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Employment Intensity of Output: An Analysis of Non-Agriculture Sectors

Computer and Its Related Activities



Institute of Applied Manpower Research

Planning Commission, Government of India

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Executive Summary

Overview of the Sector

India's drive for technological modernization has led the economic planners and technocrats to place high priority to the development of the electronics industry. At the forefront of technological modernization, the electronics industry in India has rapidly expanded, with the computer software sector playing an important part in the promotion of exports. The Computer Industry is a rapidly expanding industry in India. It has shown remarkable growth in a very short span of around 20 years. The rise of the IT software and services industries (henceforth software industry) during the 1990s registers one of the most spectacular achievements of the Indian economy. One of the objectives in the 12th Five Year Plan is the creation of productive and decent employment. Looking at the phase of economic growth, the transfer of surplus labour from low productive agriculture to industry and services is needed; software plays a key role in this transformation. The Indian software industry specializes in the application of software category.

Objectives of the Study

1. to assess the performance of computer and allied activities sector in terms of employment generation.
2. to identify the constraints and challenges faced by the industry and suggest policy measures to improve the performance of the sector.

Total employment in computer and its related activities was around 0.32 million in 1999-2000. It increased to 0.9 million in 2004-05 and then to 1.81 million in 2009-10. So, the growth rate is more than 200 percent from 1999-2000 to 2004-05 and 2004-05 to 2009-10. It is one of the fastest growing sectors of our economy. Majority of the employment is in organized sector. The proportion of organized segment is increasing over the years: the employment in organized sector was only 62 percent in 1999-00 but it increased to 64 percent in 2004-05 and subsequently in 2009-10, it increased to about 77 percent.

Findings of the Study

Within the computer and related activities sector, there are only four sub-sectors whose contribution is more than 10 per cent each. These are:

1. Development, production, supply and documentation of made-to-order software based on orders
2. Analysis, design and programming of custom software, ready to use, including analysis of the user’s needs and problems, consultancy

3. Production, supply and documentation of readymade (non-customized) software
4. Data processing: This includes the processing or tabulation of all types of data.

Four southern states namely Karnataka (19), Tamil Nadu (13.2), Andhra Pradesh (8.9) and Kerala (5.7) account for about 46.8 percent of all software jobs in India. If we include Maharashtra (26.4), then it accounts for 73.2 percent of all jobs in computer and its related activities. So, industry is more concentrated in south India and Maharashtra. The southern states which are educationally more developed have more concentration of software industries. Northern states are not doing well except the National Capital Region (NCR).

A 100 percent Foreign Direct Investment (FDI) is permitted under automatic route to the E-Commerce activities in India. Software Technology Parks (STP) have been a major initiative in India to drive in Foreign Direct Investment in the computer software industry. Measures like increased freedom of recruiting and laying-off employees, tax benefits and easing of export producers have contributed to the growth of FDI in this sector. In the year 2009-10, about $ 780 million worth of FDI were made in India in computer and its allied activities. More than 80 percent of the FDI came from mainly five countries: Mauritius, USA, Singapore, Netherlands and UK. Mauritius alone accounts for more than 50 percent of the FDI in computer activities of India. The USA and Singapore were responsible for 13 and 10 per cent of the investment respectively.

India continues to retain its position as the world's leading global sourcing region for IT-BPO services with a share of 58 percent in 2011. India's value proposition rests on its five pillars of strength.

1) Continued focus on optimal cost efficiency; 2) Unparalleled human capital; 3) Unique customer centricity; 4) Scalable and secure environment; and 5) Supportive ecosystem.

The challenges faced by the sector came from both overseas as well as within the country. The overseas challenges are (i) lower export and slow growth, and (ii) problem of double taxation. The domestic challenges are: (i) shortage of trained labour force, (ii) lack of finance, (iii) weak infrastructure facilities, and (iv) lack of protection for small industries**.**

Certain crucial steps taken by the Indian Government to propel the sector's growth are:

- Constitution of the Technical Advisory Group for Unique Projects (TAGUP)
- Setting up the National Taskforce on Information Technology and Software Development with the objective of framing a long term National IT Policy for the country.
- Enactment of the Information Technology Act, which provides a legal framework to facilitate electronic commerce and transactions.
- Setting up of Software Technology Parks of India (STPIs) in 1991 Plans to formulate Information Technology Investment Regions (ITIRs).

- The difficulties of double taxation are creating great hardships for the exporters of the computer sector; these need to be resolved by the government.

- MSMEs are facing problems in getting finance for their firms. The government should make a finance agency under the aegis of Department of Electronics and Information Technology with the help of NASSCOM with the objective of making finance easily available to MSMEs firms.

- There are constraints with respect to the supply of skilled and technical manpower to the industry.

According to a report prepared by McKinsey for NASSCOM in 2012 called, 'Perspective 2020: Transform Business, Transform India', the exports component of the Indian industry is expected to reach US$ 175 billion in revenue by 2020. The domestic component will contribute US$ 50 billion in revenue by 2020. Together, the export and domestic markets are likely to bring in US$ 225 billion in revenue. This sector has a great potential both in terms of revenues and employment, and deserves policy attention in the following areas:

- There should be a rationalization of the legislative laws. The laws should exist to boost the business and not to hamper its growth. There are about 27 departments which deal with the computer industries. Business clearance procedures need to be minimized.

- There should be proper management of database for the industries.

- There should be a continual review of rules and regulations in the light of the latest developments in computer technology.

- Contract awarding procedures are so lengthy and time consuming that setting of firms becomes cumbersome. Contract procedure should be more simplified and made transparent.

- There is a need to increase the supply of professional and technical expertise.

1.1 Introduction

One of the objectives in the 12th Five Year Plan is the creation of productive and decent employment. To achieve this objective, the transfer of surplus labour, from the low productivity agriculture to industry and services is needed. It would also lead to an overall increase in productivity. There is also a need for movement of labour from informal labour in the unorganized sectors to either formal employment in organized sectors or at least informal employment in the organized sectors. The pace of agricultural growth is slow in India. Its share in the economy is also declining and has a negative marginal labour productivity. The key to sustain the high economic growth and the consequent poverty reduction is only the performance of the secondary and tertiary sectors. However, the sluggish growth in employment has been observed for non-agricultural economy also during 2000s. There are some sectors in services, which are experiencing growth, both in terms of employment and revenues e.g. construction, road transport, computer and its related activities etc.

Conventional wisdom suggests that during the early development phase of any country, expansion of output in manufacturing goods proceeds growth in the service sector. As the country progresses further, manufacturing often takes a back seat, giving way to the service sector in terms of both output and employment, and manufacturing firms themselves become increasingly service-centric in order to remain competitive.(Economic survey 2011-12:226). But in India, reverse is more true. It is the service sector that is growing faster than manufacturing. Even service sector is a major force behind expansion in manufacturing.

The services sector covers a wide range of activities from the most sophisticated information technology (IT) to simple services provided by the unorganized sector, such as the services of the washer man and carpenter. Within the services, computer and related activities is one of the emerging sectors in the developing economy of India. After the opening of the Indian economy, there is a spurt in the computer and related activities during the decade of 1990's. During the first decade of 21st century, there is a further increase in the computer and related activities. This increase is both in terms of its market size and employment generation (NASSCOM, 2011). Computer and its related activities is quite a complex service sector. It includes a variety of activities and business involved in development, maintenance and distribution of computer software.

The Computer Industry is a rapidly expanding industry in India. It has shown remarkable growth in a very short span of around 20 years, in spite of frequent and abrupt shocks due to world market fluctuations. The big software slowdown, which shook the world in the years 2001 and 2002, also unsettled the Indian software industry. Many upcoming firms could not sustain this shock and were forced to wind up. Global upheaval is not the only reason for the disaster in the Indian market. Another important reason is the inter-industry structure in the

sector. Most of the Indian computer hardware firms are importers of machine parts and intermediate goods (such as motherboards, processors, memory and hard-disks) and they assemble and sell the machine systems under a brand name in the Indian local market. The software firms, on the other hand, rely mostly on export markets. While the domestic market has been flourishing due to rapid computerization, it is catered for by ready-made software manufacturers (usually large multinationals (MNCs) such as Sun, or Microsoft).

The rise of the IT software and services industries (henceforth software industry) during the 1990s represents one of the most spectacular achievements of the Indian economy. The industry, grown at an incredible rate of 50 per cent per annum over the past few years, is highly export-oriented and has established India as an exporter of knowledge-intensive service. It has brought in a number of other spillover benefits such as creating employment and a new pool of entrepreneurship. The evolution of India as an exporter of these knowledge-intensive services has also created much interest in the development community worldwide. Encouraged by the Indian success, a number of other developing countries are trying to emulate it in entering the industry. Questions are also being raised on the sustainability of the high growth rates of Indian exports in view of the emerging competition, growing scarcities of manpower in the country, eroding cost advantage, and the recent technology slowdown in the US and other markets of Indian software.

India's drive for technological modernisation has led the economic planners and technocrats to place high priority to the development of the electronics industry. At the forefront of technological modernistion, the electronics industry in India has rapidly expanded, with the computer software sector playing an important part in the promotion of exports. Ambitious plans to boost software exports in the future are matched with some promising achievements by software producers. In promoting software exports, India enjoys certain key advantages giving it an edge over many other nations. Human resources are the chief asset of the industry. Indian computer personnel are capable, well qualified, possess a good command over the English language, and relatively low paid. How far India can capitalise on its comparative advantage remains to be seen. Nevertheless, the present buoyant state of the software sector, combined with the important status it occupies within the electronics industry, demands a serious attention. This paper therefore examines some essential features of the software sector such as government policy, growth of software exports, human resources, and markets and foreign collaboration. The discussion highlights certain constraints confronting the industry in the bid to expand its share in the international market. Unless these limitations are overcome, India will be confined to a minor status within the global computer software industry.

The computer industry has features of both the manufacturing and services sector. The computer hardware industry is more like a manufacturing industry, whereas the software industry has characteristics of the services sector. The computer hardware industry requires huge initial investment-sunk costs in setting up a plant and a large number of employees.

Whereas the computer software industry does not require large start-up costs or a large base of employees but it requires maintenance and update and support services for the software produced. In this paper only services are taken into consideration.

The computer industry of India, led by its software sector, started on a high growth path in mid 1980s. With the New Industrial Policy of 1984-85, the Indian software industry was liberated from heavy government regulations (namely, the Monopolies and Restrictive Trade Practices Act) on import of foreign technology and was allowed to form collaborations with foreign firms. In 1986, as restrictions on software imports were further lowered, the Indian software industry changed its trade outlook from inward orientation to outward one. Indian firms were now permitted to be distributors of foreign software packages and, by 1990, the software industry practically moved out of the domestic market, leaving it to the distributors of equivalent foreign packages.

The Indian software industry turned its force into the exports market and became the preferred destination for global software outsourcing.[1] The Enterprise Resource Planning (ERP) boom and the upshots of the Y2K (year 2000) concerns further contributed to the increase in its exports and, during 1991-96, the software industry of India grew at a rate that was ten times higher than the growth of her GNP (Gross National Product). The burst in the dot com bubble of 2000 resulted in a drastic fall in software exports and, as a slowdown set over the industry, many young companies were forced to shut down or reduce production. This slowdown, however, lasted only a couple of years and the industry gained an upward swing in late 2002 and early 2003, and is booming at present. The companies that survived the 2001-02 shock emerged strongly in business and are now giants in the industry. The Indian software industry specializes in the application software category, whereas its share in communication software, firmware and consultancy activities has stagnated or even gone down. The hardware industry is fully confined to the domestic market but the software industry is increasingly becoming export oriented with professional services and turnkey projects being the key activities. The domestic software market is more products and packages based.

India's IT industry can be characterized as: "*First, a software dominated IT industry; second, a predominantly on-site development services provider for the export market and a dominant products and packages developer for the domestic software segment; and third, more important as an application-oriented software developer than a major player in communications and consulting segments".*(Venkatesan and Malvea, 2002)

In 2009-10, there is about 18,00,590 people were employed in computer and related activities. About 17,67,537 people were employed in this industry in principle status and about 33,053 as subsidiary status involving about $ 80 billion revenue. NASSCOM (National

[1] In 1997-98, 158 of the FORTUNE 500 companies had outsourced their software projects to India

Association of Software and Services Companies), the leading association of IT-BPO industries in India says that about 2.8 million people are employed in IT-BPO industries in 2012. This 2.8 million also include the people working outside India, who are working for the Indian companies. NASSCOM also says that IT-BPO industries have indirect employment of 8.9 million.

1.2 Growth of Employment in the Sector

Table 1: Total Employment in Computer and Its Related Activities (in millions)

	1999-2000			2004-05			2009-10		
	Total	**Unorganized**	**Organized**	**Total**	**Unorganized**	**Organized**	**Total**	**Unorganized**	**Organized**
72 Computer and related activities	0.32	0.13	0.20	0.90	0.31	0.58	1.81	0.41	1.40
% to total services	0.34	0.20	0.70	0.80	0.38	1.87	1.56	0.51	3.87
Percentage of Organised & Unorganised	100	40.63	62.5	100	34.44	64.44	100	22.65	77.35
Growth				281.25	238.46	290	201.11	132.26	241.38
Total Services	**94.20**	**65.62**	**28.57**	**112.81**	**81.72**	**31.09**	**116.34**	**80.17**	**36.18**
Total Workforce	**396.76**	**342.64**	**54.12**	**457.46**	**394.90**	**62.57**	**460.22**	**387.34**	**72.87**

Source: Various rounds of NSS

Total employment in computer and its related activities is 0.32 million in 1999-2000. It increases to 0.9 million in 2004-05 and then to 1.81 million in 2009-10. So, growth rate is more than 200 percent from 1999-2000 to 2004-05 and 2004-05 to 2009-10. So, it is one of the fastest growing sectors of our economy. Within the services, its share of employment also increases from 0.34% to 1.56% only during the same time period. In spite of significant increase in the size of employment, its share in services is not increasing much. Within the

services, hotels and restaurants, banking and insurance, real estate and other business activities are other major growing sectors. The growth of these sectors is controlling the proportion of computer sector within service segment employment.

Majority of the employment is in organized sector. About 77 percent of the employment is in organized sector and only 23 percent is in unorganized sector in 2009-10. The proportion of organized segment is increasing over the years. The organized sector comprises only 62 percent in 1999-00 but it increases to 64 percent in 2004-5. So, there is slow and steady growth in the proportion of organized sector. Within the services, there is not much growth in the organized segment proportion. The proportion of organized segment within services is 30.32 percent in 1999-2000, decreases to 27.55 percent in 2004-05 and then further increases to 30.73 percent only. So, from 1999-2000 to 2009-10, organized segment proportion increases only by 0.41 percent. In comparison with it, growth of organized segment in computer sector is quite significant. In case of total workforce in 2009-10, only 15.8 percent workers are in organized sector. So, number of workers in computer activities in organized sector is much higher than those of total workforce of our economy.

1.3 Composition of the Sector

Service sector is a large and most dynamic part of the Indian economy both in terms of employment potential and contribution to national income. It covers a wide range of activities, such as trading, transportation and communication, financial, real estate and business services, as well as community, social and personal services. In India, services sector, as a whole, contributed as much as 68.6 per cent of the overall average growth in gross domestic product (GDP) between the years 2002-03 and 2006-07. During 2011-12, the growth in the service sector is about 9.4 percent and its total contribution to India's GDP is about 56.3 percent.

Computer and related activities includes a variety of activities. They are like hardware consultancy; software publishing, consultancy and supply; data processing; database activities and distribution of electronic content; maintenance and repair of office, accounting and computing machinery; and other computer related activities.

Table 2: Employment in Computer and its related activities, 2009-10

NIC-98	Description	Total	Share
72100	Hardware consultancy	173302	9.58
72211	Production, supply and documentation of ready-made (non-customized) software	233313	12.90
72212	Production, supply and documentation of ready-made (non-customized) operating systems software	43050	2.38
72213	Production, supply and documentation of ready-made (non-customized) software for business & other applications, where the application is by & large spelt out clearly	29269	1.62
72214	Production, supply and documentation of ready-made (non-customized) computor games software for all platforms	3950	0.22
72291	Analysis, design and programming of custom software, ready to use, including analysis of the user's needs and problems, consultancy on the best solution and production of software to realize this solution	240352	13.29
72292	Development, production, supply and documentation of made-to-order soft-ware based on orders from specific users	273497	15.12
72293	Writing of programmes of any kind following directives of the users	25890	1.43
72294	Web-page designing	58108	3.21
72295	Software maintenance	125775	6.95
72300	Data processing	232281	12.84
72400	Database activities and distribution of electronic content	102466	5.66
72501	Repair & maintenance of computers and computer based systems	112863	6.24
72502	Repair of office, computing and accounting machinery (including repair of Xerox machine and duplicating machine) other than computers and computer based systems.	13882	0.77
72901	Activities of cyber cafe	40795	2.26
72909	Other computer related activities, n.e.c.	100284	5.54
Total	**Computer and Its Related Activities**	**1809077**	**100.00**

Source: NSS 2009-10

Within the computer and related activities sector, there are only four sub-sectors whose contributions are more than 10 percent. They are:

1. Development, production, supply and documentation of made-to-order software based on orders from specific users contribute about 15 percent of the total employment within the computer and related activities during 2009-10.

2. Analysis, design and programming of custom software[2], ready to use, including analysis of the user's needs and problems, consultancy on the best solution and production of software to realize this solution accounts for 13.27 percent of the total employment within the sector.

3. Production, supply and documentation of ready-made (non-customized) software accounts for about 13.23 percent of the total employment within the sector.

4. Data processing. This includes the processing or tabulation of all types of data. Provision of such services on (i) an hourly or time -share basis, and (ii) management or operation of data processing facilities of others on a time sharing basis; on a fee or contract basis] accounts for about 12.9 percent and hardware consultancy about 9.6 percent of the total employment within the sector.

All these sub-sectors are mostly services oriented. They are not producing any product under their own brand name. Their participation in the engineering research and design is very minimal. The service of engineering research and design is more value added and costly. This engineering research and design is mainly done by big multinational companies in their own countries and lower end works are outsourced to India. This is the major shortcomings of the Indian software industries.

[2] **Custom software** (also known as **bespoke software**) is software that is specially developed for some specific organization or other user. As such, it can be contrasted with the use of software packages developed for the mass market, such as commercial off-the-shelf (COTS) software, or existing free software. This also may be quite expensive. Since custom software is developed for a single customer, it can accommodate that customer's particular preferences and expectations. Custom software may be designed in stage by stage processes, allowing all nuances and taking into account the possible hidden dangers, including issues which were not mentioned in the specifications. Especially, the first phase in the software development process may involve many departments, including marketing, engineering, research and development and general management.

1.4 Regional Variation in India

Table 3: Employment in Computer and its related activities across states and UTs of India, 2009-10

	Total Employment	Share within state	Share within India
Jammu & Kashmir	2610.05	0.06	0.14
Himachal Pradesh	327.12	0.01	0.02
Punjab	10773.12	0.10	0.60
Chandigarh	12151.93	2.62	0.67
Uttarakhand	9584.38	0.24	0.53
Haryana	26005.43	0.27	1.44
Delhi	176453.22	2.99	9.75
Rajasthan	6059.76	0.02	0.33
Uttar Pradesh	71353.18	0.11	3.94
Bihar	3607.97	0.01	0.20
Sikkim	1070.88	0.41	0.06
Arunachal Pradesh	39.27	0.01	0.00
Nagaland	0	0	0
Manipur	237.87	0.03	0.01
Mizoram	0	0	0
Tripura	4273.60	0.32	0.24
Meghalaya	0	0	0
Assam	3541.76	0.03	0.20
West Bengal	71846.85	0.21	3.97
Jharkhand	362.46	0.00	0.02
Odisha	6948.85	0.04	0.38
Chattisgarh	8849.71	0.09	0.49
Madhya Pradesh	31165.33	0.11	1.72
Gujarat	56825.35	0.23	3.14
Daman & Diu	0	0	0
Dadra & N Haveli	468.08	0.44	0.03
Maharashtra	477318.36	0.97	26.38
Andhra Pradesh	161272.32	0.40	8.91
Karnataka	345563.73	1.29	19.10
Goa	0	0	0
Lakshadweep	22.21	0.07	0.00
Kerala	103758.62	0.80	5.74
Tamil Nadu	238394.76	0.80	13.18
Pondicherry	7904.61	1.45	0.44
A & N Islands	48.96	0.03	0.00
India	**1809076.49**	**0.39**	**100**

Source: NSS 2009-10

Four southern states namely Karnataka (19), Tamil Nadu (13.2), Andhra Pradesh (8.9) and Kerala (5.7) account for about 46.8 percent of all jobs of India. If we include Maharashtra (26.4), then it accounts for 73.2 percent of all jobs in computer and its related activities. So, industry is more concentrated in south India including Maharashtra. Even growth is more observed in these five states during the last five years led by Maharashtra (2.7 lakhs) and Karnataka (2.3 lakhs). Delhi (9.7), UP (3.9), West Bengal (4) and Gujarat (3.1) are the other major emerging players in India. So, the southern states which are educationally more developed have more concentration of software industries. Northern states are not doing well except Delhi and National Capital Region (NCR).

If we look at the share of the computer activities employment within the state's total employment, a different scenario emerges. Maharashtra, which is the leading state in computer activities employment constitutes only less than one percent of the total employment within the state. In case of Karnataka, total employment consists of only 1.3 percent within the state. In Tamil Nadu and Kerala, it is only 0.8 percent and in Andhra Pradesh, it is only 0.4 percent. In the case of Chandigarh and Delhi, this sector consists of about 2.62 and 2.99 percent respectively of all employment within the state. So, in spite of growth of this sector, its share in total employment is very small. It is not the employment of masses but of small educated group of people.

1.5 Revenues and Exports

Total revenues of about USD 100 billion are likely to cross in 2012 with growth of 14 percent in comparison to 2011. Aggregate IT software and services revenue (excluding hardware) is estimated at USD 88 billion. As a proportion of the nation's GDP, the sector revenues have grown from 1.2 percent in 1998 to an estimated 7.5 percent in 2012. (India IT-BPO Performance, 2011).

Share of total Indian exports (merchandise + services) increased from less than 4 percent in 1998 to about 25 percent in 2012. (approx. USD 69 billion). So, about 68.5 percent of revenues came from outside and rest 31.5 percent from Indian market. Export revenues are accounted for by about 2.2 million workforce (total 2.8 million) (NASSCOM, 2011)

Although global uncertainties persist, the India IT-BPO sector has been able to grow due to its ability to adapt to changing business environment. With customers exhibiting a cautious mindset, Indian IT-BPO organizations have responded by maintaining a tight control over operating metrices, controlling costs and attrition, expanding to nearshore and onshore locations for customer proximity and partnering with customers to grow their business.

Despite the rise of several alternative sourcing locations like latin America, Philippines, South Africa etc., India retains its number one position as the world's leading sourcing location for IT-BPO services with a share of 58 percent in 2011(India IT-BPO Performance

2011: 43). It is estimated that India-based resources account for about 60-70 percent of the offshore delivery capacities available across the leading multinational IT-BPO players.

Within aggregate IT-BPO revenue, exports account for about 69 percent. Overall industry export is estimated to grow at around 16 percent to cross $ 69 billion. IT services exports account for the largest share of about 58 percent. The BPO exports contribute to 23 percent followed by engineering research and design (ER&D) and software products which together account for about 19 percent. Hardware exports contribute to about 0.6 percent of the total exports. The financial year 2012 marked a return to basics, largely because of the economic situation in America and Europe and the political situation in rest of the world. The spotlight returned on reducing costs.

The domestic IT-BPO segment (including hardware) accounts for a little over 31 percent of the overall industry revenues. This is slightly below previous year's revenues (NASSCOM, 2011). It is mainly because of the depreciation of the rupee against the dollar. This depreciation has also impacted the growth rate (in $ terms). The domestic sector is expected to grow a little over 9 percent (20.5 percent in 2011) to reach $32 billion. The share of hardware is about 40 percent. For IT services this is 38 percent, for software products 12 percent and for BPO about 10 percent (NASSCOM, 2011).

A rapidly growing economy, rapid adoption of IT across consumer segments, emerging technologies, consumer-centric service, government's IT mandate, business and pricing models tailored to meet local need, are some of the key drivers for the increased adoption of IT in India.

1.6 Foreign Direct Investment (FDI)

A 100 percent FDI is permitted under automatic route to the E-Commerce activities in India. However, a pertinent condition is that, 26 percent of their equity will be spent on welfare activities for the Indian population in five years. Software Technology Parks (STP) have been a major initiative in India to drive in Foreign Direct Investment in the computer software industry. These software technology parks provide highly developed infrastructure and facilities that attract foreign investors. Regulatory measures by the Indian government have also played a positive role in this regard. Measures like increased freedom of recruiting and laying-off employees, tax benefits and easing of export producers have contributed to the growth of FDI in this sector.

The computer software industry has witnessed a growth of 28 percent compound annual growth rate (CAGR) in the years 2002-07. The highest FDI was witnessed in 2006-07 i.e. $ 2.6 billion. After that it went on decreasing. The total contribution of Information Technology and ITES (information technology enabled service) was estimated to grow by 7 percent by the year 2007-08 as against 4.8 percent in the year 2005-06 to the Gross Domestic

Product of India. The computer hardware industry had occupied about USD 1.4 billion in the entire electronics hardware industry as was accounted in the Financial Year 2005. This included PC, Servers, and Laptops. A 100 percent Foreign Direct Investment is permitted under automatic route in the computer hardware industry.

In the year 2009-10, about $ 780 million came to India as FDI in computer and its different activities. Computer industries accounted for over 10 percent of India's total FDI in the last decade (over $8 billion). Over $8 billion was invested by private equity and venture capital players in around 700 deals. More than 80 percent of the FDI came from only five countries. They are Mauritius, USA, Singapore, Netherlands and UK. Mauritius alone accounts for more than 50 percent of the FDI in computer activities of India. USA and Singapore contribution are about 13 and 10 percent respectively. The contributions of Netherland and UK are less than 10 percent. According to Reserve Bank of India, the top three states receiving highest FDI from January 2000 to December 2009 were Maharashtra, Karnataka and Tamil Nadu respectively. More than 20 percent of the FDI in this sector goes to Maharashtra. The fourth slot is occupied by Delhi, part of UP and Haryana. Andhra Pradesh is at the fifth position.

Table 4: Financial year-wise FDI equity inflows from April 2000 to December 2011

(Amount in US $ million)

Sector	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12 (Apr-Dec)	Total
Computer Software & Hardware	228.39	419.39	314.24	368.32	527.90	1,359.97	2,613.33	1,382.25	1,543.34	871.86	779.81	563.93	10,972.72
Annual growth rate	9.6	10.41	11.62	16.83	16.40	24.55	20.92	5.62	4.92	3.37	4.01	2.33	6.95
Grand Total	2,378.68	4,027.69	2,704.34	2,187.85	3,218.69	5,539.72	12,491.77	24,575.43	31,395.97	25,834.41	19,426.93	24,187.77	157,969.24

- It is noted that year-wise FDI inflow is available from April, 2000 onwards.

Source: Ministry of commerce, Government of India

1.7 Strength of the Sector

Even in the face of stiff competition from other locations, India retains its position as the world's leading global sourcing destination for IT-BPO services with a share of 58 percent in 2011. India's value proposition rests on its five pillars of strength.

1) Continued focus on optimal cost efficiency
   India continues to be the most cost-competitive provider of IT-BPO services. Cost efficiencies have been further maintained through various internal process and

productivity improvement initiatives including stable entry level salaries, widening the pyramid, tightening non-employee cost structures, fast career growth, movement into tier 2/3 cities, and a non-linearity focus through platform and cloud products (Nasssom, 2012).

2) Unparalleled human capital

India produced about an estimated 4.4 million graduates in 2001-12, retaining its position as the largest source of employable talent in the world. Service providers are effectively utilizing India's talent pool by designing large scale talent re-engineering initiatives and employee engagement activities. This is enabling the industry to provide both end-to-end and high-end value added services across sectors.

3) Unique customer centricity

Leading industry players have been able to deliver continuous value to customers. This unique customer-centric approach is best demonstrated by re-engineering their business/organizational structures, engaging in strategic advisory relationships, focusing on delivery innovation and managing high-end complex engagements.

4) Scalable and secure environment

The sheer size of the Indian market provides a high level of stability in terms of managing concentricity risk as compared to other sourcing markets. With political and economic stability, major service providers in India have managed to further de-risk their delivery approach by expanding their global delivery network, in addition to adopting robust disaster recovery models.

5) Supportive ecosystem

India's infrastructure development landscape is expected to transfer to the next level in the coming years, driven by the government's massive thrust on over $ 1 trillion in investments (2013-17) on infrastructure development. Besides, with further simplification of laws and regulations, large scale investments in e-governance projects and focus on establishing the national cyber security policy, the IT-BPO industry is poised to maintain its growth trajectory in the domestic market.

1.8 Challenges of the Sector

There are challenges of the sector which need to be tackled so that it continues with its growth momentum. These challenges are both domestic as well as international. Some of the challenges of the sector that emerge after discussion with the industry associations are:

1) Overseas Challenges

The overseas challenges are those challenges, which come from outside India. Some of the challenges are:

(i) Lower export and slow growth**.**

Since 69 percent of the services are exported, so this industry is very much depended on exports. Majority of the exports are to USA, western European countries, Australia etc. Now these countries are facing economic recession. Because of global economic recession, real global domestic product (GDP) began contracting in the third quarter of 2008, and by early 2009 it was falling at an annualized rate not seen since 1950. Even interest rates were also started rising. The economy was losing jobs and unemployment was increasing very fast. All these factors led to lesser demand for services from India and lower exports consequently. Lower exports of IT-BPO services caused slow growth of this sector.

(ii) Problem of double taxation

Problem of double taxation are also affecting this sector. The firms, which are involved in exports, are taxed not only in the foreign countries but also in their own countries. This double taxation is creating great economic problems for the exporters of this sector.

2) Domestic Challenges

Some of the domestic challenges which are being faced by the industries of computer and its related activities sector are:

(i) Shortage and Training of labour force**.**

This sector requires hi-tech computer training particularly in customized software development, three-dimensional animation, engineering research and design etc. along with various soft skills. New techniques are coming every day. Employed persons are needed to be trained in these skills. But our educational institutions, technical training institutions are not imparting these skills to the students adequately. So, employers are training the new entrants themselves and making them employable. Thus, there is a shortage of skilled manpower.

(ii) Lack of Finance

Finance is a big problem for the start-ups companies. After focused group discussions with the micro, small and medium enterprises (MSMEs) involved in software

development, we came to the conclusion that they are facing problems of finance. These small companies are putting their personal money into the business.

(iii) Weak Infrastructure Facilities

Infrastructure facilities (electricity, water etc.) are weak in our country. Computer and its related activities sector is people intensive industry, functioning round the clock. So, transportation and safety of people are also major concerns. Transport has a major cost for the industry.

Real estate costs are rising everyday. Majority of the enterprises are concentrated in million plus cities, so they have to spend a major chunk of their budget on rising real estate prices. Infosys is providing residential facilities for their employees, but this is not happening in Delhi and NCR because of shortage of housing, land and their rising prices.

(iv) Need for protection of small industries**.**

Majority of the business are controlled by big companies. So, small and start-up firms face competition directly from these companies. Small industries have to be protected and promoted by the governments by providing facilities. Small firms are facing problems of lack of finance and shortage of skilled labour. Government of India should set up separate body for financing IT-BPO industries. Government of India should also outsource 20 percent of its works to MSMEs.

1.9 Government Initiatives

After economic reforms of 1990s, the government of India and the individual state governments have taken liberalization of external trade, elimination of duties on imports of information technology, relaxation of controls on both inward and outward investments, and foreign exchange and fiscal measures, especially for IT and ITES. These have been major contributory factors for the sector to flourish in India and for the country to be to acquire a dominant position in offshore services in the world. Government sector is a key catalyst for increased IT adoption- through sectors reforms that encourage IT acceptance, National e-Governance Programmes (NeGP), and the Unique Identification Development Authority of India (UIDAI) programme that creates large scale IT infrastructure and promotes corporate participation.

Certain crucial steps taken by the Indian Government to propel the sector growth are:

- Constitution of the Technical Advisory Group for Unique Projects (TAGUP) under the chairmanship of Nandan Nilekani. The Group would develop IT infrastructure in

five key areas, which includes the New Pension System (NPS) and the Goods and Services Tax (GST).

- Setting up the National Taskforce on Information Technology and Software Development with the objective of framing a long term National IT Policy for the country.
- Enactment of the Information Technology Act, which provides a legal framework to facilitate electronic commerce and electronic transactions.
- Setting up of Software Technology Parks of India (STPIs) in 1991 for the promotion of software exports from the country. There are currently 51 STPI centres where apart from exemption from customs duty available for capital goods, there are also exemptions from service tax, excise duty, and rebate for payment of Central Sales Tax.
- Plans to formulate Information Technology Investment Regions (ITIRs). These regions would be endowed with excellent infrastructure and would reap the benefits of co-siting, networking and greater efficiency through use of common infrastructure and support services.

For the promotion of Software exports from the country, the Software Technology Parks of India was set up 1991 as an Autonomous Society under the Department of Electronics and Information Technology. The services rendered by STPI for the Software exporting community are statutory services, data communications servers, incubation facilities, training and value added services. The STPI has played a key developmental role in the promotion of software exports with a special focus on SMEs and start-up units. The STP Scheme has been extremely successful in fostering the growth of the software industry. The exports made by STP Units have grown many-folds over the years. The exports made by STPI registered unit during 2008-09 were of INR 215571 crores which is about 90 percent of the total software exports from the country (DEIT, 2011).

In 2005, the Ministry of Commerce, Government of India enacted the Special Economic Zone (SEZ) Act, with an objective of providing an internationally competitive and hassle free environment for exports. An SEZ is defined as a "specifically demarked duty-free enclave and shall deemed to be foreign territory (out of Customs jurisdiction) for the purpose of trade operations and duties & tariffs". The SEZ Act, 2005, supported by SEZ Rules, came into effect from 10th February, 2006. It provides drastic simplification of procedures and a single window clearance policy on matters relating to central and state governments. The scheme is ideal for bigger industries and has a significant impact on future Exports and employment. The STPI Directors act as Development Commissioners for IT/ITES SEZs.

Even the National Policy on Information Technology, 2011 has been made to further streamline the growth of IT and ITES sector and its usage in our day-to-day life. The National Policy on IT focuses on application of technology-enabled approaches to

overcome monumental developmental challenges in education, health, skill development, financial inclusion, employment generation, governance etc. to greatly enhance the efficiency across the board in the economy. The policy seeks to achieve the twin goals of bringing full power of ICT within the reach of the whole of India and harnessing the capability and human resources of India to enable the country to emerge as the Global Hub and Destination for IT and ITES Services by 2020. The focus of the IT policy is therefore on deployment of ICT in all sectors of the economy and on providing IT solutions to the world.

One of the objectives of the IT policy is to create a pool of 10 million additional skilled manpower in ICT. The policy also proposes to provide fiscal benefits to SMEs and startups companies in the key industrial sectors for adoption of IT in value creation. It wants to create ecosystem for a globally competitive IT/ITES Industry, to enhance productivity and competitiveness in key sectors through ICT, to enable service delivery through e-governance, and to develop GIS platform for facilitating location based planning, service delivery and information availability.

1.10 Policy Suggestions

Lots of challenges are being faced by computer industries as we have already discussed in detail. Government of India should take initiatives to tackle these problems along with the industry associations. Some of the policy suggestions are:

Administrative Issues

- There should be rationalization of the legislative laws. The laws should propel the business not to hamper it. There are about 27 departments which deal with the computer industries. The number of government needs to be reduced so that a lot of time and work could be shaved by the computer and its activities related enterprises.

- There should be proper management of database for the industries. The proper database would help in policy formulations along with the researchers.
- Review and modernization of the various rules and regulations should be initiated, in light of the latest development in the technology arena.
- Contract awarding procedures are so lengthy and time consuming that setting of firms takes lot of time to start with. Contract procedure should be simplified and made transparent. Although some good work has been done in this regard but still there is further need to simplify the contract procedures and setting of the industries.

Financial Issues

- Problem of double taxation should be resolved by the government. The problem of double taxation is creating great hardships for the exporters of the computer sector.

- MSMEs are facing great problems in getting finance for their firms. The government should make a finance agency under the aegis of department of electronics and information technology with the help of NASSCOM with the objective of making finance easily available to MSMEs firms.

Other issues

- There is constraint in supply of skilled and technical manpower to the industry. Apart from doing away this constraint, we will have to increase the supply also in the future.

- National skill development council (NSDC) should work sincerely to enhance the availability and supply of skilled and trained manpower for the industries. The initiatives should also include identifying gaps emerging from the formal sector and planning programmes in the non-formal and formal sectors for meeting these gaps.

1.11 Conclusion

The Indian information technology sector continues to be one of the sunshine sectors of the Indian economy showing a rapid growth. According to a report prepared by McKinsey for NASSCOM in 2012 called, 'Perspective 2020: Transform Business, Transform India', the exports component of the Indian industry is expected to reach US$ 175 billion in revenue by 2020. The domestic component will contribute US$ 50 billion in revenue by 2020. Together, the export and domestic markets are likely to bring in US$ 225 billion in revenue, as new opportunities emerge in areas such as public sector and healthcare, and as geographies including Brazil, Russia, China and Japan opt for greater outsourcing. So, this sector has a great potential both in terms of revenues and employment.

This industry is more concentrated in southern states of India and Maharashtra. Delhi, West Bengal and Gujarat are the other emerging states. It is also an worrying factor that this industry is not emerging in other northern states of India. The revenues are increasing very fast along with the exports. As a proportion of nation’s GDP, the sector revenue is estimated at more than 7.5 percent in 2012. But the problem of shortage of skilled manpower in this industry is very grave, particularly for the MSMEs and start-up industries. The unavailability of finance for the start-ups is also a big problem. These two issues need to be tackled, so that small and medium firms could also grow.

Table 5: Share of the subsectors within services sector's employment and GVA and non-agricultural employment and GVA

	Shares (within services)				share in non-agricultural economy			
	1999-00		2009-10		1999-00		2009-10	
Sub-sectors	Employment	GVA	Employment	GVA	Employment	GVA	Employment	GVA
1. Trade	38.82	25.36	37.30	26.08	22.94	16.27	19.32	17.50
2. Hotels & restaurants	5.06	2.45	5.33	2.53	2.99	1.57	2.76	1.70
3. Transport, storage & communication	15.61	14.52	17.21	17.74	9.23	9.32	8.92	11.90
4. Banking (& insurance)	2.53	12.68	3.28	13.75	1.50	8.14	1.70	9.22
5. Real estate, renting and business activities	2.95	15.34	5.33	16.23	1.75	9.84	2.76	10.89
6. public administration & defence	10.97	13.91	8.20	10.53	6.48	8.92	4.25	7.07
7. Education	8.86	7.77	9.84	6.75	5.24	4.99	5.10	4.53
8. Health	2.95	3.07	2.87	2.53	1.75	1.97	1.49	1.70
9. Other community, social & personal services	10.55	4.29	7.38	3.54	6.23	2.76	3.82	2.38
10. Other services	2.11	0.41	3.28	0.33	1.25	0.26	1.70	0.22
Total services	100.00	100.00	100.00	100.00	59.10	64.17	51.80	67.11

	1999-2000			2004-05			2009-10		
	Total	Unorganized	Organized	Total	Unorganized	Organized	Total	Unorganized	Organized
Agriculture	**237.67**	**232.21**	**5.47**	**258.93**	**252.83**	**6.09**	**244.85**	**242.11**	**2.74**
15 food products and beverages	5.95	4.37	1.57	5.65	4.09	1.55	5.48	3.70	1.78
16 tobacco products	4.37	3.71	0.66	4.62	3.71	0.91	4.13	3.43	0.70

17 textiles	7.85	5.69	2.17	10.10	7.46	2.64	8.43	5.62	2.81
18 wearing apparel; dressing and dyeing of fur	3.66	2.86	0.81	8.92	7.12	1.80	7.32	6.45	0.87
19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear							0.93	0.55	0.38
20 wood and wood products except furniture;	4.52	4.35	0.17	5.22	5.02	0.21	3.65	3.45	0.20
21 paper and paper products	1.29	0.79	0.50	1.65	0.89	0.76	0.51	0.22	0.28
22 Publishing, printing and reproduction of recorded media							1.05	0.59	0.46
23 coke, refined petroleum products and nuclear fuel	1.22	0.44	0.78	0.94	0.43	0.50	0.11	0.01	0.10
24 chemicals and chemical products	1.85	0.73	1.12	2.09	0.74	1.35	1.67	0.49	1.18
25 rubber and plastics products							0.70	0.25	0.45
26 other non-metallic mineral products	3.39	2.14	1.25	4.46	2.52	1.93	4.28	2.42	1.86
27 basic metals	1.15	0.48	0.67	1.03	0.33	0.70	1.38	0.52	0.86
28 fabricated metal products, except machinery and equipment	3.68	2.20	1.48	4.21	2.77	1.43	2.24	1.67	0.57
29 machinery and equipment n.e.c.							1.57	0.78	0.80
30 office, accounting and computing machinery							0.06	0.02	0.04

31 electrical machinery and apparatus n.e.c.	1.16	0.31	0.85	0.95	0.55	0.40	0.96	0.39	0.58
32 radio, television and communication equipment and apparatus							0.23	0.10	0.13
33 medical, precision and optical instruments, watches and clocks	2.51	1.96	0.55	3.34	2.45	0.89	0.16	0.05	0.10
34 motor vehicles, trailers and semi-trailers	0.62	0.15	0.47	1.12	0.25	0.87	0.72	0.13	0.59
35 other transport equipment							0.81	0.30	0.51
36 furniture; manufacturing n.e.c.	0.81	0.73	0.09	1.41	1.32	0.10	4.28	3.49	0.79
37 Recycling	0.02	0.02	0.00	0.09	0.06	0.02	0.06	0.04	0.01
Manufacturing	**44.05**	**30.92**	**13.13**	**55.77**	**39.71**	**16.06**	**50.74**	**34.70**	**16.04**
Mining	2.17	0.88	1.29	2.64	0.89	1.75	2.95	1.09	1.86
Electricity Gas & water supply	1.13	0.09	1.04	1.30	0.09	1.21	1.25	0.12	1.14
Construction	17.54	12.92	4.62	26.02	19.66	6.35	44.08	29.16	14.92
Non Manufacturing	**20.84**	**13.89**	**6.95**	**29.96**	**20.64**	**9.32**	**48.28**	**30.36**	**17.92**
50 Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	2.05	1.84	0.21	2.69	2.40	0.29	2.49	2.01	0.48
51 Wholesale trade and commission trade, except of motor vehicles and motorcycles	3.56	3.13	0.43	5.44	4.74	0.70	5.32	4.51	0.81
52 Retail trade, except of motor vehicles and motorcycles; repair	31.02	29.32	1.69	35.23	34.28	0.95	35.72	34.03	1.70

of personal and household goods									
wholesale & retail trade	36.63	34.30	2.33	43.36	41.43	1.93	43.53	40.55	2.98
Hotels & Restaurants	4.62	4.08	0.54	6.10	5.29	0.81	6.13	5.22	0.91
60 Land transport; transport via pipelines	12.49	9.64	2.85	15.78	12.87	2.91	17.01	13.91	3.10
61 Water transport	0.20	0.07	0.13	0.10	0.03	0.06	0.12	0.03	0.09
62 Air transport	0.08	0.00	0.08	0.08	0.00	0.08	0.09	0.01	0.08
63 Supporting and auxiliary transport activities; activities of travel agencies	0.55	0.27	0.28	0.54	0.27	0.26	0.95	0.46	0.49
64 Post and telecommunications	1.29	0.46	0.83	1.98	0.85	1.14	1.80	0.67	1.12
Transport, Storage & Communication	14.61	10.44	4.18	18.47	14.02	4.45	19.97	15.08	4.88
65 Financial intermediation, except insurance and pension funding	2.25	0.49	1.76	3.10	0.80	2.30	2.57	0.37	2.20
66 Insurance and pension funding, except compulsory social security							0.86	0.28	0.57
67 Activities auxiliary to financial intermediation							0.39	0.23	0.16
Banking & Insurance	2.25	0.49	1.76	3.10	0.80	2.30	3.82	0.89	2.93
70 Real estate activities	0.18	0.17	0.01	0.50	0.48	0.02	0.70	0.62	0.09
71 Renting of machinery and equipment without operator and of personal and household goods	0.31	0.30	0.01	0.54	0.52	0.02	0.49	0.46	0.03

72 Computer and related activities	0.32	0.13	0.20	0.90	0.31	0.58	1.81	0.41	1.40
73 Research and development	1.06	0.77	0.29	1.71	1.20	0.52	0.02	0.00	0.01
74 Other business activities	0.80	0.66	0.14	1.00	0.78	0.22	2.73	1.86	0.87
Real Estate, renting	2.67	2.02	0.65	4.65	3.29	1.36	5.75	3.36	2.40
Public administration and defence; compulsory social security	10.48	0.80	9.68	8.84	0.08	8.76	9.46	0.00	9.46
Education	8.47	2.29	6.18	11.43	3.07	8.36	11.85	2.67	9.17
Health	2.62	1.19	1.43	3.34	1.58	1.76	3.59	1.39	2.20
90 Sewage and refuse disposal, sanitation and similar activities	0.49	0.25	0.24	0.41	0.33	0.09	0.55	0.38	0.17
91 Activities of membership organizations n.e.c.	1.14	0.64	0.49	1.67	0.89	0.79	1.21	0.81	0.40
92 Recreational, cultural and sporting activities	0.77	0.53	0.25	1.07	0.74	0.33	0.88	0.56	0.32
93 Other service activities	7.59	7.09	0.50	5.60	5.50	0.10	5.99	5.73	0.26
Other community, social & personal services	**9.99**	**8.50**	**1.49**	**8.75**	**7.45**	**1.30**	**8.63**	**7.48**	**1.15**
95 Activities of private ho useholds as employers of domestic staff	1.84	1.51	0.33	4.75	4.69	0.06	3.62	3.54	0.08
Other Services (95+96+97+99)	1.86	1.51	0.34	4.76	4.70	0.06	3.62	3.54	0.08
Total Services	**94.20**	**65.62**	**28.57**	**112.81**	**81.72**	**31.09**	**116.34**	**80.17**	**36.18**
Total Workforce	**396.76**	**342.64**	**54.12**	**457.46**	**394.90**	**62.57**	**460.22**	**387.34**	**72.87**

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