Report
On
Indian Software Industry
By

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EXECUTIVE SUMMARY

BACKGROUND

The Indian software industry epitomizes all that market forces and liberalization can bring to a rather insulated economy. Expanding market opportunities, exponential growth prospects, access to the latest technology, increased income levels, better corporate governance etc have been some of the key benefits that this industry has witnessed over the years.

India continues to be a rather small player in the global IT landscape with a share of around 20.0 percent in the global customized software market and less than 1.0 percent in the products and packages market in the year 2000. However, domestic majors have started to create a mark for themselves in the global software industry, especially in the services segment. The success of the offshore model (a model that facilitates the development/ execution of projects based in India and transmitting the deliverables through high-speed data links etc) has resulted in software export revenues growing exponentially over the last decade. During this period this segment clocked growth rates in excess of 50.0 percent per annum. The current year's (2001-02) software export targets are pegged at around US$ 6.2 billion, a share of around 13.0 percent of the country's total export revenues.

This growth has been possible due to some competitive advantages that the country enjoys including a huge manpower base that is highly skilled and relatively cheap when compared to global standards, knowledge of the English language, proactive government policies, improvement in the existing telecom infrastructure (even though it still is not up to the global levels in terms of the quality of service) etc. The private training institutes have been a major reason for this continuous supply of skilled manpower. Continuing in the rich Indian tradition of imparting knowledge to the world, these institutes (at least a majority of them) strive to bridge the inadequacies in the conventional educational system by offering students access to the latest technologies.

Global Scenario

The global business environment is fast changing with technology permeating the functioning of businesses to a great extent. Information technology has started to affect all facets of business, be it customer relations or vendor management or research or marketing etc. Some of the prominent trends that are influencing global business today and will continue to do so in the future include,

1. Increasing E-enablement of businesses
2. Greater interaction between customers and marketing channels (intermediaries)
3. Rapid convergence of the IT, telecommunication and entertainment medium
4. Proliferation of numerous mobile devices, resulting in a slow decline of the PC
5. Greater cost cutting initiatives and de-risking of businesses will result in a proliferation in outsourcing activities
6. Application Service Providers (ASPs) will revolutionize the software industry by changing the pricing dynamics
7. The rapid generation of data and the rising importance of the same will propel the growth in the storage segment.

The North American market is the largest in terms of IT spend. Despite companies reducing their IT spend for the current year amidst the economic slowdown, the dot com bust and the ensuing war in Afghanistan, this market is forecasted to remain the largest IT spender accounting for around 41.0 percent of total global IT spend (Global IT spend is forecasted at over US$ 1.2 trillion). However, these estimates are likely to be downgraded if the aforementioned gloomy conditions persist for a longer time.

India Vs Global Scenario

Globally, software product companies dominate the software landscape. In case of the Indian market, it is the services-based companies that dominate the scenario. A major reason for this is the high-risk profile of the product segment. This segment typically involves huge research and development investments; enormous marketing network and the chances of product success is rather limited. Consequently, domestic software majors have preferred to tread the more cautious services route. Similar to the Silicon Valley in the US, India has also seen its share of Software Technology Parks (STPs) that offer high-speed data links, better infrastructure etc.

Despite such developments, IT spend, as a proportion of Gross Domestic Product (GDP), continues to be low when compared to other global markets. For instance, in the year 1999, while India's IT spend as a proportion of its GDP was around 1.7, the US had a ratio of around 6.1, the UK had a higher ratio of around 6.3. Even smaller countries such as Ireland and Israel had higher IT spend ratios of around 3.2 and 3.7, respectively.

However, one area where India compares favorably to other developed markets is the declining level of piracy. From around 89.0 percent in the year 1993, piracy levels in the domestic market declined to around 63.0 percent in the year 1999. This compares favorably to other markets such as China (93.0 percent), Pakistan (83.0 percent), Vietnam (97.0 percent) etc.

Industry Structure and Segmentation

The Indian software industry has been concentrated in a few major cities such as Bangalore, Chennai, Hyderabad, etc in the past. However, in recent times, the proactive initiatives taken by various State Governments have resulted in software companies setting up their development centers across the country. New clusters in Pune, Noida, Gurgaon etc are growing at a rapid pace.

The industry can be broadly segmented into the products & packages segment, the services segment and the training segment. The products and packages segment in turn can be classified based on technology/ application into the application software category, the system infrastructure software category and the application development software category. This report focuses only on select product categories in the application software category including financial accounting products, Enterprise Resource Planning (ERP) software, Anti-Virus products and Multi-media Software.

The software services segment can be broadly classified based on the type of project contracts entered into by software majors. These include the Time & Material (T&M) based contracts and the fixed material price contracts. In case of the former kind of projects, the domestic company executes either a part or the whole project. These types of projects are invariably of lower value and don't allow the Indian company any scope for pricing power. However, the overseas company gains in terms of time and cost. In case of the latter kind of projects, the onus of project management is shifted to the contractee. Generally, overseas clients offer this kind of contract to Indian companies that have gained a reputation in terms of project management skills.

Margins in this kind of contracts are typically higher when compared to the T&M type of contracts (around 25.0 percent-30.0 percent).

The IT training segment can be broadly classified into 3 segments based on the end-user profile. These include the toddlers, the adolescents and the adults. Toddlers are essentially people who have low or no knowledge of computers and basically are interested in becoming computer literate and/or enhance their computer skills to include design & graphics, know about the Internet, enhance their office productivity tools skills (MS-Word, MS-Excel etc). The adolescents' category includes people who want to upgrade their computer skills, who want to switch from an engineering background to the software industry and/or people wanting to go abroad. The adults' category primarily involves people in the software industry wanting to keep themselves abreast of the changing technologies.

CURRENT SCENARIO

The Indian software industry was estimated at around US$ 8.3 billion (Rs 377.6 billion*) in the year 2000-2001. Domestic market revenues have grown at a lesser pace (46.8 percent) when compared to the export revenues that grew at over 62.0 percent per annum during the period 1995-2000.

Exhibit (1): The Indian Software Industry- A Snapshot

(Values in Million)

Category	1996-1997		1997-1998		1998-1999		1999-2000		2000-2001#	
	Rs	US$	Rs	US$	Rs	US$	Rs	US$	Rs	US$
Domestic Revenues	24,100.0	670.0	35,100.0	950.0	49,500.0	1,250.0	72,000.0	1,700.0	94,100.0	2,060.0
Export Revenues	39,000.0	1,083.0	65,300.0	1,750.0	1,09,400.0	2,650.0	1,71,500.0	4,000.0	2,83,500.0	6,200.0
IT Training	6,623.0	184.0	9,121.0	245.3	13,330.0	327.2	17,520.0	410.1	-	-
Total	69,723.0	1,937.0	1,09,521.0	2,945.3	1,72,230.0	4,227.2	2,61,020.0	6,110.1	3,77,600.0	8,260.0

(Source: NASSCOM, The IT Software and Services Industry in India- A Strategic Review 2001)

(Note: * For the year 2000-2001, the Rs-US$ conversion rate has been taken as Rs 45.71= 1US$

 # Data for the IT Training revenues for the period 2000-2001 is unavailable)

The Software Products & Packages Segment

Products and packages dominated the domestic software market with a share of around 41.0 percent (of a total domestic market of around Rs 72,000 million) in the year 1999-2000. In case of exports, the products and packages contributed a meager 8.0 percent of revenues during this period.

Over the years, the product segment has grown from around Rs 8.9 billion in the year 1995-1996 to around Rs 29.5 billion in the year 1999-2000. Financial accounting products, Enterprise Resource Planning (ERP)-based products and Computer Aided Design (CAD)/Computer Aided Manufacturing (CAM)/ Computer Aided Engineering (CAE) related products dominate the domestic products market and together had an overall share of over 26.0 percent of the total products market in the year 1999-2000. The CAD/CAM products market is the largest of the 3 segments and was estimated at Rs 3.6 billion in the year 1999-2000. The financial accounting products segment has grown from around Rs 370.0 million in the year 1995-1996 to over Rs 950.0 million in the year 1999-2000.

Similarly, the ERP segment grew from around Rs 1.72 billion in the year 1997-1998 to nearly Rs 3.15 billion in the year 1999-2000, a growth of over 35.0 percent.

The multimedia segment is a segment that has witnessed exponential growth in the last couple of years. During the year 1999-2000, the multimedia market in India was estimated at around Rs 5.0 billion (US$ 1.1 billion). This represented a growth of nearly 70.0 percent when compared against the previous year's levels. Around US$ 180.0 million worth of multimedia software was exported during this period. Estimates peg the current year's export revenues at around US$ 370.0 million. In case of the anti-virus segment, revenues increased from around Rs 150.0 million in the year 1998 to over Rs 220.0 in the year 2000.

The Software Services Segment

The software services segment has been the star performer amongst the various segments in the Indian software industry and accounted for around 45.0 percent (inclusive of projects) of the domestic software market that was estimated at Rs 72,000 million in the year 1999-2000. Similarly, from a meager US$ 128.0 million (Rs 2.5 billion) in the year 1990-91, software and services exports increased to around US$ 6.2 billion (Rs 283.5 billion) in the year 2000-2001 at a Compounded Annual Growth Rate (CAGR) of over 50.0 percent per annum. Despite worries of slowdown, this momentum has continued in the first quarter of the current year too. Export revenues jumped by around 52.0 percent to Rs 86.0 billion in the first quarter of the current year (vis-à-vis export revenues in the first quarter of the previous year, Rs 56.7 billion). However, this marks a decline from the 65.0 percent growth rate witnessed in the corresponding period of the previous year.

E-commerce solutions formed a significant part of these export revenues. During the year 2000-01, E-commerce solutions valued at around US$ 1.2 billion were exported and this is forecasted to increase to US$1.8 billion in the current year.

The North American market continues to be the favored destination for software exports and accounted for around 62.0 percent of software exports in the year 2000-2001. However, of late domestic majors have started to target other markets such as Europe, Japan, South-East Asia etc.

The IT Training Segment

From around Rs 4.6 billion in the year 1995-1996, the Indian IT training market has grown to over Rs 17.5 billion in the year 1999-2000, accounting for an overall share of nearly 7.0 percent of the total software revenues of Rs 261.0 billion. This is one segment that has witnessed a great deal of branding strategies by domestic majors. Companies such as NIIT and Aptech have created global brands over the years.

Majors in this segment have metamorphosed over the years keeping in sync with changing global technologies. From offering courses just related to Common Business Oriented Language (COBOL), majors today offer training in high-end courses such as E-commerce, networking, C Sharp, .NET etc. Growth in this industry has been largely due to the burgeoning needs of the domestic software industry. From around 6,800 employees in the year 1988-1989, the supply has increased to over 0.4 million in December 2000. Over 0.1 million professionals (of the total 0.4 million) are employed by the software and services export industry. On the supply side, NASSCOM estimates for the year 2000-2001 are at around 122,000 workers and in the subsequent year, around 140,000 workers.

Similarly, demand levels for IT professionals have increased over the years from around 2,000 professionals in the year 1986 to around 90,000 in the year 2001. While the current demand-supply position appears to be that of an oversupply, when the quality factor is considered, the demand level exceeds the existing supply levels. This is where the private training institutes play a major role. By offering training in the latest technologies, these institutes by and large meet the high-quality demand of the Indian software industry.

REVENUE DRIVERS

- **Government Policies**

Government policies have been and are likely to continue to be a major growth driver for the domestic software industry. Some of the major policies that have and will continue to shape the industry in the future include,

Budget 2001

Budget 2001 definitely provided further impetus to the domestic software industry. The budget focused largely on globalization, enabling greater IT penetration etc. Some of the key features of Budget 2001 were

a) Profits derived from export of services of units located in the STPs to be eligible for deduction like other export income
b) Amendment to section 10a/10b of the income tax act that enables listed companies in the Export Processing Zones (EPZs), Export Oriented Units (EOUs), Special Processing Zones (SPZs) areas to be exempt from it even in the case of change of 51.0 percent ownership
c) Overseas acquisition limit fixed at US$ 100.0 million or 10.0 times export earnings, whichever is higher
d) Conferring the status of IIT on the university of Rourkee and more fund allocation to IIT Guwahati and 43 regional engineering colleges to be upgraded during the course of the year. Educational loan scheme formulated by the Indian Banks association to increase the growth of it education in the country. 100 percent tax exemptions to contributions made to engineering colleges
d. Computerization of all government departments by the end of the year 2002
e. E-commerce transactions kept out of the tax net
f. Two-way fungibility to shares of domestic companies
g. Employee Stock Option Plan (ESOP) holders of foreign companies can make investments abroad up to US$ 20,000 per annum, instead of the existing US$ 10,000 every 5 years

Government Initiatives in the Human Resources Front

In terms of human resources, the government has taken several initiatives that are likely to ensure a sustained supply of high quality work force to meet the growing demands of the software industry. For instance, the government has decided to double the intake of students in premier institutes such as the Indian Institute of Technology (IITs) and the Regional Engineering Colleges (RECs) in the current year (2001-2002) and triple the intake by the year 2003-2004. The government also conferred the status of IIT on the University of Rourkee and decided to allocate more funds to IIT Guwahati in Budget 2001. Around 43 RECs are likely to be upgraded during the course of the current year. Also, 100% tax exemptions to contributions made to engineering colleges. The Indian Banks Association (IBA) has proposed an educational loan scheme in the current year that simplifies the existing loan application and documentation procedures. Also, loans up to Rs 0.2 million do not need any security from the current year. Loan amounts have also been increased to Rs 0.75 million (Rs 0.5 million initially) in the case of domestic studies and Rs 1.5 million (Rs 1.0 million initially) for studies abroad.

The Information Technology Act 2000

In August 2000, the government passed The Information Technology Act 2000 (IT Act 2000). This paves the way for a regulatory framework for cyber laws in the Indian context. Some of the salient features of this act include,

1. Authentication of Electronic Records by Digital Signatures
2. Legality of Digital Signatures
3. Regulation of Certifying Authorities
4. Digital Signatures
5. Penalties and Adjudications for Various Offences
6. Creation of a Cyber Regulations Appellate Tribunal
7. Offence Related Issues
8. Creation of a Cyber Regulations Advisory Committee

Implications of the Act

The enactment of the Information Technology Act 2000 makes India amongst the few countries such as the US, Europe etc that have/are in the process of establishing similar policies. The law envisages the ushering in a new era of e-governance (subject of course to the speedy implementation of other related policies), thereby empowering the citizen to a greater extent. The act recognizes e-mail as a legal communication and validates the same. In addition, digital signatures have become valid forms of authentication by way of this law.

The Software Products Segment

With increasing convergence of the information technology, entertainment and the telecommunication mediums, more and more hardware devices are using software. In this regard, telecommunication networks will witness a rising deployment of software in the future. Consequently, the telecom software segment will be a major revenue driver for the software industry.

Similarly, the rising integration between hardware and software will result in the embedded software segment emerging as a major revenue driver. With the rapid proliferation of mobile devices, this segment will definitely witness an increase in demand for software applications.

The software components segment is yet another likely growth driver for the Indian software industry. More and more is getting increasingly component-based. The underlying code of any software application is getting more and more complex. Hence, companies are looking at various software companies to do a part of the overall coding requirement. With margins in this business higher at around 35.0 percent-75.0 percent, Indian majors have a potential gold mine in the component business in the future.

The Software Services Segment

Growth in the software services segment in the domestic context is likely to be fuelled by the large-level of computerization of banks and e-governance implementation. In the year 1999-2000, only around 30.0 percent of all banks in the country were computerized. With E-banking and greater customer focus becoming key imperatives for success in the global banking arena, domestic banks will have to catch up.

E-governance is yet another area that is likely to drive revenues in the future. E-governance is the process of using information technology to enable the government to work in a more transparent and efficient manner. NASSCOM projections peg the investments in this area by the State and Central governments during the year 2001-2002 at Rs 40.0 billion. By the year 2007-08, this segment is likely to witness investments of around Rs 250.0 billion.

While the going has been rather slow, this is an area that offers software majors tremendous opportunities in terms of large-scale computerization, creation of new software packages, training etc.

The IT Training Segment

Rapid growth in the information technology business in the future not withstanding the current slowdown will require an increasing supply of qualified manpower. Hence, the IT training segment will continue to witness a sustained demand. However, key revenue drivers for this segment will be the increasing adoption of E-learning as a medium of instruction and constant churning in the industry by way of attrition fuelled by constantly changing technologies.

Increasing offshore development necessitates the need for several cross-functional/ cross-cultural teams working together. Various members of the team may require training in different modules and at various levels. It isn't possible for conventional teaching medium to meet this diverse need. E-learning offers the right solution. Already majors such as NIIT and Aptech Ltd are moving ahead in this direction by offering their online programs to a global audience. In the future, this trend is only likely to intensify.

Also, the IT industry is one that has a high degree of technology obsolescence. Rapidly changing technologies thus require professionals in this industry to keep learning all the time. Hence, this need to stay ahead in the learning curve will be a major growth driver for this segment.

CRYSTAL GAZING

Despite the current slowdown and increased tension in the US, the North American market will continue to dominate global IT spending levels. However, the share of the Asia-Pacific market is forecasted to increase from US$ 249.6 billion in the year 2001 (global IT spend is US$ 1.7 trillion) to around US$ 388.0 billion in the year 2005 at a compounded annual growth rate (CAGR) of around 11.7 percent per annum. Together, the North American, Western Europe and Asia-Pacific markets are forecasted to account for over 85.0 percent of the global IT spending levels.

In the future, domestic companies will have to move up the value chain, from executing low-level maintenance projects to the software products, high-end consulting arenas etc. While domestic majors are likely to witness sustained pressure on their billing rates in the near term, recent reports indicate that increased outsourcing opportunities will enable majors to witness growth rates of around 25.0 percent –35.0 percent in the near term. Proactive government policies have enabled the domestic companies to witness high growth rates in the past. Rapid implementation of computerization of domestic banks, e-governance initiatives by the government etc will be the major growth drivers in the future. Also, domestic companies have been less aggressive in their growth strategies in terms of acquisitions. Majors have to start looking at this route, as organic growth will not be sufficient in the future to occupy a significant place in the global software industry.

Majors also have to start focusing on branding initiatives to succeed in the global market. This assumes greater relevance in light of majors wanting to succeed in the products front. Typically this segment involves a lot of marketing expenditure and creating considerable awareness, an area that has been a weak link in the domestic major armor. While majors in the training segment have successfully used branding as an effective strategy both in the domestic and global markets, others have been lacking in this regard. This area needs to be paid a lot more attention to succeed in the future.

All along, India's huge, highly qualified technical manpower base has been touted as a competitive advantage. This advantage is likely to erode in the future if the government and educational institutions don't take adequate care. NASSCOM-Mckinsey projects a manpower requirement of around 570,000 professionals by the year 2008 in order to have a domestic software market of around US$ 18.0 billion. This appears to be a rather easy task given the proliferation of engineering colleges and other technical institutes. However, if the quality factor is taken into account, the equation changes. This is where private training institutes have a major hand to play. When the software boom existed over the last couple of years, several fly-by-night operators forayed into this segment. Now the churning process has begun and smaller institutes have begun to close down. In the future, institutes such as NIIT, Aptech, SSI etc have a more responsible role to play and need to constantly keep updating their course curriculum. Only then, can India hope to sustain its advantage of being a provider of skilled manpower.

The prospects for the software industry in general continue to be good despite the current gloom and uncertainty. However, majors and the government need to keep revisiting their strategies and priorities constantly to take advantage of the emerging global needs. With increasing globalization it is inevitable for the domestic software majors to feel the heat due to major global developments such as the current technology slowdown or the war in Afghanistan. The only way to circumvent such hiccups will be to focus to a greater extent in developing the domestic market. Until, majors do this, any slowdown in the US will have a negative impact on the fortunes of domestic companies.

BACKGROUND

No introduction needs to be given on the impact the domestic software majors have made on the global software industry since the mid 90s'. Estimates indicate that around 40.0 percent of the major Fortune 500 companies outsource their software requirements from Indian companies (1999-2000). Furthermore, Indian programmers monopolize the H1B visa permits issued across the globe. In terms of quality, Indian firms are amongst the best in the world. Around 32 software companies in India were accredited with the Software Engineering Institute- Certified Maturity Model (SEI CMM) Level 5 certification (a quality standard developed by the US-based Software Engineering Institute) as of October 2001.

Over the last 10 years, the software industry has created over 0.4 million direct jobs and is likely to create over 2.2 million jobs by the year 2008. Domestic companies exported software to over 100 countries in the year 2000-2001. Since the year 1991, the domestic software industry has clocked growth rates in excess of 50.0 percent per annum. Estimates peg the current year's export levels at around US$ 6.2 billion, accounting for over 13.0 percent of all Indian exports. Forecasts indicate that software exports are likely to account for around 23.0 percent of total exports by the year 2003. From around 11.9 percent in the year 1991, the country's share of the global customized software development market increased to 19.5 percent in the year 2000.

While all these accolades have been in the services landscape, majors have been rather slow to move into the products space. India has less than 1.0 percent of the global software products market. However, things are changing for the better.

Similarly in terms of training, India continues its rich tradition of transferring knowledge to the entire world. Companies such as NIIT and Aptech have become global providers of knowledge. In fact, recent reports indicate that NIIT Ltd has emerged as the 13th largest IT training company in the world.

However, the recent slowdown in the technology sector in the US has begun to have its repercussions on the fortunes of domestic majors as well. Consequently, training majors and services majors have witnessed a revision in terms of their growth forecasts in the current fiscal (2001-02) and are likely to do so in the near future too.

Global Scenario

Across the globe, several technology trends are rapidly changing the way businesses function. Prominent amongst them include,

- **E-Enablement of Traditional Enterprises**: Emergence of new markets, personalized customer care, more collaborative efforts among enterprises and mobile access to applications are some of the trends that are bringing out this sea change. This e-enablement is also changing the existing IT architecture. Internally focused applications are giving way to more "extended" enterprise applications. Also, inflexible software packages are being replaced by the trend to use software applications when required. Furthermore, from building in-house resources, companies are increasingly opting for the outsourcing model.

- **Increasing Interaction Between Various Channel Partners & Consumers**: Most of the companies are transforming their IT systems to enable more interaction between their various channel partners and the end-consumers.

- **The Broadband Revolution**: Telecommunication networks are witnessing a revolution. Several global majors are upgrading their networks to facilitate the faster transfer of data in the form of music, video etc. With several of the telecom companies jumping on the Internet landscape, exciting times are ahead for consumers.

- **The Decline of the PC**: The ubiquitous PC is slowly losing its hold in the new era. Digital devices are fast becoming popular. Hardware manufacturers are already shaping to this change. Printers, scanners and other peripherals are undergoing a re-invention process. Simple appliances that perform a single task efficiently are the order of the day.
- **Outsourcing Models Get Popular**: Firms face a daunting task of managing various applications and systems at a time when there is an increased focus on cost-cutting measures. Furthermore, with core competency gaining importance, companies are forced to look out to third party providers. This has led to increased offshore development facilities as in countries such as India.

- **Application Service Providers – New Stars In the Horizon**: Application Service Providers (ASPs) are one of the fastest growing categories. These providers offer infrastructure, packaged applications etc for a periodic payment. This market is likely to grow from US$ 3.0 billion in the current year (2001) to around US$ 16.0 billion by the year 2005, a compounded annual growth rate (CAGR) of over 50.0 percent. Already, companies such as Microsoft and Oracle have started to embark on a restructuring of their license process. This trend is likely to intensify in the future, thereby changing the dynamics of the software products industry.

- **The Power of the Cellular**: Research indicates that by the year 2003, the global cellular market will reach a level of over 1.0 billion units. Cellular companies such as Nokia, Ericcson and Motorola have introduced cellular phones that allow the consumer to access the Internet or a company's intranet. Such a shift in favor of wireless data is being brought about on account of the rapid decline in the prices of mobile telephony. With the existing telecommunication networks not capable of transmitting huge amount of data, majors are moving to beef up the infrastructure. Also, companies such as Nokia are trying hard to convert the cellular phone to a lesser version of a PC. Plans are also afoot to introduce machines that communicate without any cables.

- **Convergence of Communication & Computing Platforms**: Currently, most of the e-commerce sites offer interactive features to a lesser extent. With a greater convergence between the communication and computing platforms, greater levels of interaction will be possible. Already, communications applications are gaining popularity. For instance, AOL's instant messaging facility has over 80 million subscribers.

- **Storage Devices**: Information being the key to success in the new corporate age, companies are focusing to a large extent on the storage of vital consumer and business data. This has led to the increased usage of storage devices. In the future, such devices are projected to be an integral part of the information network. The storage market is likely to grow from around US$ 42.0 billion in the year 2000 to US$ 107.0 billion in the year 2005.

These trends are likely to govern the IT spending pattern in the current year and the years to come.

IT Spending in Light of the Ensuing Economic Slowdown

Despite the current economic slowdown in the US and the impending possibility of the same spreading to the European and Japanese markets, IT spending is likely to continue to grow (albeit at a slower rate). Major growth drivers are likely to be the rapid growth of the Internet, the continued cost cutting initiatives undertaken by the corporate community that can only be achieved by increased technology infusion in the business processes etc.

Global IT spending for the current year is forecasted at over US$ 1.2 trillion and is projected to grow to around US$ 1.7 trillion in the year 2005 (based on earlier estimates). North America, Western Europe and Asia Pacific are likely to be the largest IT spenders.

Exhibit (1): IT Spending During the Year 2001- Region wise

(Values in Percentages)

Region	Percentage Share of IT Spend			
	Hardware	Software	Services	Total Share of Global IT Spend
North America	40.0	21.0	39.0	40.6
Western Europe	45.0	22.0	33.0	24.5
Asia Pacific	65.5	12.0	22.5	20.8
Others	-	-	-	14.1

(Source: Industry Sources)

(Note: Total Global IT Spend is estimated at US$ 1.2 trillion)

The total IT spending levels in the North American market is likely to be around US$ 487.0 billion. However, in view of the current slowdown and the recent attack in the US, these estimates are likely to witness a downgrade. The actual impact of the same on overall spend is likely to emerge over the next few quarters only.

In case of Western Europe, the total IT spending levels for the current year (2001) is likely to be around US$ 294.0 billion. Overall, the spending mix is likely to be similar to the North American region.

The Asia Pacific region is likely to witness a divergence in terms of the spending mix when compared to the other developed markets on account of the need for greater infrastructure. Even in this region while markets such as Japan and Korea mirror the other developed global markets, regions such as China and India are likely to exhibit varying trends. Hardware is likely to be the biggest area of IT spending in this region (65.5 percent) in the current year.

India Vs Global Scenario

The Indian software industry represents a contrasting view when compared to other global markets. Globally, while software product companies rule the roost, in case of the Indian market, services companies dominate. Similarly to the Silicon Valley in the US, the domestic market too has seen the rapid advent of Software Technology Parks (STPs) especially in the Southern states of Karnataka, Tamil Nadu, Andhra Pradesh and Kerala. However, the similarities end here. IT spending is relatively low in India when compared to other global markets such as the US, UK, Canada etc

Exhibit (2): IT Spending As a Percentage of GDP During the Year 1999

(Values in Percentage)

Region	IT Spend As a Percentage of GDP
USA	6.0
UK	6.3
Australia	4.6
Canada	5.5
Germany	3.4
Ireland	3.2
Israel	3.7
Japan	2.2
India	1.6
Philippines	1.0

(Source: NASSCOM)

In case of developed markets such as the US, UK etc the share of IT spending in GDP is typically higher when compared to India. This trend is likely to continue in the future too. For instance, by the year 2008, IT spending as a percentage of GDP in the US is forecasted to increase to nearly 7.0 percent. In case of India, IT spending levels increased from around 1.25 percent in the year 1998-99 to around 1.68 percent in the year 1999-00. In the future, with the government being proactive in its policies, IT spending as a percentage of GDP is likely to grow to around 4.0-5.0 percent.

Piracy Levels – A Comparison

India compares favorably to other parts of the world where piracy is more rampant. Constant initiatives by NASSCOM have resulted in the domestic piracy levels decline from around 89.0 percent in the year 1993 to nearly 63.0 percent in the year 1999. For instance,

Exhibit (3): Piracy Levels- A Comparative Picture in the Year 2000

(Values in Percentage)

Country	Piracy Level
China	93.0
Pakistan	83.0
Vietnam	97.0
Indonesia	89.0
Thailand	79.0

(Source: NASSCOM/ Business Software Alliance)

India's Position in the Software Value Chain

A majority of Indian companies continue to languish at the lower end of the value chain (maintenance, data conversion etc). Only front-line companies such as Infosys, Wipro, TCS, HCL Technologies, Satyam etc have been successful in moving up the value chain.

Table (1): Value Chain in the Software Industry

Level	Activity
0	Maintenance, Data Conversion etc
1	Development, Implementation projects like ERP, CRM, Groupware etc
2	Design, Development and Implementation
3	Consulting
4	Products

(Source: Industry Sources)

(Note: Level 0 indicates lesser degree of complexity, Level 4 indicates the highest degree of complexity)

India's Competitive Advantages

Some of the major advantages that the domestic companies possess include,

- A huge manpower resource pool
- Highly talented work force that is also inexpensive when compared to global standards
- English speaking work force
- A lead-time of around 10-12 hours with regard to the US markets and
- Reputation for high quality work especially in the services area

These advantages have translated into consistent, higher export levels year on year during the recent times.

Industry Structure and Segmentation of the Software Industry

Over the years, the concentration of the domestic software industry has changed from being restricted to the bigger metropolitan cities (essentially in the South) to across the country. New regions such as Pune, Noida, Gurgaon etc have seen the birth of several software development centers. Despite this rapid geographical diversification, the Southern states continue to have a higher concentration of software companies. For instance, during the year 1999-2000 as many as 160 software companies had their headquarters in Bangalore, while over 70 had their headquarters in Chennai and an additional 60 in Hyderabad. In contrast, Mumbai was headquarters to only around 148 companies. Delhi was even poorer with only around 60 companies having their headquarters.

Segmentation of the Indian Software Industry

Broadly, the software industry can be categorized into the software products & packages segment, the software services segment and the supporting IT training market.

- The Software Products and Solutions Segment

Generally, the software products and solutions market is categorized into the generic market and the customized developed software market. Typically, the latter involves a lot more client interaction as against the former. Majors in this segment focus on vertical areas such as retail, banking, manufacturing etc. On the other hand, software solutions can be developed for a specific domain. These products can migrate across various verticals, but at the same time are usually unsuitable for several users across these verticals. In case of ERP packages, the variation and the enormity of data results in the end product being highly customized before being implemented. In short, software products can be classified along the following lines,

Table (2): Software Products Industry- A Classification

Software Products Segment		
Application Software	System Infrastructure Software	Application Development Software
➢ Vertical Industry Software ➢ Cross Industry Software ➢ Consumer Software	➢ System Level Software ➢ Systems Management Software ➢ Security Software ➢ Middleware ➢ Serverware ➢ Network Management Software	➢ Database Management Systems ➢ Information Access Tools ➢ Internet Tools ➢ Programming Languages ➢ Lifecycle Development Tools

(Source: Industry Sources)

Due to the enormity and diversity of these segments, this report focuses only on a few categories in the application software segment of the products domain. These categories include financial accounting products, Enterprise Resource Planning (ERP) software, Anti-Virus products and Multi-media Software.

- The Software Services Segment

Services are the stronghold of Indian companies. However, even in this space, companies such as Infosys command a premium on account of their higher level of quality, time frames, delivery and brand equity. Typically in the case of services, the fixed cost component is less and consequently can be recovered at a faster pace. Subsequent to attaining the break-even stage, growth in profits is much slower vis-à-vis the products segment. Also, costs involving manpower, software, hardware and infrastructure are considered as variable costs in the case of services. Hence, while recovery of costs in the services category is almost immediate, it is not so in the case of products. Consequently, the risk levels attached to services are also on the lower side.

Domestic software majors undertake software services projects under the following categories.

1. *Time and Material based (T&M)*

In case of such contracts, the Indian company executes a part or whole of the project. The overseas client is benefited on account of the time and cost factor. Most of the projects undertaken by Indian companies are of this type. However, this type of contract is usually meant for low-value added work and consequently offers little or no scope for any kind of brand pricing.

2. *Fixed Price Contracts*

Generally, when the overseas client's confidence level on the domestic company increases, the former opts for a fixed price contract. On account of this higher level of confidence, clients need not monitor the progress of the project constantly and hence the onus of project management is shifted on to the contractee. While these contracts have a higher risk factor attached against a normal T&M project, the margins offered are also on the higher side (25.0 percent-30.0 percent).

- The IT Training Segment

The IT training market is generally categorized into the short-term and long-term courses market based on the duration of the training program offered. Based on the end-user segment it is also segmented into the individual and the corporate segments. Keeping in mind the end-user profile of the consumer, the domestic training market can be segmented along the following lines,

Table (3): Segmentation of the IT Training Segment Based on User Profile

Indian IT Training Segment		
Toddlers (People unfamiliar with the existing/ rapidly changing technology)	**Adolescents (People wanting to go abroad/ upgrade their skill sets, people with engineering background wanting to switch careers)**	**Adults (Essentially the retraining segment)**
➢ Computer Literacy ➢ Design & Graphics ➢ Office Productivity/ Application ➢ Internet	➢ Computer Literacy ➢ Design & Graphics ➢ Office Productivity/ Application ➢ Internet ➢ Java ➢ E-Commerce ➢ Linux ➢ RDBMS ➢ ERP ➢ Network/ Hardware	➢ ERP ➢ Linux ➢ Developer Tools ➢ Others

(Source: Industry Sources)

SWOT Analysis of the Indian Software Industry

The Indian software industry has a great deal of inherent strengths that local majors have efficiently used in the past. However, there still continue to be areas of weakness that need to be addressed. Also, apart from the traditional areas, new areas are emerging all the time and this needs to be addressed by Indian majors to sustain their high growth rates.

Table (4): A SWOT Analysis of the Indian Software Industry

Strengths	**Weakness**
➢ High quality and value for money proposition ➢ Skilled and knowledgeable, English-speaking work force ➢ Flexibility in operations ➢ Successful offshore model ➢ Experience in working on large projects ➢ Presence of good educational institutions ➢ Inherent strength in the areas of math and science ➢ Proactive government policies ➢ Time difference between the domestic and global markets	➢ Lack of significant presence in the global packages market ➢ Inadequate PC penetration levels that has resulted in a smaller domestic market ➢ Lack of original product development ➢ Inadequate marketing skills ➢ Inadequate localization efforts in the area of development ➢ Barring a few cases, alliances with global majors mostly for technology and not for strategic purposes
Opportunities	**Threats**
➢ Increasing demand for IT professionals despite the ensuing slowdown ➢ Rapid proliferation of the Internet in the domestic and global markets ➢ Shift in the business model from the brick-n-mortar to the click-n-mortar one ➢ Shift in the global markets from legacy systems to more of web-based systems ➢ Indian government's thrust towards increased computerization of offices, banks etc ➢ Global outsourcing market is all set to boom (especially under the current circumstances) ➢ IT enabled services in the country and across the globe is forecasted to explode ➢ Shift in focus towards other markets such as Europe, Japan, Australia etc	➢ Telecom infrastructure is relatively poor when compared to other global markets ➢ Other infrastructure problems such as power, lack of commercial space etc ➢ Government policies could change and result in greater interference ➢ China, Ireland, Philippines etc are fast catching up ➢ Entry of not-so-serious players, wishing to cash in on the boom ➢ Protectionist measures such as tightening of Visa rules etc by other countries ➢ Complacent attitude by domestic majors ➢ Continued reliance on organic growth and an over-dependence on the exports market alone

(Source: NASSCOM / Industry Sources)

CURRENT SCENARIO

During the year 2000-2001, the Indian software industry (inclusive of exports and excluding training revenues) was estimated at around US$ 8.3 billion (Rs 377.6 billion). This represented an exponential growth of 39.7 percent per annum from the miniscule levels of around US$ 150.0 million (Rs 3.0 billion) in the year 1989-1990 on a comparable basis. At the same time, the domestic market and the export markets have shown varying growth rates, with the latter growing at a far greater pace (62.3 percent over the period 1995-2000 vis-à-vis 46.8 percent for the former).

Exhibit (4): Growth in the Domestic IT Software and Services Market During the Period 1995-2001

Period	Value of the Domestic IT Software & Services Market		% Growth (Y-o-Y)	
	Rs Billion	US$ Billion	Rs Billion	US$ Billion
1995-1996	16.7	0.49	-	-
1996-1997	24.1	0.67	44.3	36.7
1997-1998	35.1	0.95	45.6	41.2
1998-1999	49.5	1.25	41.0	31.6
1999-2000	72.0	1.70	45.4	36.0
2000-2001	94.1	2.06	30.7	23.5

(Source: NASSCOM)

Products and packages accounted for the largest share (around 41.0 percent) of domestic software revenues (excluding training revenues) during the year 1999-2000. Projects accounted for another 31.6 percent during this period. This was in contrast to the exports segment where professional services dominated the revenues with over 40.0 percent share and were followed by projects with nearly 37.0 percent share. Products and packages contributed a meager 8.0 percent of export revenues during this period.

The Products & Packages Segment

Over the years, the product segment has grown from around Rs 8.9 billion in the year 1995-1996 to around Rs 29.5 billion in the year 1999-2000.

Exhibit (5): Growth Of The Products Segment During The Period 1995-2000

Year	Value in Rs Billion	% Growth
1995-1996	8.9	-
1996-1997	12.5	40.0
1997-1998	18.3	46.0
1998-1999	23.9	30.0
1999-2000	29.5	23.5

(Source: NASSCOM)

Major End-Users

Industry estimates during the year 1999-2000 indicate that the manufacturing sector was the largest user of software products (40.0 percent) and was followed by the financial services sector with around 25.0 percent. Surprisingly, the government was the 3rd largest user with a share of nearly 14.0 percent.

Exhibit (6): End-user Industry-wise Product Sales for the Year 1999-2000

(Values in Percentage)

Vertical	% Share of Revenues
Manufacturing	40.0
Financial Services	25.0
Government	14.0
Communication	6.0
Education	4.0
Others	11.0
Total	100.0

(Source: NASSCOM) Total Product Sales: Rs29.5 billion

Major Product Segments

Financial accounting products, ERP-based products and CAD/CAM/ CAE related products dominate the domestic products market and had an overall share of 26.0 percent of the products market in the year 1999-2000. The CAD/CAM products market is the largest of the 3 segments and was estimated at Rs 3.6 billion in the year 1999-2000. While CAD/CAM related products accounted for 63.0 percent of sales, the GIS/plant design products had a market share of around 20.0 percent and the EDA products had a share of around 17.0 percent.

Global majors such as Microsoft, Oracle and SAP dominate the domestic products market (barring the financial accounting segment). However, a large number of domestic majors have developed in-house software for their in-house requirements. But for exceptions such as Citicorp, other players haven't been highly successful in the overseas markets.

The Financial Accounting Segment – Be Indian Buy Indian

The financial accounting segment is by far the only segment that is totally dominated by Indian companies. During the year 1998-1999, domestic majors contributed around 97.0 percent of the overall segment revenues of Rs 795.0 million. Tally Ltd is the market leader with a share of around 66.0 percent. This segment has been a high growth area in the past and forecasts indicate that this trend is likely to continue in the future too (20.0 percent-30.0 percent). This segment is characterized with an element of seasonality in its sales. Typically, sales peak during the end of the financial accounting period (January-March) and taper off in the next few quarters before beginning to pick up again.

Exhibit (7): Value of the Financial Accounting Segment During the Period 1995-2000 (E)

(Values in Rs Million)

Year	Value	% Growth (Y-o-Y)
1995-1996	370.0	-
1996-1997	430.0	16.2
1997-1998	590.0	37.2
1998-1999	795.0	34.7
1999-2000 (E)	954.0-1,033.5	20.0-30.0

(Sources: Industry Sources)

Tally Ltd and Tata Consultancy Services (TCS) are the 2 leading domestic players in this segment. These 2 players together account for over 70.0 percent of the overall market.

Exhibit (8): Market Share of Majors in the Financial Accounting Segment In the Year 1999-2000

(Values in Percentage)

Company	Market Share
Tally	66.0
TCS	5.0
Others	29.0

(Source: Industry Sources)

The Enterprise Software Segment – Know Thy Customer Well

The ERP segment is one of the areas in the domestic products and packaged software segment that has witnessed a lot of action in recent times. From around Rs 1.72 billion in the year 1997-1998, the ERP segment grew to around Rs 3.15 billion in the year 1999-2000, a growth of over 35.0 percent. This segment is dominated by the likes of major players such as SAP, Oracle, Baan etc. Ramco is amongst the few domestic players who are strong in this segment.

Exhibit (9): Market Share of Majors in the ERP Segment in the Year 1999-2000

(Values in Percentage)

Major	Market Share
SAP	54.0
Baan	15.0
Ramco	5.0
Oracle	4.0
BPCS	4.0
Others	18.0
Total	100

(Source: Industry Sources) Market Size: Rs 3.15 billion

Of late, the ERP services area is also witnessing high growth rates. In the future, this growth is likely to increase on account of existing vendors targeting new markets and customers. Some of the prominent services include consulting (business process redesign and solutions architecture), implementation (deployment, integration and ABAP programming) and outsourcing (application management, training, education etc). While conventional services account for a dominating share of the ERP services market, in the future services in niche areas such as supply chain management will have a larger presence in the service pie.

Also, the rapid advent of global corporations, which has thereby resulted in greater degree of competition, has forced the domestic majors to focus a lot more on the consumer. Consequently, the need to retain and enhance the customer base has become a top priority. Hence, companies are in a greater urgency to upgrade their infrastructure to enable them to collect, analyze and use large amounts of data. Also, vendor/ supplier management has assumed greater importance in recent times. This in turn has created a strong demand for ERP applications and Decision Support Systems (DSS) etc.

Yet another major factor that is driving the demand in this segment is the need for increased integration between the legacy and open environment. This demand is likely to intensify in the near future as more companies undergo this transition. Opportunities for domestic majors exist in the areas of converting their offerings into “customized products” that can be marketed to various clients. While this space is currently highly service-oriented, increasing customer demand will make this space will become more packaged solution based. This space is dominated by the likes of Oracle Corp. (US), IBM Corp. (US), and SAP, Germany etc. In the domestic market, majors such as Ramco Systems dot this space.

E-Commerce is yet another key driver of enterprise software. Growth in this area will be largely on account of the corporate demand to store, manage and customize enormous amount of electronic data. Specific areas in the application software category include development of content creation tools, content search/ distribution systems, electronic cash systems, information management tools etc. Other areas of opportunity include the development of products targeted at the services side of e-commerce applications. Domestic companies need to develop their strengths in order to compete with these giants in the long run.

The Consumer Software Segment – Net Windows in the Offing

The consumer software segment includes those that enhance personal productivity levels such as word processing, spread sheets etc and client applications that facilitate the collation and manipulation of large quantum of stored data. Global majors such as Microsoft, Lotus, and Intuit etc dominate this segment. This segment is driven by large volumes and constant product upgrades. Consequently, large sums of money are required to be pumped into research and development and marketing efforts. With domestic companies failing on these counts, it is but inevitable for global majors to monopolize this market.

Exhibit (10): Market Share of Majors in the Office Suite Applications Segment in the Year 1999-2000

(Values in Percentage)

Company / Application	Market Share
Microsoft (MS Office)	95.0
Lotus Smart Suite	5.0
Total	100

(Source: Industry Sources)

At the same time, the high quality man power available in the country coupled with lower costs have lured many a global major to set up their development center in India. Prime instances include Microsoft India, Adobe India etc.

Exhibit (11): Adobe India- A New Beginning

Adobe started its development center in India in the year 1998. This center was set up to provide crucial engineering support to it's the main engineering team in the US. Hamburg and India are the only two places that have Adobe's R&D centers outside the US. In fact, the Indian center is the 3rd largest amongst the six R&D centers of the company.

Since its establishment, the Indian center has filed for 3 patents and has increased its employee strength to around 70 employees. Adobe Inc., the parent company has so far invested around US$ 12.0 million in the Indian center. Revenues that were around US$ 2.0 million in the year 2000 were estimated to grow by around 65.0 percent in the year 2001.

The Indian center has been actively involved in developing Adobe's global products such as the Acrobat, Illustrator, Photoshop, PageMaker (version 7.0) and Indesign. Furthermore, the Indian team has been involved in developing new products/ technologies in the area of data interchange. Also, this team was involved in the premier release of Indesign as well as the subsequent update. Other areas of development include the usage of the Acrobat technology (especially the portable document format, pdf) in case of mobile handheld devices.

(Source: Industry Sources)

The Multimedia Software Segment – Cashing on the Home Segment

The fast converging world of information, communication and entertainment has propelled the multimedia market into the high growth trajectory. Consequently, majors across these segments have been consolidating to become the content provider of choice to the consumer. For instance, the acquisition of Time Warner by AOL is a striking instance of this phenomenon. This growth in the multimedia market is being propelled by advancements in the information technology area such as new digital compression technologies, broadband etc coupled with increased PC and mobile device penetration levels and growth in the home PC market across the globe.

However, the domestic market has been a laggard in this regard. Poor PC penetration levels, lack of requisite bandwidth and lack of technology standards in this segment prevented the large- scale development and deployment of multimedia products in the Indian market. However, things are changing slowly for the better. Despite the domestic PC market achieving levels of around 5.0 million PCs in the previous year, estimates peg the level of multi-media capable PCs at less than 3.0 million units. This is far lesser than the critical mass required to propel this industry.

The Domestic Market for Multimedia Software

During the year 1999-2000, the multimedia market in India was estimated at around Rs 5.0 billion (US$ 1.1 billion). This represented a growth of nearly 70.0 percent when compared against the previous year's levels. Around US$ 180.0 million worth of multimedia software was exported during this period. Estimates peg the current year's export revenues at around US$ 370.0 million.

Exhibit (12): Multimedia Exports against Total Software Exports during the Period 1997-2001

(Values in US$ Millions)

Period	Value of Multimedia Exports	Value of Total Software Exports	% Share in Total Software Exports
1997-98	55.0	1,750.0	3.1
1998-99	104.0	2,650.0	3.9
1999-2000	180.0	4,000.0	4.5
2000-2001 (P)	370.0	6,240.0	5.9

(Source: NASSCOM)

The Indian multimedia market is highly diverse in terms of end-user applications. In recent times, there has been a gradual shift in the usage pattern in favor of entertainment, business promotion etc.

Exhibit (13): Multimedia Application Across End-use: A Comparison for the period 2000 & 2002

(Values in Percentage)

Application	Share of Application in the Year 2000	Share of Application in the Year 2002 (P)
Education & Training	23.0	23.0
Entertainment	20.0	23.0
Business Presentations	18.0	19.0
Defense and Military	5.0	9.0
Science and Technology	5.0	7.0
Tourism	5.0	7.0
Research & Development	5.0	7.0
Others	19.0	5.0

(Source: NASSCOM)

The Anti-virus Software Market in India –Indian Majors Play Second Fiddle

The anti-virus software market in India enjoys a positive correlation with the PC market. Consequently, with PC volumes yet to attain critical mass, the size of the anti-virus segment too has been rather meager. Estimates pegged the size of the anti-virus software market at around Rs 150.0 million in the year 1998. This market has since then grown to over Rs 220.0 million in the year 2000. While global majors such as Network Associates, Dr. Solomon and Symantec dominate the domestic scenario, there are a few Indian players who are making it big in this segment. Prominent amongst them include K7 Computing, N&N Systems, Micro Clinic Software (I) Pvt Ltd, Fifth Generation, APCL, Progent Technologies etc.

While the initial efforts were more on the direct marketing area, companies have started to adopt a distributor/ reseller approach in recent times. Companies such as K7 Computing are adopting this approach. Such focused strategies are likely to enhance their revenue streams in the long term. For instance, K7 Computing is estimating a turnover of Rs 80.0 million on account of such focused efforts.

In the long run, smaller, less focused, non-specialized domestic majors are unlikely to survive. Larger domestic firms will have to partner with global majors in order to emerge as winners. Ultimately, access to the latest technologies and an efficient marketing set up will separate the winners from the losers.

Supply Chain Scenario In The Software Products Industry

Fast changing technology requirements and advancements are altering the distribution practices in this dynamic industry. Global leaders such as Microsoft, Oracle and Computer Associates etc are fast establishing a network of partners across the country in order to meet the burgeoning demand of the domestic consumer. At the same time, channel partners are abreast with the latest technology trends, consumer preferences etc and are playing a major role in the buying decision process.

The home office segment, small and medium enterprises and the high-growth e-enterprises are the primary drivers behind this structural change. At the same time, the emergence of new entities such as the application service providers is also changing the conventional supply chain. Majors such as Cisco and Intel are increasingly adopting the on-line route to market their products.

Currently, in the domestic software products market, the wholesaler, distributor, the reseller and the end-user are the major entities in the forward supply chain.

The Emerging Service Model

In the conventional software license model, the onus of procuring the supporting environment such as network, servers, storage, installation, configuration, integration with existing applications, ongoing support etc lies with the end-user. Generally, the Independent Software Vendor (ISV) offers support only with regard to the application code and the linkages between the code and other system components such as databases, operating systems etc.

However, in the emerging service model, the onus is fast shifting to the service provider. As a result, ISVs are forced to adopt new strategies to compete in this new age. Some of the emerging service areas that ISVs will need to provide include the following,

Under the traditional model, the ISV offers its services only for the first 2 criteria and transfers the responsibility of the remaining factors on to the end-user. This is on account of the enormous amount of investments required in gaining expertise, systems, processes etc in the remaining areas. Hence, while it may be prudent for larger ISVs to opt for such an exercise, smaller ISVs will be better off forging strategic alliances with third party providers of such services.

Application Service Providers (ASPs)- A Small Bit in the Big Byte

The Application Service Provider (ASP) is an outcome of the aforementioned trends, albeit in a very small manner. This segment has witnessed a lot of action in recent times and is forecasted to do so in the near future in the global and domestic market. Recent market estimates peg the domestic ASP market revenues in the year 2000 at around Rs 47.0 million. This is forecasted to grow to Rs 3.6 billion by the year 2004, a growth of around 140 percent during this period. Despite such a phenomenal growth, the domestic market will only account for a miniscule share of the US$ 21.0 billion global market. However, majors such as DSQWorld, Eastern Software Systems and ASP India Pvt Ltd etc are committing huge investments in this area to sustain their high growth rates in the future too. With the Indian market lagging the US market by around 1-1.5 years in terms of technology/ market trends adoption, consolidation that is being witnessed in the US market will have its repercussions in the domestic scenario in the time to come. This market is likely to witness a proliferation followed by consolidation in the years to come.

This changing scenario is likely to alter the functioning of software majors too. Firstly, their end-user segment will change from the individual/ small and medium enterprises to that of Application Service Providers. However, the revenue stream for majors is unlikely to witness a change, as they would still be charging an up-front licensing fee only this time to the ASP.

Also, while small and medium sized firms are likely to make the migration to the ASP model at a faster rate, it is likely that large-sized corporate firms that have a large IT team will continue to procure applications and manage the same internally. At the same time, software vendors would no longer enjoy the advantage of being the point of contact between the software major and the customer, thereby tilting the bargaining power balance in favor of the ASP. This in turn is likely to affect the pricing policies being adopted by software majors.

The packaged software market is expected to witness the advent of a hybrid pricing structure, one that includes a-per user per month fee and the traditional base license fee. Also, strategic alliances are likely to become the norm in the future. For instance, majors such as Microsoft, Ariba, Intelligroup and SAP formed a strategic alliance in the form of the Forum for Application Service Providers in India (FASPIN) earlier in the year 2000 to aid the growth of the nascent ASP industry in India and to set up the necessary systems and standards in the industry.

Piracy Levels- A Major Concern for the Products Segment

Piracy is amongst the major hurdles to increased outsourcing of R&D activities in the country and a major dampener for the growth of the domestic products segment. However, over the past few years (barring year 2000) there has been a decline in domestic piracy levels. Constant initiatives by NASSCOM have resulted in the domestic piracy levels decline from around 89.0 percent in the year 1993 to nearly 60.0 percent in the year 1999. Despite this aberration (the rise in piracy levels in the year 2000), the association has targeted a level of 25.0 percent by the year 2005.

Recently, the association along with the Business Software Alliance (BSA) announced a reward program upto Rs 50,000 as an incentive to reveal information against companies using pirated software. BSA is an international association formed in the year 1988 to combat global piracy and has global majors including Microsoft, Apple, Adobe, Compaq, Dell, Novell, and Sybase etc as member companies.

Exhibit (14): Piracy Levels During the Period 1993-2000

(Values in Percentage)

Year	Piracy Level
1993	89.0
1994	83.0
1995	78.0
1996	75.0
1997	68.0
1998	63.0
1999	60.0
2000	63.0

(Source: NASSCOM, Business Software Alliance)

The Software Services Market

Prior to the year 1995, a dominating part of software services was contributed by professional services only. Subsequent to this period, the establishment of several software technology parks (STPs) equipped with the latest infrastructure in terms of networking facilities, telecommunication infrastructure etc resulted in the offshore model gaining prominence. From around Rs 3.1 billion in the year 1993-1994, offshore services have grown rapidly to Rs 5.9 billion in the year 1999-2000.

Exhibit (15): Growth in Offshore Revenues Vis-à-vis Onsite Revenues

(Values in Rs Billion)

Year	Onsite Revenues	% Change	Offshore Revenues	% Change
1993-1994	6.3	-	3.1	-
1994-1995	9.3	47.6	4.5	45.2
1995-1996	15.2	63.4	8.0	77.8
1996-1997	22.9	50.6	11.8	47.5
1997-1998	38.5	68.1	21.0	78.0
1998-1999	63.6	65.2	37.1	76.7
1999-2000	98.2	54.4	59.5	60.4

(Source: NASSCOM- The IT Software and Services Industry in India, Strategic Review 2001)

The software services segment has been the major revenue earner for domestic majors amongst the various segments in the Indian software industry and accounted for around 45.0 percent (inclusive of projects) of the domestic software market that was estimated at Rs 72,000 million in the year 1999-2000.

Similarly, from a meager US$ 128.0 million (Rs 2.5 billion) in the year 1990-91, software and services exports increased to around US$ 6.2 billion (Rs 283.5 billion) in the year 2000-2001 at a compounded annual growth rate (CAGR) of over 50.0 percent per annum. Despite worries of slowdown, this momentum has continued in the first quarter of the current year too. Export revenues jumped by around 52.0 percent to Rs 86.0 billion in the first quarter of the current year (vis-à-vis export revenues in the first quarter of the previous year, Rs 56.7 billion). However, this marks a decline from the 65.0 percent growth rate witnessed in the corresponding period of the previous year.

E-commerce solutions formed a significant part of these export revenues. During the year 2000-01, E-commerce solutions valued at around US$ 1.2 billion were exported and this is forecasted to increase to US$ 1.8 billion in the current year.

In fact, the contribution of software exports in the overall exports pie has also been increasing simultaneously. For instance, during the period 1996-97 to 2000-2001, the share of software exports as a percentage of overall export revenues tripled from 3.3 percent to over 14.0 percent. By the year 2003, software and services exports are projected to account for around 23.0 percent of total export revenues and increase further to around 35.0 percent by the year 2008.

Exhibit (16): Share of Software Exports in the Overall Exports Pie

(Values in Percentage)

Year	% Share of Exports
1996-97	3.3
1997-98	5.0
1998-99	7.7
1999-00	10.5
2000-01	14.1

(Source: NASSCOM)

IT software services continues to be the mainstay of domestic software majors. During the year 1999-2000, this category accounted for around 92.0 percent of the overall software export revenues. Onsite services contributed a dominant share of over 57.0 percent of software export revenues in the same period.

In the first quarter of the current year (2001-02), the contribution of software services in the overall software exports pie increased to 21.5 percent from around 20.0 percent in the corresponding period of the previous year.

In case of the domestic software services industry, a giant share of export revenues are contributed by few large and medium sized players. However, there has been an increase in the contribution by the smaller sized firms as well. For instance, the share of the top 25 software exporters declined from 79.7 percent in the year 1995-96 to around 55.0 percent during the year 1999-2000.

US- The Largest Export Destination

During the year 2000-2001, domestic majors exported their software services to over 102 countries. The North American (US and Canada) market continues to be the largest destination for Indian software exports (62.0 percent) and is likely to remain so (despite the current slowdown) in the future. Other major destinations included Europe, South-East Asia and Japan.

Exhibit (17): Target Markets For Indian Software Exports in the Year 2000-01

(Values in Percentage)

Destination	% Share
North America	62.0
Europe	24.0
Japan	4.0
Rest of the World	10.0
Total	100

(Source: NASSCOM)

In recent times however, majors have started to target other countries such as Korea, South Africa, Malaysia, Latin America and other East European countries. This strategy has been adopted in order to minimize/ diversify the operational risks in circumstances such as the ensuing slowdown in the US market.

Marketing- A Major Issue in the Software Services Business

Marketing and branding are two major weak links in the overall business plans of domestic majors. While in the past, domestic majors depended entirely on direct marketing practices to target the end-users; things have changed in recent times. Several Indian companies have started to set up their own offices in the global markets. For the year ended December 2000, around 582 offices of Indian software companies were present all across the globe. This reflected a growth from the earlier levels of around 165 offices in the year 1995.

The US Slowdown and Its Effect

Since the middle of the year 2000, the US technology sector has witnessed a decline. This in turn resulted in large-scale lay-offs and restructuring exercises. The telecom equipment sector has been amongst the hardest hit. For instance, Nortel Networks announced plans to lay-off around 15,000 employees. Lucent Technologies (10,000 employees), Cisco Networks (8,000 employees) etc were some of the other companies that made similar announcements. Furthermore, in the US, preliminary reports indicate a slashing of IT spend across companies from the hitherto 13.0 percent levels to around 5.0 percent levels. The overall economy too is not all that good in the US, with IMF estimates indicating a growth of around 1.5 percent in the current year (2001) against the 2000 levels of 5.0 percent.

Recent industry reports indicate that technology spend during the second half of the current year is likely to be affected due to the September 11th attacks on the World Trade Center in the US. Despite this likely decline in the second half of the year certain areas such as the upgrade to Windows 2000 in case of the desktop and the server segments and an upgrade to Office 2000 for desktops is likely to continue.

In terms of specific areas of spending, the attacks are likely to result in additional spending on disaster recovery systems, security, and back-up & recovery software.

Implications on the Indian Software and Services Segment

Despite the much talked about slowdown, corporate India appears to be in no mood to cut down drastically on IT spending. Recent industry estimates indicate that a majority of large companies plan to continue with their planned IT investments. Major focus areas include security, database and network management. At the same time, investments in the areas of consulting, E-commerce and customized software development is forecasted to take a beating.

This assumes great significance in the light of the ensuing slowdown both in the domestic and the global economies as corporate India is the largest spender of IT products and services in case of the Indian market and hence any cut down on planned investments will definitely have a bearing on the fortunes of domestic software majors.

Exhibit (18): Significant Trends in Corporate IT Spending

- A majority of large Indian companies are likely to continue with their planned IT investments despite the ensuing slowdown.
- Companies in the manufacturing sector are likely to cut down on their planned investments as they have been the hardest hit on account of the recession in the Indian economy
- Financial Services segment is likely to witness greater investments in the IT area
- Consulting, E-commerce initiatives and customized software development are the most affected areas.
- Outsourcing of IT requirements is likely to pick up as companies shift their focus from captive software development. Also, corporate India is likely to shift its preference towards packaged software.
- Security, Database management and Network management are areas likely to be affected the least.

(Source: Industry Sources)

However, this doesn't mean that domestic majors will not be affected by the slowdown. While majors have started to focus on other global markets such as Europe, Japan etc, North America continues to dominate the software export market (around 62.0 percent). Also, the US market sets the trend in terms of technology trends, investments etc. Hence, if this slowdown permeates to other global markets as well, the fortunes of domestic software services firms could be affected to a larger extent.

Similarly, while this slowdown could result in a larger share of offshore services coming the Indian way, billing rates are bound to be under pressure. Already majors such as Infosys have announced pricing pressures in the quarter ended September 2001. This trend is only likely to intensify in the coming quarters.

Smaller companies with a business model focused on body shopping alone are likely to be hit the hardest. Also, companies that contract onsite services are likely to witness a squeeze in their margins. Consequently, only companies that are higher on the value chain are bound to survive this rather difficult phase.

In addition, a majority of the domestic companies rode the dot com euphoria in recent years and invested heavily into Internet/ E-commerce related companies. With the bubble having burst, the bottom lines of several companies were impacted. This impact is likely to continue in the near term too depending on the level of investments. For instance, Infosys Ltd made a provision of around Rs 177.5 million towards writing off its debt in EC Cubed, a US-based provider of B2B solutions.

Offshore Development- India Takes the Lead

During the last couple of years, the share of offshore development activity in case of the exports segment has been increasing. For the year ended 1999-2000, while offshore development accounted for around 42.0 percent of total exports, onsite development activity accounted for the remaining 58.0 percent. This is in stark contrast to the 1991-1992 levels of 5.0 percent (offshore) versus 95.0 percent (onsite) levels. This transformation has been made possible on account of the advent of high-speed data links at the Software Technology Parks (STPs). Estimates indicate that for the period ended June 2000, there were more than 1,200 leased lines from domestic software companies capable of transmitting data at 64 Kbps or greater speeds. While only some of the product development work is done offshore, most of the product maintenance work is done here.

Over the years, the demand for Indian programmers has been on the rise. But is this demand sustainable? A careful analysis of the likely situation in the foreseeable future presents a favorable view. With increasing globalization and rapid penetration of technologies across the globe, outsourcing of software R&D has become easier. Some of the major competitive forces that are shaping this landscape include,

a) Reduction of in-house information systems activity

b) Rapid Technological Shifts

c) Depletion in the Labor Pool in Developed Markets

d) New Markets Such as India Offering Greater Scope for Global Majors

Several global majors including Microsoft, Adobe, Sun Microsystems etc have started their development centers in India. This trend is likely to continue in the future too given India's competitive advantages.

Microsoft “Net”s TCS as a Partner

Microsoft recently announced its plans to partner with Tata Consultancy Services (TCS) to jointly develop a product as a part of its .NET initiative. This makes the company the first Indian company to test its products in the Microsoft labs and also the first amongst the 3 Asian companies chosen for the ISV.NET program, a program that has been launched by Microsoft in collaboration with other software majors to develop the next generation of products that will operate on the global major’s .NET platform. Other global majors who have been chosen to develop the next generation of products using the .NET platform include Motorola, Merrill Lynch, National Citicorp and Bridge Information Systems.

Recent reports indicate that TCS will develop its Mastercraft product for the .Net platform at its development center in Pune. Mastercraft is essentially an integrated suite of object-oriented software tools that are used in the development of medium-to-large multi-tier applications (client/ server components of an application). The product helps in organizing and managing the software development process in a systematic manner.

Manpower Requirements- An Analysis

Software services typically require a large amount of manpower. The demand for IT professionals in fact has mirrored this aspect.

Exhibit (19): Manpower Requirements and Growth in Software Services Export Revenues

Year	Manpower Requirements (Unit Numbers)	Software Services Revenues (US$ Millions)
1986	2,000	-
1991	20,000	128.0
1996	40,000	734.0
2001	90,000	6,240.0

(Source: NASSCOM- The IT Software and Services Industry in India, Strategic Review 2001)

NASSCOM estimates indicate that in order to achieve the projections of around US$ 90.0 billion by the year 2008, the IT industry will require around 2.2 million professionals. Furthermore, for the top-level companies such as Infosys to reach revenues of around US$ 2.0 billion, they will have to enhance their employee base to over 35,000 professionals by the year 2005. So is the case with Satyam Computer Services.

India currently produces around 0.4 million IT professionals (1999-2000 figures). Hence, supply levels need to grow by around 24.0 percent per annum during the period (2000-2008) to meet these requirements. Also, considering the current quality of students with computer and related background, this rate needs to be far greater.

Competition in the Software Arena from Other Countries

While India is comfortably placed currently in terms of skill sets, costs etc, competition from other countries such as China, Ireland, Russia etc is growing. India has been successful when compared to the Chinese primarily due to their knowledge of the English language. This advantage is unlikely to remain so in the future, with software majors in China focusing to a great extent on this barrier. Similarly are the Russian software majors.

The Irish majors also likely to offer stiff competition to domestic majors in the software services area. Around 40.0 percent of their software revenues are contributed by exports to the European Union. Here again, their higher costs in terms of employee salaries has favored the domestic majors. This advantage is also likely to erode in the future despite the recent downturn in remuneration (due to the slowdown) in the domestic software industry.

However, Indian companies have been quick to realize this competition and are evolving suitable strategies to sustain their advantage. For instance, majors including Tata Consultancy Services (TCS) are using the lower costs in China to undertake their software projects.

Strategies of Majors

- Infosys- The De-risking Model

The company's Predictability, Sustainability, Profitability, De-risking (PSPD) model captures the essence of the Infosys success strategy. The PSPD model involves formulating revenue and business models that offer predictable (P) revenue flows both in the short and in the long term. In this regard, the company focuses on working on mission critical systems. Establishment of offshore centers has also been a prime area of focus for Infosys.

Also, these revenue streams must be sustainable (S) in nature. The company witnesses a great deal of repeat customers. For the year ended March 2001 the company had around 273 active clients. Furthermore, repeat customers contribute around 84.5 percent of overall revenues. Infosys focuses on converting these client relationships into one of strategic partnerships. For instance, the company focuses on development of products jointly by way of product competency centers with the likes of Blue Martini Software, Corio, Captura, Cephren, and Jetstream etc.

While predictability and sustainability are important, profitability (P) is even more important. With the adoption of iterative model of development, the company is able to reduce cycle times and manage any changes in the scope of work. Consequently, Infosys is able to scale up to higher levels as and when the situation arises.

The other link in the model is perhaps the one that Infosys focuses to a great extent, de-risking (D). This enables the company not to depend to a large extent on any client, technology or service.

- HCL Technologies- Offshore Development Rules

HCL Technologies is amongst the few Indian companies that are capable of developing technology and engineering solutions in both the system and application software areas. The company has been successful in developing dedicated offshore development centers to meet the needs of individual clients. Currently (year 2000-2001) the company has around 14 software development centers in India and also around 35 client dedicated offshore development centers. This has enabled the company to be amongst the top performers in recent times in the domestic software industry.

The Indian IT Training Market

The growth of the IT industry has been explosive over the last decade. From being a rather stand-alone industry, IT has permeated the functioning of all industries and has become imperative for success in every area of business. Consequently, the employment opportunities generated on account of IT has also grown phenomenally in recent years. With increasing penetration levels of the PC across the globe, coupled with growing popularity of the Internet in recent times, demand both for relevant products and skills has increased. Rising E-commerce adoption rates have accelerated the demand for programmers, system analysts and researchers across the globe.

Employment opportunities in the domestic market have been increasing ever since this explosion began. Reports from NASSCOM peg the number of people employed in the domestic IT industry as on 31st December 2000 at over 0.4 million people. However, this pales in comparison to the US market where around 10.0 million people are employed by this industry. Similarly, while the global IT training market is estimated at around US$ 28.0 billion, the domestic market accounts for less than 5.0 percent of this market. This indicates the potential of this sector in the long run. Such levels can be achieved only with the sustained growth of the industry, which in turn will require enormous supply of human brain. This in turn is propelling the domestic IT training market (that is currently in a moderate growth phase when compared to the other segments such as services).

The Metamorphosis of Training Majors

With the training segment being ruled by the dictates of the global IT industry, it is no surprise to see the domestic IT training majors' offerings mirror the changing technological trends. For instance until the '80s, the domestic IT training industry hardly had any real identity mainly on account of the country still depending on its agrarian economy to meet its revenue requirements. Subsequently, when the domestic software industry started to grow, so too did the training industry. The demand for professionals equipped with the latest technologies started to boom. With the formal training segment not being able to match the demand requirements, the training institutes started to grow. With the former witnessing a lot of constraints in terms of investments, access to the latest technologies, poor infrastructure etc, the training institutes managed to find a place for themselves in the IT education landscape. Since then, the majors have been on an upward growth curve.

Subsequently in the 90s', with the liberalization wave sweeping the country and the offshore model success of domestic majors, the industry witnessed yet another surge for professionals. Students especially undergraduates increasingly started to view the software industry as the first choice of employment. Consequently, the pursuing software courses in private training institutes along with the normal curriculum imparted at the formal training colleges became the norm in the country.

With the advent of Internet and the rapid rise in the e-enablement of businesses, the domestic training segment made the shift to E-commerce based education in the late '90s. From a focus on main frames and Y2K related courses, there was a perceptible shift in favor of E-com courses. Web designing, Java scripting,

HTML and DHTML became the flavored recipes of the domestic training majors. During the year 1999-2000, the demand was rather high for Microsoft-certified professionals. An estimated 80,000 Indians earned this certification, a level that was dwarfed only by the US market. However, in the year 2000, there appears to be a slowdown, with current levels pegged at around 65,000. Despite this decline in demand, current reports indicate that the demand for certifications from Microsoft; Oracle, Lotus and SAP continue to top the list.

Table (5): Evolution of Majors

Period	Course Offerings
Late '80s- Late 90s'	Common Business Oriented Language (COBOL)
Late '80s- Current	Unix, C and Oracle
1990-Current	Windows, C++ etc
1995-Current	Java, SQL, HTML & E-Commerce
Current	. Net, C Sharp

(Source: Industry Sources)

The IT Training Demand-Supply Scenario

The IT training industry has been a witness to a period of sustained growth on account of a surge in demand for IT professionals and ever changing skill sets requirements. Revenues increased from around Rs 4,600.0 million in the year 1995-1996 to around 17,520.0 million during the year 1999-2000. This represented a share of around 7.0 percent of overall software industry revenues of Rs 261.0 billion.

Exhibit (20): The Indian IT Training Market, 1995-2000

Period	Revenues (Rs Million)	Percentage Growth
1995-1996	4,581.0	37.9
1996-1997	6,623.0	44.5
1997-1998	9,121.0	37.7
1998-1999	13,330.0	46.1
1999-2000	17,520.0	31.0

(Source: NASSCOM)

The Supply Side Dynamics

Over the years, India has witnessed a constant increase in the supply of IT professionals. From around 6,800 employees in the year 1988-1989, the supply has increased to over 0.4 million in December 2000. Over 0.1 million professionals (of the total 0.4 million) are employed by the software and services export industry. On the supply side, NASSCOM estimates for the year 2000-2001 are at around 122,000 workers and in the subsequent year, around 140,000 workers.

In terms of institutes that offer IT related courses, India has 6 IITs', 1 Indian Institute of Science and 4 IIITs'. Apart from these colleges, there are around 43 Regional Engineering Colleges (REC). However, in recent times, the number of colleges that offer courses such as Bachelor of Computer Applications (BCA), Master of Computer Applications (MCA), Bachelor of Sciences (B.Sc) and Bachelor of Engineering/ Bachelor of Technology (B.E/ B.Tech) has increased. During the year 2000, there were nearly 2,900 colleges that offered IT-related courses in the country.

Private Training Institutes- Creating The Byte Creators

While it appears that the current situation is one of over-supply, when factors such as the following are considered, the situation indeed changes,

1. Quality Of Professionals Graduating
2. Budgetary Constraints Of Formal Training Institutions
3. Outdated Syllabus Adopted In Formal Training Institutions
4. Lack Of Industry Orientation
5. Attrition Levels In The Industry
6. Changing Global Requirements

With increasing adoption of E-commerce technologies across the globe, the demand for IT professionals is on the rise. On the other hand, these markets are witnessing a tremendous shortfall in the number of professionals. This in turn is making majors from these markets to look at opportunities across the globe to meet their shortfall.

Consequently, only private training institutes can meet this gap on account of better access to technology and resources. The immense popularity of IT related programs and the increasing demand in recent times have resulted in a boom in the training industry. More and more players are entering this growing segment. Reports indicate that India had over 70,000 private training institutes across the country by the end of the year 2000. However, the attractiveness of the industry has resulted in a spew of fly-by-night operators offering several sub-standard courses.

A major trend that has been witnessed in the recent past is that of engineers and graduates from formal institutes pursuing programs offered by these institutes in order to reorient/ retrain themselves. In the long term, the role of such private training institutes is only likely to gain importance.

- Differentiation – A Lacking Feature Until Now

The Indian IT training segment has all this while been growing at a sedate rate largely on account of the sustained demand (spurred by the booming US economy). But for leaders such as NIIT, Aptech and SSI who have attempted to segment the market, the offerings have been pretty much the same. Differentiation existed to a very little extent only in terms of course duration or the pricing. With competition intensifying in recent times, players have started to focus on this crucial factor. For instance, unlike other majors who have been intent on the individual segment, Hewlett Packard (HP) is one major who has been focusing on the corporate training segment. Reports indicate that this division that commenced operations in India a year ago is likely to witness revenues of around US$ 1.0 million by the end of the current year (CY 2001).

HP's plans include the expansion of its center base to include cities such as Mumbai and Delhi, thereby increasing its centers to 10 by the end of the year. The major has also made plans to expand its course offerings to include Unix, OpenView, WAP, e-Speak, Linux, Broadvision, E-commerce and security. With its target audience essentially from the corporate sector, the company plans to opt for the E-learning medium soon.

The differentiation bug has bitten even smaller players. Globsyn Technologies is a notable player who has tried to differentiate from the biggies in the industry. The company has tried to differentiate itself by structuring its programs in a novel way. For instance, at the top-level, the company offers "Techno-campus" programs (software finishing schools). These schools offer students the opportunity to work on real life projects and on the latest range of technologies. Furthermore, the course also focuses on training the student in other crucial areas such as business communication, organizational behavior, finance, marketing etc. While volumes are likely to be on the lower side, margins are definitely higher in this segment.

In case of the volumes segment, the major has started its "Knowledge Pubs". These pubs are being positioned to compete with the traditional centers of other IT training majors. Unlike other majors who have adopted a brick-n-mortar strategy, Globsyn has adopted a click-n-mortar strategy. The company is offering students the option of either going in for the instructor-led-training (ILT) method or choosing the course through the Internet. This offers the student a great deal of flexibility both in terms of choosing the content and also in terms of paying capabilities.

With the ensuing slowdown and the resulting churning in the industry, a majority of the smaller players with rather undifferentiated course offerings will be forced to exit the industry. For instance, Wintech Computers, a recent upstart in the IT training segment has closed down its centers (around 14) in Chennai. A large number of its franchisees have lost huge sums of monies in recent times. Similarly, Chennai-based icom Technologies (India) Pvt. Ltd has closed down its operations. The company was offering courses in the areas of E-commerce, Java and other related areas. This trend is only likely to intensify in the future, resulting in the industry having only major players, who are able to differentiate, scale up and forge strategic alliances with global majors.

- *The Kids Segment- The Gates For Tomorrows Dells*

The Indian kids segment has been a fast growing segment since the late '90s and forecasts indicate that this trend is likely to continue in the near future too. The phenomenal growth witnessed by the domestic software sector has been the prime reason for this sudden spurt in the kids segment. This in turn has made several players including global ones such as Futurekids, Fourth R etc to foray into this segment. Others such as Computer Tots, Fastrackids etc have made plans to enter the domestic market. Amongst the existing players, NIIT Leda, Fourth R, BostonCyberkids, IT Kids are doing extremely well. For instance, NIIT Leda has over 100 family clubs, Fourth R has around 50 and is expanding rapidly, Boston Cyberkids has a presence across 29 cities. IT Kids that has adopted a sub-franchisee route has around 75 centers and has made plans to expand to around 300 centers in the near term. Furthermore, the company has also made plans to tie-up with various schools.

Advancements in technology have enabled teachers around the globe to opt for computers as a regular part of their training programs. At the same time, the tremendous potential offered by the IT industry in general has lured several parents in providing the best of IT education to their kids right from an early age.

At the same time, teachers are beginning to understand the drawbacks in the traditional teaching set up. Generally, the teacher assumes the level of intelligence as a homogenous factor and imparts knowledge accordingly. However, with varying levels of IQ amongst students, a standard teaching methodology isn't the best approach, especially in the case of subjects such as science, math etc. Such deficiencies can be removed with the use of multimedia applications. All these factors have accelerated the opening of kids training programs.

o Immense Potential- Luring Global Majors

With over 15 players, this segment is witnessing heightened activity in recent times. In terms of potential, India has around 35.0 million children in the age group of 3-14 years and this base is only likely to increase in the long term. Consequently, while short-term projections peg this market at around Rs 100.0 billion and in the long term, increase to around Rs 200.0 billion. With most of the state governments initiating IT-education programs across their states, these projections are likely to be met rather easily.

This in turn has attracted global majors in the education segment as well as IT giants to have a closer look at this explosive market. For instance, majors including Microsoft and Intel have announced plans for this segment. Intel, by way of its "Project Vidya" has taken a major lead in this regard. The company has already initiated this program in around 3 schools in the country (Delhi, Indore and Rangareddy district, Andhra Pradesh) along with the Government of India, Department of Education. The company's 2nd project involved the setting up of an Education Multimedia Center at the National Council for Educational Research and Training (NCERT) in Delhi. In early 200, Intel launched a major "Teach to the Future" program in Mumbai, New Delhi, Chennai, Bangalore, Hyderabad and Pune. In the near term, Intel plans to train around 10,000 teachers and extend the same to around 100,000 teachers over the span of around 3 years.

Similarly, Microsoft has forged partnerships with NIIT, Aptech etc in this regard. These companies are certified technical education centers of Microsoft and help the latter in developing special initiatives. The company along with NIIT in a joint effort with the Kerala state government worked on a program to impart IT education to around 900 teachers in the state. Hewlett Packard in mid 2000 formed an alliance with Sardar Patel Vidyalaya in Delhi to set up a computer lab at an estimated cost of Rs 1.75 million. The company has planned several other initiatives along the same lines. The school in turn is likely to extend the facilities to 5 other neighborhood schools.

More such global majors are interacting with various state governments to promote their educational initiatives. Domestic majors too aren't far behind. Companies have started to carve out separate divisions to address this nearly Rs 2.0 billion- Rs 2.5 billion market. For instance, NIIT recently established a separate division, K-12 to address this segment. The company has already bagged orders from the Tamil Nadu and Karnataka governments. Plans are on to implement the same in the state of Punjab too. Similarly, Aptech Ltd is in the process of implementing around 12 projects across various states, and forecasts revenues of nearly Rs 1.0 billion in the year 2001.

The Demand Side Dynamics

The employee (professionals) base of the IT industry has increased from nearly 0.3 million in the year 1998-1999 to over 0.4 million by the end of the year 2000. By the year 2002, demand is forecasted to surge by an additional 0.2 million. However, considering the current slowdown in the US markets, this demand is likely to taper marginally during the year 2001.

Exhibit (21): Demand Trends During the Period 1986-2001 (E)

(Values in Unit Numbers)

Year	Demand Levels in the IT Industry
1986	2,000
1991	20,000
1996	40,000
2001 (E)	90,000

(Source: NASSCOM- The IT Software and Services Industry in India, Strategic Review 2001)

South India led the way in terms of recruitment and accounted for around 43.0 percent of all such recruitment during the year 2000. This is understandable given the strong concentration of IT companies in this region.

The Much Needed Skill Sets

The demand for skill sets in the domestic industry during the short-term has always mirrored the trend in the overall information technology industry in the US and other markets. Consequently, in the mid 90s', courses focusing on ERP, database administration etc was much sought after. The dot com boom resulted in a drastic shift in demand to newer areas such as Internet, E-commerce technologies etc during the late 90s' and the early 2000. Subsequent to the dot Com crash, IT training majors have started to focus on a range of new platforms and technologies. Predominant amongst them is the Microsoft promoted .NET platform. Similarly, C# (C Sharp) is a new technology that is gaining prominence. The traditional courses such as C, C++, Unix, VC++, and Oracle etc made a comeback.

In terms of technologies, demand is strong in the areas of enterprise systems management, Linux, security and encryption. Domestic majors such as NIIT have started to foray into these emerging areas as well.

The US Slowdown and the Ripple Effect

While the effect of the US slowdown is already evident by the various earnings warnings issued by the software services majors, the training industry was generally thought to be immune to this phenomenon. However, recent trends indicate that even this segment of the knowledge industry hasn't been spared. The demand for short-term courses, generally buoyant when compared to the long-term courses has declined by around 60.0 percent in terms of volumes already. Furthermore, revenues contributed by such courses are likely to witness a decline of nearly 30.0 percent for the current year. On the whole, recent estimates indicate that training majors barring a few are expected to witness a decline in revenues by around 15.0 percent-30.0 percent during the current year.

The Internet-bubble burst has resulted in the demand for web-related courses falling out of favor in the current year. Internet programming and E-commerce courses focusing on web-designing, core java, scripting, E-commerce technologies, site server, WAP, XML etc are all witnessing reduced demand. Billing rates in the case of Java-related skills has declined by around 50.0 percent. At the same time, the attention has turned to newer technologies such as C Sharp (script language for Microsoft's .NET platform) and the old warhorses such as Oracle DBA, higher-end courses including Unix, C, C++, Oracle, networking etc are making a comeback. Also, others such as Computer-Based Training (CBT) and those related to the areas of print & publishing, advertising, filmmaking, games, virtual reality, entertainment etc are in demand.

However, with the current slowdown in the tech areas across the globe, issues such as an increase in outsourcing levels etc are likely to become clearer only over the next 3-4 quarters (later than mid 2002 2001).

Exhibit (22): Skill Sets in Demand during the Year 2000

(Values in Percentage)

Skill Sets	Percentage Demand
Programmers/ Engineers/ Analysts/ Computer Scientists	41.0
Internet & E-Commerce Applications	19.0
Network Specialists/ Developers/Communication Engineers	14.0
Database Administrators/ Developers	11.0
IT- Enabled Services	10.0
Digital Media and Technical Writing	5.0
Total	100

(Source: NASSCOM- The IT Software and Services Industry in India, Strategic Review 2001

Strategies Adopted by Majors

Market leaders including NIIT, Aptech and SSI have focused on creating greater brand equity and have leveraged their brand power to increase their student enrolments. Other strategies include rapid overseas expansions, strategic alliances with global majors thereby getting access to the latest technologies, curriculum etc and a steady transition to the software services segment. This transition has become imperative for majors to maintain above industry average growth rates and maintain their stock valuations.

- Focus on Branding and Innovation By Market Leaders

With a large number of players operating in the domestic market, it is crucial for majors to focus on branding. Indian majors have succeeded in branding and positioning their different programs across the populace. For instance, Aptech Ltd has spun off Arena Multimedia and Asset International from Aptech Ltd in order to differentiate its various brands. While Arena offers courses specializing in Multimedia-based design and creative courses, Asset focuses on software engineering career courses. Aptech on the other hand offers short-term certification courses. Aptech has also created its e-com@asset course in collaboration with IBM. Similarly, NIIT has also created its Swift, CATS and Futurz brands to differentiate its product offerings. SSI, the other major IT education provider in the country has also created its "Trilogy 2000" brand of courses.

At the same time, majors have also started to realize the importance of training professionals in the area of business management and soft skills as well. Consequently, they have started to combine their IT education programs with their management programs as well. For instance, NIIT combines its SWIFT programs along with the management programs offered by NIS Sparta, a division of NIIT. Similarly, First Computers has created programs such as First Accountant, First Executive etc that aims at this strategy.

In the future, creation of prominent brands will enable majors to differentiate themselves for the run-of-the mill players and increase their market presence.

- Software Services- The Greener Side of the Valley

With better margins and greater stock valuations enjoyed by software companies, more and more training majors have started to focus on this segment too. For instance, both NIIT and Aptech have increasingly started to focus on their software services divisions. This shift in business model is occurring largely on account of the declining growth rates being witnessed in the training market.

Exhibit (23): Software Services & Education Segment- A Comparison

(Values in Rs Million)

Year	Software Services Revenues	IT Training Revenues
1995-1996	41,900.0	4,581.0
1996-1997	63,100.0	6,623.0
1997-1998	100,400.0	9,121.0
1998-1999	158,900.0	13,330.0
1999-2000	243,500.0	17,520.0

(Source: NASSCOM)

From the current growth rates of around 30.0 percent-35.0 percent per annum, the training market is forecasted to slow down considerably at least in the near term. On the other hand, the growth in case of software services companies is likely to slow down to around 30.0 percent-35.0 percent from the 50.0 percent plus growth rates in the past. Such forays into the more lucrative software services segment by training majors is only likely to intensify in the future with players trying to become end-to-end solution providers. Yet another reason is the synergies possible between the training and software development segments. The training division offers a ready made in-house manpower base for the software development division.

- *Strategic Alliances- A Key Imperative For Success*

With most of the software products & packages, operating systems etc being developed abroad, it becomes imperative to form alliances to procure the same. Furthermore, in order to facilitate the knowledge transfer of the same, alliances are highly required. Access to the latest technologies both in terms of courseware and in terms of delivery medium is highly crucial to succeed in this business. Also, this provides them with the option of expanding their business vistas abroad. Already most of the Indian majors including NIIT, Aptech, SSI and others have alliances with global leaders such as Microsoft, Oracle, Cisco, Novell, and IBM etc. In the future, such alliances will increasingly become the norm in the industry.

- *Increasing Focus On Distance Education*

While private institutions have witnessed a constant rise in their enrollments during the past, there still seems to be certain reservations about recruiting graduates from such institutes. Companies typically prefer engineering professionals or MCAs vis-à-vis graduates from private IT training institutes. Even IT training majors such as NIIT, Aptech etc have a large share of engineers as a part of their human capital. This has resulted in a situation where both domestic and international companies prefer graduates from the IITs, RECs and the IIMs. This in turn has resulted in training majors increasingly forming alliances with recognized universities and offering integrated IT programs.

In addition, the likes of NIIT, Aptech, SSI etc despite their widespread presence are unable to reach a wider audience. This has thus enhanced the potential for distance education programs that offer the dual advantage of a recognized university degree coupled with a computer education degree. For instance, Edutech Informatics India Ltd has embarked on one such program. The institute has tied up with several universities to offer diploma, degree and honors degree courses in information technology through the distance education format.

By way of this arrangement, the student subsequent to completing the courses offered by Edutech still needs to pass the examinations conducted by the university to procure the degree. The major has forged an alliance

with the University of Mysore to offer a 3-year honors diploma in IT (HDIT). The program encompasses a wide variety of topics beginning from the basics to specialty topics such as CGI, Perl etc. The duration of the program is around 36 months at a cost of Rs 48,000.

Other alliances include one with the Utkal University. The course offered is a 3-year degree program in information and management (BITM). Students are given the option of choosing the topics that include software development, e-commerce and network engineering. Specialization is offered from the 2nd year onwards. While the entry level has been pegged at an undergraduate or 10+2 standard, the course fees is at Rs 60,000. Edutech also has alliances with over 40 universities across 26 countries. Global alliances include the one with the University of Cambridge for a diploma in Computer Studies (DCS).

REVENUE DRIVERS

Government Policies

The domestic software industry has rather been fortunate when compared to the other industries in terms of government policies and regulations. For once, the government was rather swift to understand the enormous potential of this sector and has been rather proactive in establishing a favorable climate to progress this industry.

Budget 2001 and its Impact

Budget 2001 definitely provided further impetus to the domestic software industry. The budget focused to a larger extent on globalization, enabling greater IT penetration etc. Some of the key features of Budget 2001 were

e) Profits Derived From Export Of Services Of Units Located In The STPs To Be Eligible For Deduction Like Other Export Income

All profits accruing from onsite services from units located in the Software Technology Parks (STPs) would be eligible for deduction, similar to that of other export revenues. Other units located outside these units would also be eligible for this benefit. This benefit comes into retrospective effect since the previous year.

f) Amendment To Section 10A/10B Of The Income Tax Act That Enables Listed Companies In The Export Processing Zone (EPZ), Export Oriented Units (EOU), Special Processing Zone (SPZ) Areas To Be Exempt From IT Even In The Case Of Change Of 51.0 Percent Ownership

The erstwhile Section 10A conferred a tax holiday for a period of 10 years on companies located in free trade zones (FTZ), electronic hardware technology park, software technology park (STP) or other special economic zone. A major condition for availing this exemption was that the assessee should not transfer ownership in the company in excess of 51.0 percent of total shareholding. The current budget has removed this anomaly. Still, this provision has been made applicable only to listed companies.

g) Increase In The FII Limits From 40.0 Percent To 49.0 Percent

Most of the IT companies have FII exposures below the 40.0 percent levels (the prescribed levels before the budget). This move however is likely to increase the liquidity of the companies in the bourses. At the same time, it still doesn't allow for majority stake. Consequently, Foreign Institutional Investor (FII) activity is likely to be minimal. Furthermore, with the high degree of uncertainty regarding the sustainability of revenue growth on account of the US slowdown, it remains to be seen if FII investments in companies will pick up in the short term.

h) Overseas Acquisition Limit Fixed At US$ 100.0 Million Or 10.0 Times Export Earnings, Whichever Is Higher

This had been a long pending demand of industry majors. With scale of operations, access to latest technologies and increased reach becoming key imperatives for success in the industry, this move will increase the rate of acquisitions in the industry. In addition, Indian companies will be allowed to invest upto US$ 50.0 million through the automatic route henceforth, with the constraint of a 3-year profitability record not being there. Consequently, domestic companies will be able to make decisions pertaining to the overseas markets at a greater pace. Furthermore, companies will be allowed to invest 100.0 percent of their American Depository Receipt (ADR)/ Global Depository Receipt (GDR) proceeds in the overseas markets from the existing level of 50.0 percent. This will again have a positive impact on the sector, albeit only in the long run.

i) 100 Percent Income Tax Holiday For The First 5 Years And A 30.0 Percent Deduction For The Next 5 Years In The Case Of Internet Service Providers (ISP) And Broadband Providers

Rapid development of the telecom and Internet infrastructure is vital for the continued growth of the domestic software industry. With more majors setting up their development centers in India, the demand for bandwidth is likely to explode. Furthermore, growth in the Internet penetration levels is forecasted to be exponential level. All this calls for a concerted effort by the government to encourage the players in this sector. Consequently, the aforementioned move is along the right direction and will provide the needed impetus in the long run.

j) Conferring The Status Of IIT On The University Of Rourkee And More Fund Allocation To IIT Guwahati And 43 Regional Engineering Colleges To Be Upgraded During The Course Of The Year. Educational Loan Scheme Formulated By The Indian Banks Association To Increase The Growth Of IT Education In The Country. 100 Percent Tax Exemptions To Contributions Made To Engineering Colleges

With the country becoming the major supplier of intellectual capital to the world, the pressure on the supply side has been building up. Already domestic companies are facing tremendous pressure on the human resources front. Employee costs and attrition rates in the industry were on the increase (until the current slowdown). Hence, the need to develop a larger base of human talent apart from the dependence on our Indian Institute of Technology (IITs) is paramount. This decision will enable the country to produce more high quality professionals, thereby meeting the demand of the global software industry.

k) Computerization Of All Government Departments By The End Of The Year 2002

All accounts, passport, customs, central excise and GPF offices are likely to be computerized by the end of March 2002. Estimates indicate that the average spend on computerization of such divisions to be around US$ 10.0 million. Consequently, the demand for both software and hardware products are bound to increase and translate into higher revenues for majors.

l) E-Commerce Transactions Kept Out Of The Tax Net

With the e-commerce industry still in a nascent stage, any moves to tax the same would have killed the same. This move to refrain the taxation of e-commerce transactions will enable the industry to grow at exponential levels in the long term.

m) Dividend Tax Reduced From 20.0 Percent To 10.0 Percent

Budget 2001 reduced the dividend tax and the surcharge on corporate tax from 20.0 percent to 10.0 percent. However, with most of the companies in the sector being rather poor dividend payers, this development is likely to have only a marginal impact on their bottom lines.

n) Two-Way Fungibility To Shares Of Domestic Companies

In a significant move, two-way fungibility was bestowed on the industry. By way of this development, converted domestic shares can be converted back to American Depository Receipts (ADRs') and Global Depository Receipts (GDRs'). This has been a long-standing demand of overseas shareholders and is likely to enhance their confidence in domestic companies. At the same time, the higher premiums enjoyed by stocks of domestic companies in the overseas markets will decrease and at the same time increase the liquidity of the ADRs/ GDRs.

o) ESOP Holders Of Foreign Companies Can Make Investments Abroad Up To US$ 20,000 Per Annum, Instead Of The Existing US$ 10,000 Every 5 Years

This development will largely benefit the companies with overseas listings. Employers under such circumstances will be able to offer more stock options to employees.

p) Imposition Of Tax On Profits Of Domestic Sales Of EOUs And Units In EPZs, FTZs, STPs Etc. Also, A Service Tax On Scientific And Technical Consulting Services, On-Line Information And Database Retrieval Services Will Be Levied.

This is probably the only area where Budget 2001 disappointed the industry. While export revenues of IT enabled services were exempted, revenues from domestic IT enabled services will be taxed. Hitherto, these units enjoyed a tax exemption level of 25.0 percent on their domestic sales. This is likely to have a marginal impact on the bottom line of majors.

Government Initiatives in the Human Resources Front

The possibility of not meeting the demand projections in the future has made the government to start thinking. Consequently, the Ministry of Human Resource Development has decided to double the IT students' intake in the premier institutes such as the Indian Institute of Technology (IITs) and the Regional Engineering Colleges (RECs) by the year 2001-2002 and triple the same by the year 2003-2004. Budget 2001 saw the government conferring the status of IIT on the University of Rourkee and agreeing the need to allocate more funds to IIT Guwahati. Furthermore, 43 Regional engineering colleges (RECs) are likely to be upgraded during the course of the year. Also, 100% tax exemptions to contributions made to engineering colleges.

The educational loan scheme formulated by the Indian Banks Association in the year 2000-2001 proposed a simplification of the existing loan application and documentation procedures. Furthermore, it also recommended zero security for loans up to Rs 0.2 million. With minimum eligibility criteria of a first class degree, the scheme takes care of the quality issue. The scheme has proposed a loan amount of Rs 0.75 million for studies in India and Rs 1.5 million for studies abroad. This is against the existing levels of Rs 0.5 million for the former and Rs 1.0 million for the latter.

In case of applications for loans up to Rs 0.2 million, the scheme has proposed 100 percent financing. In case of loans exceeding this limit, applicants will be required to provide 15.0 percent of the loan amount in case of domestic studies and 25.0 percent overseas studies. The proposed interest rate is the prime lending rate (PLR) + 1.0 percent for a loan amount exceeding Rs 0.2 million.

Also, the government has made plans to invest over Rs 27.0 billion by the year 2003 and triple the intake of students in IT-related departments in engineering colleges. This is part of the government's Operation Knowledge project that aims to make the country a global reservoir of human talent by the year 2008. This World Bank funded project seeks to increase the intake of IT engineering students to over 0.2 million from the existing 70,000-odd levels. Furthermore, the project also aims at enhancing the facilities in these institutions and providing superior infrastructure such as a bandwidth of around 2.0 mbps.

CLASS 2000- "No" Computers To "Know" Computers

The government initiated the Computer Literacy and Studies in Schools (CLASS) project in the year 1984-1985. The program was initiated on account of the aid offered by BBC Microcomputers. Around 12,000 computers were distributed to secondary and senior secondary schools across the country. Subsequently, the program was adopted as a part of the Centrally Sponsored program during the 7th five-year plan period (1993-1998). As a part of the 8th five-year plan, the scope of the project was enhanced to offer financial aid to the institutions that had received the BBC Microcomputers and also offer grants to other government-aided secondary and senior secondary schools.

While the centrally sponsored scheme has been terminated several state governments have initiated similar programs. At the same time, during the year 2000, the government proposed to revise the existing scheme and termed it " Computer Literacy and Studies in Schools (CLASS) 2000". The main objective of this scheme was to enhance computer literacy levels in schools across the country.

The State Efforts

With IT emerging as a major growth driver, most of the state governments have taken initiatives to promote the same. The focus has largely been on one hand to promote the growth of the industry in general across the states and at the same time increase the literacy levels across schools and educational institutions in the states. Here again, the southern states of Tamil Nadu, Karnataka and Andhra Pradesh have taken the lead to formulate policies to encourage the growth of computer literacy levels.

- Tamil Nadu- The Silent Revolutionary

From the year 1999-2000, the state government of Tamil Nadu has decided to offer Computer Science as an elective subject in all government higher secondary schools in the state. The Tamil Nadu government has been the first to initiate a statewide movement to incorporate IT training as a part of the curriculum in all government run arts and science colleges from the academic year 2000-2001. Such a move had already been completed in the case of all government run schools in the state during the previous year. This new project estimated to cost around Rs 750.0 million, will enable students to choose IT-related subjects as elective subjects. Estimates indicate that over 150 colleges with an estimated 30,000 students will be covered under this program.

- Gujarat- Showing the Way

Gujarat is yet another state that has taken the initiative in encouraging IT education in the state. The government has made computer education a compulsory subject since the 7th standard and has also prescribed a detailed syllabus for each standard. Schools in the state have been permitted to collect additional fees of around Rs 50.0 per student. The hardware and the software are being supplied by the central government, while the recruitment of teachers continues to be the responsibility of the respective schools.

Apart from such initiatives privately funded schools across various states have started to introduce computer education even from the elementary levels. Extra fees are charged for students opting for computer education. Furthermore, the Central Board for Secondary Education (CBSE) has introduced computer education as a part of the regular curriculum for students in the higher secondary classes. Also, some of the schools that have started Vocational Educational Programs (VEP) have incorporated computer education as a part of the 12th standard curriculum.

The Information Technology Act 2000

The Information Technology Act 2000 (IT Act 2000) that was passed in August 2000 provides the regulatory framework for cyber laws in the Indian context. However, issues such as privacy, content, intellectual property rights (IPR) are not covered by this act. These issues will be governed by the necessary amendments that are likely to be made to the Indian Copyright Law, 1957. Some of the salient features of this act include,

1. Authentication of Electronic Records by Digital Signatures

Chapter-II of the act facilitates the authentication of an electronic record by way of digital signatures. It also permits the usage of a public key (of the subscriber) by any person to view the contents of an electronic record.

2. Legality of Digital Signatures

Chapter III of the IT Act 2000 recognizes the validity of digital signatures. The chapter also provides details on e-governance.

3. Regulation of Certifying Authorities

Chapter IV of the act stipulates a scheme for regulating the various certifying authorities. The proposed structure includes the creation of a Controller of Certifying Authorities. This authority will supervise the functioning of the various certifying authorities and set the standards and rules in this regard. The act also stipulates details on the issuing of licenses to foreign certifying authorities.

4. Digital Signatures

Rules pertaining to digital signatures are presented in Chapter VII of the IT Act 2000. This chapter also covers the duties of the subscribers.

5. Penalties and Adjudications for Various Offences

Chapter IX of the act gives details on the penalties and adjudications for various offences. For instance, damages to computers, computer systems are likely to be compensated to a maximum amount of Rs 10.0 million. Furthermore, an officer of rank not less than the rank of a Director to the Government of India or an equivalent in the State government shall be appointed as the adjudicating officer to determine whether any of the acts have been contravened. This adjudicating officer will be given the powers of a civil court.

6. Creation of a Cyber Regulations Appellate Tribunal

The act (Chapter X) envisages the creation of a Cyber Regulations Appellate Tribunal that will facilitate the hearing of any appeals made against the rulings of the adjudicating officer.

7. Offence Related Issues

Chapter XI of the act deals with the various offences and related issues. The act mandates the investigations of such offences only by a police officer not below the rank of a Deputy Superintendent of Police (DSP). Some of the offences listed include the tampering of computer records, publishing of obscene information and hacking.

8. Creation of a Cyber Regulations Advisory Committee

The act also envisages the creation of a cyber regulations advisory committee to offer its advice on rules and other issues pertaining to the act to the government. Proposed amendments include that of the Indian Penal Code, 1860, the Indian Evidence Act, 1872, The Bankers' Books Evidence Act, 1891, The Reserve Bank of India Act, 1934 in order to make these acts in sync with the IT Act 2000.

Implications of the Act

The enactment of the Information Technology Act 2000 reflects a marked departure in the stance adopted by the government, a move from being rather reactive only to developments to that of being proactive. This propels India amongst a select club of nations that have similar policies in place (the US, Europe etc). This act assumes greater significance at a time when E-commerce is slated to grow across the globe. India can't afford to be left behind in this transformation. The law envisages the ushering in a new era of e-governance (subject of course to the speedy implementation of other related policies), thereby empowering the citizen to a greater extent.

With more and more business communication being essentially through the e-mail medium, the recognition of this channel as a means of legal communication was vital. This act aims to recognize the same. This will in turn enforce a sense of security and accountability between parties entering into any kind of understanding.

Also, with digital signatures becoming valid forms of authentication, e-commerce activities get more sense of security and authenticity. In a related move, this also facilitates the entry of players to act as Certifying Authorities to issue digital certificates.

The act also seeks to reduce the level of paperwork between government departments and companies by acknowledging the electronic format as a valid medium. Consequently, companies and government departments to file any application, documents etc to the concerned authorities in electronic format that is recognized and accepted (by the authorities). This is likely to speed up the process of clearing, authorizing and sanctioning of new projects etc.

With cyber crimes on the rise, the act offers a viable protection and compensation to corporate subject to a maximum of Rs 10.0 million. This is likely to increase the comfort levels of corporate India.

The Software Products Segment

The products segment represents a key jump in the value chain in the industry. While only a handful of majors such as Hughes Software Systems focus on this area, this segment offers a great deal of potential. Some of the major revenue drivers in the future include,

1. The Telecom Software Segment – India Rings a Bell

The telecom networks across the globe represent one of the fastest growing end-users of software products and applications. One of the major reasons for the success of the offshore model in the domestic context has been the rapid improvement in the telecom capabilities in the country. In recent times, the software industry has developed a synergy with the telecommunication industry. Consequently, the telecom industry that was hitherto been dominated by the hardware equipment is fast transforming to being dominated by the software industry. Recent estimates indicate that around 50.0 percent-65.0 percent of the costs of telecom products are accounted for by software.

Also, the hastening convergence of the IT, telecom, entertainment sectors is presenting great opportunities for domestic players to create new software/ applications. This in turn is likely to increase the competition in the equipment segment, with players trying to enhance their software capabilities. Hence, this segment will witness a lot more strategic alliances in the near future.

2. The Embedded Software Segment – Leaving an Impression

Globally, there has been a constant growth in the level of embedded devices across industries. For instance, in case of automobiles, typical applications include the deployment of the airbags, fuel injection, global positioning systems (GPS) etc. Other major areas of applications include the wireless data applications, m-commerce, control systems in the case of various appliances etc. While the demand for such services and solutions was an estimated US$ 41.0 billion in the year 1999-2000, this market is forecasted to explode to around US$ 70.0 billion by the year 2002. Consequently, this will trigger the demand for software to enhance the level of intelligence in these devices. The growth opportunities for the domestic majors are aplenty. With phenomenal growth levels forecasted for mobile devices penetration in the Indian market, development of applications and solutions will also witness a faster growth rate.

3. Software Components – A Small But a Growing Segment

Recent estimates peg the global software components industry at around US$ 681.0 million and this segment is forecasted to increase to nearly US$ 2.7 billion. This high growth segment has caught the attention of domestic majors such as TCS, Infosys etc. At the same time even start-ups such as Persistent Solutions and iSoly are also targeting this segment. Despite such a potential, this segment had not caught off in a big manner in the past. This was because domestic companies were risk averse. Huge investments initially and subsequent development of the market was not a strategy that many companies were willing to take.

However, all this is fast changing and software is getting more component-based. With software accounting for around 60.0 percent of any system, the complexity of code is only increasing. Consequently, no single company can generate all its coding requirements by itself. This is fueling the demand for software component companies. Also, margins in this segment are far higher at around 35.0 percent-70.0 percent. Furthermore, off-the-shelf packages typically don't meet all the requirements of the user.

The Software Services Segment

Software services are an area that domestic majors have made a mark at the global level. However, this is just the tip of the iceberg with a majority of companies focusing on maintenance kind of projects. This segment offers a great deal of potential in the global market. In case of the domestic market, two major factors are likely to fuel the growth in this segment. They include the impending computerization of domestic banks and E-Governance.

1. The Impending Computerization of Domestic Banks

NASSCOM estimates for the year 1999-2000 indicated that only around 30.0 percent of all banks in the country were computerized. This rather low level of computerization amongst domestic banks indicates the high degree of potential that is waiting to be tapped by software majors. E-banking is fast catching up across the globe. Already, private and foreign banks have started to tap these new developments and are moving rapidly into technology-friendly financial service providers.

Tech savvy banks are tapping multiple channels to cut costs and improve customer satisfaction. The relative cost per transaction through E-banking is estimated to be only 12.0 percent of the cost that is incurred through branch networking. Also, it is likely to result in a more customer-centric approach. The trend of adopting new technology has caught on the attention of a number of banks, including public sector major, State Bank of India (SBI). The bank has planned to join the payment network provided by Global Telesystems, along with Corporation Bank and Bank of India. This initiative is expected to facilitate real-time online inter-bank fund transfers and settlement over the web.

2. E-Governance

Electronic Governance (E-Governance) is the process of using information technology to enable the government to work in a more transparent and efficient manner. Globally, e-governance is assuming importance. In the domestic scenario, while a lot has been talked about in this area there still requires a lot to be done. The Andhra Pradesh government has been a steadfast implementer of this concept and has been a pioneer of sorts in the domestic context. Some of the key features of this concept include,

a) Greater level of information to the citizen thereby enhancing his awareness
b) Create a more easier medium for citizens and their elected representatives to interact
c) Encouraging the citizen to contribute in terms of ideas, conduct debates etc to improve the administrative process

NASSCOM projections peg the investments in this area by the State and Central governments during the year 2001-2002 at Rs 40.0 billion. By the year 2007-08, this segment is likely to witness investments of around Rs 250.0 billion.

Exhibit (24): E-Governance Investments in India During the Period 1999-2002 (P)

(Values in Rs Billion)

Year	Investments	CAGR (%)
1999-2000	14.0	-
2000-2001 (E)	25.0	78.6
2001-2002 (P)	40.0	69.0

(Source: NASSCOM- The IT Software and Services Industry in India, Strategic Review 2001)

While the going has been rather slow, this is an area that offers software majors tremendous opportunities in terms of large-scale computerization, creation of new software packages, training etc.

The IT Training Segment

Despite the current slowdown, the market for information technologists is likely to grow in the future. Global shortage of IT professionals, rapid computerization in the domestic environment, need for new software packages etc will constantly need a large pool of qualified brain power. Consequently, the training segment will be required in a greater degree in the coming years. Some of the prominent revenue drivers for this segment include,

1. ***E-Learning- The key to the Future***

With the offshore concept gaining importance in the global software industry, projects typically involve cross-functional teams to carry out various modules. With varying levels of competency, it is but difficult for traditional training methods to take care of such problems. Consequently, the need for real time, on-line learning solutions becomes highly imperative. Recent market studies project technology-based training systems to grow at around 50.0 percent per annum through the period 2002. Web-based training is projected to emerge as the leader in the future.

2. Attrition in the Industry- Fuel for More Training

The IT industry in general witnesses a higher degree of attrition when compared to other sectors. During the year 2000, estimates pegged the attrition level at around 16.0 percent. This represented a marginal increase from the 1999 levels of around 14.0 percent. While switching over of jobs both in the domestic and overseas markets is a major reason for these high levels, this also necessitates the constant upgrade of skill sets. This in turn acts as a major driver for the IT training industry.

Other Major Revenue Drivers

a) Rising Literacy Levels

Notwithstanding the fact that a large population of India still continues to live in the village, the literacy rates in the country has steadily increased from 18 percent in 1951 to 52 percent in 1991. This trend continued through the '90s and is currently at around 64.0 percent. Rising literacy levels are crucial for the creation of a sound technical manpower pool. At the same time, this huge base needs constant training both in terms of preliminary IT-related skills and also constant re-skilling. Thus, the huge population base coupled with rising literacy levels will act as a major revenue driver for this industry.

b) Greater Penetration of PCs

With the PC penetration in India having crossed just the 5 million mark by the end of 2000, there still lies a huge potential market. The 250.0-million strong middle class populace will largely drive this growth. Rising PC penetration levels will result in additional demand for packaged software applications. Also, the likely implementation of e-governance initiatives will in turn drive the demand for more PCs, which will in turn drive the demand for vernacular software packages.

c) Wireless Internet Applications

By 2005, more than one billion Internet-enabled cellular phones will exist worldwide within five years, enabling viewers to access Internet-based programs more easily. With increased wireless access and availability of broadband, there will be growth in the number of new "Internet appliances". These new appliances will require the creation of a new range of software programs/ applications etc.

d) Declining Piracy Levels

Constant initiatives by NASSCOM have resulted in the domestic piracy levels decline from around 89.0 percent in the year 1993 to nearly 60.0 percent in the year 1999. In the future, with increasing consumer awareness and more stringent regulations, piracy levels are bound to decline. This in turn will provide greater impetus to the domestic software industry.

FIGURES THAT MATTER

Infosys Technologies had yet another stupendous year for the period ended March 2001. Revenues grew by around 115.0 percent when compared to FY 2000, while net profits increased by around 114.0 percent. Revenues grew from Rs 8.8 billion in March 2000 to around Rs 19.0 billion for the recently concluded year in March 2001. Net profits increased to Rs 6.3 billion during the same period. Adjusted operating profit margins were over 37.0 percent and adjusted net profit margins were around 30.0 percent.

The company's strong relationships with Fortune 500 companies enabled it to grow at a sustained basis. More commendable was the kind of repeat business the company got during the year. During the year 2000-01, the company had a repeat business level of around 85.0 percent. During the same period, the company added around 122 new clients, thus taking the total clients for the year at around 274 clients. Despite slowdown worries and the collapse of the tech economy in the US, Infosys was active in its recruitment levels. During the year 2000-01, the company recruited around 4,442 employees.

Wipro Ltd witnessed a growth in revenues from Rs 23.6 billion in the year 1999-2000 to around Rs 31.4 billion in the year ended March 2001, a growth of around 33.0 percent. Net profits more than doubled from Rs 2.4 billion to Rs 6.6 billion during the same period. This was the highest growth in net profits over the past 10-year period. Adjusted operating profit margins were around 23.0 percent while adjusted net profit margins were around 19.0 percent in the year 2000-01.

Revenues from global IT services and domestic IT services grew by around 70.0 percent (Rs 17.5 billion) and 3.0 percent respectively during the year 2000-2001. The company added around 114 new clients during the year. These new clients contributed around 9.0 percent of global IT services revenues.

Effective September 2000, Wipro spun off its manufacturing and distribution lines of peripherals to Wipro ePeripherals Ltd for a consideration of Rs 271.0 million. This resulted in a gain of Rs 16.0 million and has been reflected as an extraordinary item.

Satyam Computer Services Ltd witnessed an increase in the income from software services from Rs 6.7 billion in the year 1999-2000 to around Rs 12.2 billion in the year 2000-2001. Net profits during the same period increased from Rs 1.3 billion to Rs 4.9 billion. While onsite revenues contributed around 39.0 percent, offshore revenues contributed an additional 57.6 percent while offsite revenues contributed the remaining. North America continued to be the largest contributor with a share of around 76.5 percent. Europe and Japan contributed around 12.6 percent and 3.6 percent respectively.

As of March 31st 2001, the company had around 8,370 associates. This represented an increase from the March 2000 levels of around 5,067 associates.

NIIT witnessed a decline in global revenues from Rs 12,371.0 million in the year ended September 2000 to around Rs 11,389.0 million in the current year ended September 2001. This represented a decline of around 8.0 percent. The global learning solutions segment witnessed a decline from Rs 6,252.0 million in the year 2000 to around Rs 5,092.0 million in the recently concluded year. Software services revenues grew by around 18.0 percent to Rs 4,870.0 million during the year 2000-2001.

NIIT Ltd, the Indian operations witnessed a similar drop of around 8.3 percent in its revenues to Rs 6,875.0 million. Operating profits were an estimated Rs 1,102.0 million, a steep drop from the previous year's levels of around Rs 2,611.0 million. Net profits plummeted by over 57.0 percent to Rs 960.0 million. This poor performance was attributed to the depressed billing rates situation in the industry and the dismal business environment for some of the company's key clients including British Airways.

The results given below for **Aptech Ltd** are for the year ended December 2000 and are compared to the previous year ended December 1999. During this period, the company witnessed an increase in global revenues by around 47.0 percent to Rs 5,777.6 million. Revenues from operations in the case of Aptech Ltd, the Indian arm, increased from Rs 3,665.1 million in the year ended December 1999 to Rs 4,663.4 million for the year ended December 2000. Net profits during the same period in case of Aptech Ltd, increased from Rs 510.8 million to Rs 815.3 million. Depreciation costs grew by nearly 74.0 percent to Rs 336.1 million due to a capital expenditure of Rs 1.3 billion during the year 1999-2000.

During the year, the company acquired Specsoft Consulting Inc., a US-based software consulting company. This acquisition is likely to benefit Aptech's software division as the US-company has expertise in the areas of Unix/ NT system software; networking, telecom and other emerging web related areas. The company also acquired Turbograd.Com Inc., a US-based company focusing on the e-learning segment.

SSI Ltd, the Chennai-based Software major registered sales of around Rs 4,105.1 million for the year ended June 30th 2001 as against Rs 1,975.2 million registered in the year ended June 30th 2000. This represented a growth of nearly 108.0 percent. Operating profits during the same period increased from Rs 713.0 million to Rs 1,017.6, a growth of nearly 43.0 percent. Net profits declined marginally by around 2.0 percent to Rs 558.0 million during the year 2000-2001. While the training business contributed around 56.0 percent of all revenues, the technologies division and the enterprise support divisions contributed 40.0 percent and 4.0 percent of total revenues.

The company registered an increase in student enrollments (82.0 percent) during the year ended June 2001. The number of training institutes also doubled to around 674 centers. E-business related programs accounted for a major share of training revenues with a share of around 42.0 percent. Integrated programs contributed another 26.0 percent of training revenues during the year 2000-2001. In case of SSI Technologies, the financial services and e-business domains contributed the major share of revenues with around 24.0 percent. Securities contributed another 23.0 percent of revenues.

VisualSoft Ltd witnessed an over 93.0 percent increase in total income to Rs 1,313.6 million for the year ended March 31st 2001. Growth in net profits was even more impressive at 177.6 percent to Rs 617.8 million during the same period. However, while product revenues increased by 86.0 percent on a year-on-year basis, revenues from this segment declined by around 39.0 percent sequentially (Q4 versus Q3 2001). This was largely due to the sharp cutback in IT spending in the US market. Operating profits increased from Rs 303.5 million in the previous year to Rs 642.7 million in the year ended March 31st 2001. Products accounted for around 47.3 percent of revenues during the year 2000-2001. Internet-related technologies accounted for 89.0 percent of solutions revenues while client server and other technologies accounted for around 11.0 percent of solutions revenues.

Geometric Software and Solutions Ltd (GSSL) witnessed an increase in sales from Rs 321.3 million in the year ended March 31st 2000 to Rs 448.7 million in the year ended March 31st 2001. Operating profits increased from Rs 95.3 million to Rs 103.5 million during the same period. However, profit after tax plummeted from Rs 202.2 million to Rs 88.6 million in the same period. This was largely due to a sharp rise in the sales and marketing expenditure of the company from Rs 23.31 million in the year ended March 31st 2000 to Rs 65.2 million in the year ended March 31st 2001. Also, in the previous year ended March 31st 2000, the company had an extraordinary income due to the interest earned on public issue funds to the tune of Rs 236.9 million.

(Values in Rs Million)

Parameter	Year Ended	Infosys Technologies Ltd	Wipro Ltd	Satyam Computer Services	NIIT	Aptech Ltd	SSI Ltd	VisualSoft	Geometric Software Ltd
Sales	2001	19,006.4	31,365.4	12,199.9	6,875.0	4,663.4	4,105.1	1,313.6	448.7
	2000	8,843.5	23,600.5	6,728.1	7,499.0	3,665.1	1,975.2	679.9	321.3
% Change		114.9	32.9	81.3	(8.3)	27.2	107.8	93.2	39.6
Other Income	2001	593.1	642.2	216.8	233.0	127.9	268.1	42.4	20.3
	2000	371.2	239.9	57.0	191.0	57.2	152.1	22.6	11.8
% Change		59.8	167.7	280.3	22.0	123.6	76.2	87.6	72.0
Profit Before Depreciation, Interest and Tax (PBDIT)	2001	7,654.9	7,906.5	4,451.7	1,102.0	1,215.4	1,017.6	642.7	103.5
	2000	3,421.8	4,191.3	2,466.7	2,611.0	814.1	713.0	303.5	95.3
% Change		123.7	88.6	80.5	(57.8)	49.3	42.7	111.8	8.6
Interest & Finance Charges	2001	5.9	71.4	345.2	-	42.8	73.1	0.3	0.2
	2000	4.2	286.7	406.8	-	69.7	36.8	0.1	0.5
% Change		40.5	(75.1)	(15.1)	-	(38.6)	98.6	200.0	(60.0)
Depreciation	2001	1,128.9	979.4	964.6	359.0	336.1	323.6	40.2	36.2
	2000	532.3	698.5	710.2	354.0	193.4	149.1	22.0	23.1
% Change		120.8	40.2	35.8	1.4	73.8	117.0	82.7	56.7
Tax	2001	713.1	914.0	184.5	91.0	141.7	196.1	6.8	-
	2000	394.6	432.4	60.0	144.0	95.1	126.1	7.5	91.6
% Change		80.7	111.4	207.5	(36.8)	49.0	55.5	(9.3)	-
Profit After Tax (PAT)	2001	6,288.1	6,574.2	4,862.8	960.0	815.3	558.0	617.8	88.6
	2000	2,935.2	2,430.6	1,300.0	2,242.0	510.8	569.3	283.7	202.2
% Change		114.2	170.5	274.1	(57.2)	59.6	(2.0)	177.6	(56.2)
Adjusted Operating Profit Margin, OPM (%)	2001	37.1	23.2	34.7	12.6	23.3	18.2	48.9	18.5
	2000	34.5	16.7	35.8	32.3	20.6	28.4	41.3	26.0
Adjusted NPM (%)	2001	30.0	18.9	38.1	10.6	14.7	7.1	43.8	15.2
	2000	29.0	9.3	18.5	27.3	12.4	21.1	38.4	59.2

[Note: Adjusted OPM (%)= (PBDIT-Other Income)/ Sales and Adjusted NPM (%)= (PAT-Other Income)/ Sales.

1. ***The year ended 2001 and 2000 for Aptech Ltd actually refers to the year ended 2000 and 1999 respectively as the company has its year ending in December. All other results pertain to the years 2001 and 2000 only***
2. ***NIIT Ltd has its year ending in September***
3. ***SSI Ltd has its year ending in June***
4. ***All other companies have their year endings in March***

CRYSTAL GAZING

The North American, Western European and Asia Pacific markets are likely to dominate the IT industry in the future too (over 85.0 percent of global IT spending). More importantly, the share of Asia Pacific is likely to witness an increase by the year 2005 of the total global IT spend of around US$ 1.7 trillion (from 20.8 percent in the year 2001 to over 22.8 percent by the year 2005).

In terms of services, in case of developed markets, the spending on high-end areas such as the integration of the legacy systems with newer Enterprise Resource Planning (ERP) systems etc will be higher. Spending on this transition will typically be lower for other lesser-developed markets. However, software services are likely to garner a larger share of the spending pie in the years to come both in the developed and developing markets. Consequently, by the year 2005, services are forecasted to account for nearly 39.5 percent of the overall software spending in the North American market. Similarly, the share of software is also projected to increase from the current level of 21.0 percent to nearly 26.0 percent during the same period.

In case of Western Europe, IT spending is forecasted to grow at nearly 9.5 percent per annum through the year 2005 to US$ 422.0 billion. Germany is forecasted to remain as the single largest market in Western Europe with an overall IT spending level of nearly US$ 100.0 billion. Similar to the North American market, software services are likely to emerge as the largest category of IT spending.

The Asia Pacific region is forecasted to emerge as the fastest growing region (12.0 percent per annum through the year 2005). IT spending levels are projected to increase from the current US$ 249.6 billions to around US$ 388.0 billion by the year 2005. India and China are likely to be the major catalysts of this high spending.

Unlike the developed markets, the hardware segment will dominate the spending mix in the Asia Pacific region through the year 2005 (US$ 233.0 billion). However, software and services segments are forecasted to grow in size and account for a share of around 14.0 percent (US$ 56.0 billion) and a share of nearly 26.0 percent respectively (US$ 100.0 billion) by the year 2005.

Domestic Market – The Future

Domestic majors have focused for a long time on low-level areas such as maintenance. Only now have majors started to move into other areas such as E-commerce etc. The future holds good prospects only for companies that quickly move up the value chain into high risk-high margin areas such as products, consulting, complete implementation of projects etc.

The ensuing slowdown offers domestic companies a tough and a challenging time ahead. While billing rates are likely to be under pressure, Indian companies are likely to benefit from greater levels of outsourcing. In the near term, India's advantages such as low cost of skilled labor, high degree of efficiency in project implementation, superior quality levels etc will stand in good stead.

Also, domestic companies have all this while focused on organic growth. This strategy is unlikely to work in the future, especially with no ascent up the value chain. But for a few consolidation attempts like SSI Ltd's acquisition of Albion Orion, the industry has seen very few successful acquisitions. Domestic companies need to be more aggressive on this front to sustain their historical high growth rates.

While domestic majors seem to have a considerable mind share in the US$ 700.0- US$ 800.0 billion software services industry, in the products market that is estimated at around US$ 120.0-US$ 130.0 billion, their presence is abysmally low. According to NASSCOM-Mckinsey projections, the domestic market for software and services is likely to be US$ 18.0 billion by the year 2008. Products are forecasted to account for around US$ 1.9 billions of the domestic market during the same period. In addition, re-sale of products is forecasted to contribute an additional US$ 7.8 billion. In order to achieve this target, a lot more needs to be done.

At the same time, majors have started to realize the potential in the global products market and have initiated strategies to focus on this lucrative segment. Nevertheless, the going has been rather slow. While companies perceive the need to move up the value chain, instead of migrating to products (that is more riskier), companies have adopted the safer strategy of migrating to high-end services.

Success in the products segment involves a great deal of investments in the initial phase of development. Also, companies need to have an extensive marketing set up across the global markets. With domestic majors weak in these areas, companies need to look out for strategic alliances with global leaders in order to fund their initial investment needs and enhance their reach. This would result in a win-win situation for domestic majors as the major portion of the risk associated with the product development is borne by the global major while the Indian companies leverage on their intellectual capital.

Another area that needs a lot of focus is a comprehensive and more aggressive branding policy. While majors such as Infosys, Wipro, and Tata Consultancy Services etc have earned quite a reputation in the services segment, global majors recognize only these companies and not any of their products. This needs to be changed in the future for India to become a major player in the product segment too. Also, typically, success in the products segment is possible only in the presence of a highly efficient sales and marketing network. In case of global companies, the level of interaction between the product management, development and marketing team is rather high. Typically, domestic firms excel in operational and technical skills and are rather weak in terms of vision and marketing related aspects. Of late, domestic companies have started to establish their marketing offices in the US and European markets, however, a far more aggressive approach is called for in this regard.

The Indian IT education industry is currently in a state of turmoil. While growth rates have always been moderate when compared to the software sector, the global technology slowdown has resulted in a decline in growth rates. This is probably the biggest factor that is likely to have an impact on the fortunes of players in the short-term. Several students are likely to re-strategize their outlook of the hitherto exponentially growing software sector. Already, market reports indicate that student enrolments have begun to decline. While a certain degree of this slowdown could be attributed to the inherent seasonality of the business, the macro economic effects can't be ruled out. Furthermore, growth projections for the current year have been halved from the earlier 40.0 percent estimates. Both prospective students and their parents are less than eager to enroll for an expensive program at these institutes. Consequently, majors are being forced to offer increased scholarship amounts to attract new registrants. Conversion rates are fast hitting a new bottom as the months pass.

If the NASSCOM- Mckinsey projections of US$ 18.0 billion (domestic market) for the year 2008 are to be met there needs to be a relook both at the current supply levels and the quality of manpower supplied. Forecasts peg the requirement at around 570,000 professionals by the year 2008.

All along a majority of training institutes have focused only on increasing their student base, not worrying about the quality of the intake and the resultant product. This temporary slowdown, thus gives the majors the opportunity to set right their selection processes both for students and for their faculty.

Consequently, majors need to reorient their curriculum in sync with the changing scenario. This development has already begun and is in fact only likely to intensify in the future. For instance, Aptech Ltd is focusing on offering a range of emerging technologies as a part of its curriculum rather than continuing with the older technologies. The major has started to develop a curriculum based on the .Net platform and other networking technologies. Similarly, NIIT too is reorienting its curriculum. At the same time, the major continues to invest huge sums towards brand building exercises. This in turn calls for ready access to the latest technologies and the ability to be ahead of the technology curve. Consequently, the future will mandate the forging of global alliances.

Unlike, in the past when state governments were populist in nature, today a majority of them have understood the advantages of the IT industry in general. Consequently, most of them have come up with their own IT literacy plans for their states. Most of these programs are in line with the recommendations of the IT Task Force that focused on enhancing the IT literacy levels at the school levels. Furthermore, the planned computerization of government departments presents an additional attractive area of opportunity.

Overall, the prospects for the software industry remain rather bright. The industry is likely to grow at high growth rates (when compared to other sectors) in the near term. However, external factors such as a prolonged war in Afghanistan, a prolonged slowdown in the US economy and a contagion to other global markets etc will definitely have an impact on the fortunes of the domestic majors. This downside will continue to exist till majors and the government adopt aggressive steps in addressing the domestic market.