

Introduction

On June 24, 2004, the US presidential candidate John Kerry in his speech in San Jose urged that the Bangalore phenomena should be replicated and the entire USA need to be networked. Even though his observation may be far from ground reality but the fact remains that Bangalore commands international brand equity. Bangalore is house to the bulk of knowledge based industries and attracts the best talent world over.

Recently, Vietnam and other ASEAN countries have shown interest in the development of IT clusters similar to Bangalore citing that if a small city could do so than it could also be possible for a small nation. Singapore has made conscious efforts to develop itself as a knowledge nation. In the Indian context, people recognize Bangalore's contribution to exports, its development as a high end knowledge industry but some policy planners feel that ICT is not enough to address development issues even though its contribution to exports and GDP is high. Thus, it is extremely important to examine the output and outcome of ICT sector in the economic and social development context.

It is also important to examine why developed nations may be interested in becoming completely networked and why they spend approximately 2-6 per cent of the GDP to become networked. In this context, it is important to explore the benefits that these nations derive along with any empirical evidence relevant to these countries or specific to India that may support these claims. IT spending as a per cent of GDP in the case of Australia, China, South Korea, Japan, United States and United Kingdom ranges between 5.3 to 6.5 per cent; why would these progressive, cost and growth conscious countries spend lavishly to get networked? Obviously, there are significant tangible and intangible benefits and international literature cites important intangible benefits of ICT -

- can be a powerful enabler of development goals because its unique characteristics dramatically improve communication and the exchange of

information to strengthen and create new economic and social networks.

- is *pervasive and cross cutting* as it can be applied to the full range of human activity from personal use to business and government. It is multifunctional and flexible, allowing for tailored solutions—based on personalization and localization—to meet diverse needs.
- facilitates *disintermediation*, as it makes it possible for users to acquire products and services directly from the original provider, reducing the need for intermediaries. This cannot only be a considerable source of efficiency, but has in fact been one of the factors leading to the creation of an alternative development paradigm that skips the formation of co-operatives and self- help groups.

It is thus very evident that ICT has the potential to bring in multiple benefits in the areas of governance, integration of marginalised sections, development of rural areas profitably, and productive improvement in major sectors of the economy. This would provide the much-needed forward linkage by adding value to information for using it as an enabler that has been discussed widely in literature. What needs to be tested are these various hypotheses that evaluate the role of ICT and its contribution to and impact on the Indian economy.

In chapter 2, a factor analytic method has been used to develop the e-readiness index, which measures the e-readiness of states and is consequently used to rank the states. The main purpose of this modeling exercise is to quantify the levels of achievement of each state in terms of their e-readiness index (composite) based on certain relevant characteristics. This exercise is based on the following three premises:

- There are three important stakeholders to consider in the development and use of ICT: individuals, business and governments;

- The degree of usage of ICT by (and hence the impact of ICT on) the three stakeholders is linked to their degrees of readiness (or capability) to use and benefit from ICT
- There is a general macroeconomic and regulatory environment for ICT in which the stakeholders play out their respective roles.

The logical underpinning being the environment for ICT offered by the concerned State governments, the readiness of the key stakeholders (individuals, businesses and government) to use ICT and finally usage of ICT by these various stakeholders.

Chapter 3 considers the relationship between important outcome variables of e-readiness and their main drivers. The purpose was to find out the important policies for driving IT developments at the state level. For instance, the states still lagging behind in terms of e-readiness could initiate such policies to accelerate IT development.

Through the case studies, we propose to understand what could be the economic benefits of being networked and role of ICT in government, business and society. The case studies would be used to examine whether various hypotheses that IT is indeed an enabler of developmental goals, is pervasive and cross cutting, facilitates disintermediation and the creation of an alternative development paradigm is validated in the Indian context. This is done through an empirical and critical analyses of case studies. However we wish to caution that we have not based these case studies on primary data to obtain perceptions of a representative sample to validate these hypotheses. Instead, we have looked for outliers through random interviews of stakeholders to obtain a degree of comfort in formulating these case studies as elaborated in chapter 4.

Our findings do reveal that:

- ICT is an enabler of development goals as exemplified by our case studies on e-Choupal and Akshaya.
- ICT facilitates disintermediation and the creation of an alternative development paradigm, which would replace the co-operatives, and self-help groups. Thus it is a step in the direction of the formation of cohesive social groups as in e-Choupal.

- ICT is pervasive and cross cutting for instance as shown by e-Choupal and RASI.
- ICT to bring marginalised sections in touch with the global networked society.
- ICT as a paradigm to develop rural areas profitably as done in e-Choupal
- ICT to aid in capacity building as in RASI
- ICT for effective governance as seen in RASI and Akshaya
- ICT in the era of globalization as shown by e-Choupal.
- ICT as an enabler of second generation reforms as in e-Choupal

In chapter 5, we shift our attention, again, to the state level in India. This we accomplish by identifying the global drivers of IT spending across Indian States treating each Indian state akin to a nation-state. An attempt has been made to estimate the income elasticities of PC penetration in the national context and obtain an estimate of IT spending that would be the minimal estimate to obtain the full benefit of the ICT sector at the state level for major states of India. The objective is to identify those states that spend the threshold level and those that do not, to identify the lost potential in each state context.

A knowledge of the relationship between IT spending and domestic and global economic activities can provide important insights into the potential growth drivers of the IT sector in the country. Chapter 6 makes an effort to search an econometric model, which can significantly explain growth in PC market over time- used as a surrogate to specify IT spending-, in India and is used to obtain insights that could facilitate Indian policy planners in India.

The chapter on verticals looks at the e-preparedness of various key verticals for emerging leaders among Indian states who are identified as “leaders” in the above exercise. The key verticals considered are the manufacturing sector, services sector, banking and finance, government and education. Verticals become an important focus of analysis. Various opportunities that crop up in the IT sector are traced vertical segment wise internationally.

The final chapter dwells on “recommendations” that could develop into an Action Plan based on analytic research and qualitative findings and that would show a road map to the ICT sector in India. The report thus serves to be an empirical and analytical enquiry to various questions posed by policy planners and other stakeholders.

1.1 Literature Review

Various e-readiness assessments have been carried out over the past few years. We take a brief look at the work done in this field.

- **McConnell International’s Risk E-Business: Seizing the Opportunity of Global E-Readiness**

The framework is designed to assess a country’s capacity to participate in the global digital economy. The report analyses a country’s e-readiness on the following dimensions: connectivity (infrastructure, access and pricing), e-leadership (government policies and regulations), information security (intellectual property, privacy, electronic signatures), human capital (ICT education, available skilled workforce), and e-business climate (competition, political and financial stability, foreign investment, financial infrastructure).

- **CSPP’s Readiness Guide for Living in the Networked World**

This self-assessment tool is designed to help individuals and communities determine how prepared they are to participate in the ‘Networked World’. This tool does not examine any given country, but presents a tool that is generally applicable. Measurements are divided into five categories: infrastructure, access, applications and services, economy; and ‘enablers’ (policy, privacy, security, ubiquity).

The report provides a series of 23 questions and for each question, the users choose from a set of answers, which represent four progressive ‘stages’ of development. The assessment produces a rating that indicates which of four progressive stages of development the community is at for each of the five categories listed above.

- **APEC’s E-Commerce Readiness Assessment**

The major goal of the tool is to help governments develop their own focussed policies, adapted to their specific environment, for the healthy development of e-commerce. Six categories are measured for readiness for e-commerce:

1. basic infrastructure and technology (speed, pricing, access, market competition, industry standards, foreign investment),
2. access to network services (bandwidth, industry diversity, export controls, credit card regulation),
3. use of the Internet (use in business, government, homes),
4. promotion and facilitation (industry led standards),
5. skills and human resources (ICT education, workforce), and
6. positioning for the digital economy (taxes and tariffs, industry self-regulation, government regulations, consumer trust).

Participants are asked 100 multiple-choice questions grouped into the six categories listed above. The possible answers indicate progressive levels of e-readiness for a country. Hence, the assessment is based on opinions of individuals. No overall scoring occurs. The guide does not provide a comparative assessment of nations.

- **CID’s Readiness for the Networked World: A Guide for Developing Countries**

The Center for International Development at Harvard University developed this guide for government policymakers to assess the state of networked readiness of a community. This guide measures 19 different categories, covering the availability, speed, and quality of network access, use of ICTs in schools, workplace, economy, government, and everyday life, ICT policy (telecommunications and trade), ICT training programs, and diversity of organizations and relevant content online. The guide rates the ‘stage’ a community is in for each of the 19 categories, and descriptions are given of what is required to be in a particular stage. The Guide does not offer prescriptions for improved readiness.

- **The Economist Intelligence Unit E-Readiness rankings, July 2002**

The Economist Intelligence Unit (EIU) e-readiness new model tallies scores across six categories (Connectivity and technology infrastructure, Consumer and business adoption, Social and cultural infrastructure, Legal and policy environment, Supporting e-services) : five of these include a total of 29 indicators, while the sixth is the Economist Intelligence Unit's business environment rankings. Each variable in the model is scored on a scale from one to ten. Where possible, the variables rest on quantitative, statistical data; others reflect qualitative assessments by Economist Intelligence Unit country analysts.

1.2 Analytical Framework for the Report

The framework of analysis used this year has evolved from our exercise last year, feedback received from the concerned states and government departments, and in light of latest developments in the international arena regarding e-preparedness. Last year, the e-Readiness index was calculated based on six groups (sub-indices):

- Network Access
- Network Learning
- Network Society
- Network Economy
- Network Policy
- E-governance.

These groups had various sub-groups or indicators. The framework applied is similar to the one that was used by our study last year to rank countries across the world but the sub groups/ indicators have been altered. The Networked Readiness Index (NRI) framework, 2003-04 is based upon the following broad parameters which are further divided in to sub-indicators:

- Environment for ICT offered by a given country or community — market, political/regulatory, infrastructure;
- Readiness of the community's key stakeholders to use ICT- individual readiness, business readiness, government readiness;

- Usage of ICT among these stakeholders- individual usage, business usage and government usage.

The framework has been used because of its potential not only to evaluate a state's relative development and use of ICT but also to allow for a better understanding of a state's strengths and weaknesses with respect to ICT. The Principal Component Analysis (PCA) has been used to arrive at the composite index. PCA is a way of defining patterns in data, and expressing the data in such a way as to highlight their similarities and differences. Since patterns in data can be hard to find in data of high dimension, where the luxury of graphical representation is not available, PCA is a powerful tool for analyzing data. The other main advantage of PCA is that once you have found these patterns in the data, and you compress the data, i.e. by reducing the number of dimensions, without much loss of information. This technique is used in arriving at a group index from indicators as well as a complete index of groups for every state. Details on econometric- models used to estimate the potential at the state level or macro-economic drivers that drive the ICT industry are specified in chapters 3 and 4.

We use a tailor-made composite framework for analysis of case studies. We examine whether the e-governance/e-readiness initiatives have integrated or empowered the marginalized sections (Sen's Approach); whether the 'value addition' to information, the intermediate product has been maximum (Brown's Approach) and whether the initiative is sustainable, scalable at a sufficient pace and, finally, whether the initiative is profitable so that the private sector can become a partner of the development process.

Identification of creation of IT drivers and relationship between macro variables and IT spending have been deduced based on a large number of model searching regressions as well as other econometric models as elaborated in their respective sections.

1.3 The Global Scenario

Every nation is making serious efforts to participate in the digital economy. Asia has become an emblem of the borderless economy. India's famed IT-enabled service (ITES) sector, which now contributes an estimated US\$17bn to the economy annually, is a

shining example to the emerging markets. India's success story has been replicated throughout the region—there are booming call centres surrounding Manila, customer help desk centres in Malaysia, and Korean and Japanese language software production houses in China. It is ironic that India hardly appears on the e-ready radar screen, though it is starting to push ahead. Many countries are reaping benefits from being at least partially e-ready, even if they do not have all the components that support digital services (complete technology infrastructure, and favourable policy, business and social environments) in place. But it is also clear that having one or more of the basics in place can go a long way, as a country leverages what e-assets it has to generate competitive advantage. In the Indian context, it would be helpful to look at the level of e-Preparedness of the Indian states as this would be helpful in assessing the strengths and weaknesses in the e-readiness environment and consequently appropriate remedies can be planned.

1.4 The Role of IT in the Indian Economy

1.4.1 Key Role of ICT in the Second Generation Reforms

During 1991, the twin programme of macro economic stabilization and structural reforms were initiated. It has been argued that reforms carried out till date are not enough for the Indian economy if the country wishes to ensure the quality and sustainability of growth on a long-term basis. This, policy planners argue would be accomplished through second-generation reforms. The second-generation reforms simply aim at improving government efficiency through a reduction in the fiscal deficit. They aim to bring about increased private sector participation in developmental activities and sustaining high growth through appropriate institutional mechanisms.

It can be observed from factors that indicate the health of the state (debt to GSDP, levels of fiscal deficit, primary deficit and revenue deficits to GSDP) that the objective of the second-generation reforms is to improve governance and observe the requisite fiscal discipline. It is here that one can see a major role for ICT and e-Governance. In practice, state reform and government modernization nowadays can hardly proceed without calling upon ICTs. Infact, from a long-term perspective second-generation reforms are needed to sustain the ICT revolution.

The second-generation reforms in general suggest that increased involvement of the private sector in development activities and promotion of private investment in the industry and infrastructure segments of the state is required. Hence, reforms particularly in the area of right institutions, administrative, legal and regulatory functions of the state coupled with the restructuring of the incentives and actions that are required for greater participation of the private sector in developmental activities has become imperative.

1. **e-Governance:** ICT has made possible the development of a new service delivery model, which can bring about a major shift in the way government, does business. Anywhere anytime access brings in incredible opportunities but there is a downslide for state and local governments. First, the public sector is held to a higher standard than the private sector particularly in terms of risk. Second, with new technologies comes a whole new level of competition. Digital government is all about using technology to improve the access to and delivery of public services. The goal is to create a network that builds closer relationships with all stakeholders—citizens, businesses, governments and the workforce—while maintaining security. With the expansion of e-governance, there are increasing concerns about the security of transactions, which also need to be addressed.

Specific e-Governance initiatives that provide particular solutions to some governmental problems that are associated with ICT components—can contribute to one or more of these valued functions:

- Increasing the efficiency of government operations—economists and social scientists call this “greater efficiency of the public administration by the automation/digitization of administrative functions”—in other words, simplifying processes and improving service delivery. Resources are used more effectively, and better tools are made available to both staff and agencies, as well as to clients’ interaction with the service. Efficiency gains are the first quoted arguments for ICT infusion. It is usually the first step, started decades ago when automation was brought in, but the process is a long, continuous one.

- Increasing transparency- ICT can create greater transparency and accountability in the functioning of public organizations and can allow the public sector to extend its role as a client-oriented service provider. This is at the very core of the development opportunities associated with e-Government activities. Making government operations and results open to the public eye is closely related to anticorruption initiatives typically mentioned as another valued function of e-Governance actions. What ICTs can do, for instance, is to make public on the Web a number of hitherto hidden or nontransparent agency operations, notably but not exclusively dealing with matters in which monetary transactions are involved. These have been the most quoted examples, but they easily could be transposed into the political realm, where transparency is a key element of trust and involvement in governance matters. Thus, indirectly, it also could contribute to citizen participation.
- Modernizing the public sector- It should be emphasized that in the case of developing countries, e-Governance activities often go beyond the goals of increased efficiency and lower costs in the delivery of services. e-Government projects can play a critical role in public sector modernization programs. Available literature suggests that this role of ICTs is at the core of government change and, ultimately, transformation. It involves a number of activities affecting government internally as well as in its relationships with constituents. In terms of e-Governance interventions, it is wise to remember that modernization is not a whole-of-government endeavor (except when it is the national government itself that embarks on such voyage) but actually interventions that address particular areas, functions, or sectors of the government apparatus.

2. **Private sector involvement in development activities:** Public-private partnerships are the new trend in ICT initiatives. This trend has brought in fresh investment and expertise of the private sector to ICT initiatives in the suburbs and rural areas. This is a very positive trend and needs to be encouraged. In this light it is important to analyze the progress in this

direction and to look at the following questions-

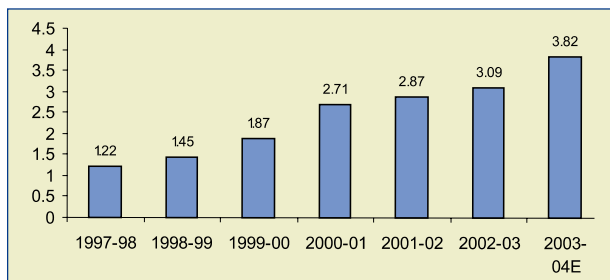
- What are the various models for public-private cooperation in bridging the digital divide?
- What is the role that the government should play for facilitating the rapid development of the private sector in ICT?
- How can private sector initiative and enterprise be encouraged and channelised for achieving the maximum benefits from ICT?
- How can private sector companies collaborate with each other to achieve win-win situations in the context of ICT?
- It is important to keep in mind that there are no off-the shelf solutions for the above queries only a case by case analysis would be able to provide suitable answers.

1.4.2 Macro Analysis of the Indian IT sector

According to NASSCOM data, the IT industry's contribution to the Indian GDP has also increased from approximately 1.4 per cent in 1998-99 to more than 3 per cent in 2002-03 and is estimated to grow further to 3.8 per cent, highlighting its increasing importance to the Indian economy. Contrast this share of ICT around 3.8 per cent of GDP with the combined share of all registered manufacturing in various industry segments ranging from food processing, beverages, textiles, leather, basic chemicals, petrochemicals, iron and steel, basic metals such as aluminum, copper, rubber and petroleum, machinery both electrical and mechanical which is just around 11 per cent of GDP. This combined share had marginally declined during the 1990's while the ICT sector in the national income is increasing at a brisk pace now as shown in Figure 1.1. Obviously the importance of this sector needs no further emphasis.

Apart from the indirect contribution that IT makes to the Indian Economy through e-Governance etc the direct contribution of IT exports is becoming increasingly important.

Figure 1.1: IT Industry's Contribution to the Indian GDP



Source: NASSCOM.

The linkages among different sections of an economy are of crucial significance in understanding the trajectory of any industry. The significance and potential of any industry can be observed by looking at three important indicators i.e. the output multiplier, the employment multiplier and the degree of forward linkage. As elaborated earlier, the output multiplier can be defined as a total increase in output generation for one unit increase of final demand in a particular sector. The employment multiplier is specified as man-years of additional employment created for an increased unitary output of the sector. Both these measures spell out the backward linkages with the other sectors of the economy in terms of output and employment effect. Forward linkages refers to the inter relationship between a particular sector and all other sectors which demand the output of the former as inputs. To better understand the macroeconomics of the ICT sector we analyze these parameters.

In the input-output table, “Other Services Sector’s” employment and output multiplier coefficients were taken as output and employment multiplier of “ICT sector” in the first iteration. However, we recognise the importance of ICT sector which cannot be clubbed with Other Services category. Thus, the NCAER research team looked at direct coefficients (employment/output and input/output) for “Software Sector” from the CSO and for “Hardware Sector” from the ASI data. Since the direct coefficients from input-output table and CSO table were available, we used two sets of direct coefficients; one from the 114th sector of the input –output table which corresponds to the “Other Services Sector” and the other for software and hardware clubbed together to obtain output and employment multiplier coefficient that is reflective of the entire ICT sector. For the ICT sector (software and hardware in 2000-01

prices) the output multiplier works out to 2.466 including the unitary output of the ICT sector. The sectors which exhibit strong backward-linkages with other sectors of the economy are presumed to have a higher output multiplier. Sectors, which have an output multiplier of two or more, can be treated as key sectors for economic growth. The ICT sector which reveals an output multiplier that is higher than the average- contrary to the popular perception that this sector may not have strong backward linkages- can be an eye-opener for the Indian policy planners. The ICT sector, in context of the output multiplier, has a rank of 30 of a total 115 sectors and the Software Sector corresponds to a rank of 80 out of 115 sectors. The increase in ICT output does have a significant output multiplier effect and should thus be encouraged. The employment multiplier for the ICT industry has been estimated at 0.183 man-years per lakh of output in 2000-01 prices. In other words, an additional output of the ICT sector to the tune of Rs 1 lakh would ensure 0.183 man-years of jobs created. For the software sector alone, which is the sector of interest, the output multiplier is 1.78 and the employment multiplier is 0.2096. In other words, increased output of one lakh in the software sector creates an additional employment of 0.2096 man-years. The rank for both the ICT and the software sector in terms of the employment multiplier is 110 out of a total 115 sectors. To reiterate our earlier observations we summarise the output and employment multipliers in Table 1.1.

Table 1.1: Output and Employment Multipliers

	ICT Sector (Hardware + Software)	Software Sector
1. Output Multiplier	2.466	1.78
1.a. Rank (out of 115 sectors)	30	80
2. Employment multiplier (man-years per rupees lakh of output at 2000- 01 prices)	0.183	0.2096
2.a. Rank (out of 115 sectors)	110	110

Source: CSO.

It is important to look at the economic implications of the above observations. For instance, the CSO has estimated that the value of output at current prices for the software sector during 1999-2000 is at Rs 21,263

crores and at Rs. 50,302 crores in 2002-03. With in this short gap of 3 years, the output of the software sector has increased by 29,039 crores and in this period the economy has been able to create 6.8 lakh man-years of employment or in simpler terms this sector has been able to create jobs for 24,500 people who would be able to work in this sector for the next 25 years. Its contribution to GDP in 1999-2000 was Rs 14,619 crores and Rs. 34,584 crores in 2002-03 current prices. The contribution of the software sector alone out of the ICT sector, in GDP has increased from 0.83 per cent in 1999-2000 to 1.54 per cent in 2002-03 (all figures in current prices). Direct employment in the software sector in 1999-2000 was 322983 according to CSO (corresponding figures for the year 2002-03 are not available). The contribution of the hardware sector to GDP in 1999-2000 was Rs 796 crores and employed around 16,800 persons. The output of the hardware sector in 1999-2000 was Rs. 4400 crores. Again, we summarise our observations in Table 1.2.

Though the ICT industry in India is mainly export oriented, domestic consumption does show a forward

Table 1.2: Software Sector of the ICT segment

	1999-2000	2002-2003	Increase in 2002-2003 over 1999-2000
Output (Rupees crores)	21,263	50,302	29,039
Contribution to GDP (Rupees crores)	14,619	34,584	19,965
Contribution to GDP (in per cent ratio)	0.83	1.54	-
Additional Employment			0.68 million man-years

Source: CSO.

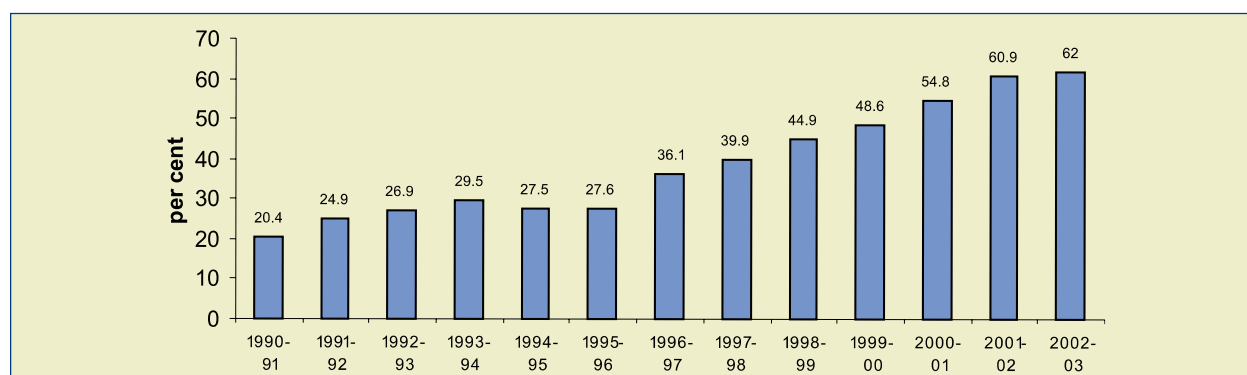
linkage that is not high as on date but is expected to increase in the coming years as the economy and the using domestic sectors mature making greater use of ICT in business, governance and society.

1.4.2.1 Composition of the IT Market in India

The Indian IT industry can be divided into domestic market and the IT exports. The domestic market can be further divided into software and services, hardware, peripherals and networking and training. The IT exports market can be divided into software and services exports and ITeS.

According to NASSCOM, IT exports will account for an estimated 62 per cent of the Indian IT industry in 2003-04 as compared with 60 per cent in 2002-03. NASSCOM estimates that IT exports from India will grow by at 20.5 per cent in 2003-04 reaching Rs. 555 billion. The domestic software and services market will grow by more than 11 per cent in 2003-04 to reach Rs. 337 billion. The number of IT and ITES (IT Enabled Services) professionals employed in India has grown from 284,000 in 1999-2000 to an estimated 813,500 in 2003-04. Most of the new recruits are fresh graduates from various backgrounds. The skills in demand included software analysts, domain specialists, information security, integration specialists, database administrators, network specialists, communication engineers etc. In 2003-04, the hardware segment is estimated to account for 51 per cent of the domestic Indian IT market as compared to 52 per cent in 2003-03. The software and services segment is estimated to account for 46 per cent of the market as compared with 44 per cent in 2002-03. The training segment is estimated to account for 3.5 per cent of the industry, the same as in 2002-03.

Figure 1.2: Share of Exports in IT Industry Output



Source: NASSCOM

NASSCOM surveys with user industries suggest that the domestic IT spend is at an inflection point and is projected to grow at over 15 per cent per annum for the next 3-5 years. The drivers for higher growth include

- Deregulation and increased competition in user industries driving the race for higher productivity and thus higher IT spending
- Prices of hardware are likely to decline in 2005, as India will lower customs duties on hardware to zero per cent in line with the provisions of the Multilateral Information Technology Agreement.

1.4.2.2 The Indian ITES BPO Industry

In 2003-04 according to NASSCOM estimates, the Indian ITES BPO industry is likely to grow by 54 per cent to reach USD 3.6 billion. In 2002-03 the Indian ITES BPO industry grew by 59.1 per cent to USD 2.3 billion. India has maintained its global competitiveness by providing a winning combination of cost, quality and scalability versus competing offshore destinations such as Philippines and China. Some of the key drivers of the Indian ITES BPO industry include:

- Improved efficiency and higher service levels due to streamline of processes
- Quality improvements due to a better educated workforce
- Cost savings between 40-50 per cent
- Increase in offshoring by existing customers
- Superior project management skills
- Availability of a highly skilled, educated and English speaking labour pool

The challenges facing the Indian ITES BPO Industry are

- Moving up the value chain will become a challenge for Indian companies as customers seek vendors with significant domain experience and expertise

- Shrinking profit margins due to intense competition
- Ability to quickly achieve scale. It will be critical for Indian vendors to be able to scale up quickly because large customers prefer vendors with size and with a proven track record.
- *Human resources issues:* While there is a plentiful supply for entry level positions, there is a dearth of candidates for middle management positions. This has led to an increase in attrition rates to about 25-40 per cent
- *Infrastructure challenges:* Local infrastructure like roads, bridges, airports, urban transportation is now becoming a bottleneck to the expansion of capacity.

An adequate legal framework for setting up IT companies and the execution of their businesses exists in India. The IT bill passed in 2000 provides a legal framework which recognizes electronic contracts, prevention of computer crimes, electronic filing of documents etc. Foreign companies have been permitted to invest in India and set up offices under the provision of the Companies Act and FEMA (Foreign Exchange Management Act).

In this light it can thus be observed that there is a major role that IT can play in the implementation of the second-generation reforms and also to growth. It is also very clear that second-generation reforms are critical if the country in to make strides in growth and productivity.

- Improving readiness of verticals.
- Increasing awareness of potential benefits of ICT in rural development.

India's attempts at moving towards an e-ready economy should therefore focus on providing a favourable environment for the Central and State governments.