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National Dependability Policy Environments

INDIA

Report Version:	Final
Report Preparation Date:	1 November 2002
Classification:	Public
Preparation led by:	RAND Europe

Contract Start Date:	1 June 2001	Duration:	18 months
Project Co-ordinator:	RAND Europe (NL)		

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IST-2000-29202

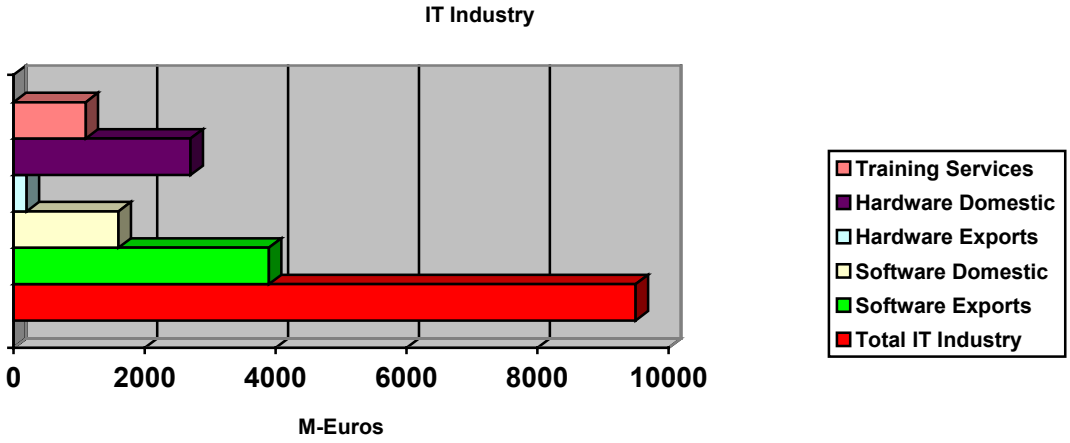
Project funded by the European Community under the "Information Society Technology" Programme (1998-2002)

Table of Contents

Overview of the Country's Information Infrastructure

This section provides a high level summary of social, political, and economic trends concerning the Internet, and information and communications networks. The following tables summarise key variables characterizing the information and communications technology environment of India.

In the area of ICT expenditures, India's Information and Communication expenditures are estimated at 3.46 percent of GDP (1999).[1] The IT industry in India was valued at 9.4 billion EUROs in 1999. A large portion of this can be attributed to export of software services such as customised software development and software maintenance. It has been estimated that India has 16 percent of the global IT market in customised software. Throughout the 1990's, the Indian software industry has expanded in export terms by 50 percent or more a year. Software exports, which were worth 1.9 billion EUROs at the end of 1998, are expected to more than double by the end of 2000; if current rates of growth continue, software exports may account for 25 percent or more of total Indian exports by the year 2005.[2] The ICT intensity rates was estimated at 3.3 computers per 1000 inhabitants in 1999.



Venture capital amounting to 222 million EUROs was available in 1999, 75 percent of which was provided by American firms. Growing interest in Indian start-ups could push the figure to 1.1 billion EUROs in two years.

The contribution of ICT to GDP within India has surged strongly within the past decade. With a GDP (1999) of 502 billion EUROs,[3] the ICT market was approximately 1.9 percent. At the same time, the share of ICT in employment had also grown, with major multinationals such as GE, British Airways, and American Express Travel already employing – in 2001 – more than 23,000 Indians and generating about 250 million EUROs in annual revenues, according to a Nasscom study.[4] According to the same study,

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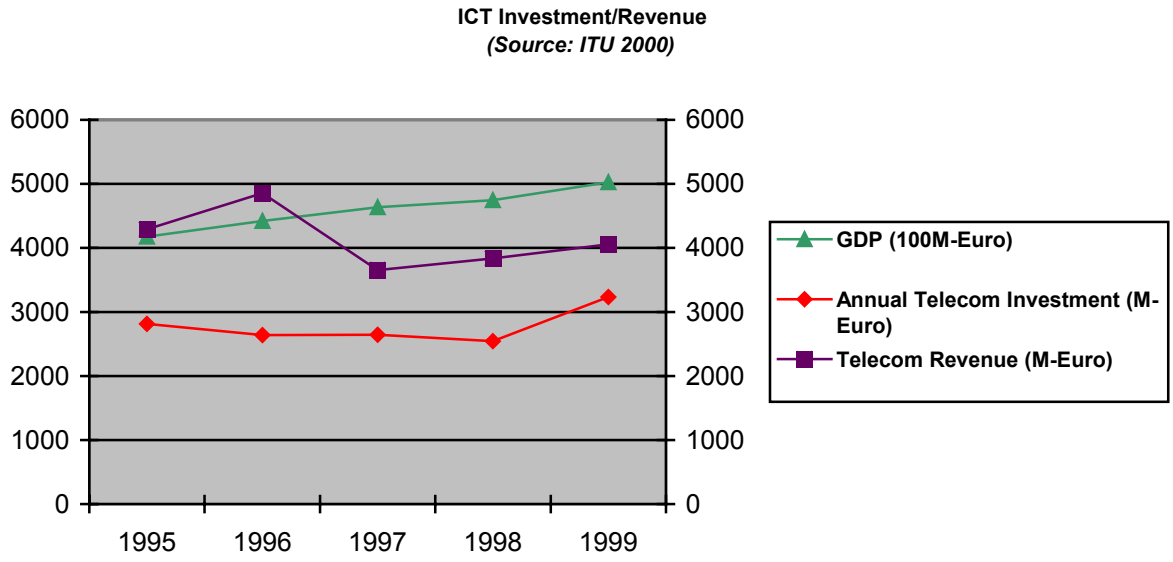
[1] Worldbank, Information Age factsheet: www.worldbank.org/data/wdi2001/pdfs/tab5_10.pdf (visited 1 November 2001)

[2] American University Class on *Impact National Information Technology Environments on Business* (December 2000), Information Technology Landscapes in Nations: www.american.edu/academic.depts/ksb/mogit/country.html (visited 1 November 2001)

[3] Worldbank, *India at a glance* (25 September 2001): www.worldbank.org/data/countrydata/aag/ind_aag.pdf (visited 1 November 2001)

[4] National Association for software and service companies, India www.nasscom.org (visited 1 November 2001)

globalisation in white-collar services could generate 1.1 million jobs and revenue of nearly 21 billion EUROs in India by 2008. By the end of 1999, India had more than 421,360 employed full-time in the ICT sector.



NB: exchange rate used 1 EURO =0.90$ (Source: ITU database, 2000)

Government Initiatives for the Labour Force

The Indian Government has finally started to realise the importance of promoting and supporting technology growth so apparent in the last five to seven years. It has undertaken several initiatives to ensure growth of IT workforce in India; the India IT Super Power Group is one of these. The Ministry Of Information Technology (MIT) recently elected people to lead an 'IT Super Power' group that is going to address issues about women in technology and technology development in rural areas. In view of the growing demand for software professionals around the globe, and likely shortfall in human resources, the government is taking initiatives to increase the number of technology students, doubling current numbers.

Telecommunications Infrastructure, March 2000[5]

Switching Capacity('000 lines)	32767.7
Telephone Exchange (No's)	27909
Direct Exchange Lines (000 lines)	26511.3
PCO (Local + STD) ('000)	648.95 (Th)
Satellite Earth Stations (No's)	443

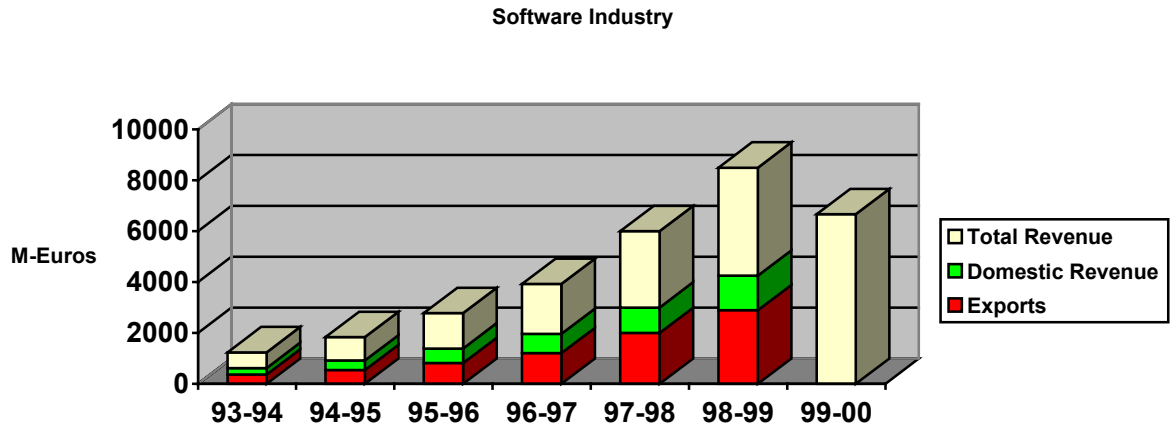
- In addition, the government is sponsoring technology institutes (Indian Institute of Technology Management) according to the same model as the highly successful Indian Institute of Technology. There has been active support given to private institutes, polytechnics and colleges that provide IT training. The DOEACC society (an agency like organisation which is part of the Ministry of Information Technology) has been formed which accredits institutions in the non-formal sector for four levels of courses.[6]

[5] Department of Telecommunications, Government of India, *Investinindiatelecom.com* (2000): www.investindiatelecom.com/infrastruct.htm (visited 1 November 2001).

[6] Department of Education Accreditation for Computer Courses DOEACC Society www.doeacc.org.in (visited 2 January 2002).

ICT Manufacturing and Services Trade:[7]

Alongside the labour force, overall ICT penetration in households has been increasing slowly. While, in 1999, there were only 3 computers for every 1000 people; there were 75 televisions for every 1000 (ie. 53 million households have a television and most of them have access to a cable network). Since deregulation, 63 ISPs have set up business in 25 cities. The available bandwidth in 1999 was 170 Mbps, though the projected requirement for 2000 is 1 Gbps. As of 1997, India had an installed base of 246,365 of PC's in homes/schools of which 35.1 percent were networked; the number of Internet hosts was 7175. During 1998-99, more than 820,000 PCs were sold in India. This took the PC penetration in India to 3.2 PCs per 1000 people by the end of 1998-99 (31 March 1999).



At present, India has 2 mobile phones per 1000 people (1999)[8]. It is expected that the number of mobile phones may be about 2.5 million by 2002 and 10 million by 2007. Today, there are 2.3 million subscribers to cellular phones[9]. In 1992, the government opened cellular telephone service to private participation. The country adopted the Global System of Mobile Communication (GSM) standard. The Cellular Service operates in the frequency band 890-902.5MHz. and 935-947.5 MHz. Today, India has 22 private companies providing services in 4 metro cities and 18 telecom areas. In 1999, there were approximately 27 telephone mainlines per 1000 people.

Main ICT Regulatory and Legal Developments

India is one of the first countries to establish a ministry dedicated to development of information technology. The Ministry of Information Technology (MIT)[10] is developed on the basis of making India an IT super power by 2008. Through this organisation the Indian government has undertaken several initiatives, some of which are outlined below:

- The government has opened India up to Foreign Direct Investment (FDI). India received FDI of US$21.8 million in 1996-97, which increased to US$47.94 million in 1999.

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[7] www.nasscom.org

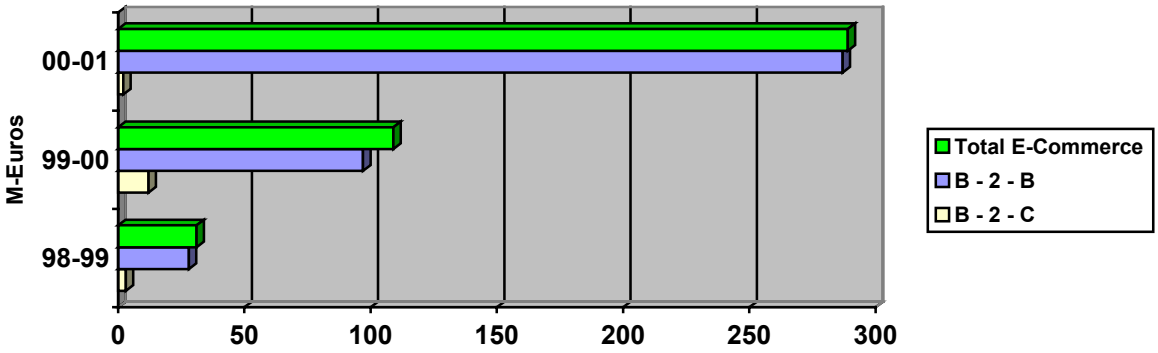
[8] Worldbank Power and Communications Factsheet, www.worldbank.org/data/wdi2001/pdfs/tab5_9.pdf (visited 1 November 2001)

[9] Department of Telecommunications, Government of India, Investinindiatelecom.com (2000): www.investindiatelecom.com/cellular.htm (visited 1 November 2001)

[10] Ministry of Information Technology, India: www.mit.gov.in (visited 1 November 2001)

- 8000 VSATS (Very Small Aperture Terminal Satellites), which offer data transfer speed of 9.6 Kbps – 64 Kbps, have been installed in the country in the network owned by service providers, government agencies and private users. Users include banks, credit card companies, stock exchanges, financial institutions and private sector companies.

Volume of B2B & B2C E-Trade *(Source: www.nasscom.org)*



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- The Government is sponsoring technology institutes (Indian Institute of Technology Management) along the same lines as the successful Indian Institute of Technology.
- It has initiated plans to establish software technology parks of India (STPI)[11], which promotes export of IT software and services by providing infrastructural facilities. There will be 17 international gateways, of which 12 are operational and 5 are in the process of implementation.
- ERNET India was established which provides network services to the 80,000 users in the academic and research community.
- Policy Initiatives: (Investment) Automatic approval of 100 percent FDI in the IT sector, (Fiscal) tax exemption on export profits, up to 60 percent depreciation on IT products.
- Venture Capital: 20 million EUROs National Venture Capital Fund in place for small and medium size industry with another 2 billion EUROs in 28 Venture Capital funds. A legal and fiscal framework has been created to support venture capital by amendment of the Company's Act and the Income Tax Act.
- The Information Technology Act of 1999 helped create a legal framework to support e-commerce. It covered concepts such as recognising digital signatures, electronic contracts, and electronic filing and preventing computer crimes. Policy initiatives regarding the Internet were introduced, which facilitated an increase in the number of ISPs.
- Installed bandwidth of 10Gbps through a submarine cable accessible through VSNL (Videsh Sanchar Nigam Limited).
- Until 1994, the Department of Telecommunications was the sole provider of basic telecom services in the country. The National Telecom Policy made initial strides in opening the field for private participants.

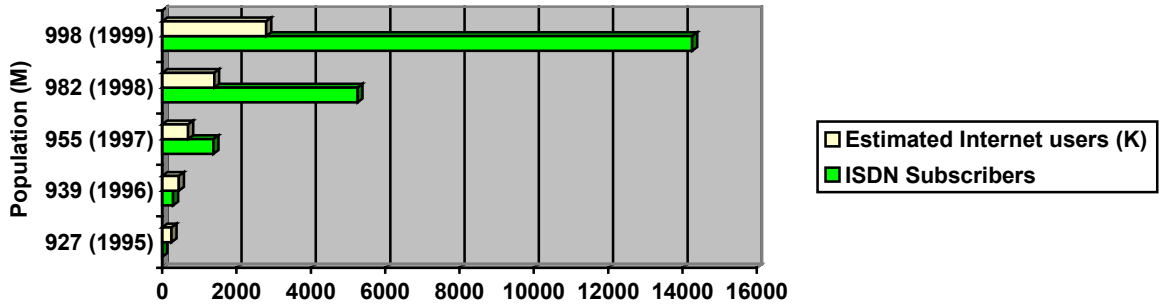
[11] Ministry of Information Technology, India: www.mit.gov.in/dbid (visited 1 November 2001)

The Indian Government set up a National Venture Capital Fund for the Software and IT Industry (NFSIT). The NFSIT, is a collaborative venture with various financial institutions and the IT and software industry. The main objective is to encourage entrepreneurship in IT related areas. Similarly, many state governments such as Andhra Pradesh, Karnataka and Kerala have also already set up venture capital funds for the IT sector in partnership with local financial institutions.

Analogue[12]	*Kms*	*Digital*	*Kms*
Coaxial Route	23206	Coaxial Route	7751
Microwave Route	30859	Microwave Route	58796
UHF Route	17542	UHF Route	45130
		Optic Fibre Route	115979

The MIT is pursuing four broad strategies. These are firstly, the provision of bigger infrastructure, the development of legal systems and capital markets to nurture the knowledge economy, the liberalisation and deregulation of the telecommunications sector and finally the improvement of skills amongst the current and future workforce.

The following targets have been put forward to be met: the density of computers in rural areas to be improved to 4 computers per 100 inhabitants by 2010; the provision of reliable telecommunications infrastructure to all villages by 2002; high speed and multi-media capable technology (including broadband and ISDN) to all towns with a population of more than 2m by 2002; Internet access to all district headquarters (local government) by 2000 and finally the realisation of US$37bn worth of investment by 2005.



The government is actively promoting Foreign Direct Investments (FDI), investments from NRIs (Non-Resident Indians) including Overseas Corporate Bodies (OCBs) owned by NRIs. FDI is freely allowed in all sector including the service sector, except in sectors where the policy specifies a ceiling on the investment. Investments and returns are freely repatriable, except in certain cases (22 cases, which attract dividend balancing).

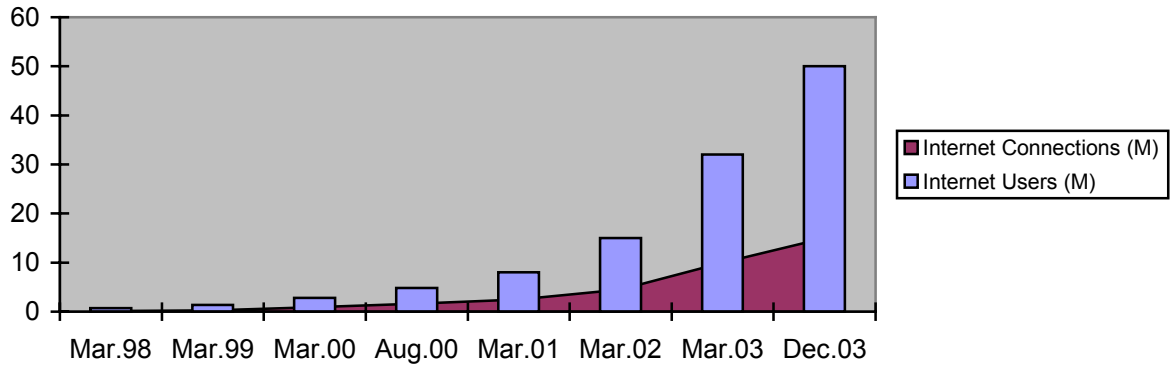
In the field of telecommunications, for basic services, national long distance, cellular services, paging, and GMPCS, FDI is limited to 49 percent subject to receipt of license from the Department of Telecommunication. The companies, which are receiving the foreign investment have to follow certain regulations regarding foreign equity cap, lock-in period for transfer, addition of equity, etc.

[12] Department of Telecommunications, BSNL, India, www.dotindia.com (visited 1 November 2001)

Assessment Of Phenomena Undermining Dependability

Little data is available about breaches of dependability. In February 2001 for the first time two men were arrested under the new Information Technology Act (see next paragraph) for hacking a site[13]. Other anecdotal evidence states an attempted hack of the information systems of the State Bank of India[14].

Index for Internet Infrastructure *(Source: www.nasscom.org)*



A survey conducted by KPMG indicates that companies in India have the highest number of e-Commerce based breaches in the world. This may be the result of the simple fact that the population of India is much bigger than many more advanced nations, so any corresponding percentage of connected companies operating e-Commerce sites will be proportionally higher. However, it still shows the poor focus on information security present in the country.

The pre-Christmas period saw a range of attacks against Indian sites by Pakistani hacker groups. The Industrial Development Bank of India was hit and its public web-site was defaced. The Indian Institute of Science web-site was also defaced, as was the Tribune Newspaper and the Engineering Export Promotion Council. It was thought that the motivation was retaliation for India's anti-Pakistan attitude following the attack on the Indian parliament. This is yet another example of bad feeling and animosity being carried over from real world events to cyberspace (admittedly only still in the form of web-site defacements).[15]

Government Initiatives Aimed At Tackling Cyber-Security

The Indian government has several sites that provide information on security and laws concerning Cyber-security.

Cyber-law: With the growth of the Internet the government has been quick to set up committees to study the governing laws on the Internet. The main legislative instrument in this area is the *Information Technology Act* 2000. The government provided an action plan within this, that mandated the creation of a number of organisations and policies. These included the creation of a National Computerised Records Security Document to enforce security requirements within government. A Information Security Agency was also created to act as a national law enforcement body. The Ministry of Law, Justice and Company Affairs is

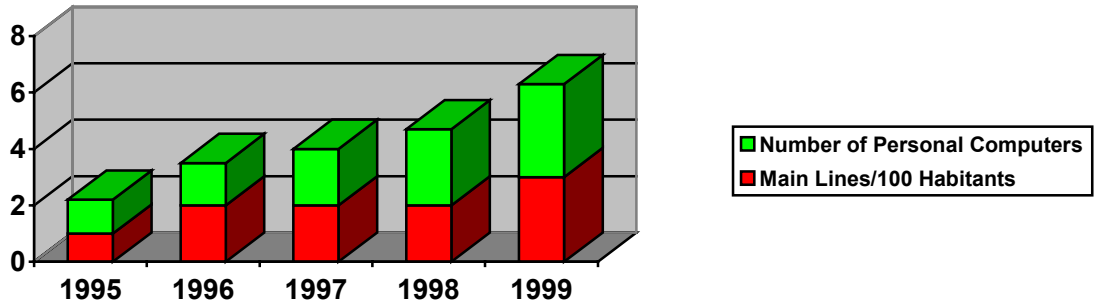
[13] "Indian Police Make First Cyber-Crime Arrests", *InfoWar* (9 February 2001): www.infowar.com/law/01/law_020901b_j.shtml (visited 5 November 2001)

[14] Grabosky, *op cit.*

[15] "Pak cyber terrorism 'injures' 20 Indian web sites", *IndiaExpress Bureau* (27 December 2001): www.indiaexpress.com/news/technology/20011224-0.html&e=747 (visited 28 January 2002)

required to look again at coverage of cyber – crime within existing legal frameworks. The Act also proposed the creation of a *National Policy on Information Security, Privacy and Data Protection* for computerised data. Finally, it asked that the knowledge of cryptography and information security currently held by the defence establishments be suitably transferred to civilian information security agencies for wider dissemination. It is hoped that the last point will bring about a greater degree of the use of electronic funds transfer, digital signatures and e-commerce.

Personal Computer Penetration
(*Source: ITU, 2000*)



Digital Signatures**:** The Information Technology Act 2000 states that digital signatures will be recognised as legal authentication in cases where requirements of government certification authorities are fulfilled. Also acceptance in electronic form of any offer, culminating into an electronic contract, has also been declared legal and enforceable.[16]

Publishing of information which is obscene in electronic form: This article places restrictions on material that a person can publish in electronic form. However, what is deemed to be obscene is vague and poorly defined.

Breach of privacy: The Act briefly mentions the need to protect consumer privacy by stating that any person who collects and distributes other people's information and electronic records to third parties is punishable by law.

Points of attention: Criticism arose about several aspects of the new Indian law: it begins by granting a legal infrastructure for e-commerce without touching on anything like other important legal issues for the corporate sector for example Intellectual Property Rights, Domain Names, Internet Policy, Linking or Disclaimers.

Another clause of the new law takes a contrary stand to emerging global trends relating to liability of Internet Service Providers for third party data and information. Under Indian law, ISPs as a matter of principle are made liable for third party data and information made available by them through their service. However, only in two exceptional cases, the ISP is not liable if it can prove that it had no knowledge of the commission of any offence or contravention of the provisions of the Act or if the ISP proves that it acted with due diligence. Both the two exceptions are extremely loosely defined and industry fears are that this will become a problem in the future.

[16] Ministry of Information Technology – India's IT Security Portal: www.itsecurity.gov.in (visited 5 November 2001)

The biggest concern about this law relates to its implementation as no solid time table or plan is set down. Furthermore, officials worry that it will be difficult to enforce as the level of Internet knowledge amongst law enforcement officials is very low.[17] However, the first Cyber Police Station was rendered operational in September 2001 in Bangalore (the centre of high tech development in India). Working under a partially devolved legal system, local police stations will deal with some cyber crime issues and retain overall responsibility for searches.[18]

An overview of appropriate laws is given by Gregor Urbas for the Asia Cyber-Crime Summit 2001:[19]

Offence	**Laws and regulations**
Illegal access Illegal interception Data interference System interference Misuse of devices Computer-related forgery Computer-related fraud Computer child pornography	**Information Technology Act 2000** (No.21 of 2000) also incorporating computer-related amendments to the **Indian Penal Code** (No.45 of 1860) **s43 Unauthorised access, damage etc.** (Damages not exceeding 10.000.000 rupees) **s65 Tampering with computer source documents** (3 yrs max and/or fine of 200.000 rupees) **s66 Hacking with computer systems** (3 yrs max and/or fine of 200.000 rupees) **s67 Publishing obscene information in electronic form** (5 yrs max and/or fine of 100.000 rupees; 10 yrs max and/or fine of 200.000 rupees for subsequent conviction) **s70 Unauthorised access to protected computer systems** (10 yrs. max and unspecified fine)

Research and Development

Promotion of research and development efforts in electronics and related fields in the country has been one of the major activities of the Ministry of Information Technology. Accordingly, MIT has been providing financial support to projects/schemes for undertaking research/development in the areas of Information Technology, Micro-electronics, Industrial Electronics, Strategic Electronics, Consumer Electronics. Materials and Components as well as applications of Electronics in various socio-economic and business sectors. A large number of academic institutions, industries and research labs with geographical distribution spread all over the country have implemented projects and programs supported by MIT.

For the future, major priorities will centre on computer applications in various socio-economic sectors; state-of-the-art software packages; the internet and enabling technologies; electronic governance; next-generation high-performance computing; technology development in indian languages; low-cost pcs; networking and associated products; and databases. Areas where the government is intending or is already placed investment include Advanced Network Architecture; Network Security; Network Management; E-Commerce; Web-based Applications; and IT-enabled Services.

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[17] "India Passes Its First Cyberlaw With Draconian Powers", *InfoWar* (19 May 2000): www.infowar.com/law/00/law_051900b_j.shtml (visited 5 November 2001)

[18] "India's First Cyber Police Station To Tackle Hackers, Net Fraud", *Newsbytes* (3 September 2001): www.newsbytes.com/news/01/169664.html (visited 28 January 2002)

[19] Urbas, *op cit.*