

Information Technology Management- Present Status and Future Prospects for Indian Economic Development

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Abstract:

Information Technology and Management explores many different technologies inherent in the field of information technology and their impact on information systems, design, network planning, functionality, operations, management and technical support.

Introduction:

Knowledge and Information Systems provides an international forum for researchers and professionals to share their knowledge and report new advances on all topics related to knowledge systems and advanced information systems. IT management is the discipline whereby all of the information technology resources of a firm are managed in accordance with its needs and priorities. These resources may include tangible investments like computer hardware, software, data, networks and data centre facilities as well as the staff hired. In managing this responsibility within a company entails many of the basic management functions, like budgeting, staffing, change management, organizing and controlling, along with IT aspects that are unique to technology like software design, network planning, technical support etc.

An Overview:

The main aim of IT management is to generate value through the use of technology. To achieve this, business strategies and technology must be aligned. Obviously, IT Management is different from management information systems. The latter refers to management methods tied to the automation or support of human decision making. IT Management refers to IT related management activities in organizations.

MIS is focused mainly on the business aspect, with strong input into the technology phase of the business organization. A primary focus of IT management is the value creation made possible by technology. This requires the alignment of technology and business strategies. While the value creation for an organization involves a network of relationships between internal and external environments. Technology plays an important role in improving the overall value chain of an organization. However, this increase requires business and technology management to work as a creative, synergistic, and collaborative team instead of a purely mechanistic span of control. Historically, one part of resources was dedicated to one particular computing technology, business application or line of business and managed in a silo-like fashion. These resources supported a single set of requirements and processes and it couldn't easily be optimized or reconfigured to support actual demand.

The technology providers to build out and complement their product-centric infrastructure and management offerings with Converged Infrastructure environments that converge servers, storage, networking, security, management and facilities. The efficiencies of having this type of integrated and automated management environment allows enterprises to get their applications up and running faster, with simpler manageability and maintenance, and enables IT to adjust IT resources such as servers, storage and networking quicker to meet unpredictable business demands. The term IT infrastructure is shown in a standard called Information Technology Infrastructure Library (ITIL) v3 as a combined set of hardware, software, networks facilities etc.

(including all of the information technology), which helps to develop, test, deliver, monitor, control or support IT services. IT infrastructure refers to the composite of hardware, software, network resources and services required for the existence, operation and management of IT environment. It allows an organization to deliver IT solutions and services to its employees, partners and/or customers and is an internal organization and deployed within owned facilities of an enterprise. The information technology management (ITM) continues to evolve at breathtaking speed. Advances in information technology (IT) have profound effects on how firms generate value and how entire industries are structured. To understand the opportunities and threats created by advances in IT is critical for modern-day managers, and this understanding will help in growing importance as more and more business is conducted in "virtual" domains in the future also.

Role of IT managers:

The role of IT managers has a lot of services in common with project managers. And IT manager is responsible and accountable for an ongoing program of IT services while the project manager's responsibility and accountability are both limited to a project with a clear start and end date. Most IT management programs are designed to educate and develop managers who can effectively manage the planning, design, selection, implementation, use and administration of emerging and converging information and communications technologies. The program curriculum provides students with the technical knowledge and management knowledge and skills needed to effectively integrate people, information and communication technologies, and business processes in support of organizational strategic goals and objectives. Graduates of IT should be able to explain the importance of terminology, facts, concepts, principles, analytic techniques, and theories used in IT management. To apply important terminology, facts, concepts, principles, analytic techniques, and theories in IT management by which

analyzing complex factual situations to integrate (or synthesize) important facts, concepts, principles, and theories in IT management for developing solutions to IT management multifaceted problems under complex and critical situations. The importance of IT managers is to understand the managing data but there are also difficulties to overcome. The quantum of data is increasing; most of the data in is separated between the organizations and different departments. They may not be using the same method or procedure. Data security, quality and integrity are most informants in receiving information. The sources have an impact also on the sources obtained; they may be internal or external. If the information structures are not transferred properly with each other that can result in unreliable data. The important part is to understand the Data Governance. It is an approach to managing information across the entire organization or company. It is also need to know about master data management, which is a process that spans all of the company's processes and business. Without a structure a company will not be able to function properly. Applying these processes in Data bases, it is the job to be able to communicate with other departments systems and develop precise communication and holding organization accountable of certain data issues. The design and programs will help to increase technical knowledge.

Disadvantages:

The more technology improves; everyday tasks that used to be performed by human employees can now be carried out by computer systems. Telephone answering systems replacing live receptionists is one example of such substitution. It is, however, important to understand that often these changes can lead to issues as well as benefits. Losing personal communication with clients, security issues, etc. may have a heavy impact in company value. Such aspects must be considered for IT management to be successful before, during and after all decisions and implementations.

Even though information technology systems allow businesses to be conducted at a faster pace, that quicker pace is not without its flaws.

Information technology systems are extremely vulnerable to security breaches. For the most part information technology systems are most vulnerable when they can be accessed through the Internet. If certain measures are not in place to prevent security breaches, unauthorized individuals could gain access to confidential data. Information can be altered, permanently destroyed or used for unsavory purposes. Additionally, sensitive information being leaked can cause a business to lose money and can permanently damage its reputation in the eyes of potential customers also.

Analysis of Information Technology Management and Indian Economic development:

According to Sanjay K Singh, Introduction here is an impression that India is world class in information technology (IT). This is mainly due to the success of India's software industry and contribution of people of Indian origin in IT revolution in the United States. The fact that IT sector in the country has increased at an incredible rate of 35% per year for the last 10 years reinforces the view that India is world class in IT. At the same time, India remains a poor country both in terms of the per capita income (PCI) and the human development index (HDI). As per 2004 Human Development Report, India is among the countries with the worst disparities between their gender related development index (GDI) and HDI values.

Although the per capita income in the country during the last 10 years has increased at the rate of 4.1% per year, Information Technology in India: Present Status and Future Prospects for Economic Development more than 250 million people still live below the official poverty line. While some have benefited the growth over the last decade. There is no doubt that inequality in income and inequality in various infrastructure facilities such as access to clean drinking water, decent housing, proper healthcare, good education, etc., is rising in the country. This paper tries to examine whether IT can contribute to India's economic development in a broader way.

It also examines the role of public policy, arguing that government should promote IT use and make it accessible to every section of the society besides removing the infrastructure constraints, strengthening the training and education system, and introducing the flexible labor laws. "Information technology is an important emerging sector of the Indian economy. The size of this sector has increased at a tremendous rate of 35% per year during the last 10 years. Its contribution to the national gross domestic product is expected to be around 8.5% by the year 2010-11, quite similar to that in the United States today.

Contribution of IT Sector in India's GDP

Table-1

Year	GDP at Current Prices (Rs in Billion)	IT Sector Revenue (in Rs. Billion)	IT Sector Revenue To GDP (in %)	IT Sector Revenue (in US \$ Billions)
1994-95	10128	63	0.62	2.0
1995-96	11880	99	0.83	2.9
1996-97	13682	137	1.00	3.8
1997-98	15224	186	1.22	5.0
1998-99	17409	253	1.45	6.0
1999-00	19296	362	1.88	8.2
2000-01	21043	566	2.69	12.1
2001-02	22929	658	2.87	13.4
2002-03	24661	780	3.16	16.1
2003-04	26954	978	3.63	21.5
2004-05	29380	1276	4.34	28.2
2015 FY		146.5	9.5	
2016 FY		160	10.4	

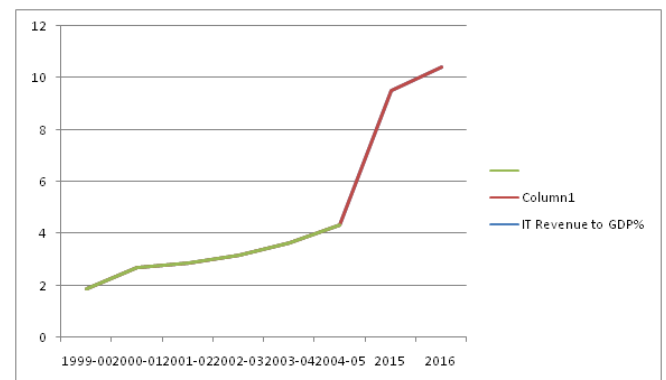
Source: <http://mospi.nic.in> and

<http://www.nasscom.org>

www.ibef.org/industry/information-technology-india.aspx

Note: GDP figures are at market prices.

Ratio of IT Contribution to GDP



Source: <http://mospi.nic.in> and

<http://www.nasscom.org>,
www.ibef.org/industry/information-technology-india.aspx.

The IT Sector in India has built up valuable brand equity over the years. In IT enabled services (ITES), India is emerging as one of the most preferred destinations for business process outsourcing (BPO). The importance of IT industry in the Indian economy can be gauged from the fact that its contribution to the national gross domestic product (GDP) has increased by seven fold in a span of just one decade from 0.6% in 1994-95 to 4.3% in 2004-05, in 2015 FY it increases to 9.5% and in 2016 FY it registered to 10.4% (Table

1). Although industry figures are not directly comparable with GDP as they are based on revenues rather than value added, they provide an indicator of growing importance of the IT sector in the country. Assuming that the Indian economy and IT sector will replicate the past six years performance during the next six years and value added in IT sector is two third of its sales revenue, the contribution of IT sector to national GDP will be around 8.5% during the year 2010-11, quite similar to that in the United States (US) today. The IT sector revenue is expected to increase from Rs. 1276 billion in 2004-05 to Rs. 6435 billion in 2010-11. The Indian IT industry is broadly categorized into three. 1). IT services and software, 2). ITES-BPO, and 3) Hardware segments.

IT Sector Revenues in %

Table-2

year	IT services and software	ITES-BPO	Hardware segments
2000-01	64.5	7.4	28.1
2002-03	61.5	16.1	22.4
2004-05	58.5	20.2	21.3

Source: <http://mospi.nic.in> and <http://www.nasscom.org>

Although IT services and software continues to remain the key contributor to the IT sector's revenues, ITES-BPO is emerging as the fastest growing segment of the sector. Between the year 2000-01 and 2004-05, contribution of ITES-BPO to the IT sector's total revenue increased from 7.4% to 20.2% whereas the corresponding figure for IT services and software fell from 64.5% to 58.5%. Presently, ITES-BPO segment of the industry is almost as big as the hardware segment. Services and Software vs. Hardware the services and software segment of IT industry in India is more robust than its hardware counterpart. India has become one of the most favored destinations for sourcing software and ITES. The revenue of IT services & software and ITES-BPO taken together reached US \$ 22.2 billion during 2004-05 out of which US \$ 17.3 billion was earned through export. India ranks high in comparison to its competitors such as China, Philippines, Ireland, Australia, Canada, etc., in various parameters such as quality of the labor pool, cost advantage, linguistic capabilities, project management skills, and overall quality control.

IT services & software ITES-BPO Hardware to producer of hardware through learning by doing. The design of hardware typically involves the development and use of appropriate software codes, therefore, hardware design could be a promising area for the Indian IT sector. It is imperative that India should focus on the areas where software expertise matters more than the manufacturing infrastructure. Obviously, it will still require significant improvement in infrastructure, broader labor law reform, and careful assessment of market demand. As Desai (2000) pointed out, there is a need for flexible labor laws not only to boost hardware segment of the industry but also to realize full benefits of growth in India's IT sector. In fact, a flexible and transparent regime of labor laws would contribute to increased employment and productivity and, therefore, appropriate legislation would be in the interest of both workers and manufacturers.

Rigidity in labor laws is one of the main reasons of sluggish growth in employment in India. It is amazing to know that India's employment elasticity of output growth is declining dramatically, e.g., from 0.52 during 1983-1994 to 0.16 during 1993-2000. Therefore, the growth rate of employment declined from 2.7% per annum during 1983-94 to 1.1% during 1993-2000 when the growth of output, i.e., GDP, accelerated from 5.2% to 6.7% per annum. Export vs. Domestic Market Currently, export accounts for around 64% of the total IT sector revenue. The IT sector export revenue touched the mark of US \$ 18 billion during 2004-05, a jump of around 35% from the previous year. IT services & software accounts for 68% of the total export revenue whereas ITES-BPO contributes 28% of the same. The share of hardware in IT sector export revenue is just 4%. India's IT services and software export went from a few million dollars in the 1980s to over US \$ 12 billion in 2004-05. The financial service sector (banking, financial service, and insurance) accounts for the largest share.

In addition, India is able to offer a 24x7 services and reduction in turnaround times by leveraging time zone differences. India's unique geographic positioning makes this possible. Emerging as one of the key investment markets in the country, the ITES-BPO segment of the industry is on a rapid growth path. This segment generated revenue of US \$ 5.7 billion in 2004-05, representing a growth of 46% over the previous year. Although 90% of the revenue is generated through export, there has been tremendous growth in domestic market as well. The size of domestic market in the ITES-BPO segment increased from US \$ 300 million in 2003-04 to US \$ 600 million in 2004-05. Hardware segment of the IT industry in India has not shown the same level of progress as experienced by ITES and software (It is also true that hardware segment of the IT industry has not received the kind of government support received by its other counterparts. Complications in the local indirect tax structure and high rates of excise and sales taxes have only added to the industry's woes.

It is also evident from the fact that while pharmaceutical and automobile companies are encouraged to do R&D through a 150% write-off on expenditure, no such facility has ever been extended to hardware. Again, while labor laws have been amended for IT services & software and ITES-BPO segment, no such initiative has been taken for the hardware segment). Profitably manufacturing semiconductors and other sophisticated hardware components typically requires infrastructure, large scale investments in capacity, and accumulated experience that India does not possess, and is not in a position to acquire easily (Singh, 2002). However, India does perform numerous hardware assembly tasks internally, almost entirely for the domestic market. Hardware components are typically imported from the Southeast or East Asian countries. As was the case with several East Asian countries, it is also possible for India to transform its capability from assemblers of sophisticated components produced elsewhere. 17 CMM level 5 certificates indicating the strength of India's software export capabilities. ITES-BPO segment of the IT industry is rapidly emerging as an important contributor to export revenue.

According to NASSCOM, the Indian ITES-BPO segment has witnessed a significant increase over the last few years. The number of seats has increased from 140,000 in March 2003 to 210,000 in March, 2004. Players in ITES-BPO segment can broadly be categorized into captive units (of both MNCs and Indian companies) and independent third party service providers. Currently, there are more than 400 companies operating in this segment of IT industry. Captive units continue to dominate the ITES-BPO segment, accounting for over 65% of the value of work off-shored to the country. In terms of export, the US continued to be the main consumer of India's ITES-BPO services with around 66% of the market, followed by Europe particularly UK which accounted for 20% of export revenue.

The global financial services are the largest user of ITES-BPO services, followed by telecom, healthcare, and airlines. Customer care and support services are the main revenue generating activities within ITES-BPO export market accounting for 38% of the segment's employee base and 33% of its revenue. Other leading service lines are finance with revenue contribution of 23%, administration and Indian software and services export at around 40% followed by the manufacturing with around 12%. Telecom equipment (9%), healthcare (5%), retail (5%), and telecom services (4%) are emerging areas of export. The key service lines for Indian services and software exporters continued to be custom application development and maintenance, applications outsourcing, ITES, and R&D services. Few Indian companies have made modest progress in segments like packaged software support and installation, product development and design services, and embedded software solutions. In terms of software service delivery, off-shore project revenue is increasing at a far higher rate than on-site revenues during recent years. In terms of geographies, although, Indian IT companies began tapping regions outside the US market, the US remained the largest user of software solutions from India. The revenue contribution from the US continued to increase on account of the large number of ITES-BPO projects getting outsourced to India. Although only the top five firms (TCS, Infosys, Wipro, Satyam, and HCL) which contributes more than one third of software export revenue have some sort of global brand status, more than 3000 firms are involved in software export in India. At the end of the year 2003, India has at least 65 companies with SEI.

Export and Domestic IT market in India (in US \$ Billions)

Table- 3

Year	IT services & software		ITES-BPO		Hardware		Total IT Industry
	Exports	Domestic	Exports	Domestic	Exports	Domestic	
2002-03	7.1	2.8	2.4	0.2	0.3	3.3	16.1
2003-04	9.2	3.6	3.6	0.3	0.5	4.3	21.5
2004-05	12.2	4.3	5.1	0.6	0.7	5.3	28.2
Total	28.5	10.7	11.1	1.1	1.5	12.9	65.8

Source: <http://www.nasscom.org>

Table 3 : Export and Domestic IT market in India (in US \$ billion) shows for the years 2002-03 2003-04 2004-05 is -Total IT industry 16.1, 21.5, 28.2 billions, while-Export 9.8, 13.3, 18.0 and Domestic amounts to 6.3, 8.2, 10.2 billions. Hardware is the only segment of IT sector in India in which the size of the domestic market exceeds that of export. MNCs dominate the hardware segment occupying the top positions in key categories such as desktop PCs and notebooks, servers, and peripherals. The BFSI, government, and telecom service providers continued to be the key contributors. BFSI alone accounts for one fourth of the total hardware spending in the domestic market. Although the size of the hardware domestic market still remains small, there is a huge potential for its growth. Currently, India is one of the fastest growing hardware markets in the world. Human Capital and Infrastructure Availability and adequate supply of skilled and knowledgeable work force and the quality of infrastructure are critical for the growth of IT industry in India. An important reason for the success of Indian IT industry has been the large supply of IT skilled workforce.

India's stock of IT professionals is estimated to be more than 1 million during 2004-05, so that the IT industry revenue per IT professional is about US \$ 27,000 A reasonable projection implies that IT industry revenue will increase by a factor of 5 from 2004-05 to 2010-11. Assuming 5 to 7% growth in revenue per employee per year, the number of professionals required will increase at the rate of around 25% per year from 2004-05 to 2010-11 to meet the demand (In fact, there has not been significant change in revenue per employee in the IT sector particularly during recent years. For example, revenue per employee decreased marginally from US \$ 28,000 in 2000-01 to US \$ 27,000 in 2004-05. Increasing revenue per IT professional beyond 5-7% per year requires significant improvement in managerial and marketing skills, and investment in higher education sector. In the short-run, assumption about 5- content development with revenue contribution of 15% each.

Customer analytics and customer relationship management (CRM), legal transcription support, knowledge process outsourcing, and financial process outsourcing are emerging as new high potential service lines for ITES-BPO companies. In comparison to competing countries such as Ireland, Philippines, and China, India is able to attract the bulk of the global ITES-BPO business due to its comparative advantage in terms of price, performance, and quality. Despite higher growth of export, the domestic market still represents around 36% of industry receipts. The domestic IT market touched the revenue of US \$ 10.2 billion during 2004-05, of which hardware contributed US \$ 5.3 billion whereas services and software accounted for US \$ 4.3 billion. The domestic market size of ITES-BPO segment is negligible in comparison to the export. Nevertheless, domestic sector of ITES-BPO segment recorded a healthy growth with revenue increasing from US \$ 300 million in 2003-04 to US \$ 600 million in 2004-05 mainly due to demand from banking, financial services and insurance (BFSI) sector and telecom companies. With competition increasing in BFSI and telecom sector, companies are emphasizing more on customer fulfillment and CRM activities.

Presently, all the major telecom service providers offer 24 hour customer self support and also involve in a high degree of telemarketing. The scenario in BFSI sector is similar to that of telecom. The domestic IT services and software segment continued to lag behind the export segment on account of issues such as higher piracy levels, pressure on software prices, and lower level of IT spending by domestic companies. However, it experienced around 20% growth rate during the last year mainly due to demand from verticals such as banking, telecom, and BPO vendors. Domestic IT spending is expected to increase further in coming years due to increase in telecom and internet penetration, higher IT budget allocations by the governments, IT spending by 19.7% growth in revenue per employee appears to be plausible).

Additional IT professionals required for the sector is likely to increase from 260,000 in 2005-06 to nearly 800,000 in 2010-11. Given the poor state of India's higher education, meeting the demand for IT professionals would be an uphill task. India produced 284,000 engineering graduates during 2004-05, out of which 165,000 can be categorized as IT professionals (computer science, electronics, and telecommunication). Although, there is large number of non engineering graduates produced every year in the country, the quality of large fraction of these graduates is very much questionable. Even the quality of engineering graduates produced by large number of private engineering colleges is not up to the mark. Although, the current demand for workforce is primarily for lower end of the market (ITES, BPO, coding and testing, etc.), which can be supplied by non-engineering graduates along with engineering graduates, sustained success in the global market will require the use of highly skilled and knowledgeable workforce. Sustained supply of high quality graduates would be difficult with the current state of higher education in the country.

It is essential to improve the quality of higher education in general and in line with the IT industry's requirements in particular to avoid non availability of human capital becoming a bottleneck for the growth of the sector. Prevalent price distortions, lack of infrastructure of both physical and human capital, obsolete curriculum, government interventions, ineffective regulatory body, and lack of encouragement for public-private partnership are some of the reasons for poor state of higher education in the country. Even at the elite educational institutions, faculty is poorly paid in relation to their counterparts in industries, and physical infrastructure has deteriorated due to lack of investment. Many universities, particularly the state-funded ones, still follow the course curriculum designed during 1960s and 1970s.

The Indian universities are controlled by the government and their state is somewhat similar to that of the Indian industry before economic reforms of 1991. Government interventions right from fee fixations to the appointment of faculties and head of institutions have led to the gradual decline of even the formerly reputed.

Growth of IT professionals in India

Table-3

Year	No. of IT professionals (in thousand)
1990-91	56
2000-01	430
2001-02	522
2002-03	670
2003-04	841
2004-05	1045
2012-13	2324

Source: <http://mospi.nic.in> and <http://www.nasscom.org>, <http://www.rediff.com/money/report/tech-three-million-professionals-employed-in-it-ites-sector-in-fy13-govt/20130503.htm>.

Growth of IT professionals in India increased from 56 in 190-91 1045 thousand in 2004-05. Similarly, PC ownership and internet connectivity has started to grow at a rapid rate (PC penetration in India is estimated to be around 11 million in March 2004 whereas current internet connectivity is touching the mark of 6 million. During the year 2004, around 3.6 million PCs were sold in the country. This is expected to increase to 4.5 million in 2005 and 6.0 million in 2006. With PC prices dropping to as low as Rs. 10,000/- per unit, PC penetration in the country is expected to increase rapidly. According to the Broadband Policy 2004 document published by the Ministry of Communication and Information Technology, Government of India, New Delhi, internet connectivity in the country is expected to increase from 6 million in 2005 to 40 million in 2010).

A denser telephone and internet network along with increased PC ownership will provide the opportunities for increasing the rate of training people for the IT industry. IT and Economic Development, the IT has potential to raise the long-term growth prospects through increased productivity in almost every sector of the economy. The resurgence of the American economy since 1995 is a classic example of the same. According to Greenspan (2000), the IT has produced a fundamental change in the US economy, leading to a permanent improvement in growth prospects. Similarly, Jorgenson (2001) argues that the development and deployment of the IT is the foundation of the American growth resurgence. The relentless decline in the prices of semiconductors and thus IT equipments has steadily enhanced the role of IT investment as a source of American economic growth. Furthermore, IT can play an important role in economic development in a broader sense, beyond just economic growth. Obviously, this depends on comparative advantage in providing IT products and services, global demand for these products and services, development of a robust domestic market, positive spillovers to rest of the domestic economy, and impact on governance Universities.

Not that the public funding for higher education does not work at all but that the experience of many countries shows us that it does work only in the presence of autonomous and effective regulatory body. The University Grants Commission (UGC) and All India Council for Technical Education (AICTE), the two most powerful regulators and disbursers of the government grants for higher education in the country, are left with little credibility in the market to enforce a structure where the good can be separated from the bad. It is high time to restructure the functioning of regulatory bodies in higher education sector of the country. Given the fiscal status of the central as well the state governments and resource requirements to enhance both quantity as well as quality of higher education, there is a need to encourage private initiatives in the sector.

In the present situation where benefits of certain kinds of education are clear and immediate, it would be easy to attract private investment in the sector provided the government does not intervene in day to day functioning. Thus, there is a need to have substantial private involvement and adequate legislative cooperation to strengthen higher education in the country. Infrastructure (including good governance) is the basic building block for development. Among various infrastructural facilities, electric power, transport, and law and order are the most fundamental, and probably the most difficult ones to tackle. Although, it is beyond the scope of this paper to address infrastructural issues, the government needs to focus on improving law and order, transport infrastructure, and power supply in the country for the continuous development of IT industry. From the last five years or so, the telecom infrastructure in the country has improved significantly. The telecom sector, which was growing in the range of 22-25% per year till 2002-03, has shifted to a higher growth path in the range of 35-40% per year.

Today, India's more than 100 million telephone networks is one of the largest in the world and the second largest among the emerging economies. The availability of large number of workers with a combination of engineering and managerial skills will definitely be helpful to move towards higher value-added goods and services. Despite having comparative advantage at least in certain segment of the IT sector, India's share in the global market is just 2%. This should be viewed as a great opportunity for the Indian IT industry. The global IT spending, which was more than US \$ 1400 billion in 2004- 05, is expected to increase at the rate of 7.9% per year over 2004-08 (NASSCOM). The fact that ITES-BPO segment is expected to grow at the rate of more than 11% per year over the same period and the US accounts for 47% of the global IT spending which is not expected to change significantly will help India to increase its market share in forthcoming years (The US is the key export market for India whereas ITES-BPO is the fastest

growing segment of the Indian IT industry. The US continued to be the main customer of India's ITES-BPO services with a share of 66%). Although the domestic IT market is just marginally more than half of the export, it has started growing at a rate of 20% per year or so during the recent years. Improvement in telecom infrastructure, increase in PC and internet connectivity, and decrease in prices of hardware and internet connection have provided great opportunities for firms to strengthen domestic IT market. The use of PC, an important access device for IT, and internet needs to be encouraged further for larger economic benefits. This can easily be used to provide distance education, telemedicine, and variety of other information. This can also enhance access and delivery of government services to various stakeholders and citizens. Internal record keeping, flow of information, and tracking decision and performance can be improved with the use of IT. The use of IT in governance can directly benefit the people, particularly the poor ones (since economically well off people in any case can get the information).

Above all, IT has the potential to improve transparency and accountability and thus the efficiency of government delivery system. In India, many government organizations have started to adopt IT based systems and solutions to manage payrolls, stock market, rail reservation, tax collection, etc. Various initiatives have been taken by the government to provide e-governance interface to citizens. The central government has recommended that each ministry should allocate 2-3% of its budget for promotion of IT and move towards electronic governance. It is clear that IT can be used not only for improvement in competitiveness in the global market but also for overall economic development. There are strong complementarities between IT and rest of the economy. IT can enhance the productivity and efficiency in other industries. It can improve efficiency in areas such as accounting, procurement, inventory management, and production and operations management.

Although labor unions usually raise concern with IT adoption due to fear of job loss, evidence suggests that increases in other kinds of job as a result of IT use more than make up for job loss (Singh, 2002). Moreover, IT implementation may increase the productivity and/or quality more than that is feasible otherwise. The use of IT in rural banking and micro-finance may enhance efficiency in informal sector and can impact broader cross-section of population. Information access to farmers could benefit agriculture sector as well. Farmers can receive weather forecasts, market price quotes, advice on farming practice, offers to buy and sell livestock, and specific trainings. Even basic education could be enhanced in rural areas by the use of IT. The IT sector is one of the largest employers of women, and therefore, can play a crucial role in women empowerment and the reduction of gender inequalities. The sector provides flexibility to its employee of operating from home and in working time, which enables women to carry on with jobs with family life. It is estimated that during the year 2004-05, male to female ratio in IT services and software segment of the industry was 76:24. The ITESBPO segment provides more opportunity for women. The ratio of male to female is reverse i.e., 31:69 in this segment (Annual Report (2004-05), Ministry of Communication and Information Technology, GOI, New Delhi, pp. 46). It is clear that the promotion of IT will help to address the gender issues in the country. Encouragement and promotion of computer education and IT use among socially and economically weaker section of the society has potential to reduce inequality. The government has to play a key role in this regard. To uplift the status of socially and economically weaker section of the society, the government needs to make IT accessible to them. Special efforts should be made to promote IT use in rural areas. There is a need to make significant capital investments in rural areas if not for some altruistic reasoning, at least because of a desire to enter a domestic emerging market that has been virtually untapped so far. The industry along with the central and the state governments should now look at taking

IT services to villages. One should remember that without access to the IT, the rural people can be caught in a poverty trap caused by the digital divide between the haves and the have-nots. Efforts should be made to promote the development and availability of low cost PCs and other communication access devices with internet connectivity at the most reasonable prices. There is a need to resolve regulatory issues in communication, and reduction and rationalization of tariff structure on hardware and software to provide seamless communication connectivity to rural areas and promote value-added services and micro enterprises to enhance economic wellbeing of rural community.

Conclusion:

From the analysis, it is clear that the IT has potential of not only accelerating the growth in the Indian economy but also promoting the broad-based economic development. To realize the same, besides standard policy initiatives such as improving infrastructure, strengthening training and education system, and introducing flexible labour laws that affect every sector of the economy including the IT sector, the government needs to take specific measures to promote IT use and to make it accessible to every section of the society. The IT should be promoted to be used as a tool for raising the living standards of the common people and enriching their lives. IT literacy needs to be enhanced manifold among the population at large through conventional and nonconventional means, so that ordinary people can begin to use it to derive benefits, both economically and socially. Incentive means will create opportunities for local communities and villages to realize the benefits from the IT sector.

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