are located, along with 30 per cent of all operational IT SEZs. The industry contributes to solving the issue of unemployment and migration, making the growth storey of India inclusive.

Gender Divide Issues

In bridging the gender gap, the IT-BPO industry has played a key role, employing 31 percent of women in 2009. One fifth of them are at or above the management level, reflecting the various resources this industry provides them with.The lives of not only girls / women from educated middle-class families in urban areas have been affected by the IT-BPO industry, but also women from rural or uneducated backgrounds.It should be noted that 72% of females joining engineering chose IT engineering in 2008. Women are increasingly enrolled in computer education courses run in rural areas by different IT-BPO firms, enabling them to earn a living by taking up employment as teachers in primary schools or other computer training centres.

SOFTWARE TECHNOLOGY PARKS

The needs of the software industry are unique and the requirements of IT industry are high speed data communication link with which software units can connect, communicate and transfer their work to clients all over the world. The technology is rapidly changing and any delay could cost entrepreneurs loosing orders. Therefore, this sector needs single window clearance for all administrative requirements which necessitated starting up of STP in the

country. The first Software Technology Park (STP) was established in Pune in 1990 and two more were opened in Bangalore and Bhuvaneshwar.

The STP is an autonomous organization under the Department of Electronics (DOE) of Government of India. The projects worth less than Rs.100 million and if the proposal is viable the approval is given by the Director of a STP. If the project cost is more than Rs.100 million then the proposal needs more review before approval. With regard to foreign investment of less than 51 percent of the total project cost decisions are taken at the level of the Director of the STP. If it is more than 51 percent the approval will be given by the Foreign Investment Promotion Board (FIPB). STP also monitors software exports and provides various other services when needed. STP connects foreign investors with Indian software developers. They help in getting finance to the entrepreneur and lenders and in certain cases give financial guarantee on behalf of them.

In providing facilities to set up units and export applications from India, the STP also provides a single window solution. Often there are cases where an entrepreneur does not want any of the advantages of customs, excise, income tax, or revenue, or even the HSDC facility so they can get Videsh Sanchar Nigam Limited (VSNL) dial-up facilities. But, because of this single window approach to other problems, such as dealing with government and RBI, they also want to be a STP team. They can come to the STP' in New Delhi' if they have any doubts or need clarification' (NirupamBajpai and VanitaShastri, 1998).

The STP provides export software services , data communications servers, incubation facilities, training, and value-added services. They play a key role in promoting software exports, with a special focus on SMEs and start-up units. The STP system has been highly successful in promoting the development of the software industry. The exports produced by STP units have

multiplied over the years. Exports made by the STP registered unit during 2008-09 accounted for Rs. 215571 crores, which represented 90 percent of total software exports from India.

STP schemes contribute to the promotion of exports through IT / ITES. They benefit from a customs duty exemption for capital goods, service tax, excise duty and a refund for central sales tax payments. A 100% exemption from income tax on export earnings, which was extended until 31.3.2011, is the most significant incentive. It is a virtual framework that enables software companies to set up activities in the most convenient and cheapest places and to schedule their investment and development based solely on business needs.

Exports from the STP registered units increased from Rs.2,05,505crore in 2009-10 to Rs.2,15,264 crore in 2010-11, with a 4.75 percent growth rate. As far as new STP registrations during the year are concerned, the number of new STP units registered in 2010-11 was 294, compared to 521 registered in 2009-10. The explanation for such a decline may be that the fiscal gain of the STP scheme's income tax exemption expired on 31 March 2011 (NASSCOM, 2012).

Conclusion

The IT industry is performing well even during the economic slowdown and unprecedented pandemic COVID-19 situation. The IT professionals have the advantage of work from home when compared to their other industry counter parts due to nature of work. This sector provides huge foreign exchange, more employment, tax revenue etc., to our country. The composition of work force and more technology manpower of India is an advantage to India in the future.

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