Chapter 27

INFORMATION TECHNOLOGY

The Information Technology (IT) sector has tremendous potential to generate foreign exchange earnings, high quality employment and also contribute to productivity in rest of the economy. In industrialised countries, IT penetration in different sectors is leading to a sea-change in the pattern of working in almost every walk of life. While penetration level in India is low at present, the new technology provides tremendous opportunities for the country to benefit from the international boom in IT and also use IT in domestic economy to achieve efficiency gains.   The strategic imperatives being followed in the Ninth Plan are production at internationally competitive quality and prices, market promotion and export thrust, rationalisation of procedures to ensure growth, identifying niche areas in the world market, strengthening R&D (Research & Development) and manpower base, computing in Indian languages and developing new applications of IT and electronics relevant to India. The penetration of computers, which is at present four per thousand of Indian population, is targeted to grow to ten per thousand by the year 2001.

2.   A major part of IT and electronics industry is in private sector and Ministry of Information Technology (MIT) is playing a promotional   and facilitating role for development of the industry. The share of private sector, which was 76 per cent in electronics hardware production in 1996-97, is likely to reach a level of about 86 per cent by the year 2001-02.

3.   The growth rate of electronics and IT production during first three years of Ninth Five Year Plan has gradually increased from 20.4 per cent in 1997-98 to 26.4 per cent in 1999-2000. While software exports exceeded the Plan targets by registering impressive growth rates of over 55   per cent in first three years of the Plan, growth in electronics hardware sector remained stagnant at around 10 per cent. The hardware industry is facing stiff   competition as a result of poor infrastructure, high cost of finance and the tariff structure. It is desirable that recommendations of the National IT Task Force (Second and Third Reports) are examined and implemented to accelerate the growth of hardware industry. The reports focus on development, manufacture and export of IT Hardware and a long term national IT policy.

4.   The following table shows IT and electronics production in first three years of the Ninth Plan:

(Rs. Crore)

Sl	Item	1997-98	1998-99	1999-2000
1	Consumer Electronics	7,600	9,200	11,200
2	Industrial Electronics	3,150	3,300	3,400
3	Computers	2,800	2,300	2,000
4	Communication & Broadcast Eqp.	3,250	4,400	4,400
5	Strategic Electronics	900	1,300	1,450
6	Components	4,400	4,750	5,200
	Sub-total (Hardware)	22,100	25,250	27,650
7	Software for Exports	6,500	10,940	17,150
8	Domestic Software	3.470	4,950	7,200
	Total	32,070	41,140	52,000

5.   From the above trend it appears that the production target of Rs. 1,38,350 crore set for the terminal year of the Ninth Five Year Plan may not be achieved. However, export target of Rs.48,930 crore set for that year would be realised as Computer Software export is the major contributor and it has been recording good growth in the recent past.

Liberalisation and Thrust Areas

6.   With delicensing of the consumer electronics sector, liberalisation in foreign investment and easing of export-import policies, the country is attracting new investments; it is restructuring existing activities, diversifying   the product range and is facing an intensely competitive environment. Most of the renowned global brands in consumer electronics and IT sector have either established production facilities in the country or are present in the market through technical or financial collaboration, offering the consumer a wide choice in terms of   product features, quality and competitive prices. India is a signatory to the Information Technology Agreement and is committed to ensure penetration of IT at all levels in the society. The country has also agreed gradually to phase out tariff on IT products to zero by the year 2003.

BOX No. I
INCENTIVES FOR INFORMATION TECHNOLOGY

- Depreciation of IT products would be allowed at 60 per cent.
- Income derived by foreign companies as dividend and interest would be taxed at the rate of 20 per cent.
- Payments in the form of royalty and technical service fee would be taxed at 30 per cent.
- Under section 80 HHE of the Income Tax Act, definition of Computer Software has been widened to include transmission of data.
- Exemption of withholding tax on interest on external commercial borrowings has been extended to the IT sector.
- Computers have been exempted from Gift Tax.
- The tariff levels are being brought in line with the average international levels in a phased manner.

Special Action Plan

7.   An agenda under the Special Action Plan (SAP) of the Prime Minister is to make India a Global Information Technology Superpower and one of the largest generators and exporters of software in the next ten years. The Government constituted a National Task Force on Information Technology and Software Development inMay 1998. The Task Force submitted its First Report in July 1998, with a 108- point Action Plan. The First Report is at various stages of implementation. Some of its key recommendations are:

- Opening of Internet Gateway access to private Internet Service Providers (ISPs).
- Encouraging private Software Technology Parks.
- Zero customs and excise duty on IT software.
- Income tax exemption to software and services exports.
- Encouragement to set up venture capital$_{626}$ funds.

- Create a fund to handle Y2K problem.
- Promoting e-commerce.
- Framing cyber laws.
- Strengthening manpower base.
- Updating various databases over NICNET.
- Sharing information with users/ public.
- Earmarking 1 to 3 per cent of budget of every Ministry/ Department for IT applications.
- Networking all Universities and research institutions.
- Dollar Linked Stock Option to employees of Indian Software Companies.
- Sweat Equity.
- Financial package for buying computer; etc.

Major Initiatives & Achievements

8.   In October 1999, the Government set up a new Ministry of Information Technology (MIT) to act as a nodal institution and facilitator in respect of all initiatives in Central and State Governments, academia, the Indian private sector and successful Indian IT professionals abroad. MIT will actively promote and accelerate Internet revolution in India, IT enabled services, IT education, electronics and hardware manufacturing and exports, microelectronics, silicon facilities, e-commerce and Internet- based enterprises. An Advisory Committee for MIT has been formed to identify thrust / emerging technology areas and suggest measures and policies for proper growth of the sector.   A select Group comprising successful and well known IT professionals based in Silicon Valley, USA, was formed under the Chairmanship of Minister (IT) to advise Government on issues relating to development of IT, telecommunication infrastructure and software export.

9.   Government has taken up an ambitious project for setting up of Community Information Centres (CICs) in 486 blocks in the North-East and Sikkim at an estimated cost of Rs. 220 crores. It will provide connectivity at the block level and will be completed within 2 years. VSATs are being used to provide Internet connectivity under the scheme. The Centres will be managed with the assistance of Central Government for five years and after that State Governments are expected to take them over.

10.   A Rs 100-crore Information Technology Venture Capital Fund (VCF) has been set up, in collaboration with Small Industries Development Bank of India (SIDBI)/ Financial Institutions (FIs)/ Industry to provide capital and guidance to start- up professionals and IT units in small scale sector. The VCF launched in December 1999 is expected also to promote R&D and innovations in software development.

11.   An upgradation of the Education & Research Network (ERNET) has been approved by the Government at a cost of Rs. 196.20 crore, and would be completed in the Ninth Plan; under it, The network will be further upgraded in terms of quality and speed. ERNET is being connected through high speed links and will be used for imparting distance education. All 217 Universities and Regional Engineering Colleges will be connected on the new high speed backbone of 8/2 Mbps bandwidth.

12.   Measures are under way to facilitate growth of e-commerce, electronic communication through Internet and   accelerated induction of   IT in critical sectors of the economy. For this purpose, an "Information Technology (IT) Act 2000" has been approved by the Government. It seeks to provide legal framework for recognition of electronic contracts and prevention of computer crimes.627 It   will   pave   way   for   electronic

filing/documents and will legalise digital signature.   Amendments carried out in the Indian Evidence Act, Indian Penal Code, Bankers Books Evidence Act and RBI Act through the IT Act will serve the basis for carrying out amendments in the Registration Act, Negotiable Instrument Act, Consumer Protection Act and Formulation of Electronic Fund Transfer Act. The IT ACT has some pending issues as detailed in the following box:

BOX No. II
INFORMATION TECHNOLOGY ACT 2000- SOME PENDING ISSUES

- The Act seeks to amend only the Criminal Law and Law of Evidence, whereas, amendments may be necessary to the Law of Contracts and Transfer of Property. The Registration Act and the Stamp Act also need to be taken note of.
- There is no provision for consumer redress in case of fraud committed through e-commerce.
- There should be a foolproof system for dispatch, receipt and acknowledgement of receipt of electronic records.
- The Law does not envisage difficulties arising out of Electronic fund transfer. The issue of jurisdiction of Courts have not been addressed.
- The issue of privacy, viruses, hacking etc. need to be dealt in more exhaustive manner.
- Certain categories like power of Attorney, Trust, Will and Contract For Sale have been excluded from the IT Law, this may put limitation on growth of e-commerce, e-banking and e-governance.

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13.   Many countries have enacted similar Information Technology Acts in the last two years and these laws still have to pass through the test. Various issues which may arise during implementation of the above Act will be studied and addressed suitably.

14.   A Centre of Excellence for e-commerce has been set up at CMC Ltd., Hyderabad, with the objective of providing: consultancy in the area of e-commerce covering security of server, network, web and transaction; auditing of e-commerce, procedure manual on e-commerce; development of e-commerce in Indian context and prototypes for users like Indian Railways, Electricity Boards, Road Transport Corporations etc. Besides, the Centre will provide training in the area of e-commerce and will also undertake R&D.

15.   Government has initiated institutional mechanism to facilitate initiatives towards greater utilisation of IT as an enabling tool for efficiency and effectiveness in Government and public utility services. Three pilot projects in the area of electronic governance have been initiated in association with Government of Andhra Pradesh. Experience of these pilot projects could be used by other states for replication. A Centre for E-Governance has been set up at MIT headquarters to showcase existing tools and applications in e-governance. The Centre would also help to identify / develop various applications of immediate concern to Central Ministries/ Departments and the State Governments.

16.   All critical sectors of the economy were made Y2K compliant.The roll- over to the year 2000 was smooth and no major incidents were reported.

17.   India has achieved capability of designing and building supercomputers using massively parallel processing technology. The Centre for Development of Advanced Computing (C-DAC) has released its latest model-the PARAM 10000 - having a peak computing power in excess of 100,000 million floating point operations per second (MFLOPS) with an architecture scalable to 1 terra floating point operation per second (TFLOP). C-DAC has initiated a national project for the proliferation of the PARAM high-performance computers, under which a configuration of the   PARAM 10000 along with software and training, will be supplied to 12 premier academic institutions around the country. In order to commercialize PARAM Supercomputers, 40 machines have been installed in various institutions in the country and five have been exported.

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BOX No. III
MAJOR INITIATIVES IN IT SECTOR

- Setting up of a new Ministry of Information Technology.
- Setting up of Community Information Centres (CICs) in 486 blocks in the North-East and Sikkim for socio-economic development of North Eastern states.
- Information Technology Venture Capital Fund set up with a provision of Rs. 100 crore for triggering the growth of IT Industry.
- Upgradation of Education & Research Network (ERNET) by connecting all the Universities and Regional Engineering Colleges through high speed network.
- All major sectors of the economy were made Y2K compliant.
- Development of PARAM supercomputer having 100 giga floating point operation per second (GFLOP) peak computing power by C-DAC.
- Growth of software exports over 55 % and expanding new markets in European countries.
- Setting up of Indian Institutes of Information Technology (IIITs) by various State Governments. IIITs at Allahabad, Gwalior, Hyderabad and Bangalore have been set up.
- Information Technology (IT) Law has been approved to cater to the legal requirements of Internet and e-commerce.
- Setting up of Centre of Excellence for e-commerce at CMC Ltd., Hyderabad.
- Government allowed 100 per cent Foreign Direct Investment in e-commerce and decided not to tax such transactions

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18.   To promote information processing in Indian languages a project has been taken up at 13 Educational and R&D Institutions spread across the country. The objective is to increase IT penetration in the society, improve the quality of life of people of India by enabling IT use through Indian Languages, development of new products and services in Indian Languages and promote content creation (on web sites) efforts in Indian Languages for better dissemination of information among the Indian masses, apart from facilitating research in technology intensive areas of Language Engineering.

19.   Internet Service Providers (ISP) have been permitted to set up international gateways and hire bandwidth on foreign satellites. This will enable increased availability of Internet bandwidth and facilitate Internet expansion in the country. The growth and projections of Internet users in India are as under:

	Internet Connections (million)	Internet Users (million)
31.3.1997	0.09	0.45
31.3.1998	0.14	0.70
31.3.1999	0.28	1.40
31.3.2000	0.77	2.80
July, 2000	1.60	5.00
31.3.2002 (estimated)	3.50	10.00

20.   Availability of trained manpower is the most vital input for growth of IT industry and achieving Ninth Plan targets, especially in software exports. The Government has been supporting a number of institutions by way of providing hardware and software. A scheme Special Manpower Development for Software Export has been launched at National Centre for Software Technology, Mumbai. In addition to existing engineering colleges / private sector efforts in HRD (Human Resource Development) activities, Government institutions like Centre for Electronics Design & Technology (CEDT), Centre for Development of Advanced Computing (C-DAC), Electronics Research & Development Centres

(ERDCs), STQC (Standardisation, Testing & Quality Control) Labs and DOEACC (Department of Electronics Accreditation of Computer Courses) Society are making a significant contribution in generating trained manpower. Though DOEACC scheme is in operation since 1991, its "B" and "C" level courses which are of Graduate and Post graduate levels are yet to be recognised formally by Ministry of HRD. The number of registered students for various levels of courses under DOEACC scheme as on January, 2000 was 2,16,457.

21. In addition, MIT is implementing a Sustainability Support Scheme (SSS) for quality upgradation of the learning environment to produce high quality engineering graduates and diploma holders at 25 select institutions (14 engineering colleges and 11 polytechnics) in the country. The Government has been taking initiatives for promotion Internet-based education aimed at meeting high quality IT manpower requirement of Software Export Industry to meet the export target. These initiatives are I) Virtual Campus Initiative of IGNOU – One year PG Diploma in IT, ii) Centralized Web Site for Internet-Based Online Interactive Courseware and Courses – IIT Delhi, iii) Internet-Based Online Interactive Information Services over Internet and Hybrid Network – IIT Kanpur, iv) Design and Development of Multimedia-Based Courseware – BITS, Pilani, and v) National Resource Centre for online learning at NCST, Mumbai.

22. National Informatics Centre (NIC) has established NICNET facilities in all Central Government Departments, 32 States/UTs and in about 540 District Centres to facilitate information development for decision support and information exchange. In 1999-2000 NIC further upgraded the quality of NICNET based computer services. Internet services were extended to districts. About 380 high speed VSATs were installed in the districts and the transponder capacity was increased to handle increased network load. The updgradation programme for remaining districts is in progress. One-way Videobroadcast was tested at 380 districts, which is useful for distance training. Video conferencing facility was made operational at the Secretariat of Assam, Manipur, Tripura and Mizoram. Some of the major programmes being pursued by NIC are; NICNET based land records computerisation, implementation of Grass Roots Input to Districts (GRID), extension of NICNET services to newly created districts in the country, expansion of video-conferencing network, Modelling Graphics & Design Programme, Treasury Accounting Project, and implementation of Court Information System Programme for High Courts and District Courts and Bibliographic Information System. . NIC has also prepared a Five Year IT Plan for various Ministries and developed web sites of Government departments. The entire network of NIC was made fully Y2K complaint.

23. The Semiconductor Complex Ltd. Mohali, which has been rebuilt after its facilities were destroyed in a fire in 1989, started commercial production of Very Large Scale Integrated chips in October, 1997. The Government has decided to look for suitable Joint Venture Partner(s) to upgrade the technology as well as improve viability of the project in view of large scale import of chips. There has been hardly any progress in this regard; this needs to be pursued seriously.

E-Commerce - Prospects

24. The e-commerce can emerge as a major opportunity for India. The growth of e-commerce business transaction during the Ninth Plan period is as under:

Year	e-commerce business
	(Rs. crore)
1998-1999	131
1999-2000	450
2000-2001 (Anticipated)	3,500
2000-2002 (Anticipated)	15,000

25.   The Government has also approved 100 per cent foreign direct investment in e-commerce and decided not to tax such transactions to promote Internet based business. With improvement in telecom infrastructure, proper regulatory framework, increase in PC penetration and spread of Internet, the industry is hopeful of fast growth of e-commerce as projected.   The real emerging opportunity for India is to provide software solutions and services in e-Business.

Comparative Position of India in IT

26.   India is second in the world (next to US) in terms of the largest scientific-English speaking professional manpower. It also has a growing bank of 4.1 million technical workers, produced , among others, by over 1,832 educational institutions and polytechnics, which train more than 75,000 computer software professionals every year. Computer and software engineering graduates pass out from Indian Institutes of Technology, Indian Institute of Science and various deemed universities; training in all these institutions is comparable with world standards. However, for various reasons like poor laboratory infrastructure, shortage of faculty and books, the quality of technical education at a large number of other institutions both in government and private sector are not up to the desired level.

27.   In 1999, a consultancy study by Mc-Kinsey (commissioned   by NASSCOM) projected that the size of India's IT business would by 2008 swell to an annual revenue of $ 87 billion (currently $4billion), and out of this, $50 billion would   come from software exports. The report also estimated that Indian IT sector would account for 35 per cent of the country's total exports, an annual foreign direct investment of about $5 billion and contribution of over 7.5 per cent of Gross Domestic Product (GDP) by the same period. Besides, the report also projected that India's IT sector will require 2.2 million globally competitive professionals and roughly 1 million Indians would be employed in various IT related industries, and they would be generating an annual revenue of Rs. 81,000 crore.

28.   The Indian software industry has already established its recognition in providing high quality IT solutions to the world. The capability of Indian Software industry is reflected in the very high market capitalization. The Government is supplementing the industry efforts by providing right policy environment and infrastructure for its growth. The availability of high speed data-communication for software has been greatly enhanced through 12 earth-stations set up under the Ministry's Software Technology Park scheme.

29.   IT-enabled services like back- office operation, data entry jobs, medical transcription, insurance claim processing and content development have a large employment potential. As on December 1999, these services employed 41,000 people who generated US$ 460 million. It has been projected that IT-enabled services will be able to provide employment to about 11 million people generating US$ 17-18 Billion by the year 2008.

Telecom Network and Availability of Bandwidth:

30.   For the growth of IT industry and IT enabled services it is of utmost importance that a proper telecommunication infrastructure is put in place speedily. It is also necessary to have broadband capability of transmission of data and voice so that utilisation of the international bandwidth is possible in properly matched system. In order to get full benefits of infotech revolution, e-commerce, e-governance adequate connectivity, accessibility and bandwidth are the key drivers. (issues of telecommunication infrastructure has been covered separately under chapter on Telecommunication)..

Issues and Action Points

31.   Although significant developments have taken place in the IT sector, action on a number of points actions is required to be taken. They are summarised below:

- Second and Third Reports of the National IT Task Force which mainly focus on "Development, Manufacturer and Export of Information Technology Hardware" and "Long Term National IT Policy" should be examined in the present context and implemented for accelerated growth of hardware industry which is stagnating for the last 5/6 years.
- Large scale applications of IT by State Governments in Public Utility Services i.e. promotion of e-governance.
- Encouragement of IT development in Indian languages so as to increase degree of PC penetration and IT awareness in the society.
- Promotion of e-commerce strengthening of Internet infrastructure in the country including providing at least 300 GB of Internet bandwidth by 2005.
- Proliferation of Distance Education through Internet.
- Involvement of private sector in IT Education.
- Upgradation of Regional Engineering Colleges to the level of IITs and opening more IITs and IIITs. Training facilities in other private and government engineering institutions also need to be suitably augmented for generating quality manpower.
- Rapid implementation of Cyber Laws.
- Coordination of all round development of IT thereby leading to formation of a knowledge-based society and removing regional imbalances.