PERFORMANCE, CHALLENGES AND OPPORTUNITIES OF INDIAN SOFTWARE EXPORT

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ABSTRACT

India has emerged as an 'IT Super power', especially in the field of software and related services export. The paper is an attempt to discern and delineate the growth performance, challenges and opportunities of such a promising sector of Indian economy. It has been observed that software export has registered an annual compound growth rate of 45 per cent during the last decade and continues to show robust growth even today. Growing respect for Indian software industry in the international market, continued rise in the offshore services, quality services, timely delivery, entry into new markets, Y2K data conversion business, international linkages and also due to various steps taken by the Government to promote software export such as simplifying procedures, tax concessions, establishments of software technology parks, more liberal foreign investment policies, possessement of second largest pool of scientific and skilled manpower which is also English speaking, low cost of labour, locational time difference with the western world enabling round the clock development, pro-active role by Nasscom (the software industry association), etc. are some of the factors that gave fillip to the faster growth of India's software export. Undoubtedly other developing countries can learn lessons from India's experience and can develop IT capabilities by mutual cooperation.

I. INTRODUCTION

India's IT (Information Technologies) capabilities and its presence in the world market for IT software and services are well documented in a number of studies (see for instance, Radhakrishnan and Sharma 2004, Sudarsan 2004, Radakrishnan 2004, D' Costa, 2003, Arora and Athreya 2002, Joseph 2002, Joseph and Harilal 2001, Kumar 2001, Arora et al 2001, Illiyan 2001, Heeks 1996). IT and IT Enabled Services (ITES) has emerged as a promising sector for Indian economy as it generated revenue to the tune of US $ 64 billion during 2007-08. Because of the faster growth of IT industry, its contribution to the national economic output (GDP) has increased from a mere 0.38 per cent in 1991-92 to 5.5 per cent in 2007-08.

'The rapid growth of ITES-BPO and the IT industry as a whole has made a deep impact on the socio-economic dynamics of the country. The total IT Software and Services employment has grown from 284,000 in 1999-2000 to 1.63 million in 2006-07 and expected to reach 2.0 million marks in 2007-08 (excluding employment in Hardware sector). The indirect employment attributed by the sector is estimated to about 8.0 million in the year 2007-08. This translates to the creation of about 10 million job opportunities attributed to the growth of this sector' (DIT 2008). Thus, the sector has risen to become biggest employment generator with the number of jobs added almost doubling each year. Hence, Indian Software industry can continue to have manpower led growth creating large scale employment. Above all, 'IT has spawned a number of ancillary businesses such as transportation, real estate and catering, and has contributed to a rising class of young consumers with high disposable incomes as well as a rise in direct tax collection' (DIT 2008).

It is a well known fact that export oriented software and service sector is indeed the driving force of Indian IT industry and it is widely held as the engine of growth and earner of foreign exchange. Its share in total software industry has increased from 34.69 per cent in 1985-86 to 77.51 per cent in 2007-08. 'At an annual growth rate of 50 per cent over the last decade (1990-00), the Indian software and service sector has expanded

faster than in any other Countries of the world of comparable size'(Raghavan and Nair, 2001). Such a wonderful and sustained growth rate has been unparalleled in any of the sectors of the Indian economy since independence.

Despite the fact that Indian software export still constitutes less than 2 % of world software and related services market, 'according to a World Bank funded study, its share in the global cross country customized software development market, has grown up from 11.9 per cent in 1991 to 19.5 per cent in 2000'(Sachitananta 2001). Further, 'with foresighted policies it could become a major force, capturing 5-8 per cent of the world market' (Sunder Shyam 2007).

All these have not only made the software sector as one of the high value additions and net foreign exchange earning industries but created history of its sorts on the Indian stock exchanges. More importantly, listing of Satyam-Infotech in NASDAQ (a dream exchange of high tech companies) in the year 1999 was a moment of great pride for Indian software industry and has heightened the international recognition of Indian software companies. Since then a number of Indian software companies have been listed on NASDAQ and New York Stock Exchanges. India exports software and services to more than 100 countries and over half of Fortune 500 companies outsource their software requirements from India. What is more, majority of the IT firms in the world with CMM- level 5certification (highest quality certification in the world) are from India. Significantly, software export is poised to emerge as the country's largest exporting sector with its share expected to rise from 26 per cent in 2007-08 to 36 per cent in 2008- 09. Due to all these reasons it is firmly believed that 'this is one of the few areas where India has potential to become a 'Global Powerhouse' (Sen 1995).

Thus, India has established a definite superiority in software services production. Recognizing the enormous significance of the Indian IT sector especially software export, this paper makes an attempt to delineate various dimensions of software export from India. The paper is divided into 6 sections. While Section 1 being introductory Sections 2 delineates growth and performance of software export. Factors responsible for faster growth of export (including India's comparative advantages) are described in Section 3. While Section 4 explains opportunities for Indian software export, some of the grey areas/challenges are given in Section 5. Section 6 ends with conclusion.

2. PERFORMANCE OF SOFTWARE EXPORT- AN OVERVIEW

It was in 1970s that computer as a productivity tool started proliferating in the Indian industrial scene. But it was only by mid-1980s that the forecasters, analysts and Indian policy planners began to understand the potential of Indian talent in computer software. This realization led to the formulation of first computer policy (related to software) in 1986. Since then IT has been given much thrust and software export has been growing at a phenomenal rate. Of late, the information Technology Action Plan suggested by IT task force, 1998[1], such as setting up of a world class info infrastructure with an extensive spread of fiber optic networks, zero customs, and zero excise duty and procedural simplification etc. have provided much needed fillip to the industry. The performance of Indian software export over the years can be vividly seen from Table 1 and figure 1

Table 1: Software export on financial year basis

(Rs in crores)

Year	Value	% growth

1985-86	34	-
1986-87	49	44.11
1987-88	70	42.85
1988-89	101	44.28
1989-90	175	73.26
1990-91	250	42.85
1991-92	410	39.62
1992-93	675	64.60
1993-94	1020	51.11
1994-95	1535	56.49
1995-96	2520	64.00
1996-97	3,900	54.75
1997-98	6530	67.40
1998-99	10,940	67.50
1999-00	17,150	56.76
2000-01	28,350	49.12
2001-02	36,500	29.12
2002-03	46,100	28.00
2003-04	58,240	26.33
2004-05	80,180	37.60
2005-06	104,000	29.70
2006-07	141,800	34.80
2007-08	163,000	15.6
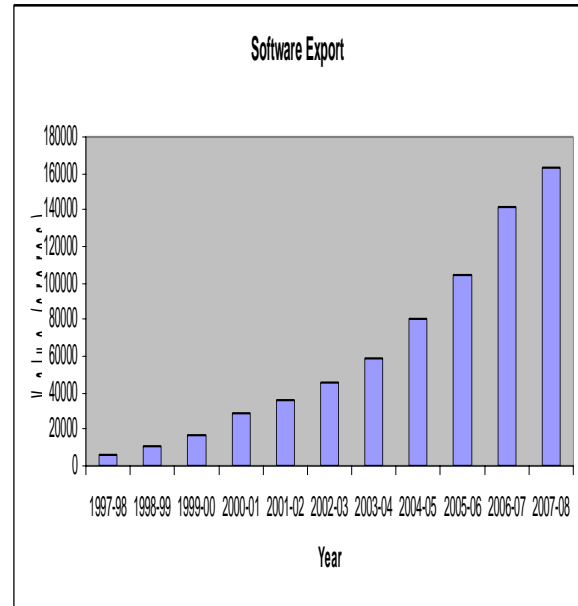
Sources: i..Nasscom ii..Department of Information Technology, Government of India

Figure 1: Software Export on Financial Year Basis

From table (1) and figure (1) it is clear that there has been tremendous growth and spurt in the software export from India over the years. Export has grown by leaps and bound in value terms from Rs 30 crore (US $0.34 billion) in the year 1985-86 to Rs 17,150 crore (US $ 4 billion) in 1999-00 and further to an all time high of Rupees 163,000 (US $ 40.8 billion) in 2007-08. This shows that software export has increased more than 40 times over the period 1985-86 to 2007-08.

2.1 ANNUAL AVERAGE GROWTH RATE

Table 2: Annual Average Growth Rate

Period	Annual Average Growth Rate
1985-86 to 1990-91	49.40
1991-91 to 2000-01	57.13
2001-02 to 2007-08	28.42
1985-86 to 2007-08	45.00

Source : Calculated on the basis of Table 1

As the Table 2 indicates Software export has registered a very strong annual average

growth rate of 49.40 per cent during 1985-86 to 1990-91 and 57.13 per cent during 1991-92 to 2000-01. Since 1992-93 onwards software export has been growing at 50-60 per cent annually. It is to be noted that even when all India export slumped to the lowest level during 1997-98 to 1998-99 due to South East Asian crisis, software export demonstrated an annual growth rate of 67.4 per cent in 1997-98 and 67.5 per cent in 1998-99. However, annual average growth has slipped down to around 28 per cent since 2001-02. This has been mainly attributed to slowdown in US economy since 2000. Further, industry expert feel that software export has been stabilizing around 30 per cent.

If we look at recent performance of the software export the picture is still bright. For instance, during 2007-08 Indian software and services export are estimated at Rs 163,000 crore (US$ 40.3 billion) as compared to Rs 141,000 crore (US $ 31.4 billion) in 2006-07. Software export has registered an increase of 28.3 per cent in dollar terms and 15.6 per cent in Rupee terms. As the Information Technology Annual Report of DIT 2008 notes " though the growth rate is numerically lower than that in past few years, it is worth highlighting that this comes on the back of strong headwinds including an impending slowdown and a severe financial sector crisis in the US and a sharp appreciation in the value of Indian Rupee (INR). Further, the absolute value of incremental growth (US$ 8.9 billion) in export expected to be achieved by the industry this year is the highest ever achieved by the industry in a single year in its history. This segment will continue to show robust growth in future also"

Moreover, software export is performing well in terms of its over all contribution to the total export. The percentage share of software export in total export increased from a mere 0.39 per cent in 1986-87 to an impressive 10.5 per cent in 1999-00 and further to 26 per cent in 2007-08. This is slated to jump to 36 per cent by 2008-09 constituting the single largest item of India's export basket.

2.2 CONTRIBUTION TO GDP AND EMPLOYMENT

The contribution of IT sector (consisting of hardware, software and services) to the GDP of the country has been significantly increasing from US $ 6 billion in 1997-98 to US $ 64 billion in 2007-08. Within ten years time the share of IT sector recorded a 5 fold increase from about 1.2 percent in 1997-98 to 5.5 per cent in 2007-08. It is to be remembered that the major share of this contribution is by Software and related service exports.

'By way of comparison, Chandrasekhar et al (2006) finds that IT revenues in 2004-05 were about 20 per cent higher than construction sector and almost three times higher than in mining and in electricity, gas and water supply. The gross revenue from IT services exceeded 12 per cent of GDP generated in India's service sector that accounts for about 54 per cent of the GDP. These estimates, however, appears to involve some underestimate because it does not include telecommunication (both equipment and services) mass communication output like Television and some of the other electronic products that are integral part of ICT sector. Viewed thus the real contribution of IT to the GDP would be much higher'[2]

The phenomenal contribution of IT sector to the employment generation has been noteworthy especially in the context of declining/slow employment growth in the organized sector in the post reform phase (i.e. after 1991 when liberalization was adopted) in the Indian economy. According to the latest Information Technology Annual Report 2008 of DIT, the total IT Software and Services employment is expected to reach 2.0 million mark in 2007-08 (excluding employment in Hardware sector), as against 1.63 million in 2006-07, a growth of 22.7per cent YoY (year to year). This represents a net addition of 375,000 professionals to the industry employee base, this year. The indirect employment attributed by the sector is estimated to about 8.0 million in the year 2007-08. This translates to the creation of about 10 million job opportunities attributed to the growth of this sector. The industries direct employment has grown at a compound

annual growth rate (CAGR) of 26 per cent in the last decade, making it the largest employer in the organized private sector of the country.

3. FACTORS BEHIND THE SUCCESS STORY OF INDIAN SOFTWARE EXPORT

The phenomenal growth of Indian software export can be attributed to the growing respect for Indian software industry in the international market, continued rise in the offshore services[3], quality services, timely delivery, entry into new markets, Y2K data conversion business, international linkages and also due to various steps taken by the Government to promote software export such as simplifying procedures, tax concessions, establishments of software technology parks, more liberal foreign investment policies, as well as a number of comparative advantages India possess such as 2nd largest pool of scientific and skilled manpower which is also English speaking, low cost of labour, investment friendly economic climate and policy, locational time difference with the western world enabling round the clock development, building up of national level institutions and continued expansion of their capacity, pro-active role by Nasscom (the software industry association), market diversification and so forth. Some of these factors are elaborated below.

3.1 Y2K DATA CONVERSION BUSINESS AND INDIA'S ACHIEVEMENT

In the late 1990s, it was realized that computer system would fail at the end of 1999 when calendar changed to year 2000 because years were designated with a code comprising only two last digits of the year. This peculiar problem gave rise to a temporary rise in software conversion work. Y2K solution was a golden opportunity for Indian software exporters. Indian firms were well placed to take advantage of the situation because: i) Indian programmers were already familiar with the obsolete code that had been used many years before ii) Y2K conversion was labour intensive and at the low end of the software development, Indian software

professionals were low cost for foreign clients. iii) Moreover, linkages from western clients to Indian software firms had already been established via body shopping[4], and rising offshore services in 1990s via international telecom linkages. One may wonder if Indian software firms alone could do the Y2K conversion. Of course, software firms in other countries surely could do also the Y2K conversion work, but they did not had the combination of first mover advantage and the low labour cost that Indian firms possessed.

According to the estimate by NASSCOM (2000), Indian software firms earned 16.5 per cent of their export revenue from Y2K related work in 1998-99 and 12 per cent in 1999-2000. The Indian software industry earned an accumulative total of US $ 2.5 billion from 1996 to 1999, from Y2K solutions. These shares are significant but cannot be considered the sole factor for the faster growth of software export. However, the role played by Y2K business is manifold. First, Y2K was at best a modest demand booster for Indian software firms at that time. Second, the most important role played by Y2K was the increase in exposure to new export customers and spreading of a reputation for quality work completed on time and within budget. The success of Indian Y2K expertise has helped the Indian companies to get more orders in the area of interactive architecture[5], legacy to web and software engineering from satisfied clients.

Looking beyond Y2K: Initially there had been apprehension that after the Y2K problem is over there may be wastage of Y2K experts. However, Indian software industry has been able to perform a massive transformation by retraining its employees to the new area of e-commerce, Euro solutions[6], CRM[7,] ASP[8] and IT Enabled services. Thus, the Indian software companies have been able to convert challenges into opportunities.

3.2 SHIFT TOWARDS OFFSHORE SOFTWARE DEVELOPMENT

During the initial phase Indian software export was dominated by onsite[9] development than offshore development. But the trend has been reversing and the dominance of offshore software has been increasing over a period of

time. For instance, the per cent share of offshore services which was a mere 5 per cent in 1991-92 increased to 42 per cent of total export in 1999-00 and further to 70 per cent in 2005-06. On the contrary, the percentage share of onsite services declined form 95 per cent in 1991-92 to 58 per cent in 1999-00 and further to 30 per cent in 2005-06 (see figure 2). This shift has been possible because of : setting up of a number of Software Technology Parks, which inter alia provided access to modern telecommunication facilities, and liberalized policies towards telecom sector which has led not only to the entry of private sector in telecom companies but also low telecom tariff and high speed data communication links to the industry. With proliferation technology and software technology parks, services of high speed dotcom provided by VSNL (Videsh Sanchar Nigam Limited), Relaince, Airtel etc., liberalized economic policy, unnatural visa restriction in USA and some other Western European countries, the component of offshore software development is expected to increase further.

Figure 2: Changing Share of Onsite and Offshore Services
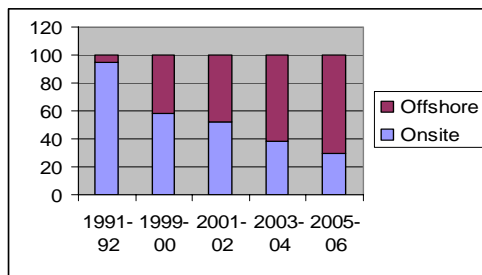
Source: Derived on the basis of Nasscom data

3.3   INTERNATIONAL   QUALITY CERTIFICATION

Indian software industry continues to get international recognition for quality in software development. No doubt, 'India has moved rapidly on the quality front. Indian software organizations adopted the ISO model soon after it came and then when the

Capability Maturity Model (CMM) started becoming more important, rapidly transitioned to the CMM. This has given the Indian companies solid project and process management strength these models are supposed to bring.

This is a tremendous strength that is not easy to emulate. For example, China, despite the fact that it has about a 1000 software companies in Bejing area alone, has probably none at level 4 or 5 and is now actively looking at CMM as part of the country-level strategy to tap the global market. The situation in the rest of Asia (not counting the developed countries) is similar. The situation in Latin America is no different. In fact, outside of the developed countries, it is only India that has companies that have been able to successfully implement these global quality models.

The difficulty of achieving this can be illustrated by a small anecdote. Based on experience of Indian companies transitioning from ISO to CMM, most Indian companies moved from ISO to Level 4 or above with a matter of a year or two. Overall, the project and process management abilities of Indian companies are very advanced and compare well with the best in the world. In fact, many Indian companies are now getting requests from their customers seeking help in setting up quality systems in their organizations' (Rebello 2007).

The following statistics help us empirically prove our argument. 'In 2005-06 among the 401 firms that reported different international quality standards 82 had SEI CMM level 5, the highest level of quality accreditation across the globe, which that accounted for more than two-thirds of such firms in the world over. As many as 123 firms had SEI CMM level 2 certification or above and 330 had ISO 9001 (see table 3). If the evidence presented in table is any indication most of the Indian software enterprises have strived to attain excellence in their professionalism and best practices' (Joseph 2007)

Table 3 : Status of quality Certification obtained by Indian IT firms

Description	No. of Firms
ISO 9001	330
ISO 9002	23
ISO9001/9002	345
ISO9001:2000	72
SEI CMM Level 5	82
SEI CMM Level 2,3,4	41
CMMi Level5	32
CMMi Level 2,3,4	14
PCMM Level5	13
PCMM Level 2,3,4	11
Six Sigma	44
Others	41
Total	401

Note: Total refers to the total number of firms for which information available
Source: Quoted from Joseph 2007
(Complied by him based on NASSCOM (2006)

Quality certification assures export customers that the supplier can deliver the contracted service on time, in full as well as within budget. Many studies (for instance, Nollen 2007) have found that companies with quality certification have faster revenue growth than companies without them.

3.4 POLICY INITIATIVES AND GOVERNMENT INTERVENTION

'Though the genesis of software development in India can be traced back to the early 1970s, it received the direct attention of the policy-makers only in the mid -1980s. This was probably because in the early 1970s, the share of software in the total cost of a computer system was negligible compared with that of the hardware. Also, it was generally held that software and hardware are complementary and therefore separate initiatives are not necessarily called for. Hence, till the mid-1980s, while there were explicit policy announcements towards promoting computer industry in general, there was hardly any specific policy towards software development. This also reflected the lack of demand on account of the limited diffusion of computers. The use of computers was confined mostly to a few government departments, private sector units and educational organizations, wherein software programmers were appointed to develop the required software. In general, software was considered a product amenable to trade.

The computer policy of 1984, probably for the first time, explicitly acknowledged the importance of software development and underlined the need for institutional and policy support. The policy called for the setting up of a separate Software Development Promotion Agency (SDPA) under the department of electronics, (DoE). Imports of inputs needed for software development were made more liberal. The increase in the production and use of computers as a result of the liberal computer policy (Joseph 1997) enhanced the domestic demand for various software products and services. However, the nascent industry could not meet this increasing demand. As a result, a sizeable proportion of domestic demand had to be met through imports. At the same time, the rapid growth of global demand for software pointed to the increasing export potential. This in turn called for more concrete policies for the promotion of software development and export. Accordingly, in 1986, an explicit software policy was announced and software was identified as one of the key sectors on India's agenda for export promotion. The policy underlined the importance of integrated development of software for domestic and export market (GoI 1986). To facilitate the stated objectives, policy emphasized the need for simplifying procedures and provides various incentives such as tax holidays, tax exemption on income from software exports, export subsidies and duty-free import of hardware and software.

With the initiation of economic reforms in the early 1990s, there have been a number of other policy initiatives that have facilitated the growth of IT. The new policy initiatives included provision of finance for software development through equity and venture capital, measures to make available faster and

cheaper data communication facilities, removal of entry barriers for foreign companies and reduction and rationalization of taxes, duties and tariffs (Narayana Murthy 2000)

In addition, the government also made certain institutional interventions. Not less than four major national task forces have studied all aspects of IT in the past four years and most of their recommendations have been acted upon by the government. More significantly, chief executives of leading private sector IT companies have been fully involved in the task force. A number of government agencies involved in different aspects of IT were brought together into an integrated ministry of information technology. This was followed by an IT Act to deal with the wide variety of issues relating to the IT Industry (Partahsarathi 2001).

One of the notable institutional intervention has been establishment of software technology parks (STPs) to provide the necessary infrastructure for software export. The first ones to come into being were those at Pune, Banglore, and Bhubaneswar in August, October, and December in 1990 respectively. In 1991, four more STPs were set up by the DoE at Noida, Gandhinagar, Thiruvanthapuram, and Hyderabad. As of now there are 18 software technology parks in the country and they play a significant role in the software export[10]. STPs are performing well in terms of its contribution to the over all revenue and export of the Indian software industry. 'As on 31st March 2007, 7543 units were operative out of which 6321 units were actually exporting. The remaining units are at various stages of gestation as the scheme allows three years for companies to start commercial production. There is 43 per cent increase in Software Exports through STPI in the year under review, from Rs 100, 965 crore in 2005-06 to Rs 144,214 crore in 2006-07' (DIT 2008).

software companies. These linkages are both in the form of equity strategic alliance and non-equity strategic alliance. Most of them are non - equity strategic alliance that has helped Indian firms to increase their business with foreign clients. The NRIs (Non Resident Indians) living in USA has played an important role in fetching important deals and many NRIs themselves have established software firms in India. Of late especially after 2000 onwards outward oriented foreign direct investment (OFDI) by Indian companies has increased substantially. Software firms are the leaders in outward oriented foreign direct investment which has heightened the competitive edge as well as the international reputation of Indian software companies abroad. Thus, they are making their presence felt through cross border mergers and acquisitions and Global partnership with foreign firms.

3.6 AVAILABILITY OF SCIENTIFIC AND SKILLED MANPOWER

India can boast of the world's 2nd largest pool of scientific and skilled manpower which is also English speaking and computer savvy. This large pool of cost effective and technically competent professionals offers the state of the art quality software which is regarded as India's major advantage. Above all India has been well positioned to reap the *demographic dividends* as it has more younger generation (working population i.e those in the age group of .15-59 years) than dependent population i.e. below 14 years and 60 plus (see table 4 for details*). For the uninterrupted supply of trained and skilled manpower 'India has about 357 universities, comprising 15,600 colleges that turn out an average 2.5 million graduates every year'(Iyer Savita)

3.5 INTERNATIONAL LINKAGES

Another most important reason for the success of Indian software industry is the international linkage established by Indian

Table 4 :Young Population Profile

Population	2001	2006	2016
Total (Mn)	1027	1114	1268
Age Group			
0-14	35.6%	32.5%	27.1%
15-59	**58.2%**	**60.4%**	**64.0%**
60+	6.2%	7.1%	8.9%

Source: Planning Commission, Government of India (GoI)
www.planningcommission.nic.in

Of course, the acquaintance with English does not create any barriers in USA and UK markets (two of the largest markets for our software export, the English language speaking countries). This, creates problems in important non-English speaking markets like Japan, Europe, and East Asia. However, some countries like Japan have started emphasis on English language. The IT action plan part III of National IT policy by Government of India has reiterated that special attention should be given for increasing the language advantage in exports by promoting sections of IT manpower to cultivate other languages like Russian, Japanese, Chinese, and European languages.

3.7 LOW COST OF LABOUR

Heeks (1996) had argued that single most important factor that led to the emergence of internationally competitive software and service sector in India has been the availability of skilled manpower at highly competitive rates. Indian software is extremely good with relatively low cost. The cost of qualified personnel in India is amongst the lowest in the world. This can be evidenced from Table 5 that presents labour cost comparison of IT personnel by category of IT-Services in Switzerland, USA, Canada, UK, Ireland, Greece, and India.

This cost advantage has not only enabled Indian companies to export manpower in a big way supplying contract programmers to Western Companies for routine programming, maintenance and data entry, jobs at cheap rates but also helped to attract more foreign companies to India in the software field. India is fast emerging as a software development centre, with more and more overseas companies setting up operations in India. India has also been growing as a major outsourcing centre as more than half of the Fortune 500 companies outsource their requirements to Indian companies.

3.8 INVESTMENT FRIENDLY ECONOMIC CLIMATE AND POLICY

Emergence of IT on national agenda and announcement of National IT policy and enthusiastic announcement of IT policies by state Governments has further strengthened India's position in the software driven IT sector in the world. As noted earlier, the first computer policy (related to software) was announced in 1986 and since then IT has been given ample thrust. Since 1991 a plethora of measures have been implemented such as income tax exemption to the export earnings of software industry, measures to make available faster and cheaper data communication facilities, removal of entry barriers for foreign companies and provision to finance software development through equity and venture capital etc. that gave fillip to software export. Besides this, a number of other incentives are provided by the Government. The discussion of these is beyond the scope of this paper.

3.9 LOCATIONAL TIME DIFFERENCE WITH THE WESTERN WORLD

Locational time difference with the western world enabling round the clock

development (24/7) is another added comparative advantage of India (for example, Medical transcription work for USA and India's advantage in it). To elaborate, there is 12 hour difference between the local times of India and the US Pacific Standard Time (PST). By the end of the day the doctors in the US send the problems to Medical Transcriptors in India who receives it while it is morning here. They work on it throughout the day and by the evening send the solutions back to the US. The doctors receive them back in US at morning the next day. Thus, their tie-up with India helps round the clock functioning of the US industry (company). Similarly India is 5.0 to 5.5 hours ahead of the U.K. and 9.5 to 10.5 hours ahead of New York and Eastern Standard Time (EST). This difference provides similar extended hours, especially crucial on quick turnaround assignments.

3.10 THE PRO-ACTIVE ROLE OF NASSCOM (SOFTWARE INDUSTRY ASSOCIATION)

Nasscom, the apex association of Indian software and services companies has played a significant role in promoting software export. Apart from lobbying at the Central and State Governments, it has played a crucial role in projecting India's image in the world IT markets by facilitating participation of Indian firms in a large number of international IT exhibitions and projecting India's capabilities in the sphere of IT sector (for more details about the role of Nasscom, see Nasscom website).

3.11 MARKET DIVERSIFICATION

There has been substantial diversification in the destination of software export from India. India exports its software and services to more than 100 countries. Out of which USA continues to be the most favourite destination for Indian software export as it is the world's largest software market as also it has more liberal immigration rules for workers or for residence. In 1990-91 USA accounted for 60 per cent of Indian software export. Although its share has come down to 56 per cent in 1999-00, but it has risen again to 61

per cent in 2006-07(for details see Table 6).

The second major destination of software export is Europe (two third of it is sourced to U.K) and it accounted for 30 per cent of Indian software export in 1990-91. Its share had been reduced to 23 % in 1999-00 but increased gradually to 29 % in 2006-07. Thus, U.S and UK remain key markets providing more than 85 per cent of our software and related services export. Other major destinations of Indian software export are: (1) Japan, whose share has declined from 6 % in 1997-98 to 3.5 per cent in the year 1999-00. (2) South East Asia, which constituted 6 % of export in 1997- 98 had declined its share to 3.5 per cent in 1999-00. This decline may be attributed to the financial crisis in these countries during 1997-00. Rest of the countries/areas such as West Asia, Australia and Newzeland and others have less than 2 per cent of the share in total software export from India.

More broad basening of the export market is

the mantra of Indian software industry so that

it can insulate against fluctuations in a few markets. Export earning from markets other than US and U.K are also continuously on the rise, indicating a broader market base for the industry in the coming years. Indian companies are found keenly exploring new geographies for business development. For instance, India is exploring many joint ventures and strategic alliance in Europe. The trade with European nations is growing, especially with opportunities in Euro solutions, as well as NIESAC, (Nasscom's India's Europe Software Alliance programme). Europe is fast recognizing the competitive advantage that would accrue to its economy by aligning with Indian software Industry. Similarly to increase software business with Japan, Nasscom has launched a project NINHAS (Nasscom's Japan Software Alliance). More such alliance with other countries is expected to form.

Recently, more market opportunities were discovered in Japan, South Africa, Canada, and France. The new markets vigorously

explored include Korea, South Africa, Latin America and countries in Eastern Europe. Further, of late, 'more and more organizations from rest of the Europe, South-east Asia, Australia, Japan, Honkong, Newzeland, etc are also reaching out for Indian expertise, especially in the software sector' (DIT 2007).

4. OPPORTUNITIES AND PROSPECTS FOR FUTURE GROWTH

Despite the commendable performance of the industry so far, it is estimated that there is still significant room for growth. As pointed out earlier, though India now accounts for only less than 2 per cent of the world software and related service market, with farsighted policies it could become a major force capturing 5-8 per cent of the software and related service market. More broad basening of the market, high quality standards and domain expertise attained by Indian players in niche areas etc. are favorable factor for further growth of Indian software export. It is also expected that the rate of flow of work to India through offshoring would increase considerably, in the context of mounting pressure on developed countries and global majors to resort to further cost cutting. It is in this context that lot of projections for the further growth of the software industry is made by industry association and committees and task forces appointed by the Government of India.

The IT task force 1998 appointed by Government of India has put the following targets for the Computer industry (See table 7). As the table 7 shows the targets for software export is $50 million out of a production of $ 87 billion. Given the present growth rate of this sector the industry can very well achieve this target. Out of the US $50 billion $ 23 billion is expected from IT services whereas Software products contribute $ 8 billion. And $15 billion and $ 4 billion are expected from IT enabled services and E-business respectively. Software is expected to provide 2.2 million jobs by 2008.

5. CHALLENGES FACING INDIAN SOFTWARE INDUSTRY

Despite these bright and encouraging facets of the software industry there are certain areas of concern, which need to be given the desired attention and weightage. Some of these areas of concern or challenges are:

1).The most formidable challenge facing Indian software industry is *sustainability of high growth rate of software exports in future*. Foregoing analysis suggests that while software export registered an annual average growth of above 50 per cent during the period 1990-00, it has come down (or stabilized around) 28 to 30 per cent since 2001. The main reason has been slowdown in US economy since 2000 as 60 per cent of our software exports are sourced to US. Hence, any slowdown in US will have adverse impact on Indian software export. Further, a number of countries such as China, Russia, Philippines, Canada, and Ireland etc. have started emerging as competitors to India in the international market. Therefore, there is diversion of business to these countries. There is another line of argument as well. The argument is that 'initially software industry had started from zero and hence from a low base it could grow much faster at 50 per cent but once it reached the peak it has started stabilizing around 28-30 per cent'. Even to maintain this growth rate Indian software industry will have to focus on innovation, high labour productivity, emphasis on software products, and market diversification and so forth.

2). *Shortage of skilled labour is* another daunting problem affecting software industry. There is growing demand for skilled labour in software industry. Despite the fact that country is known for its human resource for IT industry world over, it has been struggling hard to meet the growing demand for IT professionals. IT task force, 1998 predicted that IT industry will create over 4 million direct jobs and another 5 million indirect jobs by 2008-09. Are our institutions capable of supplying such a large number of IT work force?. The answer is staunt no. Further, there is not only shortage of skilled labour but also even a part of the skilled labour available is not fit for employment. 'According to Nasscom, among the 3 million graduates and post graduates added to Indian

workforce, only 25 percent of technical graduates and 10-15 percent of other Graduates are considered employable by the growing IT/ITES segments'[11]. Added to this, the problem of migration of knowledge workers to developed countries in search of greener pastures make things worse. Demand for Indian software professionals are increasing day by day in developed countries. They attract Indian professionals by paying higher salaries and providing them with Green cards. Very recently European Union decided to issue Green cards to Indian IT professionals just like US do.

3). *Low diffusion of information technology in the domestic market i.e weak domestic software market* is a matter of serious concern for India. While software export is growing very fast domestic software could not pace with software export. For instance, when domestic software increased from Rs 64 crore in 1985-86 to Rs 47,300 crore in 2007-08, software export increased from Rs 34 crore to Rs 163,0000 crore in 2007-08. And also that share of software export in total output, which was 34.69 per cent in 1985-86 leaped to 70.43 per cent in 1999-00 and further to 77.51 per cent in 2007-08. Correspondingly that of domestic market declined from 65 per cent to about 22 per cent during the same period (See table 8). This is an indication of existence of weak domestic market. A strong and vibrant domestic market is essential for sustained software export and to insulate it from any fluctuation in international market. Therefore, Government has to come out with appropriate policies to promote the diffusion of IT into various sectors of the economy.

Why India has a weak domestic market? The reasons are not far to seek. The installed base of PCs (Personal Computers) in India is too small to support a thriving indigenous software industry. The total installed base of PCs is close to 20 million**.** This amounts to less than 15 PCs per 1000 people. High cost of hardware and piracy are also working as a stumbling block in the way of rapid growth of domestic software. Another reason has been that in software sector profits on exports are considerably higher than the domestic sales.

However, domestic market is slated to grow faster with the rigorous enforcement of copyrights laws, increased government spending on IT, e- governance and e - schooling and also implementation of zero import duty on software (this would have buoyant effect on the market and the increasing trend of buying software through internet).

## Table 8: Domestic software Vs software Export

(Figures in Rs crores)

Year	Software export	Domestic software	Total output	Exp to Output ratio
1985-86	34	64	98	34.69
1986-87	49	106	155	31.87
1987-88	70	115	225	31.11
1988-89	101	140	241	41.91
1989-90	175	170	345	50.72
1990-91	250	225	475	52.63
1991-92	410	320	730	56.16
1992-93	675	490	1165	57.93
1993-94	1020	695	1715	59.47
1994-95	1535	1070	2605	58.92
1995-96	2520	1670	4190	60.14
1996-97	3900	2410	6310	61.80
1997-98	6530	3510	10040	65.03
1998-99	10940	4950	15890	68.84
1999-00	17150	7200	24350	70.43
2001-02	36,500	10,874	47374	77.04
2002-03	46,100	13,400	59500	77.47
2003-04	58,240	16,250	74,490	78.18
2004-05	80,180	21,740	101,920	78.66
2005-06	104,200	29,600	133,800	77.87
2006-07	141,000	37,000	178,000	79.21
2007-08	163,000	47,300	210300	77.50

Sources ; i)) Nasscom
ii)Department of Information Technology, Govt. of India

computer hardware components was a death knell for domestic computer industry. Therefore, to promote computer hardware more incentives are to be given by the Government.

Figure 3: Software Export vs Domestic Software

Software Export vs Domestic Software
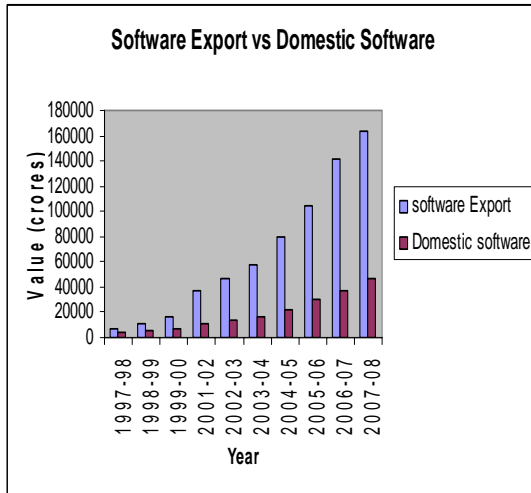
4). India has marched ahead and demonstrated its competitive strength in the international market in software field. But unfortunately, *computer hardware industry could not keep pace with the software industry.* We have been able to produce hardly 25 per cent of our hardware requirements. Rest we have to import. It is perceived as bottlenecks in the sustained growth of the software industry. More importantly, of late China has been emerging as a major competitor to Indian in software. Given the solid hardware base, China is perceived to have high potential for growth, which in turn calls for strengthening India's hardware base to sustain its high compound annual growth rate. The major reasons for lagging hardware industry in India are: i)The computer hardware industry is characterized by oligopoly with about 4 to 5 major players and those too with a highly skewed distribution. ii) Unlike software industry where entry is easy and does not require much investment, in hardware industry entry is very difficult and requires huge investment. iii) India's move (in line with WTO's Information Technology Agreement[12] (ITA-1) signed in 1995) towards permitting zero import duty on

5) R*upee Appreciation and US Economic Slowdown:* Rupee appreciation and US economic slowdown due to sub prime (banking) crisis are two most imminent challenges facing the software export. During 2007-08 Rupee has appreciated about 10 per cent against US dollar i.e. value of US dollar came down roughly from Rupees 46 during the beginning of 2007-08 to Rupees 39 by the end of 20007-08 (see table 9) This has drastically reduced the profitability of software exporting companies. Almost all big software giants like Infosys, Wipro, TCS and Satyam etc. have reported reduced profitability for the financial year 2007-08. For instance, 'leading exporter TCS had its net profit pruned just 4.15 per cent in 2007-08 as compared to previous year' (The Hindu, April 28 2008 pp 15).

Table 9 :Rupee appreciation vis-a vis Major Currencies

	Financial year 2007-08 (April13, 07to January 16 2008	**Annual (December 2006 to December 2007)**
US Dollar	9.8	13.2
UK Pound	11.0	9.9
Japaese Yen	1.8	8.4
Euro	-0.1	2.6

Source: RBI quoted in Economic Survey 2007-08, Government of India, pp 130 published by Oxford University Press,2008

Divergent views have been expressed on the impact of US slowdown on Indian software companies. *One* view is that as 60 per cent of our export are sourced to US the slowdown will have far reaching consequences on Indian software companies. This is because there will be reduced spending on IT and hence there is non possibility of not only getting more contract but also cancellation of contracts already made. The *second* line of argument is put forwarded by Nasscom, the apex body of software companies. It 'forecast a drop in orders and profit over short term. But however, short will that short tem be remains the question. Optimists put it 4 to 6 months but the more cautious extend it to even two years. The forecast is that the things will revive in 2010, not before. But many IT majors feel that even by 2009, the uptrend may be discrenible' (The Hindu, April 28 pp 15). *Third* argument is that recession will open up new avenues such as the outsourcing of debt recovery to American financial and banking institutions to Indian BPOs. During the early 2000 recession of US economy and its impact on Indian IT late Dewang Mehta, the then president of Nasscom commented that 'it might not have much impact. Magic mantra like cutting IT expenditure, improving cost effectiveness and outsourcing have allowed Indian software export to thrive well. USA , which happens to be India's largest trading partner, can increase outsourcing and in turn increase orders for Indian software exporting companies. In the recent past more US companies are showing interest in Indian software industry' (The Hindu, Feb 6 2001).

6. *Concentration on software services rather than software product* is another critical challenge to be addressed quickly by the Indian software industry. So far we have been able to concentrate only on low end software services than high end software products. For instance, 'in 2004-05 software packaged products accounted for only 5% of Indian software industry's while software services made up 68% of the industry and BPO brought in another 27%' (Dataquest 2005). But in contrary in China more than 50 per cent of the software output is in the form of products. India has to increase its share in software product by innovation, more research and development, copy right protection, developing niche products etc.

7. Regional Concentration: There is high concentration of software industry in seven metropolitan cities (tier 1) across India. 'Of the total direct employment of 2 million, 90% has been captured by Banglore, Mumbai, NCR, Hyderabad, Pune Chennai and Kolkata'(Sachdeva 2008). The reasons are obvious. Easy availability of skilled manpower, better infrastructure facilities and investment friendly climate are the main factors. This is not without a cost. It has created not only the uneven development of the regions but also there are heavy strain on infrastructure available in these cities along side other problems such as heavy traffic jams, high operating costs, migration of resources etc. that needs to be addressed on a war footing basis. Literally these cities are running out of resources. Companies will have to shift their operations to Tier 2 cities to gain competitive advantage. It is a matter of consolation that the software companies have started moving to tier 2 cities such as Ahmedabad, Kochi, Coimbatore, Indore, Lucknow, Jaipur etc. But the biggest issue in Tier 2 cities is the infrastructure. It requires huge investment from government and private sector. A Public-Private Partnership (PPP) can work wonders. In a recent study by Nasscom-AT Kearney on "Location Roadmap for IT-BPO Growth" has predicted that 'Second Tier cities are likely to account for about 40 per cent of the total projected IT-BPO jobs by 2018 if the government in tandem with the industry provide a conducive environment' (The Hindu May 6, 2008 pp 16).

6.CONCLUSION

From the foregoing analysis, it is clear that software is an area which will work as a catalyst to make India a 'Global IT Super Power'. Over the years Software has been growing at high rate of over 45 per cent. The share of software export in total export as well as its contribution to GDP has steadily increased over the years. It is seen

that software sector has emerged as a foreign exchange earner and generator of large scale employment opportunities. A few of the suggestions emanating from the study are: we need effective Govt. policy, managerial attitudes and cyber-savvy leaders to encourage high risk, long term investment. Comprehensive curricula must be put in place to cater to the demands of the emerging technologies and changing needs of the industry. Industry-Academia collaboration has to be strengthened. Specific IT graduation focusing on Industry needs can be introduced after 10+2. Software education centers like NIIT, APTECH, SSI, etc. must launch up -to -date courses keeping pace with the present demands at home and abroad. Easy access to educational loan to the students of IT courses should be provided. A national level test just like All India Engineering and Medical Entrance Examination can be conducted to tap the young talents to the IT industry after 10+2. Special attention must be paid to the marketing and brand building. Overcoming infrastructural bottlenecks like uninterrupted power supply, communication facilities are the need of the hour. More broad basening of our overseas software market, concentration on high end software products, more regional diversification of software industry, diffusion of the information technology to the domestic market etc. are the need of the hour. More private participation, both domestic and foreign, is crucial for providing high quality power supply and communication facilities like high band width. Efforts must be paid to tap the best talents of Indian software experts for promoting the original software like Windows by investing more on Research and Development (R&D), providing facilities of international standards and by paying attractive salary. There is also a need to attract substantial amounts of Foreign Investment and Technology to rejuvenate Indian IT Industry and make it more competitive globally. An influx of foreign capital and Technology would expose Indians to the latest technologies. Last but not least, making available cheap hardware by reducing excise duty, sales tax can go a long way to provide a growth spurt to the Industry.

NOTES

1. IT Task force 1998 was appointed by Government of India in 1998 to chalk out a long term IT Policy for India. In addition to policy recommendation, they have made projections for Indian IT sector.

2. See Joseph 2007

3. Offshore software development: Software development in Indian land

4. Body Shopping: Individual software professionals are found suitable for employment by foreign company.

5. Interactive Architecture: Providing strategic planning, design, software development, hosting and integration.

6. Euro Solution: European Union had mandated the change to the single currency, euro from 1 January 1999, Most of the computers in Europe would require to handle the new currency to which they were strangers. The euro business was expected to stretch out for six years.

7. CRM: Customer Relation Management

8. ASP: Application Server Provider

9. Onsite software development: It refers to sending software developers to work at the clients premises by an Indian company for a specific job.

10. See Joseph and Harilal 2001.

11. See Times Ascent "Leave it to the experts"
September 26 pp IV 2007, New Delhi Edition.

12. India is a signatory to the Information Technology Agreement (ITA-1) of the World
Trade Organization and w.e.f. 1st March 2005 the basic customs duty on all the specified 217 tariff lines has been eliminated.

References

[1] A. Arora and Athreya S., "The Software Industry and India's Economic Development", *Information Economics and Policy*, Vol 14, 2002,pp 25-273..

[2] A .Arora,.., Arunachalam V.S., Asundi J. and Ronald F., , "The Indian Software Services Industry" *Research Policy*, Vol 30 (3), 2001, pp 1267-87.

[3] Bilek Debroy, Ramesh Bebl,and L.D Mago.,'Software Export- World Scenario and Indian Prospects' Foreign Trade Review,Vol27, no 2,1992

[4] Carlos Marria Correa,"The legal protection of Software; Implication for Late Comers; Strategies in newly Industrialising Economies(NIE) and Middle Income Economies'"OECD Technical paper, No 26, October,1989.

[5] C.P Chandrasekar. Jayati Ghosh and Anamitra Roychowdhury " The Demographic Dividend and Young India's Economic Future, Economic and Political Weekly, Vol 41, No 49,2006, pp 5055-5064.

[6] Dataquest, "Industry Overview" Vol, XXIII, No. 13 July, 2005, New Delhi.

[7] A.P. D'Costa "Uneven and Combined Development: Understanding India's Software Exports". *World Development* 31(1), 2003. pp211-226.

[8] DIT (Department of Information Technology)(Information Technology Annual Report, 2006-07", Ministry of Information and Communication, Government of India (www.mit.gov.in), 2007.

[9] DIT (Department of Information Technology,"Information Technology Annual Report, 2007-08", Ministry of Information and Communication, Government of India (www.mit.gov.in)),2008.

[10] EPW "Beyond Body Shopping", EPW, Aug, 28 1993

[11] Export Import Bank of India, "Software-A Sector Study", Occasional paper, Export Import Bank of India, Mumbai. 1992

[12] GoI "Policy on Computer Software Export, Software Development and Training", Department of Electronics, New Delhi,1986

[13] R., Heeks, "India's Software Industry: State Policy, Liberalization and Industrial Development", Sage Publications, New Delhi, Thousand Oaks, London,1996..

[14] Illiyan, Asheref "Software Export : An Analysis of India's Potential, Performance and Problems", Foreign Trade Review, Vol XXXVI Nos 1 and 2 April – September,2001.

[15]Iyer Savita "KPO the Next Big Thing-Legal Services now Riding the Knowledge Process Off-Shoring Wave" Available at http://www.sddglobal.com/offshoring_legal _process_lpo_kpo_India.htm

[16] K.J. Joseph "Industry under Economic Leberalization: The case of Indian Electronics", Sage Publication, Thousand Oaks, Londaon,1997.

[17] K. J. Joseph, "Growth of ICT and ICT for Development: Realities of the Myths of Indian Experience", Discussion Paper No 2002/78, WIDER-UNU August http:// www.wider.unu.edu/publications/publicatio ns.htm,2002.

[18],K.J Joseph. and Harilal, K.N., "Structure and Growth of India's IT Exports:
Implications of an Export-Oriented Growth Strategy", *Economic and Political Weekly*, Vol. 36, No. 34, 2001, pp 3263-70.

[19] K.J.Joseph, "Addressing New Challenges of Innovation under Globalization: Lessons from India's ICT Sector",. Paper Presented at the international seminar on IT Industry in India-Propsects, Retrospects and Policies, organized by Department of Economics, Jamia Millia Islamia University, New Delhi during 1-2 November 2007

[20] N. Kumar, "Indian Software Industry Development: International and National\ Perspective", Economic and Political Weekly
  vol 36 (44), 2001

[21] N.R Narayana, Murthy. "Making India a Significant IT Player in this Millennium" in Romila Thapar (ed) *India: Another Millennium*, Viking Penguin Books, New Delhi, 2000

[22] Nasscom, "Software Industry in India- A Strategic Review", National Association of Software and Services Companies, New Delhi.1999

[23] Nasscom), "Software Industry in India- A Strategic Review", National Association of Software and Services Companies, New Delhi,2000

[24] Nasscom, "Software Industry in India- A Strategic Review", National Association of Software and Services Companies, New Delhi ,2007

[25] Nasscom, "Software Industry in India- A Strategic Review", National Association of Software and Services Companies, New Delhi,2008

[26] Nollen Stanley, , "Software Industry Performance in India and China", paper presented at Academy of International Business- India Chapter Conference 'India in the Emerging Global Order oragnised by Xavier Institure of Management , Bhubaneswar during 29-31 January, 2007

[27] Radakrishnan "Software Exports", Yojana, November,2004

[28] K.G Radakrishnan and R.K. Sharma, " Determinants of India's Software Export: A Quantitative Assessment", Indian Economic Journal Vol 3 Sep- Dec issue, 2004

[29] Raghavan Vijaya. G and and Nair V.S.M.(2001)'One of the Greatest Discoveries of our Time', Manorama Year Book, Kottayam

[30] Rebello Santhosh, "It's Qulaity that has Done the Trick for Indian Software Industry", Paper presented at the international seminar on 'IT Industry in India-Propsects, Retrospects and Policies', organized by Department of Economics, Jamia Millia Islamia University, New Delhi during 1-2 November, 2007

[31] Parthasarathi "Tackling the Brain Drain from India's Information and Communication Technology Sector: Need for a new Industrial and Science and Technology Strategy , Paper presented in the SCU conference of executive heads on ,Configuration in Globalisation', Cyprus, April 22-26,2001

[32] Sachdeva Sujata Dutta , "IT Industry must Expand to Smaller Cities for Future Growth", The Times of India May 6,2008 pp 26

[33] Sen Pronab ,"Software Export:An Assessment", EPW, feb, 81995

[34] Sudarsan P.K. ,"India,s Software Exports: Growth and Import Intensity'" Asian
Economic Review, Volume, 46, No 2, August Issue,2004

[35] N.N. Sachitananda , , "Optimisum at Nasscom-2001'", The Hindu, pp 18, March, 2001
    .
[36] Sunder Shyam (Yale School of Mangment, USA) "Investing in the Future of Indian IT Industry: Prospects and Policy", Paper presented at the international seminar on 'IT Industry in India-Propsects, Retrospects and Policies', organized by Department of Economics, Jamia Millia Islamia University, New Delhi during 1-2 November

[37] The Hindu, February 6, 2001.

[38] The Hindu April 28, 2008 pp 15.

[39] The Hindu May 6 2008 pp 16

[40] UN, "Software for Industrial Automation", UN, ECE, New York, 1987

Table 5:Labour Cost Comparison for IT Personnel by Category of IT-Services, 1995

(US $ per annum)

IT Services	Switzerland	USA	Canada	UK	Ireland	Greece	India
Project Leader	74,000	54,000	39,000	39,000	43,000	24,000	23,000
Business Analyst	74,000	38,000	36,000	37,000	36,000	28,000	21,000
System Analyst	74,000	48,000	32,000	34,000	36,000	15,000	14,000
System Designer	67,000	55,000	36,000	34,000	31,000	15,000	11,000
Development Programmes	56,000	41,000	29,000	29,000	21,000	13,000	8,000
Support Programmer	56,000	37,000	26,000	25,000	21,000	15,000	8,000
Network Analyst/ Designer	67,000	49,000	32,000	31,000	26,000	15,000	14,000
Quality Assurance Specialist	71,000	50,000	28,000	33,000	29,000	15,000	14,000
Database Data Analyst	67,000	50,000	32,000	22,000	29,000	24,000	17,000
Metrics/ Process Specialist	74,000	48,000	29,000	31,000	NA	15,000	17,000
Documentation/ Training Staff	59,000	36,000	26,000	21,000	NA	15,000	8,000
Test Engineer	59,000	47,000	25,000	24,000	NA	13,000	5,000

Note: NA: Not available**.**

Source: Richard Heeks 1996 adapted from H. A. Ruin et al (1996) Worldwide Benchmark Project',
Rubin systems, Pound   Ridge, New York.

Table 6: Destinations of Indian Software Export

Country	1990-91@	1999-00#	200607# #
USA	60%	62% (US&Canada)	61.72% (US& Canada
Europe	30%	23.5%	28.93%
Japan	_	3.5%	2.27%^
SouthEast Asia	_	3.5%	3.08%^^
West Asia	_	1.5%	1.56%^^^

Australia and Newzeland	_	**1.5%**	**1.69%**
Others	**100%**	**4.5%**	**0.71%**

Source: @ Software- A sector study, IEBI, 1992
   # Nasscom
   ##Electronics and Software Export Promotion Council
      www.escindia.org
    ^ Japan, Korea and Far East
     ^^ Singapore, Honkong and South Asia
     ^^^ Middle East

Table 7 : Targets and Opportunities by the year 2008

Targets for the Year 2008

Software Exports	**$50 b out of a total of $ 87 b**
Hardware Industry	**$ 10 b**

Opportunities by the Year 2008

Software Sector		
	Total Markets	**Exports**
IT Services	**$38.5 b**	**$23 b**
Software Products	**$19.5 b**	**$8 b**
IT Enabled Servoces	**$ 19.0 b**	**$15 b**
E-Business	**$10.0 b**	**$4 b**
Total	**$87.0 b**	**$50 b**

Employment Generation

Empolyment Generation	
Software Sector	**2.2 million**
Hardware Sector	
Direct Employment	**1.6 million**
Indirect Employment	**3.2 million**
Total Employment Generation	**7.0 million**

Source: Department of Information Technology, Government of India