

INFORMATION AND TELECOMMUNICATIONS TECHNOLOGY
MARKET OPPORTUNITIES
FOR U. S. SMALL AND MEDIUM-SIZED BUSINESSES

EXPORT *IT* REPORT
INDIA



MAY 2004



U.S. DEPARTMENT OF COMMERCE
INTERNATIONAL TRADE ADMINISTRATION
TRADE DEVELOPMENT
INFORMATION TECHNOLOGY INDUSTRIES

Export IT Report for India

INFORMATION AND COMMUNICATIONS TECHNOLOGIES (ICT)
AND ELECTRONIC COMMERCE
FOR SMALL AND MEDIUM-SIZED ENTERPRISES

Table of Contents

Acknowledgements	iv
Foreward	v
Terms and Abbreviations	vi
Executive Summary	x
1. IT/Telecommunications Sectors and the Indian Economy: Plans and Policies for Boosting Growth and Opportunity	
1.0 Introduction	1
1.1 IT Sector is a Significant Contributor to Indian Economic Growth ..	2
1.2 Government Agencies Involved in IT and Telecommunications Sectors	4
1.3 Major IT and Telecommunications Trade Associations Play a Key Role in Sector Development in India.	9
1.4 Government Support for Indian IT Sector and Market Growth	10
1.5 Indian State Governments Support IT Sector as Well.	14
1.6 Tenth Five-Year Plan (2002-2007) Establishes Framework for IT Sector and Market Growth	14
1.7 The Information Technology (IT) Act, 2000 Begins Laying Foundation for E-Commerce.	15
1.8 The (Draft) Convergence Bill of 2001.	16
1.9 Government Policies and Plans in Telecommunications.	16
1.10 India's WTO Commitments in Telecommunications, IT and E-Commerce	26
1.11 U.S. – India High Technology Partnership Formed.	27
2. Telecommunications Sector	
2.0 Size and Growth of the Telecommunications Market.	29
2.1 The Market for Telecommunications Equipment	29
2.2 Major Telecom Services Players in the Indian Market	33
2.3 The Market for Telecommunications Services.	44
2.4 Market Drivers and Trends in India's Telecom Market.	51

3.	The Information Technology Sector	
3.0	The Indian IT Sector	57
3.1	Software and IT Services: The Star Performer.	58
3.2	Hardware Firms Remain Homebound.	61
3.3	The Indian IT Market: Hardware.	63
3.4	The Indian IT Market: Software and IT Services.	64
3.5	IPR Law Toughened, but Software Piracy Remains a Problem due to Lax Enforcement.	78
4.	Electronic Commerce	
4.0	Overview of Electronic Commerce in India	83
4.1	Business-to-Business Electronic Commerce.	84
4.2	Business-to-Consumer E-Commerce	87
4.3	Electronic Government	88
4.4	Legal and Regulatory Framework for Electronic Commerce	92
5.	Market Opportunities and Entry Strategies in India	
5.0	Opportunities in Telecommunications Services	99
5.1	Telecom Products and Equipment Opportunities	102
5.2	Opportunities in Information Technology.	107
5.3	Opportunities in Electronic Commerce.	113
5.4	Market Strategies.	113
6.	The Role of the U. S. Department of Commerce	
6.0	The International Trade Administration	119
6.1	Trade Development.	119
6.2	Office of Information Technologies and Electronic Commerce	120
6.3	Office of Telecommunications Technologies	121
6.4	Office of Microelectronics, Medical Equipment, and Instrumentation.	122
6.5	Other Trade Development Offices and Programs.	123
6.6	The U.S. Commercial Service.	125
	Appendices	A 1-32
A:	Information Technology Agreement Products by Harmonized System Classification Number.	1
B.	U.S. - India Dual-Use Export Control Policies and Procedures	7
C.	U.S.- India Statement of Principles for High Technology Commerce	12
D.	Useful Contacts	15
E.	Selected IT and Telecommunications Trade Events in India	27
F.	List of Organizations Contributing Information for this Report	31

ACKNOWLEDGMENTS

This report was prepared by international trade specialists from Information Technology Industries offices in the Trade Development unit of the U.S. Department of Commerce's International Trade Administration (ITA): Tim Miles of the Office of Information Technologies and Electronic Commerce, and Dan Edwards of the Office of Telecommunications Technologies. They were actively supported by U.S. Commercial Service staff in India, including Sandeep Maini in New Delhi, Leonard Roberts in Bangalore, and Mayank Bhatt, Charles Pinto, and Navin Vazirani in Mumbai.

Information on the Office of Information Technologies and Electronic Commerce and the Office of Telecommunications Technologies can be found at: <http://www.export.gov/infotech>

FOREWORD

This report describes and analyzes the trends, key issues, and events in information technology, telecommunications, Internet and e-commerce adoption in India, to create a framework from which U.S. small and medium-sized enterprises (SMEs) can make educated business decisions about entering these markets. The report analyzes the status of telecommunications liberalization, competition in telecommunications services and the deployment of new technologies, and how these changes are affecting the adoption of the Internet and e-commerce. It also analyzes the economic, cultural, and political factors influencing the adoption of information, Internet, and e-commerce technologies. The report highlights issues and market opportunities relevant to U.S. SMEs in the telecommunications, information technology (IT), and e-commerce areas. In addition, it provides suggested market entry strategies for SMEs, U.S. Department of Commerce and other resources to assist U.S. firms in market entry endeavors, and contacts in the United States and India.

The report was written for the U. S. - India High Technology Cooperation Group (HTCG) as one of its major work plan activities in 2004. It is based on market research and analysis undertaken in India in September 2003 by international trade specialists from the Information Technology Industries unit of Trade Development within the Commerce Department's International Trade Administration (ITA): Tim Miles of the Office of Information Technologies and Electronic Commerce, and Dan Edwards of the Office of Telecommunications Technologies. They interviewed software, Internet, and telecommunications equipment and services producers, trade associations, industry analysts, IT end-users, and government officials in India. Their work was actively supported by market specialists in ITA's Commercial Service (US&FCS) in India. Information gathered from on-site interviews was supplemented with data from market research firms and an extensive review of available literature.

The information in this report was accurate to the best of our knowledge from its initial drafting in December 2003 through to its completion in February 2004.

TERMS AND ABBREVIATIONS

\$	dollar figures cited in this report are U.S. dollars
2G	second generation (mobile communications)
2.5G	intermediate generation of mobile communications between 2G and 3G
3G	third generation (mobile communications)
ABTO	Association of Basic Telecom Operators
ADSL	asymmetrical digital subscriber line
AMPS	advanced mobile phone service
APEC	Asian Pacific Economic Cooperation
ARPL	average revenue per line
ARPS	average revenue per subscriber
ARPU	average revenue per user
ASEAN	Association of Southeast Asian Nations
ASP	application service provider
ATM	asynchronous transfer mode
B2B	business-to-business e-commerce
B2C	business-to-consumer e-commerce
BPO	business process outsourcing
CAGR	compound annual growth rate
CCB	Communications Convergence Bill
C-DAC	Centre for the Development of Advance Computing
CDMA	code division multiple access
C-DOT	Centre for the Development of Telematics
CIC	Community of Information Centres project
CII	Confederation of Indian Industry
COAI	Cellular Operators Association of India
CORBA	Common Object Request Broker Architecture
CRM	customer relationship management
DIT	Department of Information Technology (India)
DOT	Department of Telecommunications
DTA	Domestic Tariff Area
DSL	digital subscriber line
ECOTECH	Economic and Technical (Cooperation in the Field of E-commerce)
EDGE	enhanced data for GSM evolution
EDI	electronic data interchange
EHTP	Eletronic Hardware Technology Park

EMS	enhanced messaging service
EOU	Export Oriented Undertaking
EPCG	Export Promotion Capital Goods program
EPZ	Export Processing Zone
ERNET	Education and Research Network
ERP	enterprise resource planning
ESC	Electronics and Computer Software Export Promotion Council
EXIM	Export-Import
FCC	Federal Communications Commission
FCCI	Federation of Indian Chambers of Commerce and Industry
FDI	foreign direct investment
G2B	government-to-business e-commerce
G2C	government-to-citizen e-commerce
GDP	gross domestic product
GIS	geographical information system
GPRS	general packet radio service
GPS	global positioning system
GSM	global system for mobile communications
HDTV	high definition television
HDSL	high bit rate digital subscriber line
IC	integrated circuit
ICP	Internet content provider
ICT	Information and Communicatins Technologies
IDC	International Data Corporation
IFC	International Finance Corporation
II	information industry
IIT	Indian Institute of Technology
IP	Internet protocol
IPO	initial public offering
IPR	intellectual property rights
IP/VPN	Internet protocol-based virtual private network
ISA	industry sector analysis
ISDN	integrated services digital network
ISO	International Organization for Standardization
ISP	Internet service provider
ISPAI	Internet Services Providers Association of India
IT	information technology
ITA	Information Technology Agreement
ITACC	IT Anti-Counterfeit Coalition
ITU	International Telecommunication Union

kbps	kilobits per second
LAN	local-area network
MAIT	Manufacturers' Association for Information Technology
MCI	Ministry of Commerce and Industry
MCIT	Ministry of Communications and Information Technology
MFN	most favored nation
MHRD	Ministry of Human Resources Development
MIB	Ministry of Information and Broadcasting
MMS	multimedia message service
MNC	multinational corporation
MOF	Ministry of Finance
MST	Ministry of Science and Technology
MVNO	mobile virtual network operator
NASSCOM	National Association of Software and Services Companies
NIC	National Informatics Centre
NGO	non-governmental organization
NTDB	National Trade Data Bank
OECD	Organization for Economic Cooperation and Development
OMG	Object Management Group
PC	personal computer
PDA	personal digital assistant
R&D	research and development
R	Rupee (Indian currency unit: 46 Rs = U.S. \$1)
SAD	special additional duties
SARI	Sustainable Access in Rural India Project
SCM	supply chain management
SDH	synchronous digital hierarchy
SEZ	Special Export Zone
SHD	smart handheld device
SI	systems integrator
SIM	subscriber identification module (as in smart cards)
SME	small and medium-sized enterprise
SMS	short message service
STPI	Software Technology Parks of India

TBT	Technical Barriers to Trade
TDIL	Technology Development for Indian Language program
TDMA	time division multiple access
TD-SCDMA	time division synchronous code division multiple access
TEC	Telecommunications Engineering Centre
TEL	Telecommunications and Information (working group under APEC)
TEMA	Telecommunications Equipment Manufacturers Association
TRAI	Telecommunications Regulatory Authority of India
TRIMS	trade-related investment measures
TRIPS	trade-related intellectual property rights
UMTS	universal mobile telecommunications system
USEAC	U.S. Export Assistance Center
USIBC	U.S. - India Business Council
USIHTCG	U.S. - India High Technology Working Group
USTR	Office of the U.S. Trade Representative
VAS	value-added services
VAT	value-added tax
VC	venture capitalist
VOIP	voice over Internet protocol
VSAT	very small aperture terminal
WAN	wide-area network
WAP	wireless application protocol
WLAN	wireless local area network
WLL	wireless local loop
WTO	World Trade Organization
Y2K	Year 2000

EXECUTIVE SUMMARY

India has a population of about 1.1 billion, the second largest in the world after China. Although roughly a quarter of Indian people live below the poverty line, India has a growing consumer class (250 to 300 million), nearly half of its population under the age of 25 and, as a result of significant economic expansion over the past decade, rising business and consumer spending. Its economy is based on traditional village farming and modern agriculture, a wide diversity of manufacturing industries, and services businesses. India has not only gained a strong reputation internationally as an exporter of agricultural products, textiles, and transportation equipment, but also for software and services outsourcing. However, it continues to suffer from inadequate power and transportation infrastructures and an education system that, despite its ability to produce large numbers of engineers and highly skilled technical personnel, has left over 40 percent of the population illiterate.

India rebounded in FY2003 after a rather difficult year when a drought-induced decline in agricultural output adversely affected the rest of the economy. According to the Government of India's (GOI) latest forecast, India's gross domestic product (GDP) is now expected to grow at a 8.1 percent rate this fiscal year versus only 4 percent in FY2002 due to a good monsoon season, higher than anticipated harvests and agricultural income, and significantly better performing Indian manufacturing and service sectors. Goldman Sachs predicts that India will become the third largest economy in the world behind China and the United States by 2050. Indian GDP is expected to increase at a compound annual rate of more than 8 percent during this period to \$27.8 trillion (in constant 2003 dollars), surpassing the growth of each of the G8 countries and other major developing nations, including China. India's U.S. dollar income per capita will also rise by 2050 to 35 times its current level, but will still be appreciably lower than these countries due to substantial growth in the Indian population expected over this period. However, India's booming economy should act as a powerful engine of new demand growth and spending on software and telecommunications and information technology (IT) products and services in the future.

TELECOMMUNICATIONS MARKET

India has the world's seventh largest telecommunications network that currently is growing at a record pace. At the end of January 2004, government figures show that there were 72 million telephone subscribers in the country. Of these, 30.1 million were wireless subscribers (23.4 million on 72 GSM networks and 6.7 million on 25 CDMA networks). On the wireline side, including fixed local wireless, the number of subscribers reached 42 million. The country's teledensity is approaching 7.0 and should reach 10.0 (more than 100 million subscribers) in 2005. Recent growth in mobile subscribers—1.6 to 2.3 million per month—was more than twice the growth during the corresponding months in 2002, and the total increase for 2003 was more than three times the total for the previous year. Since only a fraction of the potential market for mobile subscribers has been tapped, triple digit growth should continue during 2004. The number of fixed line subscribers is growing much more slowly, although basic service operators are finding a ready market for services provided over fixed wireless facilities. Sometime in late 2004 the number of wireless subscribers will pass the number of wireline subscribers in India.

Two government-owned carriers control more than 90 percent of the fixed line market and collectively are investing hundreds of millions of dollars in network expansion and upgrades. The largest carrier, BSNL, is implementing plans to provide digital connectivity in all its exchanges and is adding optical fiber systems in its national long distance networks. Now that wireless local loop (WLL) systems will be able to provide full mobility under the unified licensing regime, BSNL and its private sector competitors will expand their fixed wireless infrastructure throughout India. Private competitors like Reliance, Bharti and Tata are also aggressively building out telecom infrastructure so they can offer a complete menu of national and international communications services to their customers.

While telecom equipment sales have lagged in many developed telecom markets the past two years, that is not the case in India, where sales increased 10 percent in 2003 over the previous year. With the boom in wireless services and plans to extend networks beyond the already-covered metropolitan areas, sales of network infrastructure equipment and mobile handsets should ensure that the Indian equipment market remains robust in 2004. Indian firms manufacture customer premises equipment and, through joint ventures, produce some carrier equipment, but most state-of-the-art equipment (including mobile phones) must be purchased abroad. India may import more than \$5 billion worth of telecom equipment in 2004. U.S. telecom equipment exports to India totaled \$255.5 million in 2003, an increase of 6.6% over 2002. With Indian tariffs on most telecom equipment due to be abolished in 2005 though, future prospects for U.S. suppliers remain bright, and of course not all U.S. company sales in India are reflected in the export statistics.

Despite dramatic tariff reductions for fixed long distance and international and mobile services, total revenues from India's telecom services sector are growing at an annual 12 to 15 percent rate. As the carriers transition to a new, streamlined licensing system in 2004 that should resolve much of the controversy that led to investor uncertainty and confusion, the deployment of services via any means of technology should produce greater market efficiencies and better, more economical services for the public. Basic services still account for approximately 60 percent of India's telecom revenues. Data services are increasingly important to the business sector, but dramatic increases in public data and Internet services are unlikely to occur until the generally poor quality of the "last mile" network connection is overcome. Mobile carriers are developing a range of attractive data services to increase billed revenues, but the extent of market demand for such services is as yet undetermined. The India telecom consumer is very cost conscious, and while the use of mobile phones has spread far beyond the well-to-do residents and large business employees to urban laborers, farmers, students, and the small shopkeepers, add-on features will be attractive to the extent they are offered at very affordable prices.

This rapid expansion of India's telecom market has resulted from a number of recent developments. The Government has continued to liberalize and promote the sector and modify policies that retarded the development of the industry. With the entry of several large and well-financed firms determined to take on the government-owned former monopoly, new networks have been built, and competition has taken hold in most regional and service markets. This has led to dramatic price reductions as companies seek to gain new customers (or hold onto existing ones) by matching the price cuts of their competitors. The boom in mobile services has driven the consumer market, while India's

growing economy and export strategies are stimulating the demand from industry for corporate private network services.

A trend toward market consolidation is emerging due to mounting competitive pressures and the need for investment capital. Some observers predict that only a handful of telecom firms will remain in service by the end of the decade. However, if current licensing requirements that make it impossible for small firms to enter the market are eased or abolished, if the size (in subscribers and revenues) of India's market continues to expand rapidly, and if demands for new and better services increase, there should be ample room in the market for many telecom firms to thrive by designing, offering specialized or niche-market applications, and reselling general telecom services to the public. After nearly ten years of slow and uneven steps toward telecommunications liberalization, India appears to have hit upon a "formula" that works, and the country is enjoying the benefits that a competitive telecom industry can provide.

IT MARKET

India has the fifth largest IT market in the Asia Pacific region. IT demand there reached \$4.7 billion in 2002 with hardware accounting for 62 percent of this total, IT services (including custom software) for another 28 percent, and packaged software for the remaining 10 percent. Large corporations were responsible for more than half of Indian IT spending, but demand has reportedly been increasing at a rapid pace among small and medium-sized enterprises (SMEs).

At less than 1 percent of the population, personal computer (PC) penetration in India is the lowest in the Asia Pacific region, according to International Telecommunications Union (ITU) statistics. The high cost of these systems has been a major factor in restricting their use to mainly large corporations and wealthy households. However, the future of this market may be more promising than it appears. Indian branded manufacturers and multinational company (MNC) suppliers have cut prices on PCs significantly over the past year to the extent that many entry-level desktops are available for \$435 and notebooks sell for below \$1,100. These suppliers are also working to drive these prices even lower to boost small business and consumer sales. Other positive developments are the growing interest in PCs within India's sizeable and increasingly more affluent middle class and the ongoing push in both private and public sector Indian enterprises to computerize their operations. The Manufacturers' Association for Information Technology (MAIT) expects that annual PC sales in India could reach 22 million units by 2010, or almost ten times the number sold in this market today.

As in other countries, peripherals sales in India are closely tied to the vicissitudes of the PC business and benefited in FY2002 from the recovery in spending on these systems in education and the commercial sector, notably the banking and financial services, and insurance sector (BFSI), and the telecommunications, manufacturing, retail, and IT-enabled services industries. International Data Corporation (IDC) projects that spending on computer peripherals in India will grow at a 14.7 percent average annual rate to \$1.3 billion in 2008, or nearly twice their current level.

India is one of the fastest growing server markets in the Asia Pacific region. IDC expects shipments will increase at a 7.3 percent average annual rate to \$528 million in 2008. Market growth will be spurred by deregulation of the insurance industry, server consolidation among service providers, branch-level automation in banking, and infrastructure expansion in the mobile telecom services segment. In the public sector, another major user of these computers, demand will be driven by e-governance and e-learning projects. More widespread use of Linux-based systems should occur and will be closely linked to Internet infrastructure expansion and the replacement of Unix server installations for applications in education and research that do not require significant processing power. Purchases from U.S. vendors will increase due to the U.S. Government's efforts to highlight the limited impact of export controls on high technology products.

The Indian networking equipment market has also emerged as one of the strongest in the Asia Pacific region. Demand is expected to increase 17 percent in revenue during 2003, but will have a considerably higher 26.7 percent growth rate over the next five years, provided the deployment of wireless and broadband technologies occurs as expected. Sales of routers and switches should be fueled by a greater number of Indian enterprises establishing new networks and looking to move from data-only networks to networks optimized for voice, video and data. While the BFSI sector, the business process outsourcing (BPO) industry, and telecom should remain the major end-user segments, the manufacturing and healthcare verticals should increase their spending on switches, and the public sector, particularly state governments involved in e-governance projects, should boost purchases of routers.

India is one of the few Asian nations with which the United States actually increased its computer equipment exports during the global downturn in IT spending from 2001 to 2002. However, the growth was at a slow pace and the value exported at a very low level compared with U.S. shipments to major trading partners such as Canada, the European Union (EU), and Japan. In 2003, after building up some momentum during the first ten months, U.S. computer exports fell sharply in November and ended down for the entire year by 2 percent to \$234 million. U.S. computer imports from that country also declined by 6 percent to only \$7.9 million. The major factors behind the limited amount of computer trade between the United States and India are the high tariffs on computer equipment that the GOI has had in place to protect its IT hardware industry and industry's focus on serving domestic rather than overseas demand at this stage in its development. The prospects for a larger volume of U.S. computer exports to India should improve in the future though. In January 2004, the GOI announced that it would reduce the customs duty from 15 to 10 percent on some computer products, including desktop and laptop PCs, make cuts in the excise taxes (to 8 percent on PCs and zero on storage devices), and remove the special additional duty (SAD). These cuts lowered the effective duty rate on computer systems from 38.7 percent to 18.8 percent. The GOI also has a commitment to reduce its customs duties on IT products to zero by 2005 as a signatory nation to the Information Technology Agreement (ITA). If enacted, government reform of substantial state and local taxes incurred by IT companies will boost computer demand in India and, in turn, should also increase opportunities for U.S. exporters.

According to the National Association of Software and Services Companies (NASSCOM), the Indian software and IT services market has grown at 26 percent annual rate since FY1997 to almost \$3 billion in FY2002, but has suffered in the past from the relatively low use of IT in that country. Spending on IT by Indian industries has been less than 1 percent of turnover due to the lack of serious competition within most sectors that remain protected and over-regulated and, as a result, have yet to use IT as a productivity or customer service tool. Despite the IT initiatives of a few states, government spending has also been small and has been skewed toward investments in computer hardware. Another factor has been the high cost of computer equipment, mainly resulting from high taxes and levies, which has limited corporate investment in IT infrastructure and consumer purchases of computers and software and encouraged software piracy. However, as previously noted, the climate for IT spending in India has begun to improve now that the economy is on a strong, upward growth path and holds great promise for IT suppliers in the future. NASSCOM expects that Indian demand for software and IT services will at least quadruple by 2008 to \$13 billion.

According to the U.S. and Foreign Commercial Service India, U.S. suppliers held about a 70 percent share of Indian software and IT services imports, which rose 40 percent to an estimated \$1.12 billion in FY2002. Their strength has been in providing packaged software and turnkey project services to Indian users. NASSCOM estimates that Indian software and IT services exports to the United States grew 19 percent to \$5.17 billion in FY2002. This figure accounts for a third of India's total export shipments (merchandise plus software) to this country.

India has a keen interest in open source software. Linux use is still in a nascent stage there with only 2 percent penetration in industry and 10-12 percent in government and education. However, while the open source operating system is no threat to proprietary ones such as Microsoft's Windows at this point, it is gaining popularity in industry sectors, such as banking and telecommunications, that need to decrease costs and being actively promoted by IBM, Oracle, and Red Hat as the low cost option for price sensitive markets. In the public sector market, Linux's use has not been mandated yet by either national or state governments, but it has strong advocates in Delhi's municipal government and in several state governments. This operating system has also recently appeared in the consumer desktop market.

Electronic Commerce

India ranks low in most international studies of readiness for electronic commerce (e-commerce) and, as a result, is not as advanced in this area as many leading developed and developing nations. Internet use has primarily been focused on e-mail and web searches and not for conducting business and selling products and services. India has minimal PC penetration; a small base of Internet subscribers that remained stagnant in 2003; an inadequate, but improving telecommunications infrastructure; and high levels of poverty and illiteracy—all of which have been major obstacles to the growth of e-commerce there. However, the GOI and various state governments have been engaged in efforts over the past several years to overcome many of these barriers through nurturing the development of an IT economy, promoting the build out of the telecommunications infrastructure (particularly, wireless telephony and broadband), and bringing IT to the masses through e-governance and digital divide programs. The GOI has also sought to spur the development of e-commerce by easing restrictions on

foreign direct investment in this activity. IDC is bullish on the prospects for e-commerce in India and projects that spending by businesses and consumers should rise at 106 percent annual rate from just \$2.1 billion in 2002 to a staggering \$78.6 billion by 2007.

Business-to-business (B2B) has been and will continue to be the engine of e-commerce growth in India now that an increasing number of Indian companies are participating more in the global marketplace and need to find ways to respond faster to changing business conditions and to improve their competitiveness. According to IDC, the value of B2B transactions reached a little over \$2 billion in 2002 and represented 98 percent of total e-commerce business activity there. The early adopters in the late 1990s were MNCs and large enterprises in manufacturing, telecommunications, chemicals, healthcare, BFSI, and automobiles, but B2B has spread more recently to the fast moving consumer goods (household and agricultural products, branded foods and beverages, and tobacco) and retail sectors. NASSCOM estimates that about 23 percent of India's top 500 companies are currently engaged in some form of e-commerce.

A growing number of online portals have been set up in India for B2B exchanges and auctions in the automotive, steel, construction, insurance, shipping, and pharmaceutical industries. B2B activity has grown in the agricultural sector as well thanks to private initiatives such as the E-choupal Project. B2B transactions should benefit in the future from the proliferation of wireless technologies in India. Mobile commerce will grow as more Indian businesses buy and sell goods and services using smart handheld devices, such as personal digital assistants (PDAs) and mobile phones, particularly in areas where there is poor wired telecommunications infrastructure.

Online banking (e-banking) has generated a great deal of interest in the Indian banking community, but only 15 percent of the Internet population is currently engaged in it. The early adopters were private and foreign banks with the Industrial Credit and Investment Corporation of India (ICICI) launching online banking first in 1996 and Citibank, IndusInd Bank, HDFC Bank, and Timesbank following over the next couple of years. Public sector enterprise banks have lagged behind and are in the early stages of offering these services. The major reason inhibiting them from offering e-banking has been the absence of a legal framework to back up and regulate these operations in India.

Business-to-consumer (B2C) e-commerce has not really taken off in India as it has in some other developing nations because a mere 1.6 million homes are online and only a small percentage of Indian Internet users actually use it to buy goods and services. Electronic retailing there has been limited by the high costs for delivery, logistical bottlenecks resulting from insufficient transportation networks and the country's complex postal system, and a small base of credit card users (only 5 million in a population exceeding 1 billion during 2001). In addition, Indian consumers still have a cultural affinity for shopping at stores and malls where they can see and touch products and have not even graduated to mail order buying yet.

B2C activity reached only \$49 million in 2002, according to IDC. The principal items bought were music compact disks (CDs), books, gifts such as flowers and jewelry, travel and entertainment tickets, and consumer electronics and IT products. The services offered online included not just travel bookings handled by Indian Railways and the domestic airlines (which accounted for

approximately 23 percent of all B2C transactions), but payment of insurance premiums, electronic banking, and online stock trading. Vertical portals (vortals) also provided Indian consumers with online worship, entertainment, and games, and information services in such diverse areas as cooking, specific sports (e.g., cricket), jobs, and tourism.

IDC expects that B2C transactions in India will increase more than 88 percent annually to over \$1 billion by 2007. Whether or not India realizes this growth will depend on the government's success in expanding PC and Internet penetration to citizens in smaller cities, towns, and villages and in overcoming current constraints on B2C such as high Internet access and delivery costs, unreliable Internet connections, and the public's concern about data security. Nonetheless, greater use of wireless technologies and wider deployment of broadband telecommunications should have a positive effect on B2C sales in the future.

The GOI enacted the Information Technology Act in August 2000 to provide the legal and administrative infrastructure for e-commerce in India. The main purposes of the act are to give legal recognition to all electronic records as substitutes for written paper-based documents and to other activities carried out by electronic means, to punish computer misuse and frauds, and to enable e-governance applications for the delivery of services to Indian citizens. However, the act does not apply to the following types of transactions: negotiable instruments (except for checks); a power of attorney; a trust; a will including any other testamentary disposition; any contract for the sale and conveyance of immovable property; and any other documents or transactions as may be decided by the GOI. The act also creates a Controller of Certifying Authorities (CCA) charged with implementation and provided with the authority to oversee, license, and regulate the activities of certifying authorities that issue digital signature certificates. The areas not addressed are: consumer protection and data privacy; the infringement on the Internet of copyright laws and the protection of domain names; the jurisdiction aspect of electronic contracts (e.g., the jurisdiction of courts and tax authorities); and taxation of goods and services exchanged through e-commerce.

ELECTRONIC GOVERNMENT

While the public's use of electronic government (e-government) services is reportedly slowing down globally, the percentage of adult Internet users in India that access government websites for information and services has increased from 31 percent in 2002 to 40 percent in 2003, according to a recent Taylor Nelson Sofres study of e-government across 32 nations. It is number twelve in the ranking and trails only Singapore, Australia, New Zealand, and Hong Kong in the Asia Pacific region.

The GOI became involved in e-governance during the 1970s when it decided to automate applications in the areas of defense, economic monitoring, and planning, and to deploy IT to manage data intensive functions related to elections, census, and tax administration. In November 2003, Prime Minister Vajpayee announced that India would implement a comprehensive program to accelerate e-government initiatives and that the national government would spend \$870 million annually on them over the next three years. The funding is expected to go mainly to computerization of land records, government-to-citizen services, and the use of IT in health services.

The states and territories have begun to play an important role as well, with over 20 of them already having IT policies in place. Andhra Pradesh, Karnataka, Maharashtra, and Tamil Nadu are considered the leaders in e-governance and Goa, Gujarat, and Chandigarh are catching up fast. Most have set up static web pages with information on a variety of standard government topics. Many have sought to increase operational efficiency through projects that have concentrated on automating and computerizing government operations and developing applications ranging from accounting and payroll systems to employee/citizen databases and generic administration packages. They have also established statewide Wide Area Networks though Virtual Private Networks to provide connectivity up to the district level and sometimes to the block level, and provided citizen services such as bill and tax payment, land registration, grievance registration, and license issuance. A few of the more advanced states have launched electronic learning and telemedicine programs.

India's Department of Information Technology has several major ongoing IT initiatives under its Tenth Five-Year Plan to increase IT and Internet penetration and to boost e-government in India. The initiatives include the Community Information Centres Project, the IT for the Masses Project, and the Vidya Vahini and Gyan Vahini programs. Leading U.S. IT firms are key players in several of the national and state e-governance projects.

MARKET OPPORTUNITIES: TELECOMMUNICATIONS

U.S. telecommunications exporters can find substantial market opportunities in India, but it will likely take hard work and persistent efforts to be successful. SMEs with sophisticated equipment or telecom applications do not face competition from Indian producers, but may need to work with MNC suppliers in India or deal directly with the Indian service supplier. In addition, there are investment opportunities in the telecom sector, although foreign investment limitations and restrictions may reduce their attractiveness. Not all Indian carriers seek additional foreign investment; some prefer portfolio investments. Large and small U.S. firms must compete with European, Korean, and Japanese firms that have long-established ties with the Indian market. More recently, Chinese firms are aggressively seeking contracts from Indian telecom suppliers and looking to team up with Indian firms to manufacture certain types of telecom equipment.

High license fees and network build-out requirements make the direct provision of telecom services in India a difficult proposition for U.S. firms, especially since several large Indian firms are fighting among themselves for market share in most service markets. U.S. firms have expertise in offering virtual private network services, and several are exploring the best ways to offer those services to the Indian business community. U.S. firms that have access to international bandwidth or that engage in the trade of wholesale international minutes (for carrying traffic out of India) may find the newer Indian carriers looking for alternative means to route their international traffic.

Current regulatory restrictions on IP telephony also limit opportunities for U.S. firms that use the Internet to deliver niche services to foreign customers. However, as Indian telecom suppliers now seek to offer a full range of services, including value-added services, U.S. firms with innovative applications may find Indian operators interested in forming an alliance or venture to make such

services available in India. Wireline and wireless telecom firms in India are interested in services or features that would help them retain their customers and differentiate them from their competitors.

Indian telecom firms will spend hundreds of millions of dollars in 2004 to buy a wide variety of equipment including GSM and CDMA wireless infrastructure equipment, digital switches, platforms supporting Intelligent Network Services, synchronous digital hierarchy (SDH) optical transmission equipment, digital subscriber line equipment, equipment and gateways based on IP technology, broadband access and digital loop carrier carrier equipment, pay phones based on cashless payment/smart cards, VSAT terminals, and network security products.

Some of the Indian telecom carriers are relatively new to the industry and have been focused on network construction and signing up subscribers. Now they are paying attention to providing superior customer service, instituting good management practices, and running efficient network operations. In an industry that is expanding so rapidly, there could be good opportunities for U.S. management and training consultants. U.S. firms that have developed billing systems and solutions, network management systems, operational support systems, and fraud management systems may find Indian carriers receptive to such products.

English is the language of business in India. Indian telecom executives and technical officials are highly capable, well-trained individuals and are familiar with the latest trends in the industry. Executives in the private sector may have visited, studied and/or worked in the United States for a few years and recognize the quality of U.S. products and technology. A U.S. firm that can demonstrate how its product, service or “solution” brings value to the Indian telecom enterprise will have an attentive audience. Project financing is often a major hurdle to closing deals in many countries, but that generally has not been the case in India. India may still be a developing country, but its well-financed telecom firms are building networks that rival the best the developed world has to offer.

MARKET OPPORTUNITIES: IT HARDWARE, SOFTWARE AND SERVICES

India offers significant opportunities and challenges for U.S. IT exporters, especially SMEs. As noted previously in this summary, India’s rapidly expanding GDP over the next several decades will boost IT demand in the public and private sectors. Its per capita income will also rise substantially which bodes well for the consumer segment of the IT market. On the policy front, the GOI is attempting to develop India as an IT hardware leader following the country’s success in custom software and IT services and to increase IT and Internet use among the masses to deal with societal problems such as illiteracy and poverty. It is actively encouraging foreign investment to build India’s IT hardware industry. In addition, to help this industry compete more effectively with “grey market” suppliers there and to make computers more affordable to its citizens, the GOI has recently reduced tariffs on computer equipment and components and, as a signatory nation to the ITA, is committed to removing them entirely by 2005. As far as challenges are concerned, new-to-market SME U.S. exporters face strong competition from domestic suppliers and both U.S. and foreign MNCs that are

well entrenched in the Indian IT market. They must also deal with hardware counterfeiting and software piracy.

According to IDC, India is expected to trail only Argentina in growth of spending on IT with purchases more than doubling to \$13.7 billion by 2008. U.S. IT suppliers are very competitive in IT products and stand to benefit from the Indian market's continued strong hardware orientation. The specific areas that they should focus on are second-hand (used and refurbished) PCs, smart handheld devices and smart cards, high performance computers, servers, printers, multi-functional devices, high-end data storage units and disk drives, and networking equipment. In the software and IT services market, U.S. IT firms should target packaged software since India's demand for these products should increase 21 percent annually over the next five years. They will also compete aggressively against Indian companies for business process outsourcing (BPO), facilities and specialized network management services, consulting and systems integration contracts and may find some opportunities in IT training and education.

In the area of e-commerce, U.S. companies should target providing Indian SMEs with e-business solutions, especially e-procurement and sales automation technologies. They will also benefit from strong demand for content creation, web development and web hosting services, and customer relationship management applications from Indian firms engaged in B2C activities.

In developing their strategies for penetrating the Indian IT market, U.S. firms would do well to target SMEs and the small office/home office segments in the private sector. India has 1.9 million SMEs who now represent more than half of the IT spending activity in that country and are buying IT hardware and packaged software at a faster rate than large businesses. The Indian public sector also reportedly plans to spend lavishly on IT for e-governance initiatives to the tune of \$8.9 billion over the next five years.

As far as specific vertical markets are concerned, the big Indian IT spenders in telecommunications, BFSI, manufacturing, IT-enabled services, and education may generate substantial business opportunities for U.S. IT firms. The telecommunications industry is building out its infrastructure (especially wireless and broadband technologies) and developing new telecommunications services). The banking community is growing rapidly and has become more involved in offering its customers automatic teller and electronic banking services that require substantial computing resources as well as large numbers of automatic teller machines and networking equipment. Indian manufacturers are computerizing their operations, and large enterprises in the automotive, steel, chemical, and pharmaceutical industries are engaged in B2B e-commerce that is expected to spread to other manufacturing and services industries in the near future. IT-enabled services companies have increased in number, thanks to the global outsourcing boom, and are continuing to expand IT infrastructure. Finally, in education, many efforts are underway to introduce PCs into public and private schools and to provide them with Intranet and Internet connectivity. Universities, colleges, and technical institutes are also investing heavily in upgrading their IT infrastructure and some are actually using or experimenting with electronic learning.

CHAPTER I: IT/TELECOMMUNICATIONS SECTORS AND THE INDIAN ECONOMY: PLANS AND POLICIES FOR BOOSTING GROWTH AND OPPORTUNITY

1. INTRODUCTION — INDIA'S ECONOMY IS REBOUNDED AND MAY BECOME THE THIRD LARGEST AFTER CHINA AND THE UNITED STATES BY 2050

India has a population of about 1.1 billion, the second largest in the world after China. Although roughly a quarter of Indian people live below the poverty line, India has a growing consumer class (250 to 300 million), nearly half of its population under the age of 25 and, as a result of significant economic expansion over the past decade, rising business and consumer spending. Its economy is based on traditional village farming and modern agriculture (25% of Gross Domestic Product (GDP) and 70% of employment); a wide diversity of manufacturing industries (25% of GDP); and services businesses (50% of GDP). India has not only gained a strong reputation internationally as an exporter of agricultural products, textiles, and transportation equipment, but also for software and services outsourcing. However, it continues to suffer from inadequate power and transportation infrastructures and an education system that, despite its ability to produce large numbers of engineers and highly skilled technical personnel, has left over 40 percent of the population illiterate.

India rebounded in FY2003 after a rather difficult year when a drought-induced decline in agricultural output adversely affected the rest of the economy. According to the Government of India's (GOI) latest forecast, India's GDP is now expected to grow at a 8.1 percent rate this fiscal year versus only 4 percent in FY2002 due to a good monsoon season, higher than anticipated harvests and agricultural income, and significantly better performing Indian manufacturing and service sectors. To boost its trade with Asia, GOI improved its economic and political relationships with China and forged a free-trade agreement with the Association of Southeast Asian Nations (ASEAN) and separately with Thailand, both in 2003. It also signed a draft agreement with Pakistan and five other South Asian nations in early January 2004 to create the South Asian Association for Regional Cooperation (SAARC) and to commit to bringing down trade barriers in this region starting in 2006. In February 2004, India and the members of the Bangladesh, Myanmar, Sri Lanka, Thailand-Economic Cooperation (BIMST-EC which also includes Nepal and Bhutan) agreed (with the exception of Bangladesh) to negotiate a free trade agreement, with tariff reductions beginning in 2006.

Goldman Sachs predicts that India will become the third largest economy in the world behind China and the United States by 2050.¹ Indian GDP is expected to increase at a compound annual rate of more than 8 percent during this period to \$27.8 trillion (in constant 2003 dollars),

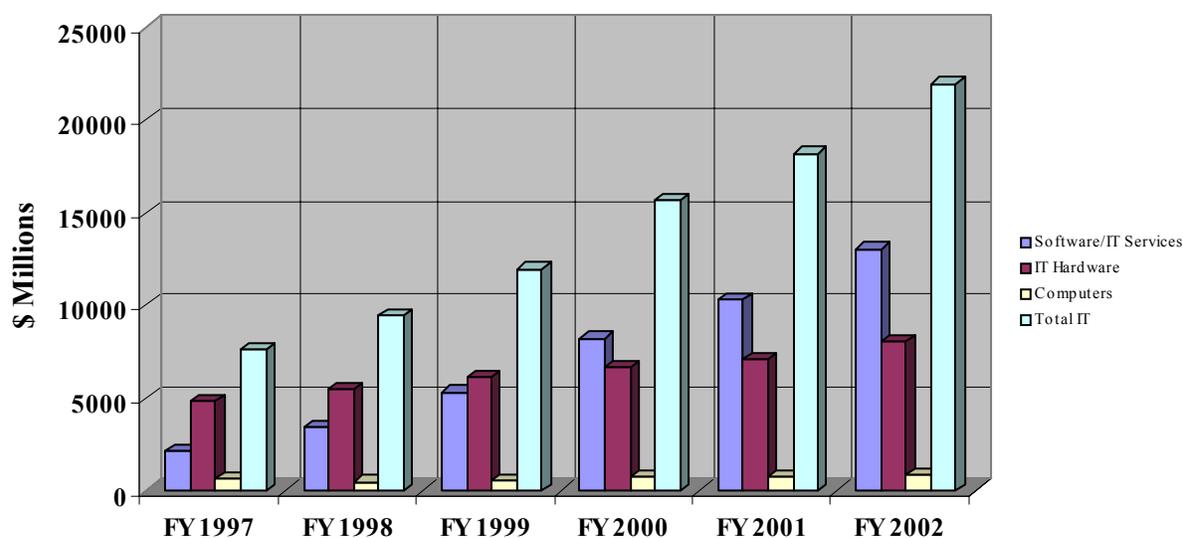
¹There is a range of projections available for India's GDP growth, including Goldman Sachs for the period through 2050 and the GOI's through 2007 in its Tenth 5 Year Plan.

surpassing the growth of all of the G8 countries and other major developing nations, including China. India's U.S. dollar income per capita will also rise by 2050 to 35 times its current level, but will still be appreciably lower than the G8 countries due to substantial growth in the Indian population expected over this period. However, India's booming economy should act as a powerful engine of new demand growth and spending on software and telecommunications and information technology (IT) products and services in the future.²

1.1 IT SECTOR IS A SIGNIFICANT CONTRIBUTOR TO INDIAN ECONOMIC GROWTH AND A LEADER AMONG DEVELOPING NATIONS IN SOFTWARE AND IT SERVICES

The IT sector makes a significant contribution to the growth of the Indian economy and has emerged as a leader among developing countries in providing software and IT services to the world. Its share of India's GDP has risen from only 0.3 percent in FY1990 to 3.2 percent in FY2002 and may reach 7 percent over the next five years.³ According to statistics collected by the Indian Ministry of Communication and Information Technology's Department of Information Technology (DIT), India's IT production has grown at a compound annual rate of 22 percent since FY 1992 to \$21.1 billion in FY2002 (**Figure 1-1**).⁴

**Figure 1-1 Indian IT Production
FY 1997 - FY 2002**



Source: Indian Department of Information Technology; Exchange rate: \$1 = 45.98 Rs

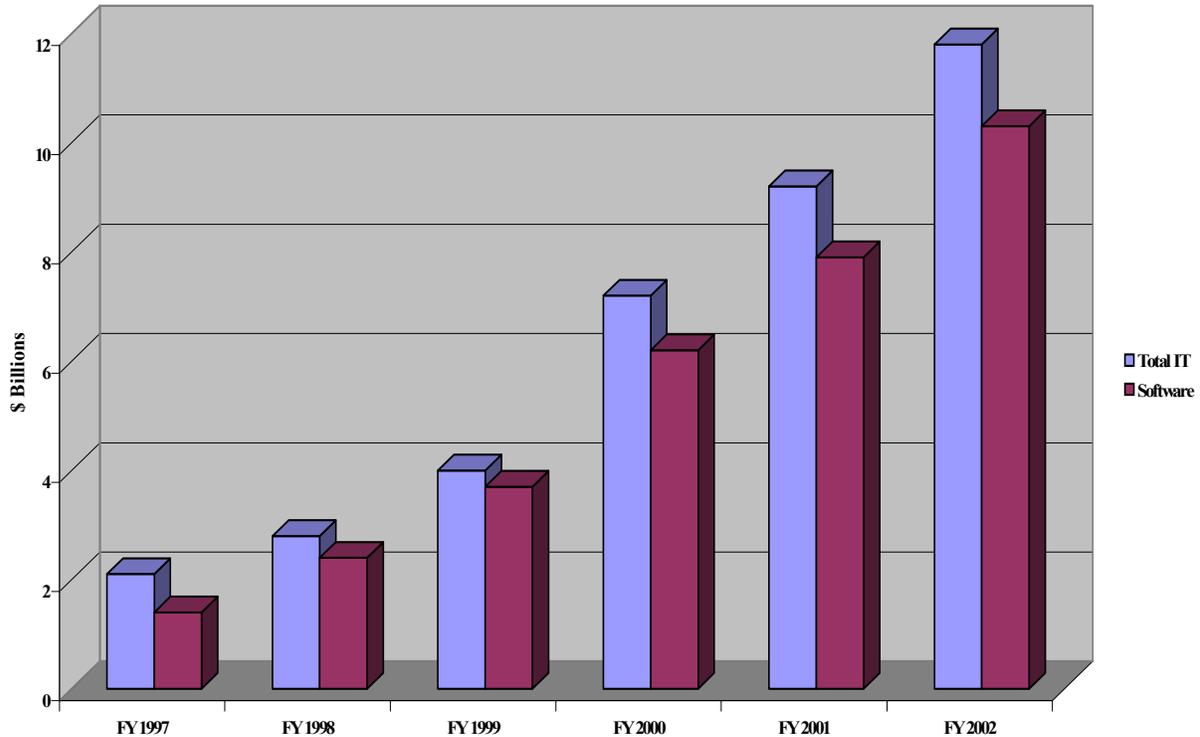
²Dominic Wilson AND Roopa Purushothaman, *Dreaming With BRICS: The Path to 2050*, Global Economics Paper No:99, October 1, 2003.

³World Bank Hails India's IT Success, *Hindu Business Line*, July 20, 2003 and Azim Premji, *IT as a Strategic Tool*, *India Infoline.com*, August 22, 2003.

⁴ Exchange rate of 46 rupees per dollar has been used throughout this report, except where noted.

Software and IT services are currently \$13 billion (62 percent of this total production) while IT hardware is \$8.1 billion (38 percent).⁵ The sector's IT exports have increased twice as fast during this period to \$11.8 billion, or half of the industry's production. Software and IT services currently account for most of this export value (**Figure 1-2**).

Figure 1-2 Indian IT Exports – Role of Software



Source: Indian Department of Information Technology; Exchange rate: \$1 = 45.98 Rs

India has an abundant supply of highly skilled, low-wage rate, and English-speaking knowledge workers to support the nation's IT sector. The National Association of Software and Services Companies (NASSCOM) estimates that the number of India's IT workers has grown over 20 percent annually since FY1990 to 650,000 by March 2003. Out of this total, 205,000 are employed in the software and IT services export industry, 160,000 are in IT-enabled services, 25,000 serve the domestic software market, and the remaining 260,000 are in user organizations. This talent pool is expected to reach 813,500 by March 2004. The trade association projects that India's demand for both software and hardware engineers will grow to 7 million by 2008.⁶

⁵ Software and IT services cover packaged and custom software development, systems integration, consulting and training, and IT-enabled services (i.e., business process outsourcing and call centers). IT hardware covers components, computers, telecommunications equipment, consumer electronics, and industrial electronics.

⁶ *India Mulls Tech Manpower Needs*, *Electronic Engineering Times*, November 3, 2003 and *India's IT Sector Creates 152,500 Jobs in Year*, *HPC Wire*, February 27, 2004.

Foreign direct investment (FDI) has played an important role in developing this sector as domestic venture capital. Foreign corporations, such as IBM, Hewlett Packard (HP), Microsoft, Oracle, and Sun Microsystems, have spent more than \$2 billion collectively on software development activities and are beginning to invest in hardware design and development. Many of them have already established research and development (R&D) centers in India and committed \$1 billion collectively since the beginning of 2001 to expanding their scope and size. The International Finance Corporation (IFC), the investment arm of the World Bank, has also been involved in helping India to develop competitive manufacturing and service industries. This organization announced in November 2003 that it would raise its investments in the Indian IT and telecommunications sectors to \$1 billion over the next two years.⁷

1.2 GOVERNMENT AGENCIES INVOLVED IN THE IT AND TELECOMMUNICATIONS SECTOR

The Planning Commission—Chaired by the Indian Prime Minister, this body is responsible for assessing the material, capital, and human resources of India and developing five-year plans which make the most efficient and balanced use of these resources through set priorities. The commission's Information Technology Sector and Telecommunications Sector Working Groups are composed of high-level representatives from certain ministries and state governments, broad industry associations (the Confederation of Indian Industries and the Federation of Indian Chambers of Commerce and Industry), and IT and telecommunications trade associations. They formulate the sector contributions to each five-year plan.

Ministry of Communications and Information Technology (MCIT)—Established in September 2001 by merging two previously distinct ministries, this agency plays the leading role in guiding the development of IT and telecommunications sectors in India. MCIT's Department of Information Technology (DIT) is responsible for IT policy, the development of India's electronics, software, and IT services industries, and the promotion of the Internet, electronic commerce (e-commerce), and IT-based education and training. It is involved in IT standardization, testing, and quality certification and runs the National Informatics Center, an organization which provides advanced IT solutions for all levels of government and operates the satellite-based, nationwide government computing and communications network called NICNET.

DIT works with several autonomous IT-related societies set up by the Indian government in the 1980s and 1990s, including the Electronics and Computer Software Export Promotion Council (ESC), the Software Technology Parks of India (STPI), the Education and Research Network (ERNET) India, and the Centre for the Development of Advanced Computing (C-DAC). The ESC has a membership of over 2200 manufacturers and exporters and promotes trade between India and the rest of the world in a wide range of electronics, computer, and telecommunications products as well as in computer software and IT-enabled services. STPI supports the software

⁷K.C. Krishnadas, *\$1B in Investments Burnish India's Hardware Design Image*, *Electronic Engineering Times*, September 22, 2003 and *IFC to Raise Investments in India to \$1Bn in 2 Years*, *The Financial Express*, November 14, 2003.

exports of Indian suppliers by offering them statutory services (i.e., project and import approvals, bonding, and export certification), incubation facilities, and world-class data connectivity, consulting, and infrastructure solutions. ERNET provides state-of-the-art communications infrastructure and services to academic and research institutions, government agencies, non-government organizations (NGOs), private sector research and development laboratories, and various non-commercial entities. It is also involved in IT training, consultancy, and course curriculum content development. Finally, C-DAC is engaged in high performance computer and communications research and development and the deployment of advanced IT-based solutions. It developed India's Param 1000 massively parallel computer system, currently the fastest supercomputer in Asia (outside of Japan).

The Department of Telecommunications — Formerly, the Department of Telecommunications (DoT) was the state-owned telecommunications entity that enjoyed a monopoly on all local and long distance telecommunications services throughout India.⁸ A fully owned subsidiary, Mahanagar Telecom Nigam Ltd. (MTNL) provided telecom services in the cities of Delhi and Mumbai, while another government-owned entity, VSNL had exclusive rights to transmit international voice and data traffic. The DoT also formulated policy and, until the establishment of the Telecommunications Regulatory Authority of India (TRAI) in 1997, regulated India's telecom sector. Private companies received licenses to offer mobile and landline services in specific geographical areas known as "circles" in the late 1990s, and in August 2000, India's domestic long distance market was opened to competition. The domestic telephone operations of DoT were "corporatized" in October 2000 under a new moniker, Bharat Sanchar Nigam, Ltd. (BSNL), to move the organization toward business and financial disciplines that would reflect the new competitive environment in telecommunications in India.

The government still maintains 100 percent ownership of BSNL and holds a majority stake in MTNL. The third formerly government-controlled telecom carrier, Videsh Sanchar Nigam, Ltd. (VSNL), is now owned by the Tata Group, although the government has kept a 26 percent ownership stake in the company. These three firms are discussed further below.

The DoT maintains its responsibility for the formulation of telecom policy and for issuing licenses to applicants to provide basic and value-added services. The DoT represents the government at international bodies such as the International Telecommunications Union (ITU), allocates radio frequencies for use by telecom providers, and promotes telecom research and development as well as private investment in the sector. Within the DoT is the Telecom Commission that exercises administrative and financial powers and is headed by a chairman, four full-time members from the DoT, and four part-time members from other departments of the government. The current chair of the Telecom Commission is Mr. Vinod Vaish. Overseeing the DoT is the Minister for Communications and Information Technology, Mr. Arun Shourie, a member of Prime Minister Vajpayee's cabinet.

⁸Some material in this section is based on an interview with a DoT official in New Delhi, September 16, 2003.

The Wireless Planning and Coordination Wing (WPC)—This group is responsible for management of the spectrum, assigning frequencies in line with the National Frequency Allocations Policy of 2002, and licensing wireless carriers. It also has a role in coordinating India's satellite networks and space communication program.

Other entities that are part of India's Department of Telecommunications include:

The Telecom Engineering Centre (TEC)—The TEC draws up specifications for telecom products, systems and networks. It has primary responsibility for setting standards in India and testing and type approving equipment, technology and services that connect with the public network. The TEC provides technical advice to BSNL and MTNL for introduction of new technologies into the network. It offers engineering support to those firms when they evaluate tenders and equipment for purchase.

Telecommunications Consultants India Ltd. (TCIL)—TCIL's objectives are to provide world-class technology and Indian expertise globally in telecommunications; to expand its operations in both India and overseas markets; and to acquire state-of-the-art technology on a continuing basis. The company has expertise in network projects, software support, switching and transmission systems, cellular services, rural telecommunications, CDMA based basic service networks, and billing and customer care services. TCIL participates in both national and international competitive bidding and has had projects in 50 countries to date, including India's neighboring countries—Afghanistan, Bhutan, Bangladesh, Nepal and Sri Lanka—as well as countries in Africa and the Middle East.

Centre for Development of Telematics (C-DOT)—The GOI established the Centre for Development of Telematics in 1984 as a telecom technology development center. It works as an autonomous body and was first charged to develop a new generation of digital switching systems relevant to the Indian environment with a focus on rural telecommunications.⁹

Since then, C-DOT has developed switching, transmission and access products for use in both rural and urban environments. Over 90 percent of the rural exchanges in India and about 30 percent of the urban exchanges are based on C-DOT technology. Notable products include a switch that can connect up to 40,000 subscribers and support Integrated Services Digital Network (ISDN) and Intelligent Network (IN) interfaces and a rural automatic exchange switch that can function without air-conditioning and has been exported to several countries in Asia and Africa. C-DOT has developed products using Asynchronous Transfer Mode (ATM) technology and software that allow its exchanges to serve as mobile switching centers for global system for mobile communications (GSM) services.

⁹Some material in this section is based on an interview with a C-DOT official in Bangalore, September 18, 2003.

As a result of the C-DOT's technology transfer process, a number of Indian equipment manufacturers and component vendors for the electronics industry have built products based on C-DOT technologies. C-DOT, however, was late in developing wireless technologies, and a recent press article noted that the organization has been "derailed" by political rivalries. It became isolated as an R&D organization and dependent on the former government monopoly service provider for trials, and finally lost its technological edge.¹⁰ The GOI is restructuring C-DOT into business units and looking at ways to obtain equity, possibly by allowing others to invest in the organization. Currently, C-DOT's sources of revenue are royalties and technology fees. Any change in ownership structure would require an act of Parliament.

Indian Telephone Industries, Ltd (ITI)—One of the first public sector units the Government of India established after independence, the Indian Telephone Industries has seven manufacturing plants located around the country. ITI manufactures a great range of products including transmission and electronic switching equipment, V-SAT equipment, and telephone handsets. While BSNL is a major customer, ITI also sells to MTNL, and the Indian railway and defense sectors. ITI also has a joint venture with India SATCOM of Bangalore.¹¹

ITI's products comprise a large part of India's national telecom infrastructure. Over the years, it has manufactured 60 percent of the country's switching lines, 75 percent of its long distance trunk lines, and 57 percent of the wireline telephones. Today, it is the top telecom turnkey services company in India. ITI suffered a sharp reduction in sales in 2002 due in part to the slow growth in the wireline network. In order to become a player in the wireless markets, ITI signed a license agreement with ZTE of China in 2003 for the manufacture of CDMA 2000-1X technology. It also has an memorandum of understanding (MOU) with Alcatel for manufacturing GSM equipment and is expanding production of newer products such as next generation IP switches, Coarse/Dense Wave Division Multiplexing (C/DWDM), and smart/SIM cards.

India Satcom Ltd. (ISL) —ISL is a public limited company with equity participation from ITI and a foreign firm.¹² Beginning as the country's first VSAT manufacturer, ISL seeks to be a competitive, one-stop solution to customers for satellite communication, software and networking. ISL's current services include the installation and maintenance of VSATs, hub stations, antennas, INMAESAT terminals, local area networks, and telecom equipment for mobile radio trunking service and distance education service. One of its business units is ISL Software Centre that offers turnkey development of business applications, e-commerce solutions, and multimedia products.

The Telecommunications Regulatory Authority of India (TRAI)—For 50 years, the Department of Telecommunications was both the operator and the regulator of telecom services in India. Although the government first issued bids for competitive licenses in 1995, it was 1997

¹⁰ "Organizational flexibility key to hi-tech industrial base," *The Hindu Business Line*, September 16, 2003, p. 4.

¹¹ Some material in this section is based on an interview with an ITI official in Bangalore, September 18, 2003

¹² Some material in this section is based on an interview with India Satcom officials in Bangalore, September 18, 2003

before a regulator was established by an act of Parliament. The TRAI Act gave the regulator a number of responsibilities, including recommending the terms and conditions of licenses to service providers; ensuring technical compatibility and effective interconnection among different service providers; regulating revenue sharing arrangements for service providers; protecting the interests of consumers; monitoring service quality; ensuring compliance with universal service obligations; and rendering advice to the government on telecommunications development.¹³ Recently, TRAI was given regulatory authority over the implementation of the Conditional Access System for pay TV.

A fundamental weakness of TRAI in its first years of operation was that it lacked sufficient authority to function as an effective regulator. The responsibility for licensing new market entrants remained with the DoT. During the first few years of TRAI's existence, a pattern developed in which the DoT, still the incumbent operator, tended to challenge in court every TRAI ruling it believed went against its own interests. More importantly, the dismissal of TRAI's members by the government from time to time was interpreted as a vote of no confidence in the organization. Furthermore, the government ignored some of TRAI's recommendations, reinforcing an image of the regulator as a weak and ineffective body.

The TRAI was restructured in 2000. Its membership was reduced, and the agency lost its adjudicatory powers. An amendment act sought to strengthen the regulatory framework and establish a clear distinction between the functions of TRAI as a maker of recommendations to the government on specific matters and as a regulator of the telecom sector. A body was created to adjudicate disputes between a licensor and licensee or between service providers, or complaints lodged by consumers, and to hear appeals against any decision or order of the TRAI. A retired justice, assisted by two other members, presides over this body, the Telecom Dispute Settlement and Appellate Tribunal (TDSAT).

TRAI's recommendations are binding in the areas of fixing tariffs, interconnectivity (technical issues and charges), and quality standards. TRAI's recommendations are not binding on the government in terms of licenses and revocation of licenses. Both TRAI's recommendations and the government responses are available as public documents, thus promoting increased transparency. TRAI's more recent recommendations on opening up segments of India's telecom market to competition have been accepted in full by the government. TRAI is composed of a chairman, currently Mr. Pradip Baijal, and not more than two full time and two part time members.

Ministry of Commerce and Industry (MCI)—This ministry has responsibility through its Departments of Commerce and Industrial Policy and Promotion for India's external trade and all matters connected with it. Its purview includes India's Export-Import (EXIM) policy, the

¹³Some material in this section is based on an interview with a member of the TRAI in New Delhi, September 15, 2003.

formulation and administration of industrial policy, Foreign Direct Investment (FDI), Intellectual Property Rights (IPR) policies, and the oversight of the development of a number of specific industries. It works closely with major industry associations and international bodies, such as the World Intellectual Property Rights Organization (WIPO), the United Nations Industrial Development Organization (UNIDO), and the Asian Productivity Organization (APO).

Ministry of Finance (MOF)—This agency administers Indian tax policy by levying and collecting national corporate and income taxes. It is also involved in developing investment policies. In the case of FDI, the Reserve Bank of India (RBI) grants automatic approval of FDI for most industries while the Foreign Investment Promotion Board (FIPB) handles all other cases not covered by automatic approval. The RBI has jurisdiction over the IT and telecommunications sectors, but not business-to-consumer (B2C) e-commerce.

Ministry of Human Resources Development (MHRD)—This ministry develops and administers India's education and training policies and oversees the nation's primary and secondary schools, universities, and technical institutes. In the area of IT, it promotes and funds computer literacy in schools and computer-based education and supports the Indian Institutes of Information Technology (IIIT), Indian Institutes of Technology (IIT), and National Institutes of Technology (NIT).

The Ministry of Information and Broadcasting (MIB)—This agency develops and administers the laws and regulations governing information (which would include Internet content), broadcasting, the press, and films.

The Ministry of Science and Technology (MST)—The Ministry's Department of Science and Technology (DST) formulates India's S&T policies and organizes, coordinates, supports, and promotes S&T activities. It currently funds a broad range of electronics and IT projects.

1.3 MAJOR IT AND TELECOMMUNICATIONS TRADE ASSOCIATIONS PLAY A KEY ROLE IN SECTOR DEVELOPMENT IN INDIA

As noted previously, the IT and telecommunications trade associations directly participate in the Planning Commission's working groups that develop the sector contributions for India's five-year plans and are involved in a wide range of committees and sub-committees operated by various Indian ministries and larger industry organizations such as the Confederation of Indian Industries (CII) and the Federation of Indian Chambers of Commerce and Industry (FICCI). The Manufacturers' Association for Information Technology (MAIT), the National Association of Software and Services Companies (NASSCOM), and the Internet Service Providers Association of India (ISPAI) are three major trade associations in the IT sector. MAIT represents the hardware, training, and services areas of the Indian IT sector, promotes the use of IT in India, and focuses on export promotion and attracting foreign investment in these industries. NASSCOM is the software and IT services counterpart to MAIT. Acting as an advisory, consultative, and

coordination body for the Indian software and IT services industry, the trade association has lobbied foreign governments on the outsourcing and H1B visa issues, worked closely with the Business Software Alliance (BSA) to wage a campaign against software piracy in India, and encouraged its member companies to provide world-class quality products, services, and solutions to both domestic and foreign customers. ISPAI was set up in 1998 to promote the interests of Internet Services Providers (ISPs) and use of the Internet and IT-enabled services, such as e-commerce, e-governance, telemedicine, and distance learning in India.

A number of telecommunications trade associations in India actively represent their members by compiling industry data or estimates, issuing studies or position papers, sending comments to TRAI on proposed regulatory policies, petitioning the government to modify existing telecom policies, and/or filing petitions with the courts on controversial issues on judicial appeal. The two highest profile associations are the Association of Basic Telecom Operators (ABTO) representing the fixed service (wireline) companies and the Cellular Operators Association of India (COAI) whose members offer cellular mobile services.¹⁴ The Telecom Equipment Manufacturers Association (TEMA) represents Indian firms producing telecom equipment. Large corporate users of telecom have formed the Telecom Users Group of India (TUGI). Other associations reflecting the interests of niche market telecom service providers include the Indian Paging Service Association (IPSA), the Mobile Trunk Radio Operators Association (MTROA), and the VSAT Service Providers Association of India (VSPAI). Additionally, telecom committees or working groups within the CII and FICCI may adopt positions on certain telecom issues of interest to their members and meet with government officials to advocate those positions.

In early 2004, MAIT joined the Consumer Electronics and TV Manufacturers' Association (CETMA), the Electronic Component Industries' Association (ELCINA), and TEMA in forming the Council of Electronic Hardware Associations (CEHA). The new council will work to spur domestic demand for electronic products, build a strong domestic electronic hardware industry, and take up with the GOI major issues that are affecting this industry, such as implementation of the Value Added Tax, the elimination of the inverted duty structure, simplification of procedures to reduce cost, labor law reforms, and implementation of the DIT's draft hardware policy (see discussion of this policy below in the section on *The Tenth Five-Year Plan*).¹⁵

1.4 GOVERNMENT SUPPORT FOR INDIAN IT SECTOR AND MARKET GROWTH

The GOI embarked on a number of policy initiatives over the past decade to nurture the Indian IT sector and market. These initiatives included substantially liberalizing its EXIM and FDI policies; creating a National Task Force on Information Technology and Software Development in 1998 that subsequently drafted an Information Technology Action Plan for the nation; establishing a new Ministry of Communications and Information Technology (see description

¹⁴Interviews with COAI and ABTO officials in New Delhi, September 15, 2003.

¹⁵*Electronic Hardware Bodies Unite*, *The Hindu Business Line*, March 8, 2004.

above) to direct the development of these sectors in 2001; enacting the Information Technology Bill 2000 as the basis for promoting e-commerce; and amending India's Copyright Law to improve IPR protection.

India Liberalizes EXIM and FDI Policies to Develop Software and IT Services Industries

A central feature of the GOI's EXIM policy liberalization has been the establishment of the following industrial development programs to promote exports.¹⁶

Domestic Tariff Area (DTA) Units: These businesses, located anywhere in India, sell into the domestic market and, as a result, receive no concession on import duties. However, they can export and qualify for duty free import of capital goods against their export obligations under the Export Promotion Capital Goods (EPCG) program.

Export Processing Zones (EPZs): EPZs are industrial parks that provide incentives, such as zero import duty and a special 10-year corporate income tax rebate, to foreign investors in export-oriented businesses. Companies in these zones may also sell up to 50 percent of the level of their exports in the domestic market after payment of taxes.

Special Economic Zones (SEZs): the business units located in these areas must be net foreign exchange earners and are not subject to the rules and regulations governing imports and exports. They are permitted unrestricted movement of goods to and from ports. SEZ firms can import duty free capital goods and raw materials and are 100 percent exempt from income taxes for seven years and 50 percent exempt for an additional 2 years. They can also sell goods into the domestic market as long as they pay any applicable duties. Eight EPZs at Kandla and Surat (Gujarat), Santa Cruz (Mumbai-Maharashtra), Cochin (Kerala), Noida (Uttar Pradesh), Falta (West Bengal), Chennai (Tamil Nadu), and Vishakhapatnam (Andhra Pradesh) have been converted to SEZs. Another 8 government-promoted and 13 private and state-government-promoted SEZs are being set up.

Export Oriented Undertakings (EOUs): EOUs are companies that can be established anywhere in India, but are required to export their entire production. Like businesses in EPZs, they are allowed to import intermediate goods duty-free, receive a 10-year income tax holiday, and are exempt from SAD, sales taxes, and excise tax on capital goods, components, and raw materials. The program is complementary to the SEZ scheme.

Software Technology Parks (STPs): As noted previously, STPs have been set up to promote and facilitate Indian software exports. They can be used by any firm in India and provide dedicated high-speed communications services (satellite, fiber optic cable, and microwave). STPs allow duty-free import of all capital goods and other imports, depreciation on capital goods up to a maximum of 90 percent over a period of five years, and a ten-year income corporate tax exemption for profits derived from exports. They also provide single-point customs bonding and

¹⁶American Embassy, New Delhi, 2003 *Investment Climate for India*, [International Market Intelligence](#) report, August 11, 2003 and [Strategic Review 2003](#), NASSCOM.

certification. There are currently 7,200 software-exporting companies in 39 parks located in major cities, such as Bangalore, Chennai, Hyderabad, Pune, Noida, Mumbai, Delhi, Calcutta, and Jaipur. These firms accounted for nearly 80 percent of India's total software exports in FY2001. The Bangalore STP, in particular, is a haven for multinational companies (MNCs) such as Lucent Technologies, Motorola, and Cisco in communications software and Digital GlobalSoft, HP, Microsoft, Network Associates, Novell, Oracle, and Sun Microsystems in systems software. The GOI is now encouraging the IT sector to set up new private sector STPs beyond the 25 that have already been established.

Electronic Hardware Technology Parks (EHTPs): The EHTP program requires manufacturers of electronics equipment and components in India to export their production. In return, these firms are allowed to import capital goods, components, and raw materials duty free, do not have to pay corporate income taxes through 2010, and are exempt from excise taxes and will receive reimbursement for all sales taxes on all domestic purchases used in the manufacturing process. They may also sell goods and services in the DTA up to 50 percent of the free-on-board (FOB) value of their exports after the payment of applicable duties. There are currently 31 companies in EHTPs in Karnataka alone, including the subsidiaries of GE Medical Systems X-Ray, Flextronics Technologies, HP (formerly the Compaq facility), and Tyco Electronics. Their exports totaled \$305 million in FY2002.

“Hi-Tech Habitats”: Concerned about meeting the growth targets it set for the Indian IT sector by 2008, the GOI is promoting the establishment of “Hi-Tech Habitats” focused on developing IT-enabled services businesses in rural areas adjacent to cities with modern telecommunications infrastructure and leading educational and research institutions. It has designated the Bangalore, Hyderabad, Pune, Delhi, and Bhubaneswar areas for the first of such habitats. The GOI eventually plans to have 50 of them spread throughout the country.

The GOI liberalized its policy governing imports into the Indian IT market as well. It reduced customs duties on software imports (including updates) over the 1990s from a high of 114 percent to zero, removed the Special Additional Duty (SAD), and exempted them from any Excise Tax or Countervailing Duty. However, in the case of software embedded or pre-loaded on IT equipment, Indian Customs requires the value of the separately invoiced software to be added to the valuation of the equipment. If not separately invoiced, it assumes the software value is included in the price of the equipment. The GOI also allowed software licenses in duty free and decided not to levy taxes on software delivered to end-users over the Internet.¹⁷

From the mid-1990s onward, the GOI removed the computer import license requirement and gradually reduced the tariffs on computer and networking equipment that had protected Indian IT manufacturers. It also became a signatory to the Information Technology Agreement (ITA) in March 1997, committing India to eliminate all tariffs on IT products by 2005. In January 2004, the GOI reduced customs duties on computer systems (including PCs and laptops), printers,

¹⁷U.S. and Foreign Commercial Service India, India: Customs, Taxes and Documentation Requirements for IT Products and Services Imports, August 26, 2003, <http://web.ita.doc.gov/ITI/itiHome>

automatic teller machines (ATMs), cash dispensers, point of sale (POS) terminals, and floppy discs from 15 to 10 percent and removed the tariff on computer storage devices entirely. This action signaled a dismantling of a major trade barrier for U.S. IT hardware exporters since the effective duty rate on computer products was nearly 39 percent when SADs and a variety of additional charges labeled as “countervailing duties” were included.¹⁸

High tariffs and the myriad of taxes (excise duty, entry tax, turnover tax, municipal sales and state taxes) that IT hardware suppliers and consumers have to pay created a significant grey market for personal computers (over half of systems sold) and limited PC use in India to less than 1 percent of the population.¹⁹ MAIT pushed to have the excise tax lowered from 16 to 8% and won this concession and the removal of the SAD on hardware from the GOI in January 2004. The trade association believes that further reform of domestic taxes would help to expand PC use in India another 20 percent beyond the annual growth of 25-30% it has projected.²⁰

To address the problem of customs clearances that can take up to ten days in India versus only five hours in China, the GOI announced in April 2003 that it would work to eliminate physical inspection of IT goods and implement a new self-assessment system using Electronic Data Interchange (EDI) and computer-based risk assessment and management techniques. The pilot of the scheme will reportedly be operational in the near future at airports in Mumbai, Tughlakabad, and New Delhi and at the seaport of Chennai. The GOI also announced in January 2004 that it would extend around-the-clock electronic filing of customs documents for goods clearance from nine customs centers to twenty-three beginning in April.²¹

The GOI began liberalizing FDI in the Indian IT sector in 1991 when it allowed foreign participation in software ventures. It now permits 100 percent equity with automatic approval in all IT industries, with the exception of their aerospace and defense-related activities. In the area of business-to-business (B2B) e-commerce, FDI can be up to 100 percent as well, but the GOI requires foreign investors to give up at least 29 percent ownership to the Indian public within five years. Foreign participation in retail e-commerce ventures is prohibited. The GOI has made a concerted effort in recent years to attract greater foreign investment in the Indian electronics industries to build stronger domestic semiconductor and computer manufacturing bases. It also has encouraged investment from non-resident Indians, including overseas corporations that are largely owned by them, to complement and supplement domestic investment. The GOI’s policy on technology collaborations in electronics allows them to be approved automatically through the Reserve Bank of India or otherwise by the government, as long as the lump sum payment for the

¹⁸Office of Information Technologies and Electronic Commerce, U.S. Department of Commerce, *Asia/Pacific: Tariffs and Taxes on Computer Hardware and Software*, August 2003, <http://web.ita.doc.gov/ITI/itiHome>

¹⁹Anoop Khandelwal, HP India’s Country Manager for Business Operations in New Delhi, estimates that taxes represent nearly 50% of a PC’s cost on the Indian market.

²⁰Interview with Vinnie Mehta, Executive Director of MAIT, September 15, 2003 and *MAIT Hails Sops to Hardware Sector: Excise & SAD Cut to Boost Domestic PC Consumption*, *MAIT Press Release*, January 8, 2004.

²¹MAIT, *Mait Hails Self-Assessment Based Customs Clearance Scheme*, *MAIT Press Release*, April 8, 2003, www.mait.com and *Coming Soon: Happier Days for Hardware*, *Dataquest India*, January 21, 2004.

²²American Embassy, New Delhi, *2003 Investment Climate for India*, *International Market Intelligence* report, August 11, 2003 and B.V. Naidu, *Tracing the History of Information Technology in India*, Software Technology Parks of India (STPI), 2003.

technology does not exceed \$2 million and royalty payments (net of taxes) are not more than 5 percent of domestic sales and 8 percent for exports.²²

1.5 INDIAN STATE GOVERNMENTS SUPPORT IT SECTOR AS WELL

Indian state governments have announced IT policies over the past few years that encourage and support IT investments. They have established suitable infrastructure facilities, provided financial assistance such as investment subsidies and rebates on land costs based on the number of jobs created, developed a highly skilled talent pool, and worked to increase awareness of IT in their communities. They have also granted fiscal and other incentives for the Indian software industry. The tax incentives that certain states offer include exemption from a variety of state and local taxes for businesses located in IT parks; exemption of sales tax for all software products and services for a certain period of time, but subject to ceilings; exemption from payment of entry tax on hardware and other capital goods up to a certain limit; and refund of municipal tax (octroi) on IT products.²³

1.6 TENTH FIVE-YEAR PLAN (2002 TO 2007) ESTABLISHES FRAMEWORK FOR IT SECTOR AND MARKET GROWTH

The Information Technology Action Plan drafted by the National Task Force on Information Technology and Software Development in July 1998 guided the liberalization that has occurred in the Indian IT sector over the past several years and provided the framework for the future development of both the IT sector and market. Many of its recommendations have been incorporated into India's Tenth Five-Year Plan (Tenth Plan).

The main objectives of the Tenth Plan are: 1) to ensure the continued growth of the software and IT services industry through sustained improvement in the quality of products and services, the availability of highly skilled workers, and strong research and development (R&D) support; 2) to expand domestic software demand and increase India's share of the global IT market; 3) to turn India into a major force in IT hardware manufacturing by putting in place a strategy for the Indian industry's development, by encouraging leading global suppliers to set up production facilities there, and by promoting international alliances, dedicated R&D, and continuous product improvement; 4) to substantially expand the use of IT in governance; and 5) to make a concerted effort to bring IT to the masses.

The GOI has established very ambitious goals for both IT production and exports in its Tenth Plan in an effort to become a global IT superpower. It has set a target of over \$61 billion for IT production in the final year of the plan (2002-2007), driven largely by the growth of the Indian software and IT services industry. The GOI expects that the sector will contribute 7.7 percent of the nation's GDP at the end of this period versus 1.7 percent now. It has also projected that Indian software and IT services exports should reach \$50 billion while those for IT hardware should total \$10 billion. As a result of the expansion of Indian

²³India's Policy Environment, *Strategic Review 2003*, NASSCOM.

IT production and exports, the GOI estimates the sector will generate seven million jobs, more than two thirds of which would be in the hardware industry.

In an effort to bridge India's growing digital divide, the GOI will spend \$2.7 billion through 2007 to encourage more widespread awareness and use of IT in communities, homes, schools, and public hospitals, according to the Indian Secretary for Industrial Policy and Promotion.

Specifically, it plans to accelerate PC penetration from 0.6 percent of the population currently to 2 percent by 2008 and place PCs in all of the country's 600,000 public schools. The GOI also wants to boost the Internet subscriber base from its level of about 4 million in 2003 to exceed 35 to 40 million by 2007 and to provide broadband service to all rural areas.²⁴

As noted previously, the Department of Information Technology (DIT) acts as the principal promoter for the IT sector and facilitates and coordinates the various initiatives of the central and state governments and the private sector in carrying out the objectives of the Tenth Plan. It has established a number of priorities for IT sector development over the course of this plan. The agency will work to shift the focus of Indian software suppliers from being only software solutions providers to manufacturers of packaged solutions, to expand the IT-enabled services of the industry, and to boost software exports by helping the sector to develop new overseas markets. It will encourage greater foreign investment, particularly in IT hardware manufacturing, by further simplifying policies and strengthening and upgrading India's telecommunications and IT infrastructures. The GOI is now considering a paper that it has drafted on a national electronics and IT hardware manufacturing policy that lays out a long-term strategy for this industry. In its effort to increase IT awareness and use, DIT will emphasize e-governance, the development of software in local Indian languages, distance education, IT for the Masses projects to address the digital divide issue, electronic commerce, cyber security, and human resources development. Finally, the agency will provide strong support for postgraduate education and research, particularly in the emerging areas of Bluetooth wireless technology, e-commerce and information security, nanotechnology, and bioinformatics solutions.

1.7 THE INFORMATION TECHNOLOGY (IT) ACT, 2000 BEGINS LAYING FOUNDATION FOR E-COMMERCE

The Information Technology Act, passed by both houses of the Indian Parliament in May 2000, provides the legal infrastructure for e-commerce. The law recognizes email as a valid and legal form of communication that can be used in a court of law and give digital signatures legal validity. It also enables companies to file forms, applications, and other documents electronically with any government entity and addresses major issues of electronic security that are critical to the success of electronic transactions. However, the act does not deal with the issue of protection of IPR with respect to the Internet and does not clarify all of the issues surrounding taxation of

²⁴Government of India, *Information Technology* (Chapter 7.4), *Tenth Five Year Plan 2002-07*, June 2001 and *Govt to Spend RS 12,000 Crore on E-Governance and E-Learning*, *ISPAI Press Release*, Internet Service Providers Association of India, February 13, 2003.

electronic transactions, particularly the indirect taxation of goods and services delivered electronically.

1.8 THE (DRAFT) CONVERGENCE BILL OF 2001

In 2001, the Indian Cabinet approved the Communications Convergence Bill that sought to update India's 1885 Indian Telegraph Act, repeal the Cable Television Networks Act of 1995, and in the process, recognize the technological convergence of voice, data and video in communications. The bill proposed that India's Ministries of IT, Communications, and Information and Broadcasting be consolidated. It would establish the Communications Commission of India to oversee spectrum management, grant licenses and enforce license conditions, set tariff rates, and ensure a competitive marketplace. One objective of the bill was to create a regulatory environment that would be flexible enough to accommodate the development and combination of technologies and services. It proposed four categories of licenses: network infrastructure facilities; network services; application services; and content application services.

The CII criticized the bill because it allowed the central government to keep control over the new regulator, the Communications Commission of India, and select its chairman. The draft also failed to include services such as webcasting and other Internet-based application services in the categories of services to be licensed under the bill.

The Indian Parliament has never debated the bill, and some observers do not believe it will ever be put to a vote. It no longer appears to be priority legislation for the current government, nor is industry pushing for its enactment. In the meantime, the IT and telecommunications ministries have been consolidated, and the government is taking other steps to deal with issues of convergence in telecommunications. TRAI proposed a unified license regime for basic and cellular mobile services in July 2003 whereby licenses would not be technologically specific and would allow operators to offer any type of telecom service. The government already has accepted this proposal in principle, and its implementation would resolve one of the major issues in the Convergence Bill.

1.9 GOVERNMENT POLICIES AND PLANS IN TELECOMMUNICATIONS

The New Telecom Policy 1999 (NTP 1999)

Recognizing that the telecommunications policy it announced in 1994 had not brought the results anticipated and the convergence of markets and technologies called for some modifications, the Indian government issued a revised telecom policy in 1999. The government noted that the rapid economic and social development of India could not be achieved without a modern telecommunications infrastructure, and that in the future the telecom and the IT industry would contribute a major part of the country's GDP. In India, telecommunications is a federal

(national) responsibility; the states do not exercise regulatory functions or have policy responsibility for the sector. The national government previously had set a goal of India's becoming an IT superpower, but that effort could be undermined if the country's telecom sector did not rapidly develop. Thus, the government sought a "comprehensive and forward looking telecommunications policy which creates an enabling framework for development of this industry."²⁵

The primary objectives of the NTP 1999 were to

- promote the availability of affordable and effective communications to the public
- develop telecommunications facilities in the remote and mountainous areas of India
- create a modern telecom infrastructure that would help India become an IT superpower
- make the telecom sector more competitive and provide equal opportunities and a level playing field for all telecom participants
- strengthen the country's R&D and manufacturing capabilities
- manage the spectrum in an efficient and transparent fashion
- enable Indian telecom companies to become global players

The NTP 1999 set out specific targets that included

- providing Internet access to all district head quarters by 2000
- extending telecom coverage to all villages in India and providing reliable media to all exchanges by 2002
- achieving a national teledensity of 7 by 2005 and 15 by the year 2010
- increasing rural teledensity from 0.4 to 4.0 by 2010 and providing reliable transmission media to all rural areas

The government estimated that meeting these teledensity levels would require an investment of approximately \$37 billion by 2005 (for 75 million telephones) and \$69 billion by 2010 (for 175 million telephones). In order to attract investments of these magnitudes in the telecom sector, the NTP 1999 divided the telecom services sector into ten categories. Current licensing conditions (some modified or newly adopted since the NTP 1999 was issued) to provide those services are indicated below.²⁶

1. Access providers. These include cellular mobile service providers, fixed service providers and cable service providers.

A. Cellular mobile service providers. For this service, India is divided into 20 circles (territorial service areas) and four metro cities. There are three types of service areas (A, B, C) based on population and potential size of the market. Licenses are to be issued to three private operators and one to the state-owned operator in each service area. The existing licenses have been issued to private companies under a fixed license fee regime; subsequently they were

²⁵"New Telecom Policy 1999" at www.trai.gov.in/npt1999.html

²⁶ Material that follows is based on "Indian Telecommunications: Bridging the Digital Divide," Department of Telecommunications, Government of India, May 2003.

migrated to a revenue sharing regime. The current license fee in the form of revenue sharing is at 8, 10 or 12 percent of revenues depending on the category of the service area. In addition, there is a 2 to 4 percent spectrum fee depending on the assigned spectrum frequency.

Cellular mobile licenses are issued for a period of 20 years and extendable by 10 years. Mobile service providers may carry their own long distance traffic within their service area and may directly interconnect and share infrastructure with other service providers in the same service area. Cellular mobile providers can provide all types of mobile services, including voice and non-voice messages and data services utilizing any type of network equipment.

B. Fixed service providers. For basic (voice and data) telephone service, India is divided into 21 circles or service areas. Applicants for licenses must meet minimum requirements for paid-up capital and combined net worth, and must pay a one time entry fee for each service area. There is a one-time entry fee, and license fees are based on a revenue share of 8, 10 or 12 percent depending on the service area. Licenses are awarded on a non-exclusive basis for an initial period of 20 years and can be extended for additional periods of ten years. Fixed service operators have network roll-out obligations linked to the establishment of points of presence in a specified geographical region. They may carry their own long distance traffic within their service area and may directly interconnect and share infrastructure with other service providers in the same service area.

Fixed service providers are free to provide all types of fixed services including voice and non-voice message and data services utilizing any type of network equipment, including circuit and/or packet switches. The NTP 1999 foresaw the possibility that basic service providers would utilize wireless-in-local loop (WLL) technologies and noted that frequencies for WLL systems would be awarded based on the payment of an additional one-time fee over and above the entry fee. The TRAI was to recommend the appropriate level of the entry fee and percentage of revenue share for WLL for the different service areas. As noted below, the question of basic service operators offering services via WLL has become extremely controversial and has been extensively reviewed by both by the courts and government policy makers.

C. Cable service providers. Under provisions of the Cable Regulation Act, 1995, (which the Convergence Bill was to supercede upon passage), cable service providers may provide “last mile” linkages and switched services within their service areas of operation. They may offer media (one-way, entertainment related) services and interconnect with other types of service provider in their areas and also share infrastructure with them. If, however, cable service providers want to offer two-way communication services, they will need to accept the license conditions for fixed service providers and obtain such a license.

2. National Long Distance Services. This sector was opened to competition in India in August 2000. To obtain this service license, an applicant must meet a number of conditions. The company must have a minimum paid-up capital of 2.5 billion rupees (approximately \$55 million)

and a combined net worth of 25 billion rupees (\$545 million). There is a one-time entry fee of one billion rupees (\$22 million) and four bank guarantees of 1 billion rupees each, to be released on fulfillment of network rollout obligations. The government's rationale for imposing such conditions was to ensure that only serious applicants with sufficient financial resources to invest in building new network facilities would qualify for licenses. There is no limit upon the number of licenses the government may issue for the provision of national long distance services.

The license fee requires a ten percent revenue sharing arrangement in addition to a contribution to the Universal Service Obligation Fund, with a total cap of 15 percent. The license is valid for 20 years and extendable by 10 years. The licensee may carry inter-circle long distance voice and data traffic, while intra-circle traffic is to be carried based on mutual agreement with a basic service operator. National long distance operators may utilize the existing backbone networks of public and private power transmission companies, railways, and other entities. Only those firms with national long distance licenses can resell domestic telephony.

3. International Long Distance Services. This market was opened to competition in April 2002. The applicant company's minimum net worth must total 250 million rupees (\$5.45 million). A one-time entry fee of 250 million rupees (\$5.45 million) is required in addition to a bank guarantee of 250 million rupees that will be released on fulfillment of network rollout obligations. The license fee takes the form of a 15 percent revenue share that includes the universal service obligation. The licensee is required to establish a minimum of four international gateways, one in each region of India. The license is granted for a period of 20 years, extendable by 5 years. Reselling international long distance service (by licensed operators) is not permitted until 2004.

4. V-SAT Services. Applicants can receive licenses, on a non-exclusive basis, for an initial period of 20 years, a period that can be extended by additional periods of ten years. There is a one-time entry fee of 3 million rupees (\$65,400) and a revenue sharing requirement of 10 percent of revenues inclusive of the universal service obligation. Operators can use the Ku-band and extended C-band at transmission rates up to 512 kbps.

5. Internet Service. The Internet service market was open to competition in November 1998. No license fee was required until October 31, 2003; thereafter a token license fee of 1 rupee per year is required. Internet Service Providers (ISPs) may establish their own international gateways (either satellite or submarine cable) for carrying Internet traffic. Only ISP licensees are permitted to offer Internet telephony. (See below for a description of the policy on Internet telephony.) An ISP may make bandwidth from its gateway available to other ISPs.

6. Global Mobile Personal Communication Services (GMPCS). These services are open to competition, and licenses are issued on a non-exclusive basis subject to security clearances. The

entry fee is 10 million rupees (\$218,000) with a revenue sharing arrangement of 10 percent. The service provider must locate its gateways in India, and those facilities are to be operated and maintained by an organization the government designates. GMPCS operators may offer voice and non-voice messages and data and information services utilizing any type of network equipment.

7. Radio Paging Services. Licenses to provide paging services are granted on a non-exclusive basis for each service area of operation for an initial period of 20 years, with 10-year extensions possible. There are no limits on the number of areas an operator may serve. Since the availability of adequate radio frequency spectrum is essential for providing optimal bandwidth to the operators, the utilization of spectrum will be reviewed from time to time in view of market requirements, optimal use of spectrum, and the presence of competition. The entry of additional operators in a service area is based on a recommendation from the TRAI.

A one-time entry fee must be paid, and TRAI has made recommendations for new operators. The fees will vary depending on the service area. The license fee for the fourth and fifth year is five percent of gross revenues for city paging.²⁷

8. Public Mobile Radio Trunked Service. There is no entry fee to provide these services. New licenses require the supplier to use digital technology and pay a license fee in the form of a 5 percent revenue sharing arrangement, in addition to spectrum charges. Licenses will be granted on a non-exclusive basis for each service area of operation for a period of 20 years with extensions of 10 years.

9. Voice Mail/Audiotex/Unified Messaging Services. No entry fee or license fee is required, and licenses are issued on a non-exclusive basis. Basic and cellular mobile service providers do not require separate licenses to offer these services.

10. Other Services (including Call Centers). For the provision of services like tele-education, tele-medicine, tele-banking, e-commerce, and call centers, the provider needs only to submit a registration. No license fee is required. The service providers may use infrastructure supplied by access providers but may not provide switched telephony.

Call centers are permitted to connect with the Internet and international private line circuits on the same LAN. Call centers of the same group of companies can be interconnected for purposes of redundancy and load balancing. International call centers may interconnect with “hot sites” for back up and operation during outages.

Infrastructure Providers. The government has established two categories of infrastructure providers. Firms in the first category provide assets such as dark fibers, rights of way, duct space,

²⁷Recent reports indicate that due to the expansion of cellular services the paging industry in India has lost most of its subscribers.

and towers. They must submit a registration, and no financial commitments are required. Infrastructure providers in the second category offer end-to-end bandwidth. While there is no entry fee, these providers pay a license fee through a revenue sharing arrangement and make a contribution to the Universal Service Obligation Fund, capped at 15 percent. The license is granted for a period of 20 years, with 10-year extensions.

Unified Access Services License. In November 2003, the Government of India announced it had decided to move towards a Unified Access Services Licensing (UASL) regime in light of several factors including the fact that advances in technologies were erasing distinctions imposed by earlier licensing systems. The central policy issue at hand was whether CDMA limited wireless systems could compete fully with existing GSM-based cellular mobile systems. The Government's decision supported the provision of services using any technology by licensed telecom operators. The new guidelines gave existing operators the choice to continue under the existing licensing regime or migrate to the new UASL in the existing service areas with the existing allocated spectrum. For the new UASL, the license fees and conditions would mirror those for the fourth cellular mobile service providers.

Cellular mobile service providers would be allowed to offer limited mobility services and would face no additional entry fee for migration to UASL. Basic service operators would have to pay certain additional amounts (specified for each circle) to obtain the new license and then could offer full mobility to their customers. The Government is expected to formally approve TRAI's recommendations on UASL early in 2004.

Foreign Investment Policy in the Telecom Sector. The levels of allowable FDI in the Indian telecom sector vary considerably. In view of the investment requirements for the rapid development of the industry, some observers question whether current restrictions are not hampering the growth of the telecom sector and sending mixed signals to potential foreign investors.

Up to one hundred percent FDI is allowed for telecommunications equipment manufacturing, infrastructure providers (Category I), companies providing e-mail and voice mail services, ISPs (not providing international gateways), call centers, and IT-enabled services firms. The one hundred percent investment level is subject to a condition that the company divests 26 percent of its equity in favor of Indian investors within 5 years if the company is listed on exchanges in other parts of the world.

Up to 74 percent FDI is allowed (subject to licensing and security requirements) for Infrastructure Providers (Category II), radio paging service firms, and ISPs whose suppliers provide their own international gateways.

FDI up to 49 percent is allowed for suppliers of international and domestic long distance services, basic local telephone services, cellular mobile services, value-added services, and global mobile personal communication services. Proposals to invest more than 49 percent are considered by the Foreign Investment Promotion Board on a case-by-case basis. The Government has been considering a proposal to raise the 49 percent investment ceiling on direct foreign investment to 74 percent, but other conditions on such investment may be imposed.

To encourage additional investment in the telecommunications sector, firms can take advantage of certain fiscal incentives and concessions. These include the amortization of license fees; tax holidays; rebates on subscription to shares/debentures; the ability to carry forward losses on mergers; exemption of cellular phones and their components, pagers, and radio trunking terminals and parts from excise duties; and a reduced central sales tax of two percent. Dividend income and capital invested in the telecom sector can be fully repatriated.

Telecommunications Under the Tenth Five-Year Plan (2002-2007). Telecommunications is addressed under the current national five-year plan (March 2002 to March 2007).²⁸ This Tenth Plan incorporates many of the objectives of the NTP 1999. In the Plan, the government has noted that while telecom is one of the fastest growing sectors in the country, it is still in an early stage of development. Hence, it should be treated as an infrastructure (high priority) sector, with telecom policy guided not by the goal of maximizing revenue generation for the government. The goal, rather, should be to foster conditions that promote the smooth operations of the various licensed service providers and to encourage the rapid expansion of network access and subscribers. The Plan recognizes the importance of spectrum and its efficient use for the development of the wireless and fixed wireless (WLL) industries. It stresses the need for sound policy governing spectrum allocation and licensing, so that scarcity of spectrum does not become a constraint upon growth.

The Plan calls attention to the continuing lack of adequate telecom facilities in India's rural areas where more than 70 percent of the India's population lives. Nearly one-third of India's villages were still without access to the public telephone network in 2001, and the government had committed to providing voice and low speed data services to all villages by the end of the Ninth Plan.

Among the major objectives of the Plan for telecommunications are to provide universal service to all unserved areas; build a modern and efficient telecom infrastructure to accommodate the convergence of telecom, IT and the media; strengthen research and development; achieve efficiency and transparency in spectrum management; and transform the telecom sector into a competitive environment where all players have equal opportunities and enjoy a level playing field.

²⁸For further details, see www.dotindia.com/plans/planindex.htm

The specific targets for the telecom sector were to make telephone service available on demand by March 2003; achieve an overall teledensity (including wireless subscribers) of 9.91 by the end of the Plan (requiring 65 million new connections); achieve telecom coverage of all Indian villages by December 2002 with reliable transmission media in all rural areas; and provide high-speed data and multimedia capability to all towns with a population greater than 200,000 by March 2003.

The teledensity targets are based on the government-owned carriers (BSNL and MTNL) providing 39.5 million additional connections and the private sector providing 25.5 million connections. For BSNL to meet these targets will require that it expand its network by 8.1 million fixed lines, 6.3 million fixed wireless lines, and add 22.4 million mobile subscribers. The Indian Government has approved an outlay of 870 billion rupees (nearly \$19 billion) for the telecommunications sector.

DOT's Perspective Plan for Telecommunication Services (2000-2010). India's former Department of Telecommunication Services (DTS), the part of the Ministry of Communications in 1999 that had responsibility for operating most of the national communications network, issued its blue print for activities relating to the growth of telecommunications in India.²⁹ This Plan predated the corporatization of DTS that resulted in the formation of BSNL and also predated the development of any significant wireline competition in India. However, the Plan was framed taking into account the liberalization policies of the government set forth in the NTP 1999, and it provided input later for the telecom portion of the Tenth Plan for the nation.

Among the objectives of this Plan were to make digital connectivity available to all exchanges in the country by 2007; to make sufficient bandwidth available for use of the Internet and information technology applications by installing optical fiber systems in the local and long distance networks; to extend ISDN services to all district headquarters; to provide Intelligent Network Services throughout the country; to increase the deployment of wireless technology and optical fiber technology in subscriber loops; and to introduce the latest telecom services such as national directory information.

As for the expansion of the national telecom network, the Perspective Plan anticipated that of the additional 146 million phones that were to be added during the decade, 55 percent would be mobile and 45 percent fixed. Of these, the government-owned carriers would provide nearly two-thirds of the total, the private carriers one-third. It now seems certain that mobile phones will constitute a greater percentage of additional connections by 2010 and that the private sector's contribution to the total number of new connections will be much higher.

DTS conceded that its projections could well be overtaken by changes in technology. Such projections also may not adequately take into account changing levels of consumer demand, company financial positions (based on new tariff rates, service revenue totals, profits, and

²⁹ Govt. of India, Ministry of Communications, Department of Telecommunication Services, "Perspective Plan for Telecommunication Services (2000-2010), nd

investment outlays needed to meet infrastructure rollout obligations), modifications in telecom policy, and regulatory uncertainty. DTS acknowledged that the targets set by the 1994 National Telecom Policy were not met largely due to the lack of contribution from the private sector. Only in the last year or so has the private sector begun to assume a significant role in developing India's telecom infrastructure and offering competitive services, and several important policy and regulatory issues need to be resolved (see below) to continue the currently pace of growth.

Internet Telephony in India. The subject of Internet-protocol (IP) telephony, including voice services offered over the Internet, has been controversial in many developing countries. On the one hand, IP networks can allow the delivery of voice and data services more economically and provide the public access to telephone service at considerably lower costs. On the other hand, the incumbent landline operator usually has large investments sunk in circuit-switched facilities and can face dramatic decreases in its revenue stream if competitors offer IP telephony at much lower rates. The incumbent's international service revenues and settlement payments can be adversely affected if traffic previously routed over the national public switched network is now sent via IP networks that operate outside the traditional international settlements system. Revenue streams for newly licensed operators that are investing heavily in new communications infrastructure can also be impacted if other entities can offer IP telephony at much lower than the prevailing rates.

The Indian Government implemented a new policy on Internet telephony in April 2001.³⁰ While the service was legalized, considerable restrictions were placed on how the technology could be used to offer the service in India. Only Internet Service Providers were permitted to offer Internet telephony and only within their service areas. An Internet telephony service provider (ITSP) license to provide the service costs 10,000 rupees (\$215). The service can be offered from one personal computer to other personal computer within India, and from a personal computer within India to a telephone or a personal computer located outside the country. These limitations ensured that the ITSP service was different in scope and kind from the real-time voice services the basic and long distance operators provided.

Interconnectivity between ISPs is allowed only if both service providers have licenses to provide Internet telephony. The ITSP infrastructure may not be physically connected with the infrastructure of a non-Internet telephony ISP. Similarly, the IP infrastructure of any corporate location may not be physically connected in any way with the public switched telephony network at the same location. There is no tariff regulation on ITSP calls, and existing quality of service standards for voice do not apply to voice calls over the Internet.

Telephone to telephone communication over the Internet remains illegal in India. The policy in effect limits the availability of Internet telephony to a small number of users and keeps this low-cost service from competing directly with the long distance and international voice services offered by licensed telecom providers.

³⁰The Business Standard (India), March 22, 2002, p. 4.

More than 100 licenses to provide Internet telephony have been issued, and the Finance Minister in 2003 issued a clarification that, for tax purposes, these services would fall under the category of online information and database access and/or retrieval services. There is a “grey market” estimated at 90 percent of the total Internet telephony market in India. Vendors sell illegal Internet calling cards at rates (5 to 8 rupees a minute for a call to the United States) less than one-half the rate charged by authorized service providers. To enforce a total ban on phone to phone Internet telephony by attempting to block foreign access numbers is extremely difficult.

Broadband Fixed Wireless (BFW) in India. Broadband fixed wireless services can be provided via the worldwide fixed wireless access band (3.4 to 2.7 GHz), LMDS (28 to 31 GHz) and unlicensed bands.³¹ In India, it is unlikely that the 3.4-3.7 GHz band will become available to operators, because it is currently used by the Department of Space and Indian Space Research Organization. LMDS frequencies in the 28 GHz band are assigned to Internet Service Provider operators. The 2.4 GHz band has been de-licensed for in-house operations.

To provide BFW services requires an operating license and a letter from DOT’s Wireless and Planning Coordination Wing that assigns the frequency. Spectrum charges must be paid. The service provider must have an Indian partner and there is a 49 percent cap on foreign ownership. For BFW interconnection with the local telephone company, standard tariffs are available for data services. To offer other services, the operator must negotiate separately with network operators. Other policies and regulations governing BFW are the same as for the ISPs.

Wi-Fi in India. India has allocated the 2.4GHz and 2.4835 GHz bands for 802.11B indoor wireless local area network known as Wireless Fidelity or Wi-Fi.³² The Government is considering de-licensing the wireless technology standards 802.11(a) and 802.11(g). The latter would offer wireless connectivity at 54 mbps and over an increased distance. The 802.11B Wi-Fi system can be deployed indoors or within the single contiguous campus of an organization or institution outdoors without a license. The Government may also allow its use for outdoor commercial purposes. Only direct sequence spread spectrum (DSSS) technology can be used to build the wireless network.

Both types of Wi-Fi systems currently are regulated. Indoor use of 802.11A and outdoor use of either Wi-Fi system require an annual license fee of \$378 for the primary user and \$95 for each additional user on the network. Since many defense and intelligence agencies in India use the 2.4 GHz band, the government is moving cautiously in opening up Wi-Fi bands.

A recent report noted that low awareness of its benefits, the low level of computer penetration, and the high cost of installation are the main barriers to adoption of Wi-Fi in India.³³ It noted that IT, telecom and financial services firms would be among the first to use Wi-Fi as a networking

³¹Communication from FCS/New Delhi, November 13, 2003.

³²Information provided in communication from FCS/New Delhi, April 28, 2003.

³³“Wi-Fi journey in India...,” *Economic Times*, December 14, 2003.

solution of wide local area network and telecommunications. Wi-Fi has been established in a few areas of India, such as the city of Bangalore and Dal Lake in Kashmir, a popular tourist spot. Other places telecom service providers are considering public WLANs are in chain restaurants, hotels and airports.

1.10 INDIA'S WTO COMMITMENTS IN TELECOMMUNICATIONS, IT AND E-COMMERCE

India is a party to three World Trade Organization (WTO) agreements, one on value-added telecommunications services, one on basic telecommunications services, and one on information technology products, including many types of telecommunications equipment.³⁴ These agreements were concluded several years ago, and India's reluctance to take strong commitments in those WTO negotiations may have sent unfortunate signals to the international investment community. Since then, India has taken steps domestically to liberalize its telecom services and equipment markets, but it has yet to revise its international obligations to reflect its current telecom regime.

India joined the United States and 39 other countries in March 1997 in concluding the Information Technology Agreement (ITA). The goal of the ITA was to eliminate all tariffs on most types of information technology products—including telecommunications equipment—by the year 2000. India, however, said it would retain tariff rates of 25 percent on most types of telecom equipment (e.g., fiber optic cable, switching equipment, terrestrial microwave communications equipment, cellular infrastructure and other transmission equipment) through 2003, reduce them to 20 percent in 2004 and zero out those tariffs only in 2005. While India now has reduced tariff rates on some types of IT and telecom equipment below 20 percent, other duties and import taxes often increase the effective duty rate to higher levels. The ICT industry in India has long advocated for lower tariff duties on imported equipment, so that costs of constructing telecom networks in India can be reduced and accordingly services can be made available to consumers at more affordable rates.

India's Uruguay Round commitments on value-added services allowed 51 percent foreign investment in specified services such as electronic mail, voice mail, on-line information and data processing services, and enhanced facsimile services. In 1998, India made limited commitments in basic voice and data transmission services by reaffirming its then local service duopoly policy, limiting foreign investment to 25 percent, and specifying that cellular service could only be provided through GSM technology. India also took an MFN exemption for international accounting rates.

Because it was in the process of establishing its telecom regulatory body, India was unwilling to assume in full the regulatory principles set out in the WTO "Reference Paper" that was designed to promote the effective implementation of competition in telecom services. India wrote its own reference paper that left out key guarantees and protections. For example, India did not commit

³⁴For India's WTO basic telecom commitments, see GATS/SC/42/Suppl.3, 11 April 1997 and GATS/EL/42Suppl.1, 11 April 1997. For an earlier perspective on India's efforts to liberalize its telecom sector and make multilateral trade commitments, see Daniel W. Edwards, "India Must Maintain, Expand Liberalization of Its Telecom Sector," *Business Times*, (Washington, DC), XIV:1 (July 1997), 99-101.

to maintaining measures to protect against anti-competitive cross-subsidization by a dominant supplier or to ensure interconnection be available on non-discriminatory terms, conditions and at cost-oriented rates. As noted above, India's regulatory authority is taking steps to establish pro-competitive processes and safeguards that are vital for new entrants to the market.

India has been involved in the Work Program on Electronic Commerce that was established by the WTO General Council in 1998 to examine all trade-related issues arising from global e-commerce. Specifically, it has been engaged with other member countries in deliberations on issues such as how electronic transmissions should be characterized in terms of trade and the potential revenue implications of a moratorium on customs duties on these transmissions. In the past, India has supported a temporary moratorium, but has also stated concerns about a permanent ban that could foreclose options for accruing revenues from e-commerce.³⁵

1.11 U.S.-INDIA HIGH TECHNOLOGY PARTNERSHIP FORMED

The U.S.-India High Technology Cooperation Group (HTCG) was formed in November 2002 to explore ways to stimulate high technology trade between the two countries following an historic joint statement issued by President Bush and Indian Prime Minister Vajpayee a year earlier that committed the United States and India to transforming and strengthening their political and economic ties. Chaired by the U.S. Department of Commerce on the U.S. side and the Ministry of External Affairs on the Indian side, the HTCG developed and signed a Statement of Principles in February 2003 regarding high tech trade, including trade in "dual use" goods and technologies. The group held two meetings in 2003, one in July and the other in November, during which the two sides discussed export controls, tariffs on IT products, standards, trade facilitation/customs procedures, privacy protection, and the WTO e-commerce work program. The HTCG also explored outreach activities that would help to facilitate and promote high tech trade and specific areas where the two countries might cooperate (defense technology, life sciences/biotechnology, information/nanotechnology, and telehealth). The private sector partners of the group that host and participate in outreach activities are the CII, FICCI, NASSCOM, and the U.S.-India Business Council. The HTCG is expected to hold videoconferences to discuss tariffs, taxation, and other issues and a cybersecurity workshop in 2004.

³⁵Brief Note on Electronic Commerce in WTO, Indian Ministry of Commerce and Industry, <http://commerce.nic.in/wtoec>

CHAPTER II: TELECOMMUNICATIONS SECTOR

2. SIZE AND GROWTH OF THE TELECOMMUNICATIONS MARKET

Certain sectors of India's telecommunications market are growing very rapidly, while others are expanding only slightly. In many cases, official government statistics are not available. Trade associations, consultants, and investment firms do provide market estimates that, though never in complete agreement among themselves, are useful to indicate orders of magnitude. Published statistics tend to be based on the government's fiscal year (April 1 to March 31). FY2003 refers to the period from April 1, 2003 to March 31, 2004. Hence, the latest official statistics are for FY2002 (year ending March 31, 2003). In this report, "2002" refers to the calendar year, not the government's fiscal year.

Frost & Sullivan set India's total (services and equipment) telecommunications market at \$13.71 billion in 2001 and projected a compounded annual rate of growth (CGAR) of 13.42 percent for the market through 2006, at which point the value of the market would be \$24.29 billion. The Garter Group foresaw India's telecom industry growing at an annual rate of 19 percent from 2003 to 2006. CyberMedia Research valued the FY2002 Indian telecom services market at \$10.97 billion and the equipment market at \$6.15 billion, and based on recent growth, a reasonable estimate for the value of the telecom market in 2003 would be \$18.5 billion.³⁶

2.1 THE MARKET FOR TELECOMMUNICATIONS EQUIPMENT

While there is always a need for telecom service suppliers to replace outdated wireline infrastructure and terminal equipment, the rapid growth of India's telecom equipment market is closely correlated to the build out of new telecom infrastructure, particularly wireless infrastructure and the equipment that connect users to that infrastructure. Over the next few years, Morgan Stanley believes the biggest gainers in India's telecom market will be consumers (because of reduced tariffs and greater service options) and equipment suppliers (because of the expansion of the telecom infrastructure throughout the country.)³⁷ The report suggests that telecom operators will make capital expenditures of \$17.7 billion during the 2003-2008 period, while customers will spend \$4.7 billion on handsets.

Although sales of telecom equipment in India grew at only a ten percent rate in 2002 over the previous year, that rate was still higher than growth rates in most other countries where the

³⁶ *Voice & Data*, Special Issue July 2003, p. 23

³⁷ "India Telecommunications," Morgan Stanley, June 6, 2003

telecom sector remained in a depressed state. Mobile handsets was the fastest growing segment of telecom equipment in India and registered a nearly 80 percent annual increase. India's equipment market may be subdivided into the following categories: carrier (service supplier) equipment; enterprise (business) equipment; and others (largely telephones and software).³⁸

The size of the carrier equipment market (FY2002) was estimated at \$2.76 billion. Wireless equipment comprised a large percentage of the market, while a previous stalwart, telecom cables, has seen its sales drop dramatically due to the slowing of the wireline infrastructure market. Equipment sold to business and public enterprises (e.g., banks, MNCs, hotels, state governments and schools) totaled \$880 million and included wireless networking equipment within premises and site-to-site connectivity. Services the equipment vendors provided to both carriers and enterprises were valued at \$664 million.

Among the other categories of telecom equipment, GSM phone sales totaled \$391 million, CDMA phones \$122 million, and fixed phones \$59 million. The market for telecom software, including export sales, was approximately \$1.2 billion. Table 2-1 shows India's major equipment suppliers and their estimated sales for FY2002)

Table 2-1: Major Equipment Suppliers in India

Company	Sales*
Lucent	439
ITI	377
Ericsson	316
Motorola	264
Cisco	242
Siemens	216
Wipro	197

*Estimates. Totals may include bundled or stand-alone telecom software.

Source: CyberMedia Research

A more detailed look at volume and demand for specific types of telecom equipment shows that turnkey projects accounted for approximately 20 percent of the carrier equipment market; voice switches for 13 percent; and telecom cables for 11 percent. While telecom service suppliers continue to rollout their GSM and CDMA networks into unserved and under-served areas of the country, the likelihood of future industry consolidation may reduce longer-term demand for this equipment by reducing the number of carriers and halting further deployment of alternative networks.

³⁸ Figures in this section are taken from *Voice & Data*, 9:12 (June 2003), p. 11

In the voice switching market, BSNL had been the dominant purchaser the past decade, but private operators have made sizeable purchases of wireless switching equipment. The annual market in India is currently estimated at nearly \$350 million. The government-owned wireline carriers bought switches on a standalone basis, but for their cellular networks, they followed the examples of the private operators and purchased bundled solutions. Currently, the top three vendors in terms of annual sales are Lucent, Alcatel and Siemens.

The first significant sales of voice over IP (VoIP) equipment in India occurred during FY2002 when sales totaled \$10.5 million for an estimated 77,000 ports.³⁹ Competitive international long distance providers, notably Data Access, have been the leaders in deploying this equipment. The traditional TDM switch manufacturers are also developing products to provide migration to VoIP, but to date the primary reason for adopting VoIP in India is for the new carriers with limited network facilities to maximize network utilization of their leased facilities. Incumbent operators BSNL and VSNL already have extensive long distance and/or international trunk facilities with underutilized capacity, so they have no immediate need for an extensive deployment of VoIP equipment. Partly because of the extremely competitive and recently depressed telecom switching market worldwide, Indian telecom suppliers have been able to purchase TDM switches at very low prices, and value-added services, which has been a driver of VoIP deployment elsewhere, have yet to become a significant service offering for the large Indian telecom operators. The market for VoIP equipment in the current (FY2003) year could well double if BSNL expands its trial rollouts of VoIP in sections of its national and local networks. VocalTec of the United States is the leading supplier with Ericsson and Cisco also active players.

While sales volumes in the VSAT market increased about 17 percent to \$51 million in FY2002, falling prices per unit of equipment resulted in a revenue decline of nearly 8 percent.⁴⁰ With the accelerated build out of India's terrestrial network and the increasing availability of affordable leased lines, VSATs are likely to become a backup communications network for many firms. VSATs still, however, are making inroads in India's banking (connecting ATMs), distance education and lottery sectors. A number of Indian companies are planning to develop their lottery operations, and those efforts, along with expected orders from the army, airport authority and government development corporations will preserve VSATs as an essential part of the telecom sector. Hughes Network Systems and ViaSat, both of the United States, and Gilat of Israel account for nearly all VSAT sales.

The value of the market for optical transmission equipment in any one year varies considerably (as is true for other equipment sectors) due to the awarding of large, one-time tenders. One estimate for annual sales in India is \$170 million,⁴¹ with the expectation that SDH (synchronous digital hierarchy) equipment will constitute 55 percent of 2003 sales, the remainder being DWDM (dense wavelength division multiplexing) equipment. Besides substantial orders from

³⁹ *Ibid.*, p. 76

⁴⁰ *Ibid.*, p. 60

⁴¹ *Ibid.*, p. 79

BSNL, VSNL, Reliance and Bharti, some Indian public service companies (Railtel, GAIL [oil] and PGCIL [gas]) are establishing or expanding their fiber networks. Future growth in this sector could be stimulated by the deployment of metropolitan fiber networks as demand develops for such data services based on ATM (Asynchronous Transfer Mode switching technology) and Ethernets. Indian prices are very competitive, in part due to the recent entry of Chinese suppliers like Huawei and ZTE. Nortel has had the largest share (about 40 percent) of the Indian transmission equipment market, trailed by the Indian firm, Fibcom, Siemens and Tellabs of the United States.

Although the market for broadband wireless radio equipment is quite small at present (\$21 million in annual sales), one estimate is for sales to increase more than 50 percent during the current year.⁴² Market growth has been held back by the difficulties most Indian ISPs have experienced in growing their business, but the market should pick up as large enterprises like banks, multinationals and media firms look for last-mile connectivity in many places where optical fiber is not available. Government regulations have served as another barrier in the wider deployment of wireless radio facilities, but these now have been relaxed for many frequencies and license fees have been reduced. As in other equipment sectors, the plans of the dominant player, BSNL, will have a large impact if it moves forward to offer local message distribution services (LMDS) in the country's largest cities. The top three vendors in India that account for more than two-thirds of wireless radio equipment sales are Cisco, Proxim of the United States, and Hughes Network Systems (HNS).

An area of telecom operations that will become increasingly important in India is that of billing and customer care systems. More generally, operation support systems (OSS) and billing support systems (BSS) are software-driven and vital for companies seeking to gain an edge in an increasingly competitive telecom market. In FY2002 the mobile carriers spent more than 75 percent of the \$25 million in purchases for such systems.⁴³ As telecom operators consolidate and/or expand the reach of their networks, there is greater need to standardize billing systems or migrate to new systems with advanced functionalities. The extensive use of prepaid mobile service in India creates the need for a single converged billing system that can handle both prepaid and postpaid accounts. Systems integrators like Wipro and Infosys could become important vendors should BSNL adopt a "front-end" approach and deploy such billing systems throughout its network.

In the customer premises equipment market, the rapid growth of mobile subscribers has accelerated the demand for both GSM and CDMA phones. As the duty on imported mobile handsets has decreased, so has the price to consumers. The Indian market in GSM phones can be divided into the legal market (29 percent) in which Nokia, Samsung and Motorola hold about 70 percent of the market and the "gray market"—phones imported outside authorized channels to avoid customs duties—with 71 percent. In addition, about 16 percent of the handsets sold are used/recycled.⁴⁴ The value of the 2004 market is estimated at \$1.3 billion. Even with the current

⁴² *Ibid.*, p. 67

⁴³ *Ibid.*, p. 84

⁴⁴ *Ibid.*, p. 92

explosive growth in the number of new mobile subscribers, most observers doubted that India would be able to generate the volumes required to support local manufacturing of mobile handsets that could compete in price with those now being imported from other Asian countries. However, Alcatel reportedly intends to transfer handset technology to India and manufacture its mobile phones in the country.

The market for CDMA phones expanded greatly in FY2002 with the launch of CDMA-based limited mobility services by Reliance Infocomm and Tata Teleservices. Although just more than 1 million CDMA phones, valued at \$115 million, were sold in FY2002 those handsets were among the world's most advanced. They can provide "users access to a variety of multimedia content, including news clips, sports highlights, movie previews, music videos and personalized video messages."⁴⁵ CDMA phones are more expensive than GSM phones, but tend to be bundled with the cost of subscribing to the service and, as noted, offer far more capabilities than GSM phones presently on the market. The Korean vendors, LG and Samsung, currently dominate the Indian market.

FY2002 brought a sharp 25 percent decrease in the number of access (direct exchange) lines the state-owned incumbents telecom firms installed in India. While the new basic service operators added a modest number of new lines, the trend is clear, and a number of small Indian manufacturers are expected to stop producing telephones.⁴⁶ Approximately 6.6 million fixed phones were sold in FY 2002, but the number of mobile phones in India should overtake the number of fixed phones by 2005, and before the end of this decade perhaps two-thirds of current domestic fixed line subscribers could surrender their service in favor of mobile.

A Department of Telecommunication's report acknowledges that domestic manufacturing of telecom equipment declined 6.5 percent from FY 2000 to FY2002 when the total value of such equipment was \$3.14 billion. Through the first half of FY2003, the government received no new proposals for setting up manufacturing facilities in India. As India has promised under the WTO's Information Technology Agreement to move to a zero duty regime for most telecom equipment in 2005, and since indigenous manufacturers have yet to establish a presence in producing wireless equipment, the outlook for U.S. telecom equipment exports remains bright. In January 2004, India's special additional duties on telecom equipment were eliminated, and the tariff on cell phones was reduced to 5 percent. Official statistics for U.S. exports of telecom equipment to India are shown in Figure 2-1. U.S. telecom equipment exports to India in 2003 totaled \$255.5 million, a 6.6 percent increase over 2002.

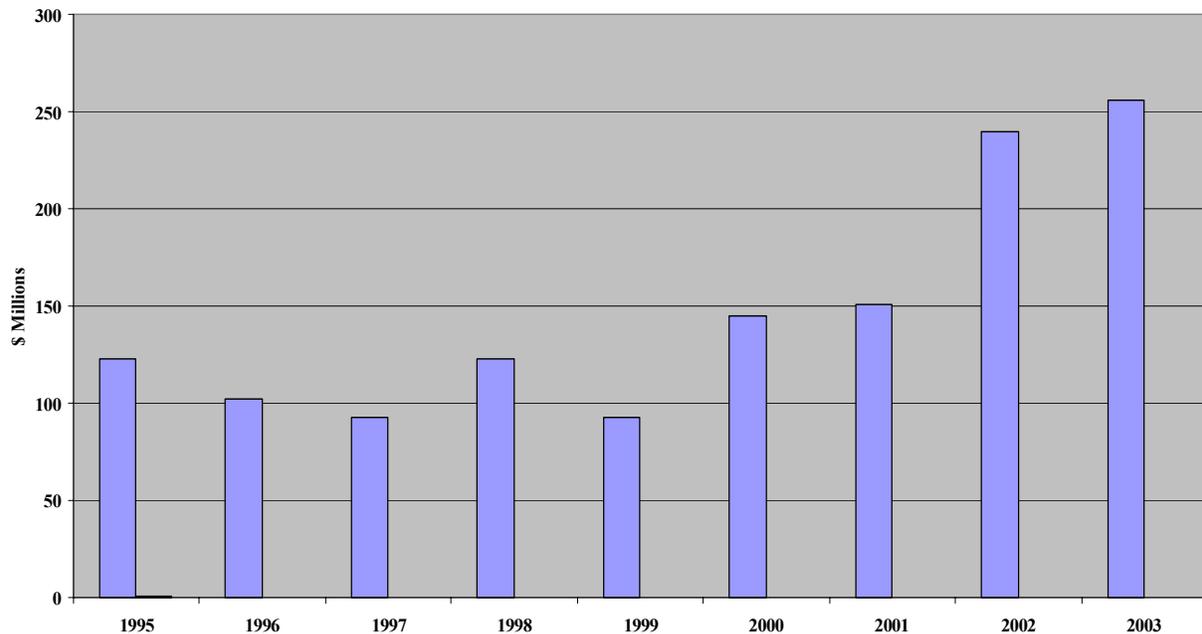
2.2 MAJOR TELECOM SERVICES PLAYERS IN THE INDIAN MARKET

Bharat Sanchar Nigam, Ltd. (BSNL). BSNL, formerly known as the Department of Telecommunications Services, is the telecom carrier that was spun out of the Department of Telecommunications in October 2000 and "corporatized" so that it could operate as a stand-alone

⁴⁵ *Ibid.*, p. 94

⁴⁶ *Ibid.*, p. 96

Figure 2-1: U.S. Telecommunications Equipment Exports to India



Source: U. S. Census Bureau

business entity rather than as a governmental department.⁴⁷ There was a need to make the company a more regionally-based operation that could respond to competition as private sector firms entered the telecom market. BSNL is the largest telecommunications company as well as one of the largest public sector undertaking in the country and employs approximately 350,000 people. The Government of India holds 100 percent ownership of BSNL and has not announced plans to privatize it although most observers expect that to happen eventually.

BSNL's revenues in FY2003 are expected to total about \$5.7 billion, which would be just slightly above FY2002 totals and represent a modest 7 percent increase over its FY2001 revenues. Profits in FY2002 dropped 76 percent to \$31.6 million, in part due to reorganization efforts, instituting new wage scales for employees, and to new license fee payments BSNL was required to pay. However, BSNL hopes to make a profit of about \$650 million in FY2003. BSNL incurred higher operating costs in FY2002, but those were not due to the impact of competition. BSNL's has fixed assets exceeding \$21 billion and makes annual investments in its network of more than \$300 million. BSNL has planned on making capital investments of \$5.2 billion in FY2003, financed primarily by internal accruals.

⁴⁷ Some material in this section is based on interview with BSNL official, New Delhi, September 15, 2003

The Government is contemplating a 5-year financial support package for BSNL that would provide reimbursement for license fees, spectrum charges, and extend the moratorium for repayment of previous government loans. The company will derive a financial benefit of one billion dollars from the new access deficit charge (ADC) regime⁴⁸ and will be able, on the basis of its nationwide basic services license, to also provide mobile telecom services (utilizing WLL technology under the unified licensing regime) at no extra cost.

BSNL provides a full range of telecommunications services throughout India except for the metropolitan areas of Delhi and Mumbai served by another government carrier, MTNL (see below). It offers wireline local and domestic long distance telephone services. On the mobile front, BSNL offers GSM cellular mobile services as well as a local service provided through WLL systems. High speed voice, data and image communications are available through its ISDN network service, while “Intelligent Network” (IN) or value added services such as prepaid cards, virtual private network (VPN) services, toll-free calling, and account card calling, are also available.⁴⁹ BSNL offers Internet dial up and leased access services as well as an IP telephony service. A x.25 packet switched public data network operates in more than 100 cities and supports frame relay services. Leased lines for voice and data communications are available, as well as bandwidth on demand in most cities. BSNL operates a managed leased line network with circuits accommodating up to 2mbps supports Internet leased lines and international private leased circuits (IPLCs).

In 2003, the BSNL network had a total equipped capacity of 45.4 million telephone lines and included 1.34 million village public telephones (VPTs). Services were provided over a nationwide network of 32,000 electronic exchanges (99.9 percent digital) that included digital transmission systems of coaxial cable (6000 route kilometers), UHF (45,000 route kms), microwave (121,000 route kms), and optical fiber (412,000 route kms). BSNL’s network connects 5,000 Indian towns and cities and is worth \$13.9 billion.

BSNL has adopted some aggressive plans to expand and improve its network. Among the targets are to

- make its network fully digital and have digital connectivity in all exchanges by 2007;
- extend ISDN services to all district headquarters;
- provide IN services to all locations in India;
- replace older analogue, coaxial and radio systems;
- expand optical fibers systems in its local and long distance networks;
- introduce wireless and optical fiber technology in subscriber loops;
- continue the roll out of GSM mobile service to cover 4 million customers in 1,000 cities and offer service in every circle; and
- upgrade its CDMA-based WLL systems to offer 3G services and to offer full mobility on WLL phones when the unified licensing policy is adopted.

⁴⁸ *Business Standard*, November 4, 2003

⁴⁹ BSNL Annual Report, 2001-2002

BSNL had great success in launching its cellular service offering in October 2002. Within 6 months, it was providing service in 1,100 towns and had 20 percent of the nation's mobile subscribers and had become the second largest cellular operator. Ninety-five percent of its mobile customers are first-time users, attracted by BSNL's low rates. BSNL now has a lower percentage of prepaid customers than other carriers. The firm intends to launch international and broadband services early in 2004.

With its resources, assurances of government support, ability to finance its capital investments, and its extensive network infrastructure, BSNL should remain India's dominant telecom carrier for some time to come. However, the company faces a number of challenges as it confronts increasing competition in most of its markets from private sector firms. As a former monopoly, BSNL did not have a corporate culture appropriate for an environment in which technologies change rapidly and the consumer can choose among multiple service providers. It is not a given that BSNL can soon become an effective competitor by dramatically improving the quality of its transmission network, telecom services and customer service. BSNL faces personnel challenges too. Like MTNL, it has lost skilled technical staff to private sector firms that can offer the technocrats two to three times the salary they were making in government enterprises.⁵⁰

There has been much speculation that BSNL would be merged with the other government carrier, MTNL, a combination that would create one company offering all types of telecom services throughout India. Whether there is a merger, or BSNL later acquires a private carrier, or the government decides to divest and/or seek a strategic foreign partner, political support as well as approval from its union will be necessary for fundamental changes in organization and ownership to occur. The government recently has ruled out any further divestment of its stake in MTNL and the merger of MTNL with BSNL. Observers still believe that in the future MTNL will be combined with BSNL as a preliminary step in the process of privatizing India's largest telecom firm.

Mahanagar Nigam Telecom Ltd. (MTNL). MTNL was taken out of the Department of Telecommunications and established as a separate entity in 1986 to provide telephone services in the Delhi and Mumbai (Bombay) metropolitan areas.⁵¹ The company, in which the government holds a 56.25 percent ownership, now offers a wide variety of telecom services in India's two biggest revenue markets. The company currently has 57,000 employees.

MTNL suffered financial reversals in FY2003. Its annual revenues of \$1.265 billion declined 6 percent over the previous year, and its profits of \$192 million were reduced by 31 percent. In the quarter ending September 30, 2003, MTNL's revenues did increase by 5 percent over the same quarter a year before, but there was an 8 percent drop in net profits. MTNL's financial slide can be attributed to steep decreases in tariffs that in turn reflect the intense competition it is facing in

⁵⁰ *Economic Times*, September 22, 2003

⁵¹ Some material in this section is based on interview with MTNL official, New Delhi, September 15, 2003

the two metropolitan areas it serves. The company's fixed assets are valued at \$2.75 billion, and it has cash reserves of nearly \$400 million. MTNL was listed on the New York Stock Exchange in 2001.

MTNL's network has 4.65 million exchange lines, with an equipped capacity of 5.85 million, and nearly 500 exchanges that are more than 98 percent digital. The heart of its network are fixed telephone lines, yet that segment is growing at only 3 percent a year. It is anticipated that in the next few years there may be a negative growth of fixed lines in Delhi and Mumbai, which means MTNL will need to greatly increase its presence in the wireless sector. Like BSNL, MTNL offers its business and residential customers a full range of telecom services: local exchange telephone service, packet switched data services, Internet access, ISDN available at 64 kbps and 2 Mbps; Intelligent Network and other value-added services; wireless local loop and cellular mobile services; leased line services for voice and data with national and international connectivity; and IP telephony service.

MTNL's customer base includes 4.51 million fixed-line subscribers, 80,000 wireless local loop subscribers, 235,000 cellular subscribers, nearly 550,000 Internet subscribers, and 40,000 subscribers for leased lines.⁵² In Delhi, MTNL faces competition in basic services from Bharti, Tata and Reliance. In Mumbai, Reliance and Hughes are operational. In mobile services, Hutch, Bharti and Idea are competing with MTNL in Delhi and Hutch, BPL and Bharti are in the Mumbai market. The new unified license regime will place MTNL under further competitive pressure, since it is expected that cellular firms will move into the fixed line business without incurring an additional license fee.

MTNL is responding to increased competition by making further rate cuts in voice services. In November 2003, it announced a 55 percent reduction in its international rates, which gave its customers the lowest rate to the United States: 6.40 rupees (14 cents) a minute. A second response has been to focus on new growth areas, since MTNL cannot legally compete with BSNL and so is restricted to providing services only in two Indian cities. While it entered the mobile arena only in October 2001, the company is focusing on new customer growth in both mobile and Internet services. MTNL also is building an optical fiber (broadband) network in Delhi of 4,350 route kms over which it will provide high-speed Internet, video-on-demand and entertainment services. It hopes to connect many large commercial buildings and housing complexes in the capital by 2004. Finally, MTNL is looking to increase its revenues and pursue new opportunities in international markets. It is part of a consortium that is providing telecom services in Nepal and also has a fixed-network license, a cellular license and a license to offer international services in Mauritius. MTNL is bidding for a license in Malawi and looking at opportunities in Kenya, Sri Lanka and Myanmar.

⁵² Narinder Sharma, "New Services introduced by MTNL," a presentation to Standing Committee on Information Technology, nd (2003)

As a public sector undertaking like BSNL, MTNL faces some of the same challenges in developing a new and less bureaucratic corporate culture suitable for a competitive world, retraining and in some cases downsizing its work force, and improving customer service. MTNL and BSNL both confront the need to upgrade their legacy networks. A recent Gartner survey found that these two state-run telecom operators had the lowest [in quality] rated local access lines of any other telecom firms in Asia.⁵³ Corporate customers in Delhi and Mumbai account for a sizeable portion of MTNL's revenues, and these are the customers the new competitors like Reliance are targeting. One advantage MTNL has is that is already is offering services corporate users need. However, it needs to strengthen its presence in the mobile market to prevent further erosion of its India-based revenues.

**Table 2-2: Major Telecom Service Firms in India
(FY 2002-03 Revenues in \$Millions)**

Company	Telecom Revenues
BSNL	5,996
Tata	1,735
MTNL	1,313
VSNL	1,049
Bharti	725
Hutchison Max	378
Reliance Group	149

Source: Voice & Data

Videsh Sanchar Nigam Ltd. (VSNL). VSNL was taken out of DoT and incorporated as a separate entity at the same time as MTNL (in 1986) and given the sole right to control international bandwidth and provide international telecommunications services.⁵⁴ Its monopoly was to last until April 2004, but the government opened the international sector two years earlier and gave compensation to VSNL. The Indian Government maintained a majority stake in VSNL until 2002, when the Tata Group became a strategic partner and paid \$296 million to acquire 28 percent of the firm. The government has retained a 26 percent share and has two members on VSNL's Board. The Tata Group has since increased its share of ownership in VSNL to 46 percent. VSNL's GDRs (global depository receipts) are listed on the London Stock Exchange, while its ADR (American depository receipts) shares are traded on the New York Stock Exchange. Indian banks and mutual funds hold a cumulative 7 percent stake in the company, and the public holds 7 percent.

In its first year operating as a private carrier (FY2002), VSNL had operating revenues of \$954 million, a 32 percent decline over the previous year's total. Net income was \$157 million, down

¹⁸ "Indian phone firms have poor last mile access—Gartner," Yahoo News India, December 11, 2003

¹⁹ Some material in this section is based on interview with VSNL officials in Mumbai, September 22, 2003

45 percent. Total assets of the firm were \$1.542 billion, with property, plant and equipment valued at \$435 million.⁵⁵ Its capital expenditures for the year exceeded \$26 million, and the company's net worth was approximately \$1.2 billion.

About 77 percent of VSNL's revenues were derived from international telephony, and it handled 3 billion minutes during the year. However, while the market for international calls grew 20 percent during the year, most of that went to VSNL's new competitors. VSNL revenue growth declined 20 percent during the year due to tariff reductions of more than 50 percent, reduced domestic rates for interconnection to VSNL's network, and reduced international settlement rates due to the highly competitive market for international calls. In a year and a half, VSNL has lost 35 percent market share, and that trend may accelerate as BSNL and MTNL enter the international long distance market in 2004.

VSNL has a diverse network infrastructure. It maintains a network of 47 satellite earth stations, 10 gateway switches and a number of Internet nodes. VSNL maintains international circuits in Intelsat and Inmarsat satellites and in several submarine cables (known as FLAG, SE-ME-WE 2 and 3, SAFE and IOCOM.) For several years, FLAG has sought to make available the full capacity of its undersea cable terminating at Mumbai, but VSNL, with sole rights to market FLAG capacity in India, has refused to renegotiate its agreement with FLAG. Now that Reliance owns the FLAG cable, new negotiations are underway, and a U.S. trade association has alleged that VSNL has resorted to anti-competitive tactics by refusing to make more international bandwidth available to international carriers and thus keeping the costs of bandwidth at unacceptably high levels.⁵⁶ VSNL is also constructing a submarine cable to connect Chennai, India with Singapore, and in the future Tyco International may extend that cable beyond Singapore.

Since it lost its international monopoly, VSNL has begun expanding its domestic network in order to compete in the Indian long distance market. By virtue of its association with Tata Teleservices that offers basic services in India (see below), VSNL will be in a position to carry traffic to and from its gateway switches to the premises of large corporate users served by the Tata firm. In order to support its domestic long distance services, VSNL plans to invest nearly \$300 million and currently is laying a 6,500 km optical cable to link high usage regions of India.

As it faces intense competition in the international market, once its sole preserve, VSNL is targeting on new services and markets in an attempt to reverse its revenue slide. Having merged its ISP with Tata Teleservices' ISP, Tata Indicom is India's number two ISP, with nearly 750,000 subscribers and a 37 percent market share. VSNL looks to value-added services and corporate leased line services (of which it has about 50 percent of the market) as a high growth market for the future. In 2003, VSNL formed an alliance with AT&T to offer managed data networking services (MDNS) to Indian businesses.⁵⁷ A significant portion of the MDNS market is composed

⁵⁵ Vidhes Sanchar Nigam Limited 17th Annual Report, 2002-2003

⁵⁶ Letter from Comptel/Ascent to N.P. Singh re: International Cable Access in India, November 24, 2003

⁵⁷ "VSNL, AT&T in managed data network tie-up," *Economic Times*, July 9, 2003

of IT-enabled services, such as software, banking and financial, engineering and manufacturing services provided to firms in Mumbai, Bangalore and New Delhi. Companies find that utilizing MDNS spares them from the need to build their own communications networks and reduces their costs for international bandwidth.

Meanwhile, VSNL will utilize its long distance license obtained in 2002 (that is free of license fee obligations) to increase its market share in that highly competitive sector of India's telecom market. It will attempt to shore up its position in the international long distance market by seeking additional agreements with cellular and basic service operators to pick up and terminate international calls. The company also will market both a corporate Internet telephony service and a retail IP telephony service that will include pre-paid cards and contracts with cyber cafes in India.

VSNL is looking abroad and evaluating telecom opportunities in foreign markets. It is part of a joint venture company that provides WLL services in Nepal. VSNL received an operators license from Sri Lanka in 2003 to provide international voice and data services. The company formed VSNL America to offer IP-Virtual Private Network solutions in the United States, particularly to companies that want to connect with their subsidiary operations in India. In December 2003, the FCC noted that it needed an additional 90-day period to review VSNL's application because "it raises issues of extraordinary complexity."⁵⁸

Now facing vigorous competition in its traditional market, VSNL clearly confronts serious challenges. Yet it has considerable assets and strengths and is run by one of India's strongest industrial firms. Even while it was a monopoly, VSNL had a deserved reputation as a well-managed company that invested effectively in new technologies and was staffed with highly qualified technical personnel. The firm has had a long relationship with the major international telecom carriers and remains in a strategic position to benefit from the continued growth of India's trade and communications with the global community.

Tata Group (telecom). India's Tata Group has business operations in 7 industry sectors including materials, engineering and chemicals. It has three major enterprises in telecommunications. In 2003, the company adopted the brand name of *Tata Indicom* for all the telecom services provided by the Tata Group. Besides its 20 percent equity holding in VSNL, *Tata Teleservices* acquired Hughes Tele.com and now offers basic telephony services in 11 Indian states including wireless local loop services in New Delhi. It was the first fixed-line provider to begin providing limited mobility services and plans to invest \$2.4 billion in its telecom networks in India. Tata Teleservices offers data, corporate Internet and web-hosting services to commercial customers and operates a VSAT network for closed user groups. The firm is migrating to a unified access services license in its operating circles, so it can provide mobile, fixed and limited mobility services in each of its service areas. To attract new customers, Tata Teleservices has offered

⁵⁸ "International Authorizations Granted: Section 214 Applications...", FCC Public Notice, December 4, 2003

various promotional tariffs and calling plans. One rate allows its mobile customers to call the United States and Europe for 17.5 cents a minute, while its fixed-line customers can do so for 21 cents a minute.

Tata Telecom, a joint-venture with Avaya, is an equipment vendor for call center and data networking solutions.⁵⁹ IBM and Hewlett Packard are strategic investors in the firm. Its primary customers are Indian companies, public sector organizations, and multi-national firms. *Idea Cellular*, formerly Birla Tata AT&T, provides cellular service in 6 Indian states and New Delhi. During FY2002-03, Idea's revenues increased 83 percent over the previous year's totals and its subscriber base grew by 58 percent. It invested more than \$1 billion in its networks during the same period, and plans on putting in an additional \$110 million this year to build new cell sites and improve its IT infrastructure.

Tata Indicom Enterprise Business Unit is the specialized sales and marketing team for VSNL and Tata Teleservices. It is organized by industry vertical groups and derives much of its business from the IT, financial services and governmental sectors.

Bharti Tele-Ventures (Bharti). The Bharti Group is India's third biggest telecom group and was incorporated in 1995 when India's telecom services market was opened to limited private sector competition. Bharti Teletech is India's largest telephone manufacturer. Bharti Telesoft is a software and solutions unit. Bharti Tele-Ventures houses the company's telecom services operations. It is consolidating its mobile subsidiaries and will provide those services in the near future as Bharti Cellular Limited under the brand name of AirTel.⁶⁰ Bharti's Infotel Group offers fixed line ("Touchtel"), long distance ("IndiaOne") and broadband services.⁶¹ Bharti is India's largest private sector telecom firm with foreign equity interests exceeding \$1 billion. Among its leading investors are SingTel (\$650 million) and Warburg Pincus (\$293 million). For its fiscal year ending March 31, 2003, Bharti's sales totaled \$642 million dollars. With revenues of \$250 million for the quarter ending September 30, 2003, a 74 percent growth over the same quarter last year, Bharti is now a \$1 billion firm on an annualized revenue basis. Its quarterly profits were \$20 million. Approximately two-thirds of Bharti's revenues come from its mobile operations, and all its mobile networks are generating positive earnings. To date, the firm has invested more than \$2.5 billion in its Indian telecom businesses.

Bharti's telecom network in India includes cellular GSM networks in 15 circles (service areas) and fixed-line networks in 6 circles. The firms will invest an additional \$325 million in its cellular networks this fiscal year. Bharti has installed a 24,000 km fiber optic network in India that should be extended to 30,000 km by April 2004. For international communications, Bharti maintains 4 international gateways, 15 international switches, and 7 satellite earth stations. With SingTel, the firm owns a cable system (i2i) connecting Chennai (India) with Singapore that has a capacity of 8.2 Terabites per second. Bharti has established more than 40 direct bilateral relationships with foreign carriers to handle international traffic.

⁵⁹ Some material in this section is based on an interview with a company official in Mumbai, September 22, 2003

⁶⁰ See description at www.bhartiteleventures.com

⁶¹ Some material in this section is drawn from "Presenting India," Bharti's IndiaOne, powerpoint, nd [Fall 2003] and from an interview with a Bharti Televentures official in New Delhi, September 17, 2003

Bharti has achieved a number of “firsts” in India’s recently opened telecom services market. The company was the first private operator to offer national long distance and international voice services; it was the first Indian private company to offer fixed line services. Bharti is the largest mobile service provider in India and has 5.2 million subscribers, or about one-fourth of the market. It provides mobile services in the four largest Indian cities (Delhi, Calcutta, Chennai and Mumbai) and has the largest service-area “footprint” that includes more than 90 percent of India’s total mobile subscribership and nearly 60 percent of the country’s population.

Bharti Infotel offers fixed line, domestic and international long distance and broadband services. The company has 550,000 fixed line subscribers in two parts of the country (Delhi-Haryana and Karnataka-Tamil Nadu) that have high densities of business and industrial establishments and well-to-do residential users. These two areas are among India’s largest generators of long distance and international traffic and telecom services revenues. Bharti has about 8 percent of the domestic long distance market and 20 percent of the international market. Bharti’s group data and broadband business provides customized business solutions with respect to voice and data applications. The company also provides VSAT services but has abandoned Internet dial-up services. Bharti intends to market end-to-end network solutions for data communications to corporate customers using last mile connectivity in its fixed-line networks, the bandwidth available in its nationwide fiber optic backbone and international bandwidth accessible through its submarine cable.

AirTel already has announced plans to expand its mobile operations to 7 other circles by investing \$155 million if the government approves its new license applications under the unified licensing system. It also is strengthening its market position by buying stakes in smaller regional players, such as Hexacom in Rajasthan. The company is staying competitive by cutting its prices for roaming and for outgoing short messaging services (SMS).

In the international arena, Bharti will continue efforts to reach agreements with other mobile carriers to select Bharti as their default international carrier. The firm is equipping its international gateway switches with IP capabilities and would like to become a niche player in providing wholesale hubbing services. Bharti would also benefit by establishing a partnership with a foreign carrier to provide advanced international private line services. Like its primary competitors, Bharti seeks to offer its customers a complete package of voice and data services and be a “one-stop shopping” source of communications services for its customers.

Bharti has raised funds internationally and is contemplating a \$185 million international share offer. Of all Indian telecom firms, it would probably benefit the most if the government raises (or abolishes altogether) the current foreign investment limitations in basic and cellular services. Bharti’s existing relationships with international firms and investors are a plus, but it will need favorable access to foreign capital if it is to maintain its position as India’s largest private telecom company.

A significant challenge that Bharti and other GSM operators face is the competitive challenge posed by the existence of low-cost WLL services in GSM service areas. The unified license regime legitimates these WLL services. However, since cellular penetration in India is still at

only two percent, there seems ample room for growth by both the GSM and the CDMA mobile service providers.

Reliance Infocomm (Reliance). Reliance Infocomm is part of the Reliance Group, a private sector company that is India's largest business house and one of the world's largest energy and petrochemicals groups. The Reliance Group has reported annual revenues of \$16.8 billion and profits of \$2.1 billion. Its total assets are \$13.5 billion. Reliance claims 3.5 million investors, the largest investor base in India. Reliance entered India's telecom market in 1995 when it obtained licenses to provide cellular services in 7 states. In 2001, Reliance Infocomm obtained basic (fixed) service licenses for 18 states and also began offering national and international long distance and Internet services.⁶²

Reliance Infocomm's installed a 60,000 km fiber optic network in India in 18 months.⁶³ With this wireline infrastructure the company combines a CDMA IX technology platform so it can offer a range of advanced wireless services. To date, Reliance has spent \$2.1 billion for its telecom network and plans to spend another \$1.8 billion over the next 18 months to expand its Indian network from 470 to 690 towns and cities. Reliance recently purchased 100 per cent equity in FLAG Telecom to increase the international connectivity of its network.⁶⁴ With this \$207 million acquisition, Reliance acquires a 50,000 kilometer undersea cable linking Asia to Europe and the United States as well as FLAG's 180 commercial accounts. The company is constructing another undersea cable from western India to the Gulf States. Reliance has international points-of-presence in Los Angeles, New York, London and Hong Kong. Domestically, its national long distance network is comprised of 17 switching centers and 5 gateways.

Infocomm offers fixed-line, wireless (local) telecommunications services in 18 Indian states, as well as long distance and international voice, data and value-added services. It is the largest mobile service operator in India with about 21 percent of the market and providing services in 13 Indian states. Reliance Infocomm is beginning to roll out broadband services, one of which is an IP-based TV service being jointly developed with Microsoft. The firm is establishing a base of call centers and more than 750 retail webstores. These WebWorld outlets can function as private virtual offices and serve as broadband centers for a variety of applications, such as video chat and conferencing, games, and digital theater and entertainment services. Customers at these WebWorlds can order Infocomm products while they patronize the gourmet coffee bars. Reliance is also setting up Internet Data Centers with high processing capabilities designed to serve call centers and meet the needs of business outsourcing.

Reliance's marketing strategy is based on an aggressive pricing strategy that sees affordable prices as the key to market expansion. Any domestic call on its network in India costs less than 0.5 cents a minute. The company also offers an attractively priced bundling of services (e.g., a

⁶² "Reliance Infocomm: A New Way of Life," powerpoint presentation, nd (Summer 2003)

⁶³ Some material in this section is based on interviews with Reliance officials in New Delhi on September 15, 2003 and Mumbai on September 22, 2003

⁶⁴ "India's Reliance Acquires FLAG in Landmark Deal," World Markets Research Centre, October 17, 2003

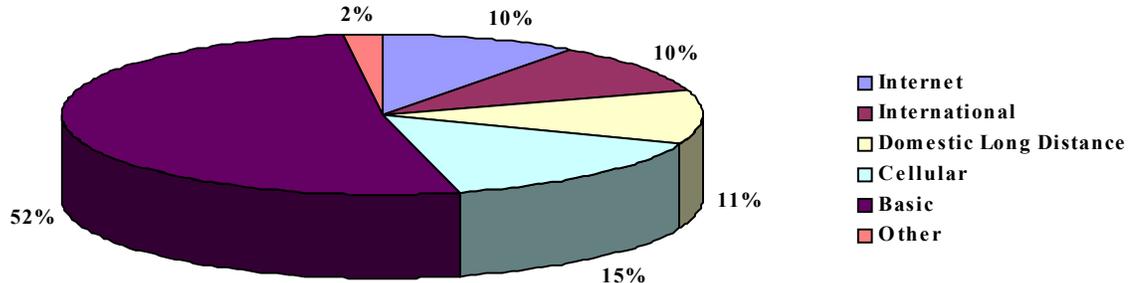
package including a handset, national and international calls, and value-added services such as games and specialized—financial, sports, weather—information). Company executives believe that by 2008, data will constitute 30 to 40 percent of the company’s revenue and 25 percent of its mobile telecom revenue.⁶⁵

2.3 THE MARKET FOR TELECOMMUNICATIONS SERVICES

According to one source, revenues in India’s telecom services industry are projected to increase about five percent in FY2003 over FY2002 totals with the value of the market reaching nearly \$11 billion.⁶⁶ In fact, most telecom service sectors in India are growing at a much higher rate. However, the overall rate of growth is affected by recent and dramatic revenue decreases in the domestic long distance and international markets due to competitors making large reductions in tariffs to attract new customers. Figure 2-2 breaks out the different telecom services sectors in India.

Figure 2-2: India's Telecom Services Market
Fy 2002-03

Total: \$10.97 Billion



Source: Voice & Data

Another study values the FY2003 Indian telecom services market at \$10.4 billion and estimates a 13.5 percent revenue growth from FY2002 through FY2007. That would create a \$17.28 billion market in five years.⁶⁷

⁶⁵ “Reliance’s Real Strategy,” *Business Standard*, January 15, 2003

⁶⁶ In this section, current revenue estimates are taken from *Voice & Data*, Special Issue 2003, p. 23.

⁶⁷ Morgan Stanley, *op. cit.* FY2007 projections given below are taken from this study. Rates are compounded annual growth rates and refer to the five-year period 2003 to 2007.

Basic Services

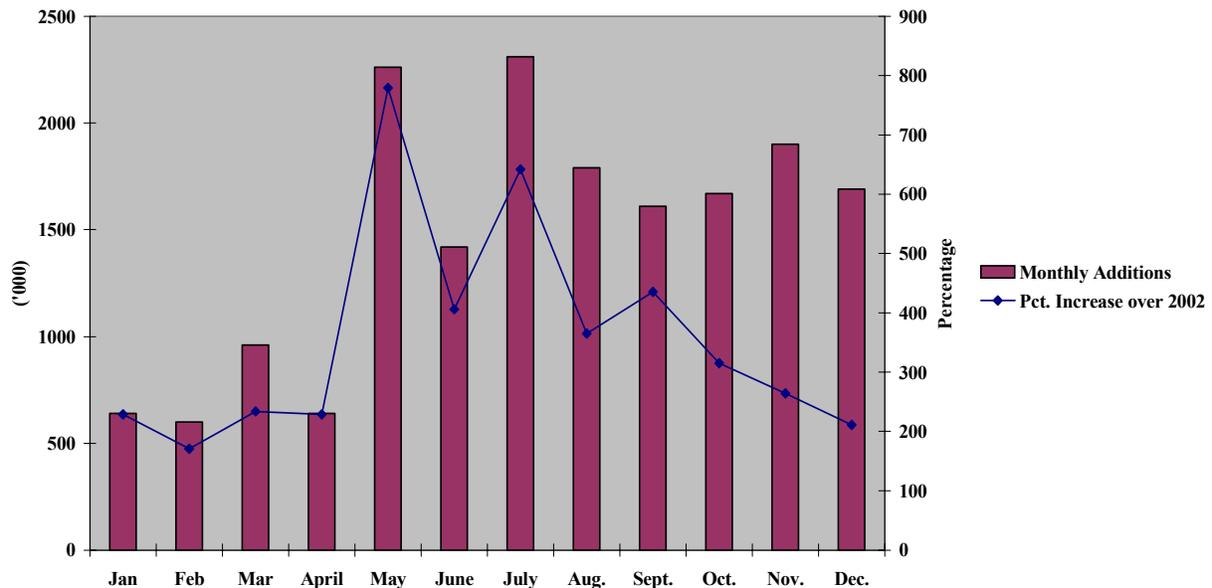
The government has issued 31 licenses to firms for the provision of basic services throughout India in addition to the services MTNL and BSNL offer (in Delhi and Mumbai and throughout the rest of India respectively.) Competitive basic service is not yet offered in the circles of Assam, Jammu & Kashmir or the 7 states of Northeast India. Even in the other circles where licenses have been awarded, the areas in which the new competitors have built facilities usually comprise only a small geographical portion of the total market and hence are within reach of a minority of the total population. Basic (fixed or landline and fixed wireless local) service revenues should total \$6.3 billion in FY2003, up 9 percent from the previous year. This basic service sector accounts for 57 percent of all telecom service revenues. While total revenues and growth rates in this sector soon will be eclipsed by mobile services, fixed basic telephony is still the bread and butter service provided over India's two legacy networks operated by BSNL and MTNL. Ironically, however, new subscribers to the networks of the competitive basic service operators, including subscribers to recently available fixed wireless (WLL) systems, have driven revenue growth in this sector. The two state-owned carriers still control more than 90 percent (in revenues and subscribers) of the wireline market for basic services, although the private sector operators, led by Tata, Bharti and Reliance, collectively doubled their revenues during FY2003. Revenues for fixed line only services are projected to increase at nearly 9 percent to reach more than \$7 billion in five years, and the number of residential and commercial subscriber lines could top 62.6 million.

It now appears that the legal uncertainty surrounding fixed wireless service will be resolved in favor of the basic service providers (by allowing them to provide fixed wireless services too), so growth in basic subscriber lines (now about 2 million) will increase sharply. The number of subscribers to WLL-CDMA services in FY2008 could total nearly 26 million, generating \$1.51 billion in revenues, for a 53 percent annualized rate of growth. Fixed wireless facilities enable basic service providers to extend their networks more rapidly than would be the case if they had to rely solely on buried cables. India now has more than 41 million wireline subscribers. That number will continue to increase at a slow rate as the uptake in mobile subscribers will meet most of the increasing consumer demand for communications services.

Cellular Services

Cellular (GSM system) services have been the big success story of Indian telecommunications in 2003. Currently, 25 firms hold 78 licenses to provide services in all 23 cellular service areas. During the year, more than 20 million new subscribers signed up for the service, at a rate by year's end that exceeded one million a month. (See Figure 2-3).

Figure 2-3: Monthly Additions to Mobile Subscriber Base, 2003



Source: Telecom Regulatory Authority of India

Projections made a year ago already are obsolete. From an estimated \$1.8 billion in FY2002, it is estimated revenues in this sector could grow 18 percent annually to reach \$4.47 billion in five years. A 35 percent annual growth in subscribers over the same period to 58 million users now seems conservative. Even that number represents only a five percent penetration rate, so the scope for continued growth is extensive. Based on current demographics and experience in the marketplace, industry experts believe the potential mobile user market in India is between 200 to 250 million people.⁶⁸ An Indian trade association executive is quoted as predicting that there could be nearly 500 million mobile subscribers in India's wireless market by 2010.⁶⁹

While cellular subscribers benefited from a 30 percent reduction in mobile tariffs during 2002, (much of that due to the entry of a fourth cellular operator, BSNL, and the offering of a competitive limited mobility [WLL] service in some areas), average billed revenue per user (ARPU) remained stable at \$16.65 per month. (Net ARPU was \$13.00) Service providers found operating profit margins very tight and still faced the need to make investments to expand their networks throughout their service areas. The top three revenue generating firms were Bharti Cellular, Hutchison Group and Idea, and by the end of 2003, BSNL had the greatest number of mobile subscribers.

The policy on payment for mobile calls changed to a "calling-party-pays" system in 2003. The mobile companies also benefited by a new interconnection usage charge (IUC) policy that

⁶⁸ Interview with Analogue Devices, New Delhi, September 13, 2003

⁶⁹ COAI's T.V. Ramachandran as quoted in *Global Mobile*, January 14, 2004, p. 2

provides a new source of revenue for mobile carriers. Since May 2003, fixed line and WLL operators have paid mobile carriers termination charges for calls originating on their networks that terminate on mobile networks.

CDMA mobile services

The roll-out of CDMA mobile services resulted in impressive growth in 2003, and by year's end the country had 6.7 million subscribers. The market increased 50 percent above the numbers given in one forecast published in June.⁷⁰ If growth in CDMA continues at its current rate, India could have more than 25 million CDMA subscribers by 2007 and more than 60 million by 2010. Though it is difficult to make projections in a market developing as fast as India's wireless sector, the launch of CDMA pre-paid cards in early 2004 is likely to stimulate growth in the current year. Another factor that bodes well for continued high growth is that CDMA service is very affordable and thus becoming popular among the rural and less affluent segments of society, most of which have never had telephone service before. Firms offering CDMA services believe the technology makes more efficient use of the spectrum than GSM and accommodates the development of better, enhanced services such as security features and higher data speeds.⁷¹

National Long Distance Services

Four players currently are competing in India's domestic long distance market: the former domestic monopoly, BSNL, the former international monopoly, VSNL, and two newer firms—Bharti Telesonic and Reliance. Long distance revenues during FY2003 are estimated to total \$1.56 billion and to grow annually at a rate of under two percent to reach \$1.92 billion in FY2007. BSNL, whose extensive network reaches most areas of the country and includes a large subscriber base, has over 90 percent of this market. Bharti has established its credentials by offering long distance service in most parts of India via a 24,000 km cable network augmented by use of alternative infrastructures owned by the national gas company. Reliance also has constructed an optical fiber network in India. VSNL is building network infrastructure in some parts of India and leasing or buying broadband infrastructure businesses in other areas, so it has facilities to serve a large geographical region of the country.

Steep price reductions have impacted revenues in this sector and are the reason behind the cautious estimates for future revenue growth. Two years ago, BSNL charged 24 rupees (53 cents) a minute for a long distance call during peak hours. After Bharti entered the market, BSNL's rate fell to 9 rupees (20 cents) a minute. Not long afterwards, the carriers introduced a uniform day rate for calls over 300 miles of 4.8 rupees (10.5 cents) a minute. When Reliance entered the market, it set an introductory, three-minute long distance rate of 1.20 rupees, or less than a penny a minute. Some observers believe the rate will stabilize at about 1.3 rupees (less than 3 cents) a minute in the long run.

⁷⁰ "India Telecommunications," JM Morgan Stanley, June 6, 2003, p. 4

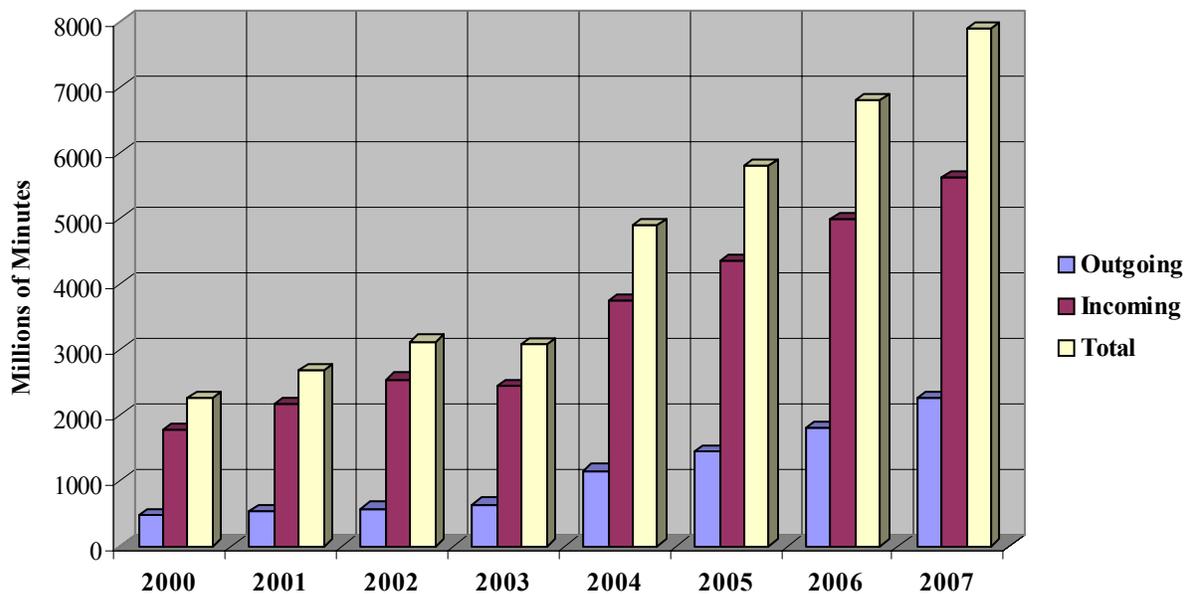
⁷¹ Interview with Reliance Infocomm, New Delhi, September 15, 2003

For a competitive “level playing field” to be created in this market, consumers need the ability to choose among alternative carriers without having to undergo inconveniences when changing their carrier of choice. Dialing parity, or the carrier access code (CAC) issue as it is known in India, would give current BSNL and MTNL customers the choice of selecting any other long distance carrier. At present, digital exchanges can be programmed to allow carrier selection, but analogue exchanges cannot. Under a national number plan released in 2003, a subscriber would dial three digits to select a long distance carrier, then dial the two-digit CAC, then the area code and phone number. This system can accommodate 40 long distance carriers. TRAI is also reviewing CAC issues. It is unclear whether customer pre-selection (whereby all long distance calls automatically are routed over the service provider of choice) will become a future option for Indian consumers.

International Services

Five firms currently offer international long distance voice and data communications services: BSNL, Bharti, Data Access, Reliance, and VSNL. Similar to what has happened in the national long distance sector, international calling rates and revenues have declined with the development of competition. Competition also has contributed to the decline in international accounting rates, and hence Indian carriers have received lower settlement payments for terminating traffic sent from foreign locations. Domestic tariffs that averaged 26 rupees (58 cents) a minute in FY2001, the last year of VSNL’s monopoly, dropped to 18.6 rupees (41 cents) a minute the next year and 13 rupees (28 cents a minute) in FY2003. Rates are expected to continue falling to a level of about 7.6 rupees (16.5 cents) a minute by FY2007. Sector revenues of \$1.178 billion in FY2001 dropped to \$1.087 in FY2003, but should increase to \$1.424 billion (average of 2.5 percent a year) by FY2007 as call volumes increase substantially. (See Figure 2-4)

Figure 2-4: International Traffic Patterns



Source: VSNL (to 2002) and Bharti estimates (2003-07)

The so-called “grey market” in international calls is estimated roughly at 1.5 billion minutes accounting for \$325 million a year.⁷² Four Indian international services providers claim they are losing large amounts of revenues in this way. They note that more than one-half of India’s incoming international traffic either originates in or is routed through the United States and that much of this traffic flows through unauthorized or illegal channels.⁷³ The operators pointed out that such traffic also escapes monitoring by security agencies of the Government of India, which have installed monitoring equipment on the premises of the licensed operators.

Some resellers of international minutes enter into arrangements with illegal exchange operators in India and then are able to offer extremely competitive rates, often via prepaid phone cards, for calls to India. The unlicensed Indian operators receive these calls and terminate them in the local Indian market at local call rates. Despite the restriction on international phone-to-phone IP telephony, these operators also route outgoing calls over international leased line (Internet) facilities. Most of this traffic, necessarily, goes over India’s wireline incumbent’s national network, but data regarding these calls are altered or not recorded to hide their source and volume. Hence, this traffic can be handled within India without payment of settlement or termination charges, so the rates can be kept extremely low. As the large India carriers further reduce their international rates, the attractiveness of this grey market will lessen.

The licensed Indian carriers are reducing their own costs and increasing efficiencies by signing contracts with VoIP carriers such as the U.S. firm ITXC Corporation. Data Access and VSNL have partnerships with ITXC. These VoIP firms serve as international wholesale voice carriers and offer bulk numbers of inbound and outbound minutes to the Indian carriers. The Indian carriers can send more voice traffic to more destinations via a VoIP partner that can reach most countries in the world over the same bandwidth and at a better price than can be negotiated with a traditional global carrier like British Telecom for transporting calls just to one region, in this case, Europe. The percentage of international traffic going over VoIP facilities is expected to increase to 16 to 20 percent of total minutes in FY 2003.⁷⁴

Data Access is also looking for effective and cost-efficient ways to serve customers whose calls from foreign locations transverse its network. Data Access is now a licensed international facilities carrier in the United States, where it can establish its own gateway switches in high volume areas instead of paying more to lease the facilities of other telecom carriers. The firm is also looking to acquire small telecom firms that provide last mile access (either wireless or wireline) to customers in overseas markets it serves. Acquiring such firms would immediately add to its customer base and volumes of international traffic it handles.

The market for international services, such as virtual private network, frame relay, and international private lines, is growing rapidly and could reach \$360 million a year in FY2003. Over the next five years, a 28 percent annual growth in the sector should push revenues to \$935

⁷² *Voice & Data*, Special Issue, op.cit., p. 70

⁷³ “Paper submitted to FCC delegation by International Long Distance Operators,” July 23, 2003

⁷⁴ *Voice & Data*, Special Issue, op.cit. p. 70

million during FY2007. Global carriers, often through partnerships such as the one between AT&T and VSNL, are offering managed data network services to multinational firms with offices in India that want the same range of advanced communications services available to their offices in Japan or the U.K. A second big user of leased lines are Indian call centers that respond to customer inquiries coming from the United States and Europe. The growing phenomenon of business process outsourcing (BPO), whereby foreign companies outsource their back-office and other business operations (financial, programming, etc.) to subsidiaries or specialized firms located in India is also driving increased usage of international leased lines.

VSAT Services

VSAT service revenues are growing at about 10 percent annually and could reach nearly \$55 million in FY2003. Prime VSAT applications have been noted above, and the original “pure-play” VSAT operators now offer such services as network management and network security, Internet data centers, and virtual private networks. Hughes Escorts Communications is the largest VSAT operator in India, followed by Comsat Max, Bharti Broadband and HCL Comnet. Some telecom providers like Bharti and Tata now include VSATs as one of the many connectivity solutions for their commercial clients.

Several initiatives have been taken to encourage the growth of VSAT services. The government now allows VSAT service providers to offer bandwidth speeds up to 512 kilobits per second (the limit before was 64kbps). The TRAI has recommended that a data speed of 2 megabits per second be allowed for VSAT subscribers. At the regulator’s suggestion, the license fee for captive VSAT networks has been reduced by 50 percent. Current regulations permit interconnection of VSATs with other networks for receive-only operations, but not with other public telecom networks. This restriction may be lifted, although the closed user group arrangement would still apply. The high cost of satellite bandwidth presently acts as an important constraint.

Internet Services

Revenues for Internet services grew at about 15 percent annually the past three years and are estimated to total approximately \$325 million in FY2003. While nearly 200 licensed firms are providing Internet services, many of them being local operators, the three largest, BSNL, VSNL and Sify control more than half of India’s Internet market. About 95 percent of all subscribers in India access the Internet on a dial-up basis. The smaller ISPs are having a difficult time making profits due to the relatively high domestic and international wholesale bandwidth prices they must pay. Local telephone charges have increased, rather than decreased, so that during the day, the consumer pays around 35 rupees (76 cents) an hour to be connected to the Internet. Broadband access (DSL, cable and fixed wireless) generate nearly double the revenues of dial-up access.

At the end of 2003, the number of Internet subscribers in India surpassed 4 million. Subscriber growth has been disappointing; the Internet Service Providers Association had reported a subscriber base of 3.8 million in September 2002. One major barrier to growth is the small

number of personal computer users in India. While one large ISP has reduced its night-time rate for dial-up access to the Internet by 50 percent, day time rates are on a metered (per minute) basis and discourage customers from spending long periods of time on line. Only a tiny fraction of Internet subscribers (about 60,000) access the Internet via a high bandwidth connection such as DSL or cable. Regulatory policies are unclear regarding ISPs' rights to negotiate fair interconnect arrangements. Procedures for obtaining clearances to set up international gateways are cumbersome and lengthy. The cost of domestic leased lines is very high by world norms, and the price of international bandwidth, despite recent reductions, is still higher in Indian than in many other major markets. Reportedly the cost of a 45 Mb/155Mb link from India to the United States is more than twice as expensive as the cost of a similar circuit from Singapore to the United States. The Indian circuit is 8 to 10 times more expensive than a circuit of the same capacity between China and the United States.⁷⁵

Recently, the TRAI released a consultation paper with the objective of crafting a policy to increase the rate of broadband and Internet penetration in the country.⁷⁶ It noted that India lags dramatically in the number of Internet connections per 100 people; it is only 0.4 for India, compared with 2 in China and 11 in Malaysia. For broadband connectivity the India figure is 0.02. The TRAI indicated it might lower the ceiling on charges ISPs pay for access to the wireline operator's network and may also reduce the maximum charges assessed for international leased bandwidth. Both actions, if taken, would help the stand-alone ISPs.

The TRAI also reported the results of an online survey it conducted that revealed widespread customer dissatisfaction with the present quality of available Internet services. Over 50 percent of BSNL subscribers and 43 percent of MTNL's subscribers said they were dissatisfied with the level of service they received. Seventy-one percent of BSNL's Internet subscribers said they were unable to obtain the maximum speed of 28.8 kbps on their dial-up connection.

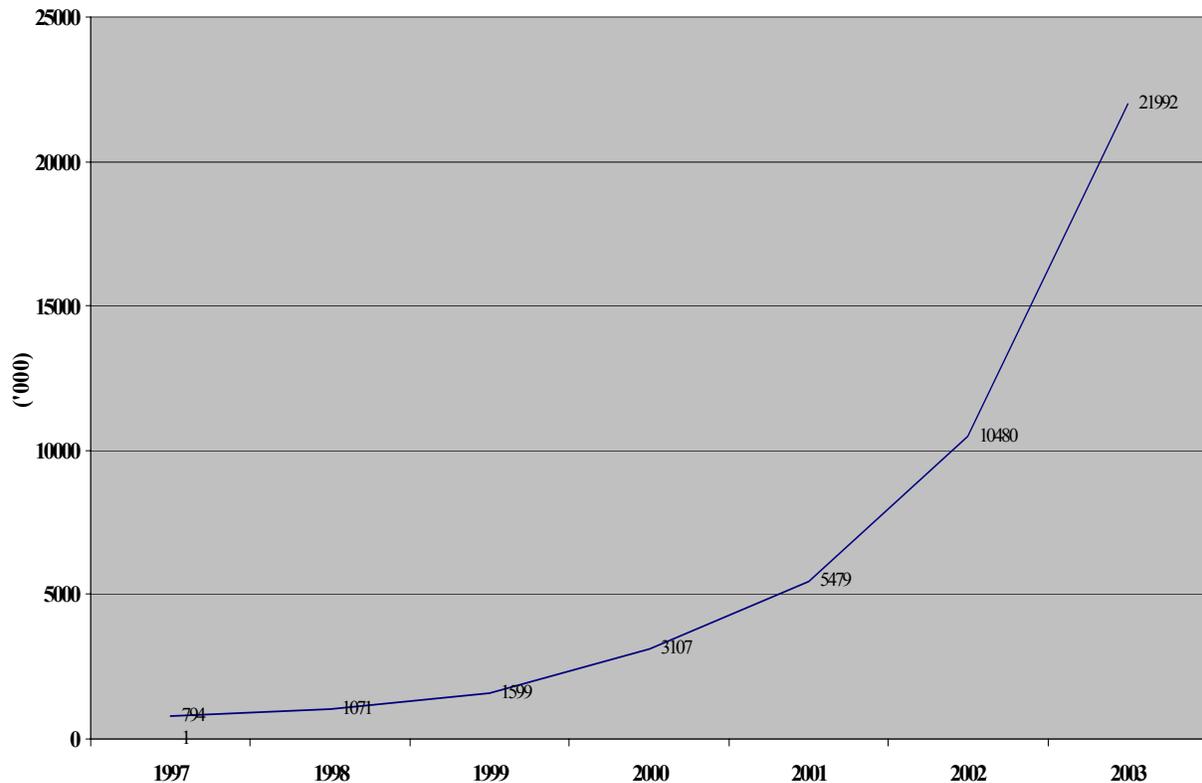
While VSNL, MTNL and the other large telecom operators now are offering an attractively priced Internet access service as one item on their menu of communications services, it is clear that rapid growth in Internet usage and customers awaits significant quality of service improvements and reduction in prices customers pay for their Internet services.

2.4 MARKET DRIVERS AND TRENDS IN INDIA'S TELECOM MARKET

The rapid growth of mobile services is driving the current boom in India's telecom market. Adding one and three-quarter million subscribers a month to a base of 28 million customers makes the Indian mobile market one of the fastest growing in the world. Yet in light of estimates that only one-seventh to one-eighth of the potential market for mobile subscribers has been tapped, continued growth seems assured. Recent regulatory decisions backing limited mobility services and ongoing government objectives to rapidly increase teledensity in the country also bode well for future development of the mobile sector.

⁷⁵ "Section 1377 Comments by CompTel/Ascent Alliance, January 7, 2004, p. 18

⁷⁶ India Telecom News, Dec. 15, 2003

Figure 2-5: Growth of Cellular Subscribers in India

Source: Cellular Operators Association of India

On the corporate side, demand for virtual private network services will increase, driven by India's growing appeal as a center for business process outsourcing (BPO) including call management centers and by the national goal for India to become a leader in the design and export of software. With the further liberalization of India's domestic industries, Indian firms will turn more to advanced telecommunications services as a way to become more efficient and competitive in the globalized economy.

Increased competition and falling prices have contributed to the impressive growth of mobile as well as fixed-line services in India. Mumbai now has seven mobile operators providing services in the commercial capital of the country. The mobile services marketed by Reliance Infocomm and Tata Teleservices have forced GSM operators to lower their tariffs and offer more attractive calling packages. Customers have seen the cost of handsets decline, as well as the costs of local mobile and fixed telephony, and national long distance and international communications services where there are now multiple suppliers.

As in other countries, growth in India's telecom services drives growth in its telecom equipment sector. Thus, the fastest growing segment of telecom equipment in 2002 was mobile handsets. As for carrier, optical cable and digital switching equipment, a small number of telecom operators (viz., BSNL, Bharti, Reliance and Tata) account for most of the sales. The specific

requirements of these carriers vary year to year according to the stage of their network expansion plans. While certain types of equipment (such that supporting VoIP networks) have yet to register impressive sales totals in India, the evolution of India's expanding and increasingly sophisticated telecom infrastructure can be expected to follow the patterns of new technologies and operating efficiencies found in North American and European telecom networks. Indian telecom carriers increasingly have the resources and incentives to build state-of-the-art networks over which they can offer high quality and advanced telecom services to the public.

On the retail side, price is king in India, the most important criteria in the mind of consumers, and to date Indian telecom providers have competed largely on price. Businesses, of course, value quality and functionality, and competition for higher-end consumers of mobile services is now turning to add-on features such as specialized information and entertainment services. For the great majority of Indian consumers, however, lower prices are the key to attracting and retaining subscribers.

Vigorous but limited competition in most sectors of its telecom market is bringing about a consolidation of telecom suppliers in India. This trend toward consolidation is strengthened by three factors. First, the government has adopted a unified licensing system permitting firms to use any (fixed or mobile) technology to offer telecom services. Second, service providers seek a regional, if not a national service "footprint." Finally, as existing licensed firms suddenly face new competitors in their service areas, large firms can expand more rapidly by acquiring smaller firms with existing networks and a customer base. Smaller firms, whose owners lack or do not want to invest the capital required to expand beyond their existing service areas, may find it more attractive or expedient to be bought out at a good price rather than to engage in a costly fight for market share against bigger and better financed competitors. Successful companies like Shyam Telelink, BPL Mobile and Spice Communications may become desirable acquisition targets for firms seeking to expand into new geographical regions of the country or to strengthen their position in key markets. Some observers speculate that, absent further changes in telecom policy, in all likelihood there will be only four major players in India's telecom services market in five years: (a privatized) BSNL/MTNL, Bharti, Reliance, and Tata. These are the firms that currently are building or have built nationwide telecom infrastructures and are offering a complete package of local, long distance and international services so as to be a "one-stop" shopping resource for customers of telecom and information services.

Mobile services were first provided in India through GSM technology. More recently, CDMA technology has been introduced and is playing a vital role in the rollout of limited mobility services. Many observers believe the current trend of "coexistence" and commercial viability of both technologies will continue for many years. Likewise, traditional circuit-switched networks will coexist with newer packet-switched networks based on IP technology. The same trends of convergence (offering voice, data and video services to the user over a high capacity network) are at work in India as they are in elsewhere. In recent years, India has pursued a course of "technological neutrality" in telecommunications and allowed competing and innovative technologies to be introduced in the sector. Both the private and public sector telecom operators are now evaluating and purchasing the most advanced telecom equipment that meets their corporate requirements. India still has a "last mile" connectivity problem, and any technology

that can be deployed economically to improve the quality of the last mile connection should find a ready market in the country.

The Indian Government will continue to play a critical role in the development of the telecom sector for several of the reasons noted above (e.g., stated national goals of increasing teledensity, increasing software exports, maintaining ownership of the largest Indian telecom operator, etc.) Government policies and regulatory actions are likely to have a large impact on current trends and future directions of the telecom industry. There are several areas to watch in the next year or two that bear on the near-term “success” of the industry. Three general issues flagged here are:

- *Effectiveness of the telecom regulator.* Despite (or perhaps because of) frequent personnel changes, rotation of staff between TRAI and BSNL, and legal challenges to its decisions by the government-owned operator, many have viewed the TRAI an ineffective regulator. That opinion is now changing. The government has accepted most of TRAI’s recent recommendations, and the regulator is actively investigating issues like dialing parity and dominant carrier regulations. TRAI’s continued efforts to establish transparent and non-discriminatory procedures and promote a “level playing field” for all telecom participants will have a fundamental impact on the development of effective competition in India. TRAI lacks the authority to issue telecom licenses and that would appear to be a major limitation to its designed role as an independent regulatory body. However, under a unified licensing regime, and with possible future reforms of licensing requirements (minimizing if not eliminating license fee and build-out requirements), obtaining a license could become a routine process not subject to administrative discretion or favoritism.
- *Reducing foreign investment restrictions.* Since August 2002, the Indian Government has been considering raising the current ceiling on foreign investment in the telecom services sector. The latest reports are that the 49 percent limits for cellular and basic services may be raised to 74 percent, but the additional 25 percent would be open to investment by foreign institutional investors. Approvals would be on a case-by-case basis, and management control of the telecom service company would remain in Indian hands. Cabinet approval for this policy was deferred in January 2004 allegedly due to security concerns raised by Indian intelligence agencies.⁷⁷ Whether these conditions will attract substantial new foreign investment remains to be seen, but it certainly will send a positive message to potential investors. Bharti is the one firm that might quickly benefit if the investment cap were raised. Reliance and Tata have not indicated they need or seek additional foreign direct investment, and the question at this point is not relevant for BSNL and MTNL.

It is notable that during the past few years, several foreign firms have sold their equity stakes in Indian telecom firms and exited the market. In the past the government often stated that billions

⁷⁷ “Telecom FDC deferred, courtesy Advani,” [Business Standard](#), January 16, 2004

of dollars of foreign investment would be needed if India were to meet its ambitious teledensity goals on target, but in the past 10 years, only \$2.1 billion in foreign investment has flowed into India's telecom sector. The amount dropped 97 percent in 2003.⁷⁸ The DoT made a study to account for such meager foreign investment totals; it found that frequent changes in policies and the lengthy period between the announcements of policies or decisions and their actual implementation were the primary reasons.

- *How Government views the telecom sector.* In setting out his dream for India's telecom sector, Telecom Secretary Vinod Vaish made the perceptive observation that great progress "can be achieved if the telecom sector is not seen as a source of revenue for the government but as an engine of growth."⁷⁹ The development of telecommunications in India has been slowed in the past by such factors as exorbitant license fees (some bid up by over-enthusiastic private companies to be sure), steep revenue sharing requirements, high tariff rates on imported equipment, and the high cost of capital. The government has attempted to reduce and rationalize the license fee system, reduce the percentage of revenues operators must pay to the government, and is committed to zeroing out import duties on telecom equipment by 2005. There are other steps that would further liberalize India's telecom policy and could help the sector become the vital engine of economic growth that Vaish envisages. Further efforts by the government to reduce up-front financial demands on telecom firms would make telecom enterprises more commercially viable in India and allow the companies to grow their businesses more rapidly and offer services to consumers at the most attractive prices.

⁷⁸ "Foreign Direct Investment in Telecom Sector Drops 97 Percent in 2003," Chennai Business Line, Dec. 3, 2003

⁷⁹ Interview with Vinod Vaish, Voice&Data, July 2003, p. 21

CHAPTER III: THE INFORMATION TECHNOLOGY SECTOR⁸⁰

3.0 THE INDIAN IT SECTOR

The Indian information technology (IT) sector is highly concentrated with 20 companies, including U.S. multinational corporations (MNCs), accounting for about half of its total revenues and controlling over 80 percent of the market.⁸¹ It consists of the hardware industry (computer and networking equipment) and the software and IT services industries (packaged and custom software development, systems integration, consulting and training, and IT-enabled services).⁸²

The sector benefited greatly from the liberalization of the Indian economy beginning in 1991 and the strong support it received from the Government of India (GOI), particularly for the development of Indian software firms. Its fortunes improved dramatically in the late 1990s due to the enormous demand that the Year 2000 problem and the outsourcing boom generated for custom software development and IT services. Indian IT sector revenues rose at a staggering 45 percent annual rate from FY1997 to FY2000, fueled largely by the growth in software and IT services exports.⁸³ Then they dropped to only a 16 percent increase the following year when the domestic IT market stagnated and exports slowed considerably due to the impact of recession in the United States and most of the West on the Indian economy and Indian IT firms' business prospects. The sector fared better in FY2002 with the recovery in Indian IT spending, but its growth was still hampered by continued sluggish economic conditions in key overseas markets, the U.S.-led coalition war in Iraq, the outbreak of Severe Acute Respiratory Syndrome in Asia, and substantial price competition among IT and Business Process Outsourcing (BPO) vendors (Figure 3-1).⁸⁴ India's IT exports are predominantly custom software (49%), BPO services (24%), and IT consulting (19%) since the sector has very little involvement in the export markets for packaged software and IT hardware. By contrast, its domestic shipments go principally to the Indian IT hardware market segment (57%) and, to a much lesser extent, to turnkey projects and packaged and custom software segments.⁸⁵

⁸⁰ The exchange rate used for all data derived from Indian sources in rupees in this chapter is \$1= 45.98Rs.

⁸¹ Interview with Rishi Seth and Prasanto Roy, Chief Editor, Dataquest India, September 16, 2003.

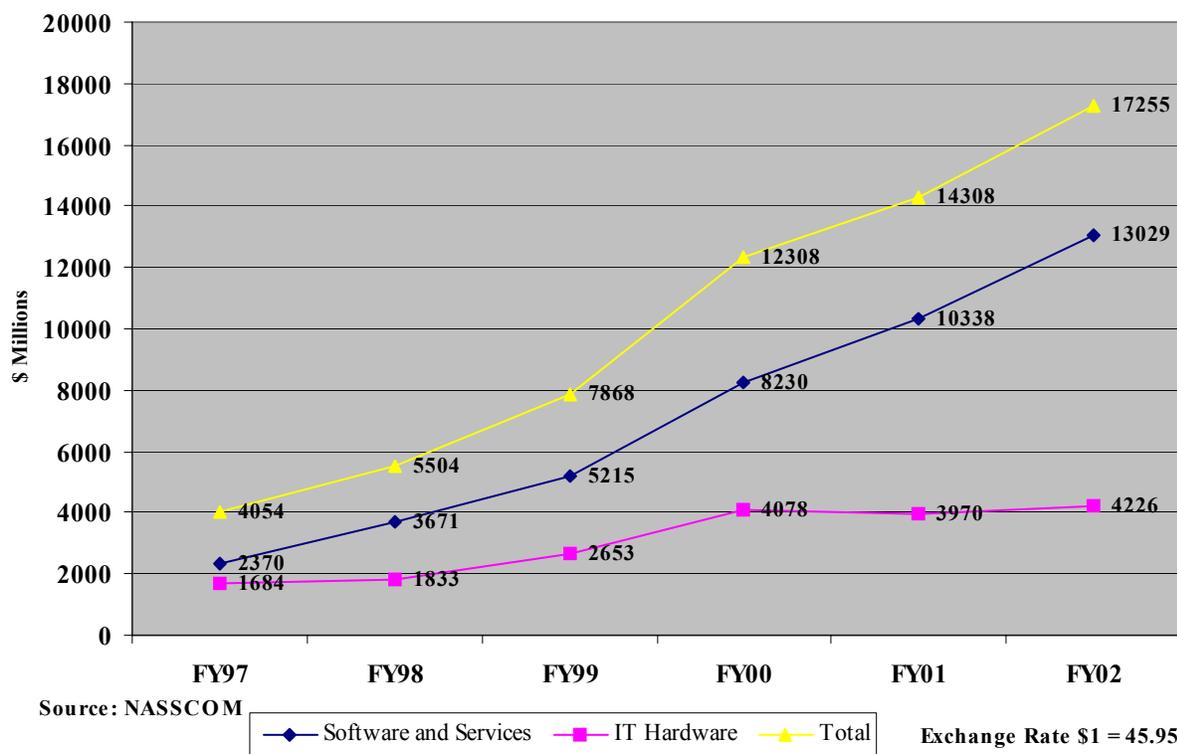
⁸² MAIT and DIT have much broader definitions of IT hardware that include not only computing and networking equipment, but also components, telecommunications equipment, consumer electronics, and industrial electronics.

⁸³ Published statistics tend to be based on the government's fiscal year (April 1 to March 31). FY2003 refers to the period from April 1, 2003 to March 31, 2004. Hence, the latest official statistics are for FY2002 (year ending March 31, 2003). In this report, "2002" refers to the calendar year, not the government's fiscal year.

⁸⁴ Rajeev Narayan, *Year of Cautious Optimism*, Dataquest India, July 15, 2003.

⁸⁵ Dataquest India estimates as of July 15, 2003.

Figure 3-1: Revenues of the Indian IT Sector



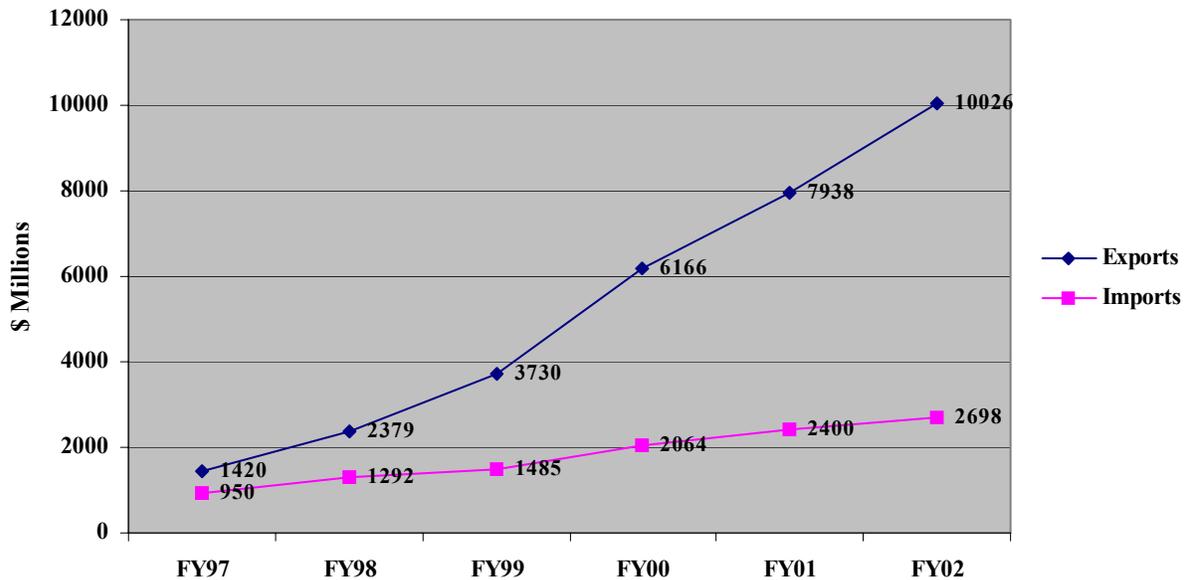
3.1 SOFTWARE AND IT SERVICES: THE STAR PERFORMER

The software and IT services industry has been the star performer in the Indian IT sector. It is largely export-oriented and accounted for 2.8 percent of the global software and IT services market in FY2002, nearly doubling its share in only two years.⁸⁶ According to the National Association of Software and Services Companies (NASSCOM), the industry's exports grew twice as fast as its shipments to domestic customers on the average each year (48% versus 24.5%) from FY1997 to FY2002 (Figure 3-2). The industry provided mainly custom software to its overseas clients during this period, but has stepped up its work in IT-enabled services (ITES) over the past two years and plans to focus more on the higher value markets for software products, embedded software, and technology services (especially animation) in the future. Its method of delivering software to foreign customers shifted from 57 percent of the value being provided onsite (on the customer's premises) in FY1999 to the same percentage being done offshore in India in FY2002. Karnataka, Tamil Nadu, and Maharashtra are the leading exporting states, and the thirty-nine Software Technology Parks located in major high tech centers throughout India accounted for roughly 80 percent of total software export value by the end of this period.⁸⁷

⁸⁶ *It's Time to Build on Lead in IT & BPO Services*, *The Economic Times*, January 29, 2004.

⁸⁷ NASSCOM, May 3, 2003 and the Electronics and Computer Software Export Promotion Council (ESC), November 2, 2003 estimates.

**Figure 3-2: Indian Software and IT Services Industry
Exports vs. Domestic Shipments**



Source: NASSCOM

Most of India's \$7.6 billion software exports in FY2002 went to the United States (68 percent), according to Dataquest India estimates. The industry's recent efforts to wean itself away from this dependence on U.S. clients by expanding its presence in Western Europe and Asia Pacific have not been very successful thus far because of language barriers. Indian software suppliers have targeted banking and financial services, telecommunications, and manufacturing as their major vertical markets in the past and have become increasingly involved in retail, healthcare, utilities, and government services. They have established a strong reputation internationally not only due to lower labor costs (\$5,880 per year for an IT employee versus \$28,000 in Ireland), but also for their highly skilled, English-speaking labor force, high productivity, and high quality products.⁸⁸

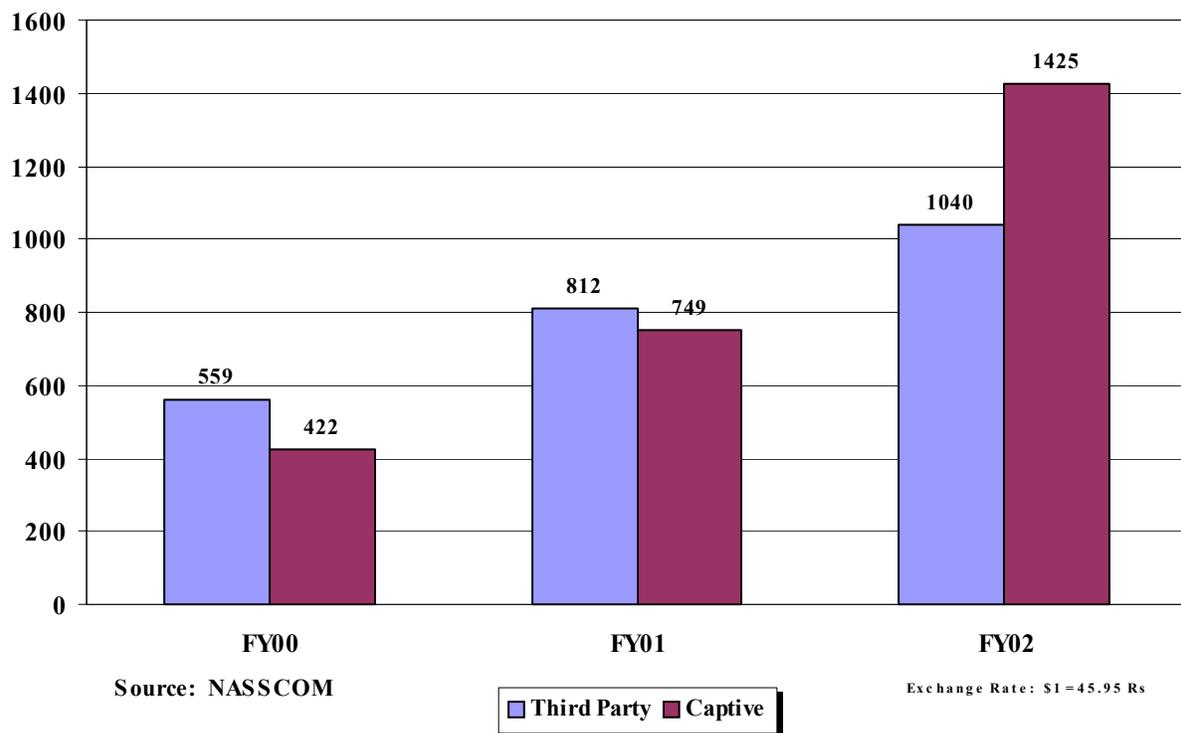
India Has Emerged as the Global Hub for ITES

India has quickly become a global hub for ITES, due to the multitude of U.S. and European companies that have increasingly transferred their IT services, call center operations, and BPO to this nation either by setting up their own subsidiaries there or by outsourcing these processes to Indian services providers. The principal drivers of this outsourcing wave have included cost reduction, productivity gains, and the need for these firms to focus on core competencies in an

⁸⁸ Why "India Inside" Spells Quality, *Dataquest: The Business of Infotech*, November 17, 2003. India has 60 out of the 80 software centers in the world that are assessed at Capability Maturity Model (CMM) Level 5 which is the highest quality performance rating possible. By contrast, China has only two at present.

increasingly competitive world market. According to NASSCOM estimates, the export revenues of Indian ITES suppliers have jumped from only \$522 million in FY1999 to nearly \$2.5 billion in FY2002, a compound annual growth rate of 68 percent and represented a quarter of the Indian software and IT services industry's exports. Most of the growth in FY 2002 was attributable to captive players who doubled their export revenues to \$1.4 billion, or 58 percent of ITES export value (Figure 3-3).

**Figure 3-3: Indian ITES-BPO
Exports by Vendor Type**



India benefits from the fact that its call centers can be operated mainly at night (daytime in the West) and its back-office processing can be performed during the day to meet the needs of U.S. and European customers. NASSCOM has predicted that Indian ITES exports could increase to \$17 billion over the next five years. Much of this business will continue to be customer care, followed in order by human resources, payment services, content development and finance work. However, Indian ITES vendors are expected to become more involved in packaged software implementation, systems integration, engineering, research and development, and network management in the years to come. They also intend to build closer relationships with many of their bigger customers and to globalize their operations. NASSCOM reported that its member companies invested \$350 million cumulatively overseas in 2003, most of it in the United States, and are continuing to search for new foreign acquisitions. Standing in the way of the Indian software and IT services industry's plans to gain a larger share of the world market in the future are IT sectors in Brazil, China, Eastern Europe, the Philippines, Russia, and even

Vietnam that have similar cost advantages and aspirations in software development and outsourcing services. In addition, according to Datamonitor, a shakeout among BPO suppliers in India is expected over the next two to three years that will leave the market dominated by large Indian IT conglomerates, smaller Indian specialists, and Western MNCs.⁸⁹ MNCs have been major contributors to Indian IT exports and employment. They accounted for 22 percent (about \$1.5 billion) of the sector's software and IT services exports and also held a 45 percent share (\$1.1 billion) of Indian ITES exports in FY2002.

Industry Has a Strong Year in FY2003 and Expects a Bright Future

According to estimates published by NASSCOM in January 2004, the industry fared well in FY2003. Its software and IT services exports rose 20 percent to approximately \$12 billion, despite slower economic growth in key overseas markets. ITES-BPO exports grew more than twice as fast as IT services and accounted for 30 percent of this total export value. NASSCOM has projected that Indian software and services exports will increase nearly five times their current level to between \$49 -56 billion in 2008 and expects that this value will be almost equally divided between software and ITES.⁹⁰

3.2 HARDWARE FIRMS REMAIN HOMEBOUND

The Indian IT hardware industry (computer and networking equipment) has mainly served domestic demand and has depended heavily on other Asian countries for imports of motherboards, other key components, and many types of peripherals. Its production has risen at 20 percent annual rate over the past five years to \$4.2 billion, but only 12 percent of this total was exported. The industry has more than 135 small, medium-sized, and large Indian branded manufacturers and MNCs, and several hundred Indian assemblers (smaller, lesser-known regional brand and unbranded computer suppliers) who produce mostly desktop personal computers (PCs). A significant proportion of these unbranded assemblers in the so-called "unorganized sector" represent a "grey market" in India since they reportedly use smuggled parts, have avoided an excise duty of 16 percent on IT products and a variety of state taxes in the past, and bundle pirated software with their PC systems. They are a major force in the industry because they offer PC users systems that are 20-25 percent cheaper than their competitors and, as a result, control anywhere from 50-70 percent of the Indian market, according to different trade association and market research estimates. In an attempt to regain ground lost to Indian branded manufacturers over the past few years, MNCs, such as HP, Lucky Goldstar, and Samsung, began tapping into the market for assembled PCs in FY2002 through partnerships to supply unbranded PC kits and components to local assemblers. Intel is also supporting some of these assemblers now by certifying them through its "Genuine Intel Dealer" program.⁹¹

⁸⁹ *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003; *Indians are Hiring in the U.S.*, ebusinessforum.com, Economist Intelligence Unit, November 20, 2003; *Big Shakeout in Indian BPO Market in 2 Years*, *The Economic Times*, August 31, 2003; and *IT Enabled Services: Little Brother Grows Up*, *Dataquest: The Business of Infotech*, December 1, 2003.

⁹⁰ *NASSCOM Estimates \$12B Software Exports This Year*, NASSCOM, January 2004. A more recent estimate from ESC places this total at \$12.5 billion for FY2003.

⁹¹ U.S. and Foreign Commercial Service India, *Country Commercial Guide 2004*, 2003; interviews with Vinnie Mehta, Executive Director of MAIT, September 15, 2003 and Satinder Juneja, Vice President, HCL Infosystems, September 17, 2003; and Vipin V. Nair, *PC Majors Join 'Assembled' Race*, *The Hindu Business Line*, November 30, 2003.

Counterfeiting is a Major Problem, but is Under Attack

Besides having to compete with “grey market” assemblers who are responsible for an estimated \$87 million loss in tax revenues to the GOI, Indian IT hardware firms have to deal with counterfeiting which includes illegal use of brand names of reputable companies, supply of factory seconds goods as quality products, and improperly declaring technical specifications on packages. Most of this counterfeit trade is in integrated circuits, motherboards, ink cartridges, and computer peripherals. In an effort to combat this problem, several leading IT vendors such as Canon, Epson, HP, Intel and Logitech came together under the aegis of the Manufacturers’ Association for Information Technology (MAIT) in December 2003 to form the IT Anti-Counterfeit Coalition (ITACC). ITACC is a consortium that will work with law enforcement agencies at both national and state levels to stop the spread of counterfeiting and to protect users from being duped by suppliers of counterfeit products. The group’s activities in 2004 will focus on regular training workshops, seminars and interactive sessions to create greater awareness of counterfeiting among judicial and enforcement authorities and lobbying the government to change the existing legal framework and to facilitate regulations that will help anti-counterfeiting operations in India.⁹²

GOI Wants Industry to Become Key Global Player

As noted previously in Chapter 1, the GOI wants to make India a key player like China and other major Asian countries in the world IT hardware market. It has begun to chart a long-term strategy for the development and promotion of the Indian industry in a draft paper on National Electronics/IT Hardware Manufacturing Policy that is currently under consideration. On the supply side, it wants to reduce the industry’s dependence on imports, boost India’s research and development capabilities, establish a viable domestic semiconductor production base, and encourage the relocation of IT hardware manufacturing plants to India and more Electronic Manufacturing Services (EMS) providers to set up operations there.⁹³ The GOI also realizes that it must bring tariffs on inputs and capital goods down to zero and address India’s infrastructure bottlenecks and the burden that the existing tax structure places on Indian suppliers if the industry is to thrive. It took a step in the right direction by joining the Information Technology Agreement (ITA) and agreeing to remove customs duties on all IT products by 2005, an action that should help to reduce the influence of “grey market” assemblers. On the demand side, the GOI and state governments are working to increase IT and Internet use in India and, thus, the domestic market through e-governance projects and support for computer literacy in elementary and secondary schools. The GOI has already spent between \$200 million to \$300 million on more than 1,000 pilot projects, according to Frost & Sullivan’s estimates, and has a \$2.7 billion e-governance action plan for 2003-07.⁹⁴

⁹² MAIT Concerned at the Growing Counterfeiting Trade In IT Hardware, MAIT Press Release, October 11, 2003 and MAIT, HP, and Intel in Anti-Counterfeit Coalition, Cyber India Online, December 15, 2003.

⁹³ Despite the high tariff barriers, Indian IT hardware manufacturers, assemblers, and MNCs source most of their requirements for components and peripherals from China, Malaysia, Taiwan, Singapore, and South Korea. They also import high performance and notebook computers to satisfy the bulk of Indian demand for these systems.

⁹⁴ Sujit John, Premji, *Calls for Focus on Hardware*, The Times of India, August 22, 2003; *It’s High Time India Focuses on Hardware*, The Economic Times, November 6, 2003; *Poll-eve Concessions Set to Give Major Boost to IT Sector*, The Economic Times, January 5, 2004.

The goals set for the industry are very ambitious. MAIT's projections call for the Indian IT hardware industry to expand its production to \$69 billion and exports to \$25 billion by 2010. The association and NASSCOM urged the GOI in 2003 to lower the excise tax on domestically produced PCs priced less than \$325 and provide exemptions from the 15% basic customs duty, the 16% countervailing duty, and the 4% special additional duty (SAD) on imported ones with a \$215 price tag to make PCs more affordable to the masses and to help the organized industry compete more effectively with "grey market" assemblers. They also recommended that the government provide incentives, such as income tax breaks for individuals who purchase PCs and 100 percent depreciation on IT products in the corporate sector, to help spur demand in India. In January 2004, the GOI responded to these requests by announcing that it would reduce the customs duty from 15 to 10 percent on some computer products, including desktop and laptop PCs, make cuts in the excise taxes (to 8 percent on PCs and zero on storage devices), and remove the SAD. These cuts lowered the effective duty rate on computer systems from 38.7 percent to 18.8 percent. As of this writing, Indian PC vendors expected that prices on their systems would drop 10-12 percent and that these cuts might boost sales 35-40 percent in FY2003 and by another million units in FY2004.⁹⁵

3.3 THE INDIAN IT MARKET: HARDWARE

India has the fifth largest IT market in the Asia Pacific region and is expected to grow even faster than China over the next five years, according to International Data Corporation (IDC) (Figure 3-4). IT demand reached \$4.7 billion in 2002 with hardware (computer and networking equipment) accounting for 62 percent of this total, IT services (including custom software) for another 28 percent, and packaged software for the remaining 10 percent. NASSCOM's estimate places the market at much higher figure—\$6.2 billion in FY2002—but also notes India's strong hardware orientation. The major end-user segments in India were IT/Telecom (due to the substantial investment made in telecommunications infrastructure and growth of call centers and BPO over the past several years); banking, financial services, and insurance (BFSI); manufacturing industries (chemicals to food processing); and government. Large corporations were responsible for more than half of Indian IT spending, but demand has reportedly been increasing at a rapid pace among small and medium-sized enterprises (SMEs). IDC expects that India's IT market will help to drive overall regional recovery during 2004 and will expand at a 19.4 percent annual rate to \$13.7 billion by 2008 led by hardware purchases. Key demand drivers will be growth in the Internet, e-commerce, and e-government.

PC Penetration Low Now, but Market Promising in Future

At less than 1 percent of the population, PC penetration in India is the lowest in the Asia Pacific region, well behind the leading developed nations, such as South Korea, Australia, and Singapore, and roughly on par with Indonesia and Vietnam, according to International Telecommunications Union (ITU) statistics (Figure 3-5). The high cost of these systems has been a

⁹⁵ MAIT Hopes for Positive Government Response, *The Economic Times*, December 11, 2003, *Poll-eve Concessions Set to Give Major Boost to IT Sector*, *The Economic Times*, January 5, 2004, *PCs for All, That's the Idea*, *The Economic Times*, January 9, 2004; *Hardware Sector to Grow at 30PC*, *The Hindu Business Line*, January 13, 2004; *Govt Cuts Excise Duty to Nil on Microprocessor, Storage Device*, *The Economic Times*, January 18, 2004. IT hardware products are also subject to domestic taxes which vary from one state to another and range from 20 to as high as 45 percent.

Figure 3-4: Asia/Pacific IT Spending by Major Country

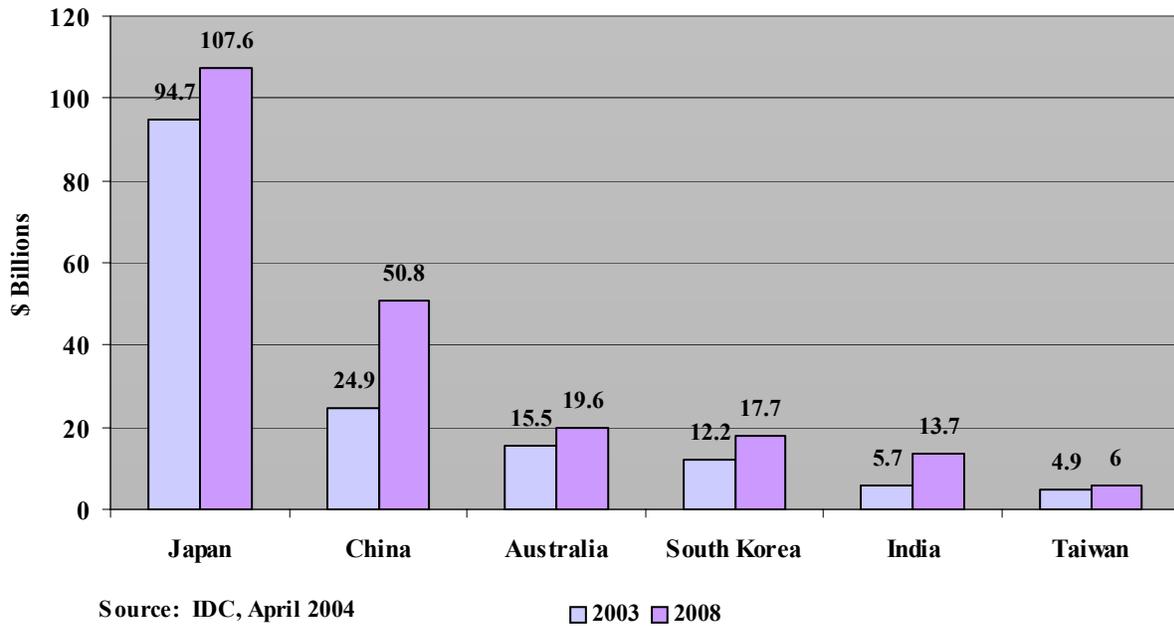
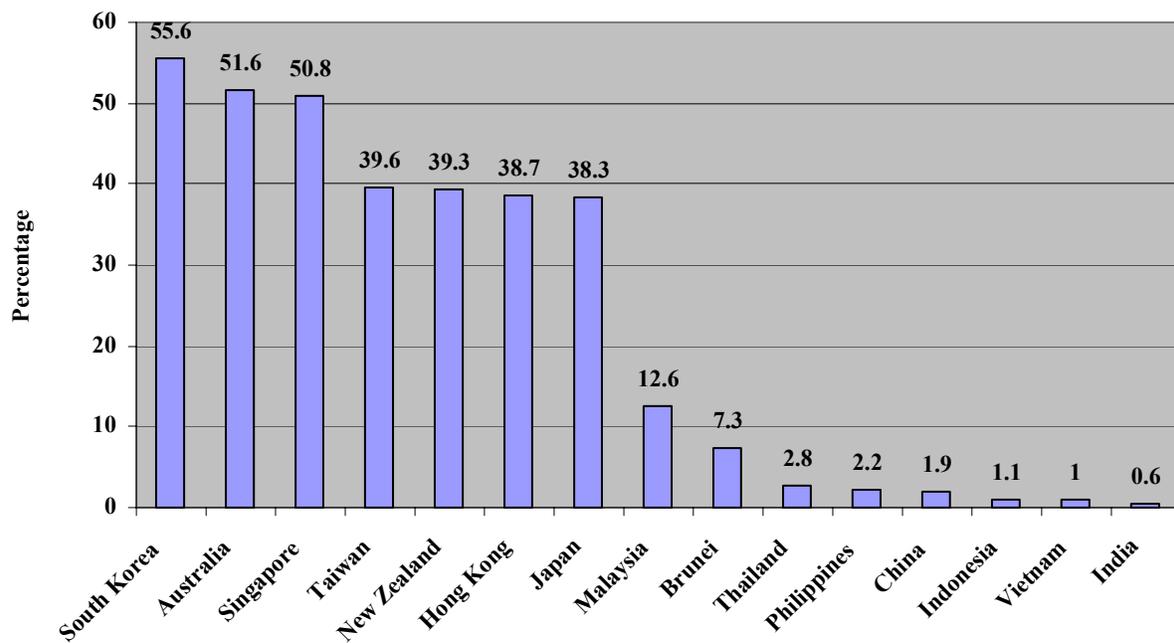


Figure 3-5: PC Penetration Rate in Asia/Pacific 2002



major factor in restricting their use to an installed base of only 6-7 million units in 2002, mainly in large corporations and wealthy households (where penetration is between 10-15 percent).

PCs have until recently been 42 percent more expensive in India than in China and 32 percent above the global average unit price. As previously noted, high import duties and national and state taxes imposed on computer equipment were the major culprit, accounting for more than a third of a PC's market price. The large number of poor and illiterate people in India has been a problem as well. A PC for the average Indian costs around 24 months of per capita income versus only 4 months in China. However, the future of this market may be more promising than it appears. Indian branded manufacturers and MNC suppliers have cut prices on PCs significantly over the past year to the extent that many entry-level desktops are available for \$435 and notebooks sell for below \$1,100. These suppliers are also working to drive these prices even lower to boost small business and consumer sales. Other positive developments are the growing interest in PCs within India's sizeable and increasingly more affluent middle class and the ongoing push in both private and public sector enterprises to computerize their operations.⁹⁶ MAIT expects that annual PC sales in India could reach 22 million units by 2010, or almost ten times the number sold in this market today.

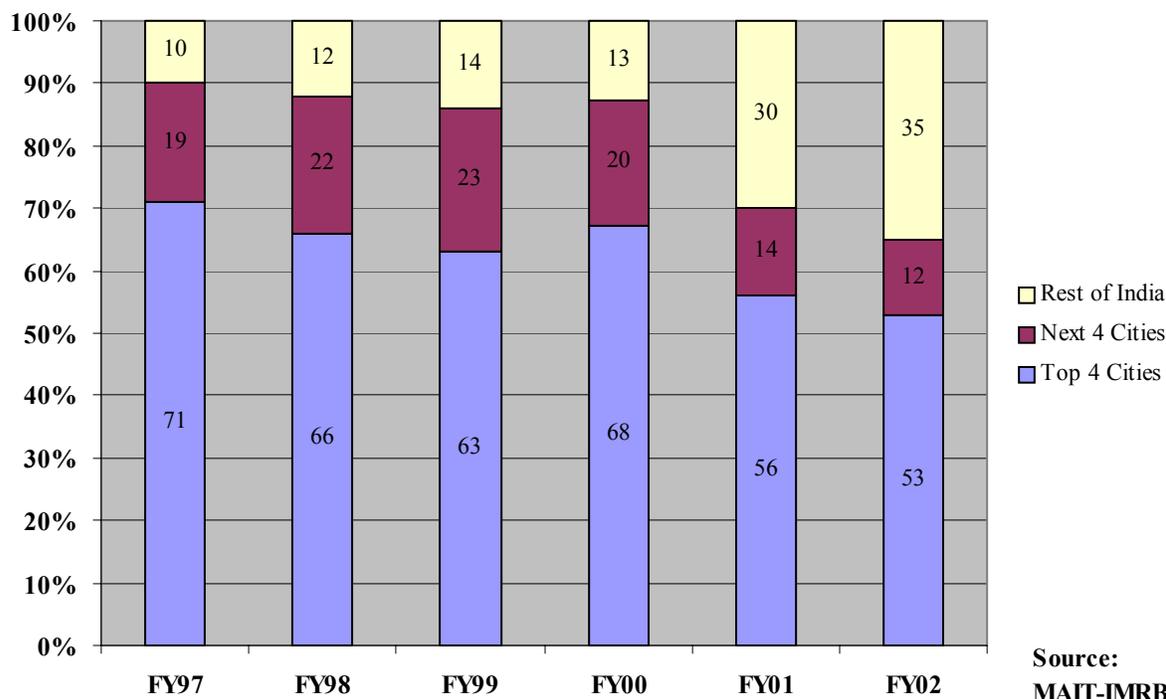
PC Sales Begin Turnaround in FY2002; Grow Strongly the Following Year

After struggling through a downturn in the IT Indian market during FY2001, Indian PC sales picked up the following year, sparked by stronger demand for commercial desktops from traditional key vertical markets, such as IT/Telecom and banking, and the major e-government and digital divide initiatives of the central and state governments. Volume shipments in FY2002 rose 37 percent to 2.3 million units valued at nearly \$1.4 billion, according to data from IMRB International, an Indian market research firm that conducts MAIT's annual IT Performance Review (referred to as "MAIT-IMRB" throughout this text). Desktops accounted for the bulk of these units, but notebooks grew more than twice as fast, albeit off of a much lower base. The business user segment dominated the market with 81 percent of PCs sold and the consumer segment held the remaining 19 percent. In the business segment, the larger companies (over 50 employees) bought more than half of these PCs as demand for replacement systems emerged. In the consumer segment, sales were stimulated not only by substantial price discounting by vendors, but also promotional programs and attractive financing schemes. PC demand, traditionally concentrated in the top 4 metro areas (New Delhi, Chennai, Kolkata, and Mumbai) and the upper class, continued its shift toward the urban population in Class B cities (Bangalore, Hyderabad, Ahmedabad, and Pune) and other smaller cities and towns (Figure 3-6).

The stronger Indian economy has improved corporate profits and, as a result, increased IT hardware budgets in 2003. IDC estimates that spending on PCs (desktops, notebooks, and PC servers) will rise 18 percent to over \$2 billion from \$1.7 billion in the previous calendar year. In addition, MAIT-IMRB has revised its PC sales estimate for FY2003 upward from 2.7 million to 3 million units. Much of this growth is due to e-governance projects and large corporate

⁹⁶ *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003; *Desktop Linux Gains Ground*, *Express Computer India*, May 12, 2003; *Revisiting the Low-Cost PC Market*, *Express Computer India*, May 19, 2003; and interview with Bhupendra Mathur, Senior Vice President and Country Manager, Indian Market Research Bureau (IMRB) International, September 15, 2003.

Figure 3-6: Distribution of PC Unit Sales in India



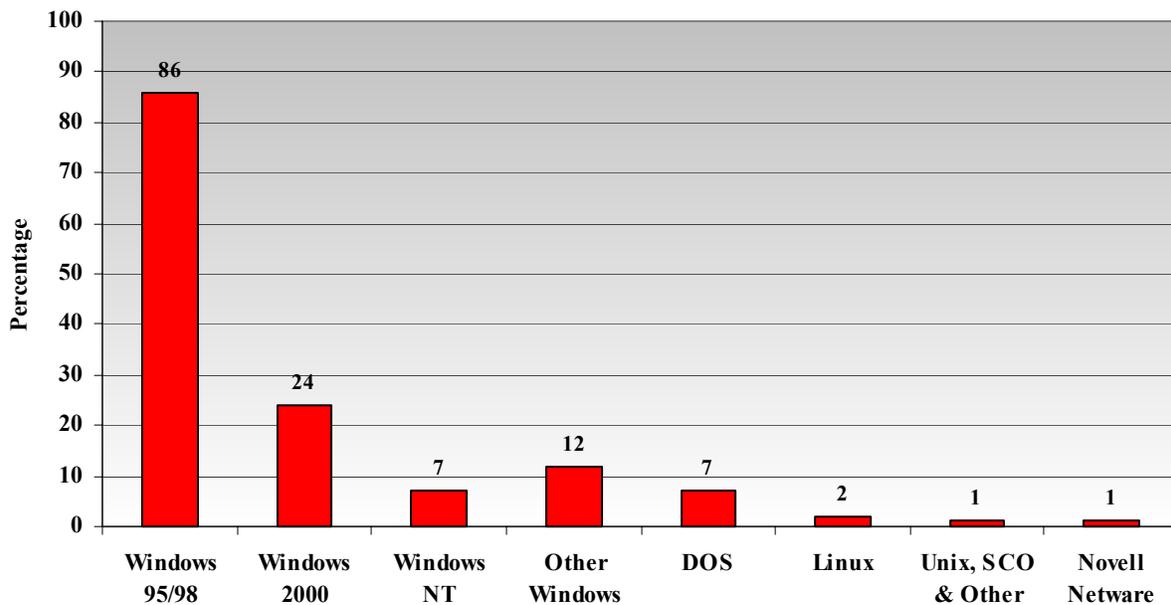
purchases, particularly from the telecom, banking and financial services, IT-enabled services, and manufacturing user segments of the market. Demand from business users, especially large and medium-sized enterprises (between 10 and 50 employees) and home offices, has gained strength, driven by the need to cut costs and improve operational efficiency. In the home user segment that is comprised mostly of first time buyers, purchases from users in the burgeoning middle class have increased significantly as prices have continued to fall. Middle class families have begun buying desktops for their children because a growing number of schools are requiring that their students have access to them for their studies. PCs are used in 80 percent of private schools and in 60-70 percent of the better public schools (but not widely overall in India's public primary and secondary education system), according to Wipro Technologies, a leading Indian IT supplier. However, PC sales to the education user segment should gain momentum in the future from the government's efforts to computerize all Indian schools. PC distribution in India has broadened as evidenced by the growing number of retail chains and outlets in supermarkets, shopping malls, and multiplexes in urban centers. HP, for example, opened its 700th retail store in April 2003 and intends to expand its outlets to 1,000 by year-end. Indian PC stores generally cater to the home and small office/home office (SOHO) user segments and gain a high proportion of their revenues from sales of desktops.⁹⁷

⁹⁷ India: PC Market Outlook 2003, Research Brief, Gartner Dataquest, April 3, 2003; *Indian IT Goes Retail*, Cyber India Online, June 13, 2003; Interview with Shuraj Shirsat, Marketing Manager, Wipro Technologies, September 18, 2003; *Indian PC Shipments up 22% in Q3*, The Economic Times, November 6, 2003; and *PC Sales to Touch 3 Million Units in Fiscal 2003-04*, MAIT Press Release, January 6, 2004.

WINTEL Dominates the Indian PC Market

The Indian desktop PC market is dominated by Intel-based systems currently, especially those using the P4 and PIII microprocessors. However, PCs using cheaper AMD and Cyrix chips have made some headway, garnering about 13 percent of sales. In terms of operating systems, Microsoft's Windows-based systems account for the bulk of PC sales. Most of these PCs use Windows 95/98 (**Figure 3-7**).⁹⁸

**Figure 3-7: Indian Desktop PC Installed Base in FY 2002
by Operating System**



Source: MAIT-IMRB

Second-hand PCs Becoming an Alternative for Price-Conscious Users

More than 75 Indian vendors operating in different regions of India are targeting second-hand PCs (either used or refurbished) as a good alternative to the more costly assembled and branded systems at price-conscious buyers who do not need PCs for anything much beyond Internet access and word processing. They benefit from the 20 percent of PCs in good working order (or 600,000 units) within India's private sector that are available each year from business organizations in verticals, such as IT/telecom, banking and finance, or discarded as scrap. The market for their \$110-\$300 desktop systems is reportedly worth over \$65 million and consists of an enormous number of potential users in homes and educational institutions in upcountry cities and towns and rural areas. However, the ability of foreign IT companies to serve this market

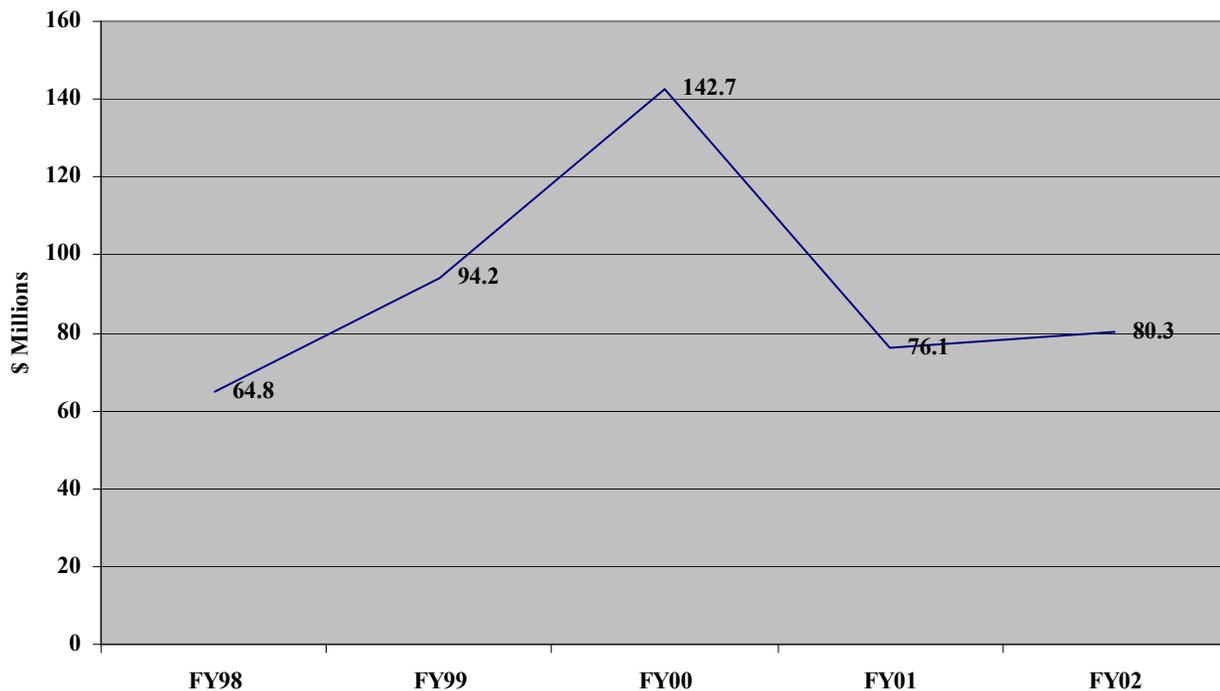
⁹⁸ Annual PC Sales Grow 37%; Touch 2.3 Million Units, *IMRB International Press Release*, July 11, 2003.

through imports has been restricted by the GOI which regards their sale as “dumping” and feels that they would destroy India’s IT hardware industry. Trade associations, such as the Confederation of Indian Industries and MAIT are also in favor of the embargo because they are afraid that foreign second-hand PCs will destabilize the market for Indian and MNC vendors of new systems and may create a substantial volume of electronic waste. They argue that PC penetration can be improved by producing low-cost information devices (e.g., the Simputer) in India and by the lifting of the 16 percent countervailing duties on suppliers for two years so that Indian manufacturers can build volume shipments. Foreign companies that would like to market second-hand PCs want the embargo lifted, but would still face high duties until the ITA is implemented in 2005 since Indian Customs officials would appraise their systems on their original market value.⁹⁹

Notebook Market is Less Developed than Desktop, but Sales Surging Now

Demand for notebooks in India is only a small fraction of the one for desktops. The market has gone through the same changes though, experiencing a major slump in shipment value and units in FY 2001 and then recovering during the following year as the Indian economy and business

Figure 3-8: Domestic Notebook Shipments in India



Source: MAIT-IMRB

⁹⁹ *Are Second-Hand PCs the Answer for India?*, *Express Computer India*, June 14 2001; *Second-Hand PCs to Rake in Rs 300cr*, *Cyber India Online*, September 4, 2003; and *Personal Computers: The Second Coming*, *Dataquest: The Business of Infotech*, November 11, 2003.

spending picked up. Notebook PC sales rose at an average 12 percent annual rate from FY 1997 to nearly 51,000 units in FY 2002, but their value reached only \$80 million because of severe price competition among vendors (Figure 3-8). The majority of these purchases was concentrated in the top 4 metro areas and went to larger businesses and to government agencies. Corporate demand for these systems was driven by the decision to replace and upgrade some desktops with notebooks and by the need to provide portable computing to middle management. Spending in the education user segment, mainly in management institutes, was at a much lower level, but reportedly increased at a more rapid pace than in the commercial space. The home market in India has not really opened up yet due to the high cost of ownership of notebooks versus desktops. Notebook sales are expected to surge in FY2003. IDC projects that shipments will jump 72 percent over the previous year's level to approximately 84,000 units as prices continue to fall significantly (entry level models are now available under \$1,100). Demand will again come largely from the business and government user segments. In particular, SME and SOHO adoption of these systems should accelerate since the growth and penetration of the India's telecommunications infrastructure will make connectivity less of an issue than it was in the past.¹⁰⁰

Smart Handhelds at Nascent Stage

The Smart Handheld Device (SHD) market includes a range of pen-based and keypad-based Personal Digital Assistants (PDAs) and "converged" mobile phones. PDAs are sold in India by Casio, Palm, Microsoft, Sharp, and Toshiba, and "converged" mobiles by Nokia, Ericsson, and Motorola. Demand for these devices is just beginning to grow in the services (finance and insurance) and manufacturing (pharmaceutical companies) sectors, particularly for sales force automation. In the public sector, they are being purchased by government agencies for e-governance projects across the country in applications such as data collection, electric meter reading, and bill preparation and issuance. Use of an Indian-designed, Linux-based product called the Simputer has also spread to businesses, such as a leading mining group, to adult education and colleges, and into small towns. IDC estimates that the Indian Smart Handheld Device market (excluding "grey" imports) reached 20,000 units valued at \$5.2 million in 2002. The market research firm predicts that SHD sales will more than quadruple to \$24.2 million in 2003.¹⁰¹

Indian Server Market is One of the Fastest Growing in Asia

India was the top server market among Association of South East Asian Nations (ASEAN) countries in 2002, according to IDC estimates. Data from MAIT-IMRB also shows that shipments of these systems rebounded 11 percent over the previous year's depressed level to

¹⁰⁰ *Annual PC Sales Grow 37%; Touch 2.3 Million Units*, IMRB International Press Release, July 11, 2003; *PC Market Registers a Modest 11.7% growth*: IDC, *Express Computer India*, July 14, 2003; *Easy Finance Props Up PC sales by 26% in July-Sept*, *The Economic Times Online*, November 18, 2003; *Lapping Up the Notebook Market*, *Cyber India Online*, November 21, 2003; *IBM India Corners 31.1% Laptop Market*, *The Economic Times*, March 3, 2004.

¹⁰¹ *Handheld Computing—A New Mantra on the Horizon?*, IDC India Press Release, April 3, 2003; Interview with Mark Mathias, Vice President of Mobile Computing Products, and S. Mohan, Chief Financial Officer, Encore Software, September 19, 2003; *iPaq Exits Indian Market*, *Cyber India Online*, December 6, 2003, and *India Inc. Takes to Low-Cost Computing*, *Express Computer*, January 12, 2004.

56,544 units valued at \$200 million in FY 2002. Slightly less than half of these units went to larger businesses, but shipments to medium-sized enterprises grew much faster at a 36 percent annual rate. The banking, financial services, and insurance user segments were the leading purchasers of servers. Sales of these systems were sparked by the efforts of Public Sector Unit (PSU) banks (State Bank of India, Punjab National Bank and Canara Bank) to establish their centralized, core-banking infrastructure to compete more effectively with newer private sector banks and to satisfy their customers' growing demand for value-added services (e.g., credit card authorization, cash and wealth management, ATM switching, and online banking). Another source of large orders was the telecommunications sector. Major mobile telecom services providers, such as Reliance Infocomm, Tata Teleservices, and Bharti Cellular, bought Reduced Instruction Set Computing (RISC)/Unix-based servers for deploying business support systems applications (i.e., billing, mediation, and fraud management) and operations support systems applications (i.e., network management and control and call switching). The manufacturing and distribution user segments were also important factors in the revival of server sales in India. Most of the purchases in FY 2002 were concentrated in the top 4 metros.¹⁰²

IDC expects that the Indian server market will be one of the fastest growing in the Asia Pacific region with shipments increasing at a 7.3 percent average annual rate from 2003 to \$528 million in 2008. Server sales will continue to be skewed toward entry-level and midrange systems and driven once again by demand from the banking, financial services, insurance, and telecommunications user segments. Purchases from education and research organizations should also increase due to the U.S. Government's efforts to highlight the limited impact export controls have on high technology products.

Computer Peripherals Emerge from Recession

The Indian computer peripherals market rose 9 percent to \$664 million in FY2002, after seeing a drop off in both value and unit shipments in monitors, printers, and storage due to the IT spending downturn during the previous year, according to estimates from MAIT-IMRB and Dataquest India.¹⁰³ As in other countries, peripherals sales in India are closely tied to the vicissitudes of the PC business and benefited in FY2002 from the recovery in spending on these systems in education and the commercial sector, notably the banking and financial services, insurance, telecommunications, manufacturing, retail, and IT-enabled services industries. Foreign suppliers have a strong position in this market, controlling roughly 70 percent of the units shipped. U.S. manufacturers dominate printer and storage sales while Asian firms hold sway in monitors and keyboards. IDC projects that spending on computer peripherals in India will grow at a 14.7 percent average annual rate from 2003 to \$1.3 billion in 2008, or nearly twice their current level.¹⁰⁴

¹⁰² *Annual PC Sales Grow 37%; Touch 2.3 Million Units*, IMRB International Press Release, July 11, 2003 and *Servers and Workstations: Back in Business*, DQ Top 20, Dataquest India, July 15, 2003.

¹⁰³ The Indian computer peripheral market consists largely of printers, monitors, keyboards, storage devices, and uninterruptible power supplies (UPS). It also includes other products such as web cameras (webcams), mice, and scanners. Suppliers bundle peripherals with systems and sell products, such as hard disk drives and monitors, into what has become a substantial after-market.

¹⁰⁴ *Peripherals Moving Along, but at Snail's Pace*, DQ Top 20, Dataquest India, July 15, 2003 and U.S. and Foreign Commercial Service India, *Computer Peripherals*, Industry Sector Analysis, September 25, 2003.

Demand for monitors took off in FY2002 with volumes jumping 40 percent to 2.4 million units valued at \$228 million. Steep price declines were the principal factor behind this surge in spending and the shift that is now underway in the market from cathode ray tube (CRT) models to liquid crystal display (LCD) monitors. Because they are more energy-efficient, take up less space, and have had their prices cut in half over the past year, LCD monitors have become more attractive and affordable to corporate purchasers in several key industry sectors and to high-income home users. However, CRT monitors remain the mainstay product for most Indian commercial and individual buyers since their upfront cost is still lower.¹⁰⁵

The Indian printer market also recovered well. Unit sales increased an impressive 33 percent to 1.1 million in FY2002, but value rose only 8 percent to \$219 million, battered by the same severe competition raging in other major peripheral products. Most of the unit growth was due to inkjet printers, which accounted for more than half (686,600 units) of the market. These printers are quickly becoming consumer commodities, given the fact their prices have dropped to under \$60 for entry-level models. Impact printer (mainly dot matrix) sales were relatively flat at \$94 million and unit shipments declined by 4 percent to 325,500. The slow down was attributable to lackluster demand among SMEs and home users. Laser printers recorded the highest unit growth (55 percent to 130,900) though, bolstered by sales to large enterprises and SMEs who took advantage of the aggressive pricing of many leading vendors.¹⁰⁶

Disk storage demand in India rose 6 percent to \$140 million during FY 2002 due to a free fall in hardware prices and the increasingly larger amounts of digital data generated by existing and new applications (e.g., digital content creation, e-mail, and database and online applications such as enterprise resource management (ERP), supply chain management (SCM), customer relationship management (CRM), and e-procurement) within the core user segments of banking and financial services, telecommunications, BPO, and government. It was also driven by a growing number of Indian enterprises that needed to implement sound disaster recovery (DR) and business continuity planning (BCP) in the wake of the terrorist attack on the United States on September 11, 2001 and the Gujarat earthquake in January 2002 and, thus, allocated monies to buy disk storage systems for these purposes. Direct access storage (DAS) devices continued to dominate the Indian storage market with a 65 percent share of unit shipments. However, the demand for networked storage (NS) solutions, such as Storage Area Networks (SAN) and Network Attached Storage (NAS), grew more rapidly and is expected to match that for DAS by 2005, according to IDC. SMEs bought practically all of the DAS devices, attracted by the availability of even higher capacity, entry-level drives, and became the focus of most disk drive vendors' marketing efforts. Large and medium enterprises (LMEs) favored networked storage for storage consolidation and backup, and some began to experiment with storage virtualization and disk-to-disk replication for faster data recovery.¹⁰⁷

¹⁰⁵ *LCD Monitors: Dropping Prices Propel Demand*, DQ Top 20, Dataquest India, July 15, 2003 and U.S. and Foreign Commercial Service India, *Computer Peripherals, Industry Sector Analysis*, September 25, 2003.

¹⁰⁶ *Annual PC Sales Grow 37%; Touch 2.3 Million Units*, IMRB International Press Release, July 11, 2003 and *Peripherals Moving Along, but at Snail's Pace*, DQ Top 20, Dataquest India, July 15, 2003.

¹⁰⁷ *Storage: The Land Where It's All About Data*, DQ Top 20, Dataquest India, July 15, 2003.

Keyboards are mainly imported from Asian countries such as China, Malaysia, and Thailand since local manufacture of these peripherals is very limited. Shipments of these devices increased by 40 percent to 2.4 million units in FY2002, closely tied to new PC sales and augmented by the need for replacements. Since home PC penetration remains low, most of the demand for keyboards has come from Indian businesses and government agencies.¹⁰⁸

Networking Equipment Stagnant in FY2002, but Poised to Grow

The Indian networking equipment market also suffered from the downturn in IT spending over the past few years and was slower in recovering than other IT markets. Although overall demand rose only 1 percent to \$490 million in FY2002, according to Dataquest India, the second half of the year brought a pick up in spending by traditional customers and resulted in healthy growth for vendors selling routers and local area network (LAN) switches. Bank automation projects, the massive telecommunications network upgrades and expansions of telecom services providers, the dozens of call centers established by a rapidly expanding BPO industry and, finally, the Wide Area Network (WAN) projects of the state governments of Andhra Pradesh and Gujarat and the National Highway Authority all generated substantial orders and stabilized this market. LMEs led the resurgence in demand as new applications like voice over Internet protocol (VOIP) and ERP forced them to upgrade their networks and to replace small switches with large enterprise-class ones. SMEs, especially those in 'B' and 'C' class cities, opted for hubs and low-end switches.¹⁰⁹

Growing interest in high-speed wireless fidelity (WiFi) Internet access along with the GOI's decision to deregulate indoor use of Wireless Local Area Network (WLAN) equipment based on the 802.11b standard have expanded the deployment of wireless networks across India. According to Voice&Data estimates, the WLAN equipment market, including access points and PCMCIA cards, reached \$2.6 million in 2002. The principal users of WLANs thus far have been MNCs, software exporters, banks (HDFC Bank and Punjab National Bank), some manufacturers (Asian Paints and Imperial Tobacco Company), premier educational institutions, first-class hotels, airports, and cybercafes. While Indian demand remains relatively small and underdeveloped compared to other Asia Pacific countries, the WLAN market there is expected to increase at an average annual rate of 35 percent from 2003 onwards now that WLAN equipment has become more affordable and WLANs more secure. In general, wireless networks in India are moving out of enterprises into public hotspots and should be in homes in the near future. The Gartner Group estimates that India will have 70 million users of public hotspots alone by 2007.¹¹⁰

Recent research from IDC indicates that the Indian LAN equipment market has emerged as one of the strongest in the Asia Pacific region. The market is expected to increase 26.7 percent in revenue over the next five years to nearly \$1.3 billion in 2008, provided the deployment of

¹⁰⁸ U.S. and Foreign Commercial Service India, *Computer Peripherals, Industry Sector Analysis*, September 25, 2003.

¹⁰⁹ *Networking: Home...By a Whisker, DQ Top 20*, Dataquest India, July 15, 2003.

¹¹⁰ *Networking: Home...By a Whisker, DQ Top 20*, Dataquest India, July 15, 2003, and *Wireless Networks Mushroom Across India and Networking Moves to the Next Level, Express Computer*, December 29, 2003.

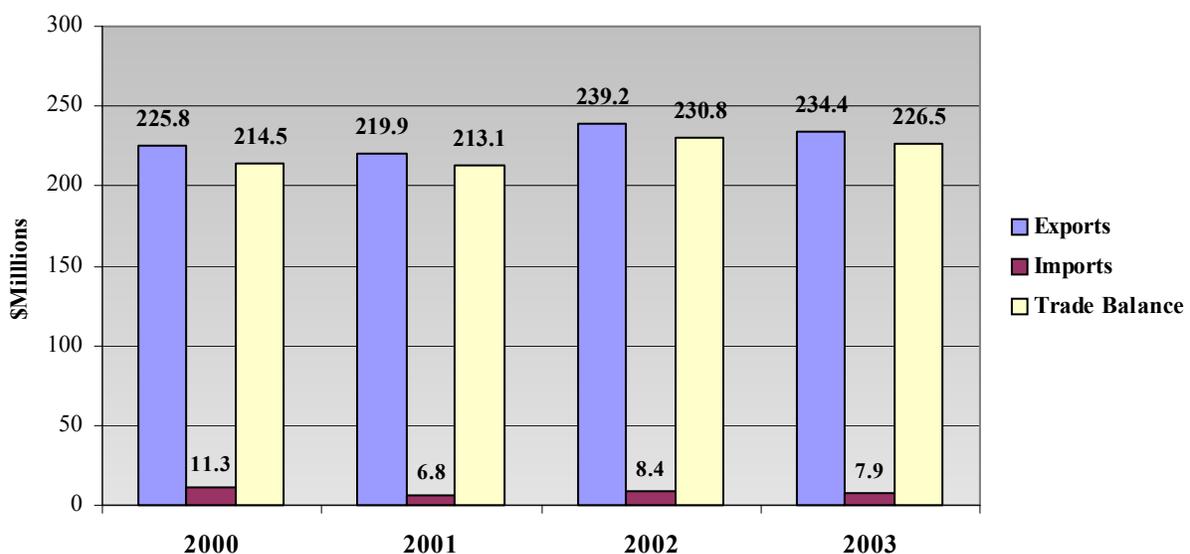
wireless and broadband technologies occurs as expected. Purchases of routers and switches should be fueled by a greater number of Indian enterprises establishing new networks and looking to move from data-only networks to networks optimized for voice, video and data. However, the demand for hubs should continue to wane as cheaper unmanaged and low-end switches replace these devices. Sales of network interface cards should also fall because they are currently being integrated into motherboards. While BFSI, the BPO industry, and telecom should remain the major end-user segments, the manufacturing and healthcare verticals should increase their spending on switches and the public sector, particularly state governments involved in e-governance projects, should boost purchases of routers.¹¹¹

U.S. firms are well entrenched in the Indian networking equipment market. According to Voice&Data estimates, they control over 73 percent of the LAN switches and 87 percent of the routers sold. Other key foreign players are Nortel of Canada and D-Link of Taiwan.

U.S. Computer Exports Fall in 2003

India is one of the few Asian nations with which the United States actually increased its computer equipment exports during the global downturn in IT spending from 2001 to 2002. However, the growth was at a slow pace and the value exported at a very low level compared with U.S. shipments to major trading partners such as Canada, the European Union (EU), and Japan. In 2003, after building up some momentum during the first ten months, U.S. computer exports fell sharply in November and ended down for the entire year by 2 percent to \$234 million. U.S. computer imports from that country also declined by 6 percent to only \$7.9 million (Figure 3-9). The major factors behind the limited amount of computer trade between the United States and India are the high tariffs on computer equipment that the GOI has in place to

Figure 3-9: U.S. Computer Equipment Trade with India



Source: U.S. Census Bureau

¹¹¹ *Devices Market Looking Up and Networking Moves to the Next Level*, Express Computer, December 29, 2003.

protect its IT hardware industry and industry's focus on serving domestic rather than overseas demand at this stage in its development. As noted previously, U.S. IT firms export mainly high performance computer systems to India since the MNCs there and Indian branded suppliers and assemblers source their requirements for key PC components, such as motherboards, and many peripherals from other Asian countries. The prospects for a larger volume of U.S. computer exports to India should improve in the future though, once the Government of India implements the commitment it made to reduce its customs duties on IT products to zero by 2005 as a signatory nation to the ITA. If enacted, government reform of the substantial domestic taxes incurred by IT companies will boost computer demand in India and, in turn, should also increase opportunities for U.S. exporters.

Export Controls on High Tech Goods to India Minimal

The U.S. Government is actively working to increase trade in IT, biotechnology, defense, and nanotechnology between the United States and India. In 1998, it began lifting restrictions on sales of dual-purpose equipment and technology to that country. It also established a U.S. High Technology Cooperation Group (HTCG) in November 2002 to address economic, trade, and export control issues and to promote high tech trade. Most exports to India do not require prior authorization from the U.S. Government. In 2003, only about one percent of U.S. exports to India required a license; almost 90 percent were approved. In particular, certain sensitive computer hardware, technology, and software can be exported to India under license exceptions, including most encryption products.

HTCG Actively Promoting High Tech Trade

As part of the November 2003 Action Plan, the HTCG has focused on facilitating and promoting high tech trade with India. The group is engaged in an ongoing discussion with the GOI on specific customs issues and the problems that U.S. high technology companies encounter in the Indian market. Since customs clearance has been a major problem for U.S. exporters, the GOI has agreed to provide the group with "case studies" about clearance times at ports that process significant amounts of telecommunications and IT products. It also hosted a videoconference with the U.S. side of the HTCG and U.S. companies on January 31, 2004 to discuss tariff and tax issues. The GOI explained the recent tariff and tax cuts on telecommunications and IT products, how to calculate tariffs, and changes in its Export/Import policy. The HTCG plans to hold two export promotion outreach events, one in the United States and the other in India, in 2004.

3.4 THE INDIAN IT MARKET: SOFTWARE AND IT SERVICES

The Indian software and IT services market consists of software (products and services), hardware services, and IT-enabled services. According to NASSCOM, the market has grown at 26 percent annual rate since FY1997 to almost \$3 billion in FY2002, but has suffered in the past from the relatively low use of IT in that country.¹¹² Spending on IT by Indian

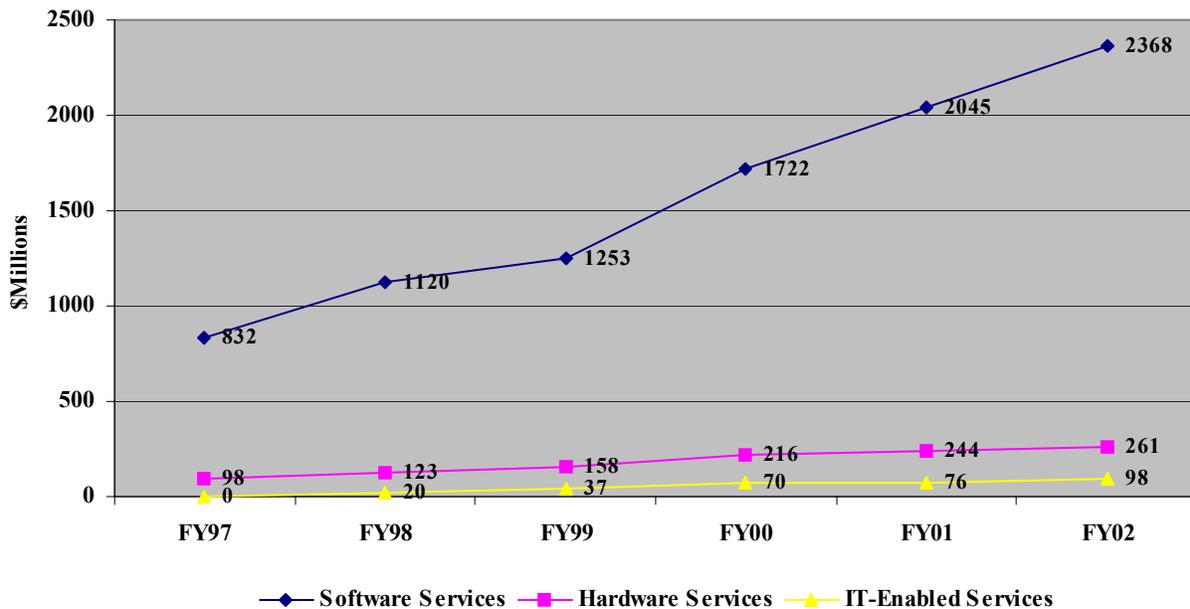
¹¹² IDC estimates that the market reached \$1.7 billion in 2002, but does not include custom software development and IT-enabled services in its data.

industries has been less than 1 percent of turnover due to the lack of serious competition within most sectors that remain protected and over-regulated and, as a result, have yet to use IT as a productivity or customer service tool. Despite IT initiatives (such as the e-governance projects) of a few states, government spending has also been small and has been skewed toward investments in computer hardware. Another factor has been the high cost of computer equipment, mainly resulting from high taxes and levies, which has limited corporate investment in IT infrastructure and consumer purchases of computers and software and encouraged software piracy. Finally, the Indian IT sector has generally been more focused on exporting rather than nurturing domestic demand. In short, India remains behind China, the Philippines, Ireland, and other major developed and developing nations on several critical IT parameters such as PC penetration, teledensity, Internet usage, and local language IT applications. However, as noted previously, the climate for IT spending there has begun to improve now that the Indian economy is on a strong, upward growth path and holds great promise for IT suppliers in the future. NASSCOM expects that Indian demand for software and IT services will at least quadruple by 2008 to \$13 billion.¹¹³

Software Services Account for the Bulk of the Market

Software services demand rose 16 percent to nearly \$2.4 billion in FY2002 and represented the bulk of the Indian software and IT services market (Figure 3-10).¹¹⁴ Captive software development, which totaled \$717 million, has been the leading market segment since Indian

Figure 3-10: Indian Software and IT Services Market
(Source: NASSCOM & Dataquest India)

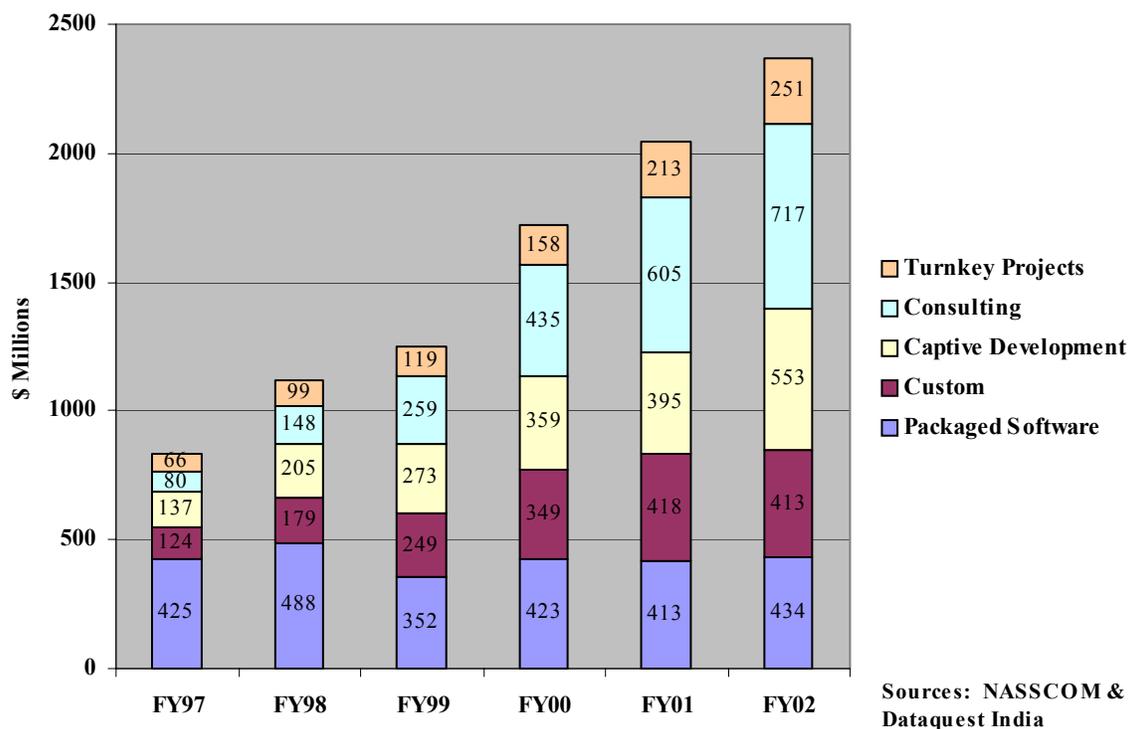


¹¹³ *Challenges on the Home Front-Kiran Karnik, Sounding Board*, NASSCOM, 2003, *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003, and *India Inc's IT Spending Below 1 pc of Turnover-Usage Steadily Going Up*, NASSCOM Press Release, July 30, 2003.

¹¹⁴ The software services market covers captive development, custom software, packaged software, turnkey projects (a combinations of systems integration and network integration), and IT consulting.

corporations have largely relied on their in-house capabilities to meet their IT needs, given the high costs of outsourcing and their low IT budgets (Figure 3-11). Spending on custom software and software maintenance services more than tripled from FY1997 to \$418 million in FY2001 though as Indian businesses began to invest in customized ERP, SCM, and CRM solutions to

Figure 3-11: Indian Software Services Market



improve efficiency and provide better customer service. A slight decline in custom software demand occurred in FY2002 that Dataquest India believes is due to a growing number of organizations, particularly SMEs, opting to use packaged software instead. However, packaged software spending rose only 5 percent to \$434 million in that fiscal year hindered by lower prices and falling purchase volumes. While growth in systems infrastructure software was slow, adversely affected by cutbacks in corporate IT budgets, packaged software implementations increasingly replaced custom software development in the areas of messaging, core-banking applications, insurance solutions, retail back-ends, ERP, SCM, CRM, and business intelligence. Dataquest India expects that the trend away from captive development and custom software toward packaged software will continue in the future.¹¹⁵

The strongest growth in the other software services segments occurred in turnkey projects. Demand for these services rose a whopping 40 percent to \$553 million in FY2002 driven by the

¹¹⁵ The U.S. and Foreign Commercial Service India, *The Indian Domestic Software Market*, *International Market Insight* report, March 31, 2003 and *Packaged Software: Good Things in Small Packs* and *Services: Acquiring Character and Maturity*, *DQ Top 20*, Dataquest India, July 15, 2003.

consolidation and centralization of server, storage and network resources in Indian enterprises and interest in technology upgrades. Much of this activity has taken place in the BFSI sector and large manufacturing sites where organizations are setting up data centers. These users have also considered establishing disaster recovery centers spurred by their concerns about business continuity following the 9/11 terrorist attacks on the United States, are deploying extranets, and are aggressively looking at new technologies such as virtual private networks based on the Internet Protocol (IP-VPNs), Internet Protocol (IP) telephony, and wireless to reduce overall operation costs. In fact, the Reserve Bank of India (RBI) has required all banks under its jurisdiction to have a business continuity policy and a disaster recovery center. Demand for IT consultancy has increased as well—18 percent to \$251 million in FY2002. The principal areas that users have spent on are security, business continuity, IT architecture, storage control and management, and applications, especially CRM.¹¹⁶

Hardware Services and ITES Thriving

According to Dataquest India, spending on facilities management services has grown steadily over the past three years and rose nearly 88 percent to \$65 million in FY2002. Their scope has also broadened to include managed services, technical help-desk, and availability services. The major customers for these services have usually been large organizations that have IT resources spread around India with mission-critical applications running over the network. Specialized network management services (NMS) have emerged as well and have become a \$37 million market due to strong demand from MNCs and businesses in the BFSI sector, and the service sector that were concerned about the costs of administering and maintaining their own networks or lacked qualified staff and resources to do so. Traditional hardware maintenance services have grown at a less torrid, but healthy pace. Combining the amount that vendors have gained from taking care of their own customers' systems with third-party maintenance, revenues for these services increased 18 percent to \$427 million in FY2002. Growth has come from the deployment of other IT equipment (such as storage, automated teller machines, and kiosks) beyond servers, desktop PCs, and networks, and from the new and potentially lucrative business of providing warranty outsourcing services for original equipment manufacturers.¹¹⁷

The Indian IT enabled services market covers a wide range of human-intensive services that are delivered over telecommunications networks or the Internet to businesses. These services include content development for websites, animation, engineering, and design outsourcing; back office processing such as accounting, finance, payroll, human resources, and insurance claims; call centers; and transcription and translation services (particularly the transcribing of medical records). According to Dataquest India, the market almost doubled over the previous year to \$207 million in FY2002, but was still only a small part of overall Indian software and IT services demand. This low level of activity was due to the fact that Indian companies have just begun to farm out their non-core processes to ITES suppliers to cut costs and focus on core competencies. The BFSI sector is the leading user of these services.¹¹⁸

¹¹⁶ *Services: Acquiring Character and Maturity, DQ Top 20*, Dataquest India, July 15, 2003.

¹¹⁷ *Services: Acquiring Character and Maturity, DQ Top 20*, Dataquest India, July 15, 2003.

¹¹⁸ *Services: Acquiring Character and Maturity, DQ Top 20*, Dataquest India, July 15, 2003.

The United States Controls Indian Software and Services Imports

According to the U.S. and Foreign Commercial Service India, U.S. suppliers control Indian software and services imports that include application software solutions, software bundled with hardware, source code (often re-exported after Indian programmers add value) and related software support services such as consultancy. They held about a 70 percent share of these imports, which rose 40 percent to an estimated \$1.12 billion in FY2002. Their strength has been in providing packaged software and turnkey project services to Indian users. In fact, several U.S. firms were among the top 10 suppliers in Dataquest India's rankings in both of these software and services categories during FY2002.¹¹⁹

NASSCOM estimates that Indian software and IT services exports to the United States grew 19 percent to \$5.17 billion in FY2002. This figure accounts for a third of India's total export shipments (merchandise plus software) to this country.¹²⁰

Open Source Software Gaining Interest

Linux use is still in a nascent stage in India with only 2 percent penetration in industry and 10-12 percent in government and education. While the open source operating system is no threat to Microsoft at this point, it is gaining popularity in industry sectors, such as banking and telecommunications, that need to decrease costs and being actively promoted by IBM, Oracle, and Red Hat as the low cost option for price sensitive markets. In the public sector market, Linux's use has not been mandated yet by either national or state governments, but it has strong advocates in Delhi's municipal government and in several states such as Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, and West Bengal. Areas of public sector use are transportation (Indian Railway Catering Services and Tourism), national security, e-governance, Internet-related applications, research and development, and schools, colleges, and universities. In particular, India's Center for the Development of Advanced Computing (C-DAC) has developed and provided applications for GNU/Linux and OpenOffice solutions in a number of Indian languages under the sharable General Public License. Linux has also appeared in the consumer desktop market. HP and Lucky Goldstar (LG) and Samsung of South Korea are offering the operating system with their PCs as a way to bring the costs of a branded PC down to the level of offerings from Indian assemblers.¹²¹

3.5 IPR LAW TOUGHENED, BUT SOFTWARE PIRACY REMAINS A PROBLEM DUE TO LAX ENFORCEMENT

Computer software is covered by copyright in India and protected under the provisions of the Indian Copyright Act, 1957. The Indian Parliament, reacting to pressure from its domestic

¹¹⁹ *Software Exports: A New Battle Begins*, DQ Top 20, Dataquest India, July 15, 2003.

¹²⁰ *U.S. Grasps Indian Hands in Partnership*, Cyber India Online, January 7, 2003.

¹²¹ Interviews with Vinnie Mehta, Executive Director, MAIT, September 15, 2003, Bhupendra Mathur, Senior Vice President and Country Manager, Indian Market Research Bureau, MAIT, September 15, 2003, and Rishi Seth, reporter and Prasanto Roy, Chief Editor, Dataquest India, September 16, 2003; *Desktop Linux Gains Ground*, Express Computer India, May 19, 2003; *Linux Draws Big Numbers to Bangalore*, Express Computer India, January 2, 2004; *Penguins in Power*, Dataquest India, January 21, 2004; and *Linux Makes Inroads into India*, New York Times, February 12, 2004.

software and services industry, passed a comprehensive amendment to that act in 1994 that incorporated provisions that brought copyright law up to international standards for copyright protection. The amendment clearly explains the rights of a copyright holder. With the exception of allowing a backup as a temporary protection against loss, the amendment makes it illegal to duplicate or distribute copies of copyrighted software and prohibits the sale or hiring of any copy of a computer program without proper or specific authorization. It subjects software pirates to trial under both civil and criminal law and substantially increase criminal penalties, imposing jail terms that can be extended up to 3 years from the 7-day minimum and fines ranging from \$1,000 to over \$4,000. The amendment also explains rental rights for video cassettes; protection for works transmitted by satellite, cable, or other means of simultaneous communication; the collective administration of rights; and the limit on judicial discretion with respect to the level of penalties imposed on copyright pirates. The length of copyright protection for computer programs under the act is the life of the author plus 60 years.¹²²

Despite strong intellectual property rights (IPR) legislation and other measures such as the establishment of a copyright enforcement advisory council, training programs for police and prosecutors, and compilation of nationwide data on copyright offenses, software piracy is still rampant in India due to lax enforcement. India remains on the Office of the U.S. Trade Representative's (USTR) "Priority Watch List" under the Special 301 provision of the U.S. Trade Act, 1974 along with ten other countries because of its inadequate protection of U.S. IPR. From 1994 through 2002, the piracy rate in this country dropped from 79 to 70 percent, but many other Asian nations, especially Japan, Taiwan, the Philippines, and South Korea made greater progress in handling IPR violations as shown by the more significant declines in their piracy rates. However, according to the Business Software Alliance (BSA), losses due to software piracy in India fell from \$365 million in 2001 to \$342 million in 2002 after growing for several years and dwarfed the \$2.4 billion revenue loss in China. The factors that encourage piracy in India are the high cost of commercial software, the high usage of assembled "grey market" PCs that often include bundled pirated software, the growing availability of illegal software on the Internet, and improper software asset management by Indian businesses. While most IPR violations have occurred in Indian corporations, software piracy grew by 30 percent during FY2002 among home and SOHO users. The products of Adobe, Autodesk, Borland, Microsoft, and Oracle have been the principal targets of Indian software pirates.¹²³

The Indian economy and the software and IT services industry have much to gain from a reduction in piracy. A BSA-IDC study released in April 2003 claimed that decreasing India's software piracy rate by ten percentage points to 60 percent by 2006 would add \$2 billion to the Indian economy, increase the industry's revenues by nearly \$1.6 billion, create 48,435 new high-tech, high wage jobs, and generate \$92.4 million in tax revenues for the GOI.¹²⁴ BSA and NASSCOM have been involved in many activities over the past several years to combat copyright violations. They have worked closely with law enforcement agencies to conduct raids

¹²² *IPR Law in India*, NASSCOM, 2002 and 2003 National Trade Estimate Report on Foreign Trade Barriers, Office of the U.S. Trade Representative, 2003.

¹²³ *Software Piracy: Understanding the Larger Picture*, Express Computer India, July 21, 2003, *Packaged Software: Packing More Punch*, Dataquest: The Business of Infotech, October 21, 2003, and *India Retained in U.S. Priority Watch List*, The Financial Express, December 8, 2003.

¹²⁴ *India*, IDC/BSA Economic Impact Study, April 2003.

against pirates and taken legal actions against several companies who were using pirated and unlicensed software. They have also been engaged in extensive media campaigns and sponsored educational programs to raise awareness of software piracy among corporate IT managers and the Indian public. More recently, both associations joined the Federation of Indian Chambers of Commerce and Industry (FICCI), the Indian Music Industry, Film Producers' Guild, and Indian Pharmaceutical Alliance in the National Initiative Against Piracy and Counterfeiting to take a much more broad based approach to fighting piracy.¹²⁵

¹²⁵ *Anti-Piracy Activities*, NASSCOM, 2002; *IPR: Time to Own it!*, [Cyber India Online](#), December 5, 2003; and Nivedita Mookerji, *Govt to Frame Optical Disc Law to Curb Piracy*, [The Financial Express](#), January 22, 2004.

CHAPTER IV: ELECTRONIC COMMERCE¹²⁵

4.0 OVERVIEW OF ELECTRONIC COMMERCE IN INDIA

India ranks low in most international studies of readiness for electronic commerce (e-commerce) and, as a result, is not as advanced in this area as many leading developed and developing nations. In the March 2003 E-Readiness Rankings published by the Economist Intelligence Unit (EIU), India was ranked 46th out of the world's sixty largest economies covered in the study and scored well below most countries in the Asia Pacific region.¹²⁶ It also did poorly in a November 2003 International Telecommunications Union (ITU) assessment that measures access to information and communications technology. India was ranked 119th out of 178 nations in the ITU's Digital Access Index (DAI) (**Figure 4-1**).¹²⁷

Figure 4-1
Digital Access 2002 Scores in Asia Pacific*

- **High Access:** South Korea (0.82), Hong Kong (0.79), Taiwan (0.79), Singapore (0.75), Japan (0.75), Australia (0.74), New Zealand (0.72)
- **Upper Access:** Malaysia (0.57), Brunei (0.55)
- **Medium Access:** Thailand (0.48), China (0.43), Philippines (0.43), Fiji (0.43), Sri Lanka (0.38), Indonesia (0.34), **India** (0.34), Viet Nam (0.31)
- **Low Access:** Papua/New Guinea (0.26), Pakistan (0.24), Nepal (0.19), Bangladesh (0.18), Cambodia (0.17), Myanmar (0.17), Lao P.D.R. (0.15)

*Index covers availability of infrastructure, affordability of access, educational level of population, quality of IT services and Internet usage

¹²⁵ Published statistics tend to be based on the government's fiscal year (April 1 to March 31). FY2003 refers to the period from April 1, 2003 to March 31, 2004. Hence, the latest official statistics are for FY2002 (year ending March 31, 2003). In this report, "2002" refers to the calendar year, not the government's fiscal year.

¹²⁶ The EIU's e-readiness rankings use nearly 100 quantitative and qualitative criteria, organized into six distinct categories, to measure the extent to which a market is conducive to Internet-based business opportunities. The six categories (and their weight in the model) are connectivity and technology infrastructure (25%); business environment (20%); consumer and business adoption (20%); social and cultural environment (15%); legal and policy environment (15%); and supporting e-services (5%). IDC's Information Society Index (ISI) has similar criteria and also places India among the lowest tier of the 53 countries that it covers.

¹²⁷ The DAI covers availability of infrastructure, affordability of access, educational level of population, quality of IT services, and Internet usage.

Internet use in India has primarily been focused on e-mail and web searches and not for conducting business and selling products and services. As noted previously in this report, India has low personal computer (PC) penetration (less than 1 percent of the population use them and, of this number, a mere 20 percent are home users); a small base of Internet subscribers that remained stagnant in 2003 (only 4 million, although an estimated 20-22 million reportedly go online in cyber cafes, at kiosks and at work); an inadequate, but improving telecommunications infrastructure (slow and sometimes unreliable connectivity and relatively high Internet access costs); and high levels of poverty and illiteracy—all of which have been major obstacles to the growth of e-commerce there.¹²⁸ However, the Government of India (GOI) and various state governments have been engaged in efforts over the past several years to overcome many of these barriers through nurturing the development of an information technology (IT) economy, promoting the build out of the telecommunications infrastructure (particularly, wireless telephony and broadband), and bringing IT to the masses through electronic governance (e-governance) and digital divide programs. The GOI has also sought to spur the development of electronic commerce (e-commerce) by easing restrictions on foreign direct investment (FDI). During 2001, it raised the cap on FDI from 49 percent to 100 percent, with the proviso that foreign companies involved in business-to-business (B2B) ventures would have to divest 26 percent of their equity in favor of Indian investors within five years. In Indian industry, businesses have become more aware of the advantages of using e-commerce to reduce costs and increase productivity and efficiency. International Data Corporation (IDC) is bullish on the prospects for e-commerce in India and projects that spending on it by businesses and consumers should rise at 106 percent annual rate from just \$2.1 billion in 2002 to a staggering \$78.6 billion by 2007 (**Figure 4-2**).¹²⁹

4.1 BUSINESS-TO-BUSINESS (B2B) ELECTRONIC COMMERCE

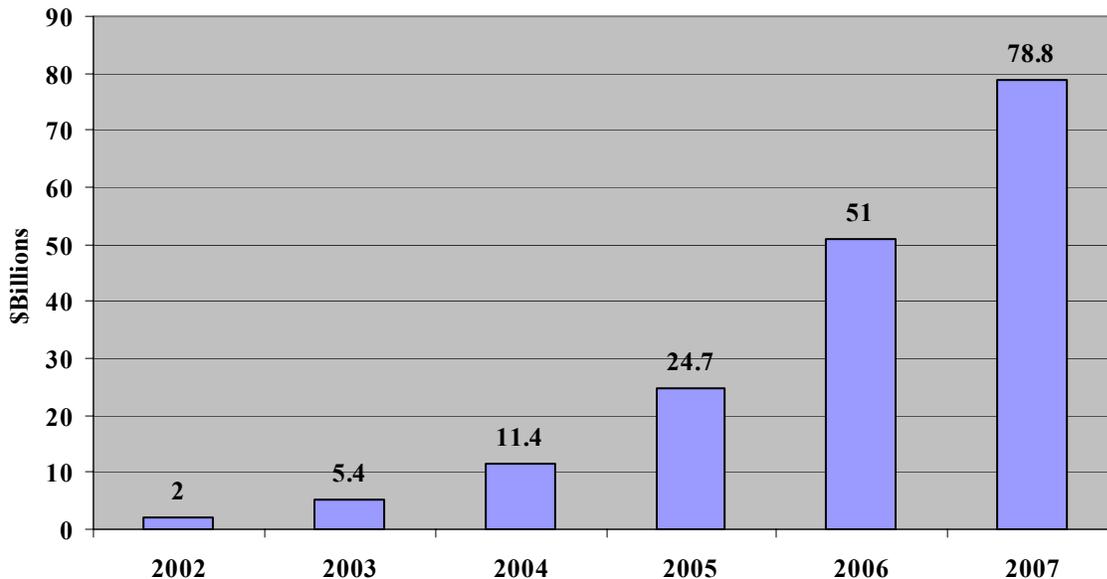
B2B is Engine of Indian E-Commerce Growth

B2B has been and will continue to be the engine of e-commerce growth in India now that an increasing number of Indian companies are participating more in the global marketplace and need to find ways to respond faster to changing business conditions and to improve their competitiveness. According to IDC, the value of B2B transactions reached a little over \$2 billion in 2002 and represented 98 percent of total e-commerce business activity there.¹³⁰ This figure contrasts sharply with the paltry \$30 million recorded back in 1998 when B2B was in its infancy. At that time, the early adopters were multinational corporations (MNCs) and large enterprises in

¹²⁸ Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003.

¹²⁹ There are several different definitions of what e-commerce is in India and, as a result, a variety of estimates on the size of activity. IDC defines e-commerce as the combined value of business end-use e-commerce and business supply chain e-commerce (B2B) and the value of products/services purchased by individuals by clicking an order button on the Internet and intended for consumption by themselves, family, or friends (B2C). We have used IDC statistics because they were the latest available data at the time the report was written.

¹³⁰ IDC defines business end-use e-commerce as the value of products/services purchased by businesses by clicking an order button on the Internet and intended for consumption by businesses. Business supply chain e-commerce is the value of products/services purchased by businesses by clicking an order button on the Internet and incorporated into the product/service offering. The total of both of these values is B2B.

Figure 4-2: E-Commerce in India

Source: IDC 2003

manufacturing, telecommunications, chemicals, healthcare, banking, financial services, and insurance (BFSI), and automobiles. B2B has spread more recently to the fast moving consumer goods (household and agricultural products, branded foods and beverages, and tobacco) and retail sectors. NASSCOM estimates that about 23 percent of India's top 500 companies are currently engaged in some form of e-commerce. Most top tier organizations (annual revenues above \$500 million) have already invested heavily in enterprise resource planning (ERP) and electronic data interchange (EDI) for handling business transactions and have moved into supply chain management (SCM) and customer relationship management (CRM). They have yet to adopt the most well known B2B technologies, such as i2 technology and CommerceOne. Second tier firms have been forced into B2B through demands made on them by their customers and suppliers. For example, Intel, Cisco, Maruti Udog, Indian Oil, and Reliance Industries refuse to deal with any company that is not e-business ready.¹³¹

SMEs Strong Potential Market for B2B Vendors

Indian small and medium-sized enterprises (SMEs) have also become more interested in e-commerce in recent years through the use of ERP and should be a major source of revenue for vendors of e-business solutions in the near future.¹³² A November 2002 SME survey released by the Confederation of Indian Industries (CII) indicated 73 percent of the respondents had their

¹³¹ *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003; *E-Biz: Here for Good*, Dataquest India, March 2003; and *Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises*, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003.

¹³² The 3.4 million SMEs are important to the Indian economy since they account for 42 percent of manufacturing turnover, 35 percent of the country's exports, and employ over 17 million workers, according to the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP).

own web sites and were using them for advertising, product display, product and services sales, data collection, data transfer, and training. These companies were primarily engaged in e-commerce for accounting and inventory management, but expected they would add customer support and employee training/retraining applications over the next two years.¹³³

Portal Use Growing in Key Industries

A growing number of online portals have been set up for B2B exchanges and some also for auctions in the automotive, steel, construction, insurance, shipping, and pharmaceutical industries. The steel industry has one of the biggest exchanges and automobile companies have come together to form an auto exchange (eas.com). More than 300 Indian companies, public sector enterprises, and a few forward-looking state governments such as Andhra Pradesh (AP) and Karnataka have gone into electronic sourcing (electronic tendering, forward and reverse auctions, rate contracts, and catalogue-based purchases) to reduce procurement costs and cycle times and to gain access to global suppliers. For example, FreeMarkets, a major e-sourcing firm, has conducted transactions worth over \$1.1 billion and has generated savings of \$152 million for its customers, including Tata Motors which sources oils, lubricants, complex materials, and components and Dabur which buys spices and herbs.¹³⁴

B2B activity has grown in the agricultural sector as well thanks to private initiatives such as the E-choupal Project.¹³⁵ Launched in June 2000 by ITC, one of India's largest consumer product and agribusiness firms, the initiative has established a network of agricultural portals in 2,500 kiosks that serve 1.1 million farmers in about 15,000 villages across four states, providing them with information on crop prices, weather, and scientific farming practices. The project has also created an agricultural meta-market that allows more efficient purchase and sale of high quality inputs (e.g., seeds and fertilizers) and farm produce and gives farmers access to credit, insurance, and health and education services. ITC currently operates aqua choupals in Andhra Pradesh, coffee choupals in Karnataka, soybean choupals in Madhya Pradesh, and wheat choupals in Uttar Pradesh to purchase these commodities directly from farmers. The company has set a target to create e-choupals in 100,000 villages within fourteen states over the next five to seven years.¹³⁶ B2B transactions should benefit in the future from the proliferation of wireless technologies in India. Mobile commerce (m-commerce) will grow as more Indian businesses buy and sell goods and services using smart handheld devices, such as personal digital assistants

¹³³ Fourth CII Survey on Usage of Information Technology by SMEs, CII, November 2002.

¹³⁴ *E-sourcing Could Transform Indian Business, Government, Express Computer India*, December 15, 2003 and *Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises*, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003.

¹³⁵ The Hindi word *choupal* means "village gathering place". In this particular case, an *e-choupal* is a combination of an Internet kiosk, a village gathering place, and an e-commerce hub. The *e-choupals* are run by operators (*sanchalaks*) who act as the interface between the computer terminal in the kiosk and the farmers involved in the project. The *sanchalak* help farmers access real-time information online. Source: Mohanbir Sawhney, *Fields of Online Dreams*, *CIO Magazine*, October 15, 2002.

¹³⁶ *An IT Bet Pays Off, Cyber India Online*, November 11, 2003 and *ITC Targets One-Sixth of Rural India through E-choupals*, *Newindpress.com*, January 16, 2004.

¹³⁷ *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003.

(PDAs) and mobile phones, particularly in areas where there is poor wired telecommunications infrastructure.¹³

4.2 Business-to-Consumer (B2C) E-Commerce

B2C Activity Relatively Low Now

Business-to-consumer (B2C) e-commerce has not really taken off in India as it has in some other developing nations because a mere 1.6 million homes are online and only a small percentage of Indian Internet users actually use it to buy goods and services. Electronic retailing has been limited by the high costs for delivery, logistical bottlenecks resulting from insufficient transportation networks and the country's complex postal system, and a small base of credit card users (5 million in a population exceeding 1 billion during 2001). In addition, Indian consumers still have a cultural affinity for shopping at stores and malls where they can see and touch products and have not graduated to mail order buying yet.¹³⁸

B2C activity reached only \$49 million in 2002, according to IDC's extensive surveys of Internet shopping websites and Internet purchasers. The principal items bought in terms of transaction volumes through online trading and shopping portals like Baazee, Rediff, CIOL, Indiatimes, and Fabmall were music compact disks (CDs), books, gifts such as flowers and jewelry, travel and entertainment tickets, and consumer electronics and IT products. The services offered online included not just travel bookings handled by Indian Railways and the domestic airlines (which accounted for around 23 percent of all B2C transactions), but payment of insurance premiums, electronic banking, and online stock trading. Vertical portals (vortals) also provided Indian consumers with online worship, entertainment, and games, and information services in such diverse areas as cooking, specific sports (e.g., cricket), jobs, and tourism.¹³⁹

E-Banking Generating Interest, but Use Still Limited

Online banking (e-banking) has generated a great deal of interest in the Indian banking community, but only 15 percent of the Internet population is currently engaged in it. The early adopters were private and foreign banks with the Industrial Credit and Investment Corporation of India (ICICI) launching online banking first in 1996 and Citibank, IndusInd Bank, HDFC Bank, and Timesbank following it over the next couple of years. Public sector enterprise banks have lagged behind and are in the early stages of offering these services. These banks include the State Bank of India (SBI), Bank of Baroda, Allahabad Bank, the Syndicate Bank, and the Bank of India. Others such as the Union Bank of India, Canara Bank, and the Punjab Bank are close to doing so. The major reason inhibiting public sector enterprise banks from offering e-banking

¹³⁸ *Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises*, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003 and *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003.

¹³⁹ Interviews with Vinnie Mehta, Executive Director, MAIT, September 15, 2003 and Anoop Khandelwal, Country Manager of Business Operations, HP India, September 17, 2003; *Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises*, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003; and *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003.

has been the absence of a legal framework to back up and regulate these operations in India. Moreover, the public sector enterprise banks' customer base is made up of people in smaller cities, towns, and remote villages and largely the elderly in bigger cities who reportedly have a natural aversion toward adopting new technology and appear satisfied with the traditional banking system. By contrast, the clientele of private and MNC banks are generally in the top five metro areas and fall within the 20-40 age group that has a greater exposure to new technology.¹⁴⁰

Most of India's bank and financial institutions have set up websites to provide information to customers. Four (ICICI Bank, Citibank, HDFC Bank, and Global Trust Bank) have also established electronic payment (e-payment) gateways for B2B and B2C financial transactions. However, all of these gateways are closed user groups and, thus, do not offer real time settlement of accounts between the users of one gateway and those of another. The Reserve Bank of India has worked to address the problem of the delays in e-commerce transactions that have resulted from the lack of an automated clearinghouse. In January 2004, it put into place the real-time gross settlement system that will provide integrated online funds transfer and settlement to the banking industry and will make the system fully operational in six months.¹⁴¹

Strong B2C Growth Expected through 2007

IDC expects that B2C transactions in India will increase more than 88 percent annually to over \$1 billion by 2007. Whether or not India realizes this growth will depend on the government's success in expanding PC and Internet penetration to citizens in smaller cities, towns, and villages, and in overcoming current constraints on B2C such as high Internet access and delivery costs, unreliable Internet connections, and the public's concern about security. Nonetheless, greater use of wireless technologies and wider deployment of broadband telecommunications should have a positive effect on B2C sales in the future.

4.3 Electronic Government

India Becoming More Involved in E-Government

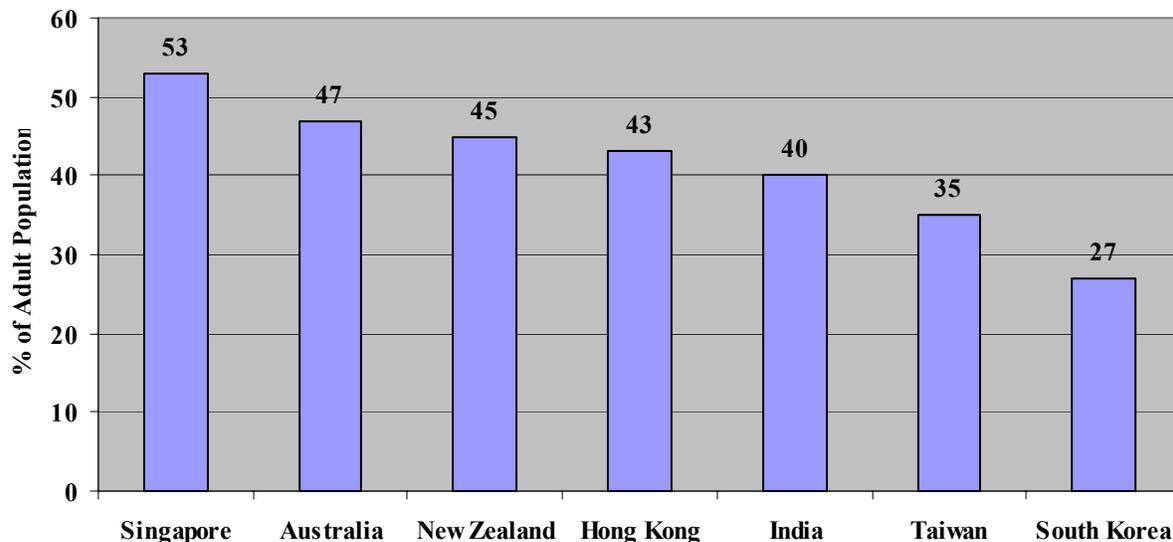
While the public's use of electronic government (e-government) services is reportedly slowing down globally, India has increased the percentage of adult Internet users that access government websites for information and services from 31 percent in 2002 to 40 percent in 2003, according to a recent Taylor Nelson Sofres study of e-government across 32 nations. It is number twelve in the ranking and trails only Singapore, Australia, New Zealand, and Hong Kong in the Asia Pacific region (**Figure 4-3**).¹⁴²

¹⁴⁰ *Internet Opens New Vistas for Indian Banks*, Express Computer, September 16, 2002; *Gear Up to Participate in RTGS System, Banks Told*, The Financial Express, November 3, 2003; and *RBI's Intra-day Liquidity Support Post RTGS*, The Financial Express, December 23, 2003.

¹⁴¹ *Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises*, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003.

¹⁴² *India Scores Highly in E-government Usage*, The Economic Times Online, December 9, 2003 and *Global Online Government Users*, www.emarketer.com, December 17, 2003

Figure 4-3: Government Online Use during 2003 in Asia/Pacific



The GOI became involved in e-governance during the 1970s when it decided to automate applications in the areas of defense, economic monitoring, and planning and to deploy IT to manage data intensive functions related to elections, census, and tax administration. It then established the National Informatics Center (NIC) to provide advanced IT solutions for all levels of government and to connect all district headquarter operations through a backbone—the

Source: Taylor Nelson Sofres

satellite-based, nationwide government computing and communications network called NICNET in the 1980s. From the early 1990s, the GOI shifted its focus to e-governance efforts in rural areas and sought funding from private sector partners and non-government organizations (NGOs). The Indian Prime Minister announced in November 2003 that India would implement a comprehensive program to accelerate e-government initiatives and that the national government would spend \$870 million annually on them over the next three years. The funding is expected to go mainly to computerization of land records, government-to-citizen (G2C) services, and the use of IT in health services.¹⁴³

States Now Taking a More Active Role

The states and territories have begun to play an important role as well, with over 20 of them already having IT policies in place. Andhra Pradesh, Karnataka, Maharashtra, and Tamil Nadu

¹⁴³ *E-governance: 20 Hot eGov Projects in India*, [Dataquest India](#), October 15, 2003; *Gov't Outlays Rs. 12,410 Cr Plan for E-gov*, [Cyber India Online](#), November 2, 2003; and *PM's E-governance Plan to Get Rs. 4,000 Crore a Yea*, [The Economic Times](#), January 20, 2004.

are considered the leaders in e-governance, according to an e-readiness study prepared by the National Council of Applied Economic Research, an Indian think tank. Goa, Gujarat, and Chandigarh are catching up fast. Most have set up static web pages with information on a variety of standard government topics. Many have sought to increase operational efficiency through projects that have concentrated on automating and computerizing government operations and developing applications ranging from accounting and payroll systems to employee/citizen databases and generic administration packages. They have also established statewide Wide Area Networks though Virtual Private Networks to provide connectivity up to the district level and sometimes to the block level, and provided citizen services such as bill and tax payment, land registration, grievance registration, and license issuance. A few of the more advanced states have launched electronic learning and telemedicine programs.¹⁴⁴

Major IT/E-Governance Initiatives Underway

The Indian Department of Information Technology (DIT) has several major ongoing IT initiatives under the Tenth Plan to increase IT and Internet penetration and to boost e-government in India. The Community Information Centres (CICs) Project was launched in August 2002 to establish 487 IT information centers at sites selected by governments in the less-developed seven North-East States and Sikkim. The CICs use the latest Very Small Aperture Terminal (VSAT) broadband satellite communications and provide local people with basic information services, including Internet access, e-mail, printing, data entry, and word processing, and IT applications, such as telemedicine, distance learning, computer-literacy training, and e-governance. DIT has set a target of extending the CIC project to 6000 centers across the country by 2007. The IT for the Masses Project will provide at least 100 million Internet connections and set up 1 million Internet-enabled IT kiosks/cyber cafes throughout India by 2008. The Vidya Vahini and Gyan Vahini Programs were started in FY2002 to bring Intranet and Internet connectivity to 6000 public and government-funded senior secondary schools and to upgrade the IT infrastructure at higher learning institutions. Their goal is to create an integrated voice, data, and video network that will be extended to every school and educational institution so that every Indian student will have access to the Internet, online libraries, academic services, web broadcasts, and e-learning.¹⁴⁵

In the area of IT-related R&D, government and corporate labs (i.e., C-DAC, IBM Research Labs, Media Labs Asia, the National Center for Software Technology, and the Indian Institutes of Technology) have taken up numerous projects to spread IT to the masses. They have developed and are working on a wide range of innovative products such as affordable Internet access devices, wireless technologies (cordect and Wi-fi, also known as 802.11x), machine translation, and software applications that include text-to-speech and language recognition.¹⁴⁶

¹⁴⁴ *E-Readiness Assessment of States, Industry Brief*, NCAER, July 21, 2003; *E-governance: 20 Hot eGov Projects in India, Dataquest India*, October 15, 2003; and *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003.

¹⁴⁵ *Northern States Community Information Centres*, National Informatics Centre, Department of Information Technology, 2003 and *Vajpayee Launches "Vidya Vahini" Pilot Project*, *Yahoo! News India*, June 11, 2003.

¹⁴⁶ Frost & Sullivan, *Local Language Information Technology Market in India* (report submitted to MAIT), May 2003.

Media Labs Asia, a collaborative 10-year venture with the Massachusetts Institute of Technology (MIT), is a network of national laboratories and participating grassroots communities that are committed to bringing the benefits of advanced information and communications technologies to the masses. The role of Media Lab Asia is to work with industry, NGOs, and government entities to meet challenges in learning, health, and economic development and to disseminate the innovations developed to every village in Asia. Media Lab Asia researchers have already created an 85 kilometer-long wireless corridor between Kanpur and Lucknow, called the Digital Gangetic Plain, using Wi-fi and Voice over Internet Protocol (VOIP) technologies. The project's objective is to provide voice and data connectivity in rural areas at low capital and operational costs. The corridor will be used as a test bed for other research efforts such as "Gram Patra"—a handheld device based on a geographical information system being developed for collecting land records.¹⁴⁷ Media Lab Asia has also worked with the Karnataka state government on a wireless networking system, called Daknet, which uses Wi-fi technology to allow farmers in remote villages to obtain land records through mobile access points.¹⁴⁸

Other state-level efforts outside Media Lab Asia are also underway. The Sustainable Access in Rural India Project seeks to provide wireless access and applications to people in 350 villages in the Madurai district of Tamil Nadu through telekiosks. An Intranet project, called Gyandoot, in the Dhar district of Madhya Pradesh, connects 35 rural centers and offers services such as current rates of agricultural produce, copies of land records, online registration of applications, and village auctions. eSeva, a one-stop-shop project, provides over 30 G2C and B2C services (such as online payment of utility, phone, and tax bills, registration of births and deaths and certificate issuance, and learners and drivers license issuance and renewal) in Hyderabad, Secunderabad, and the Ranga Reddy District of AP.¹⁴⁹ Finally, the Technology Development for Indian Language (TDIL) Program is an effort critical to the overall success of the India's IT initiatives since not more than 3 to 4 percent of Indians can communicate in or read English. The principal objective of TDIL is to develop software and content in Indian languages that will enable people in different regions and states to use computers and other IT systems.¹⁵⁰

U.S. IT Suppliers are Key Players

U.S. IT suppliers have taken an active role in several e-governance projects. Microsoft recently signed a memorandum of understanding to work with the AP Government on the company's \$20 million Project Shiksha which aims to increase IT literacy in the state by reaching out to 400,000 students and more than 20,000 teachers in public schools over the next five years. The company has already launched this project in Uttaranchal and expects to expand it to 3.5 million students and 80,000 teachers in perhaps as many as ten Indian States in the future. Similarly, Oracle has

¹⁴⁷ Ashu Kumar, *Media Lab Builds a Wi-fi Digital Bridge Across Gangetic Plain*, [Financial Express](#), March 10, 2003.

¹⁴⁸ Sofia Tippoo, *Making E-Governance a Reality*, [Times of India](#), March 5, 2003.

¹⁴⁹ *E-governance: 20 Hot eGov Projects in India*, [Dataquest India](#), October 15, 2003; Neetu Katyal, *e-Governance Unwired: Not Quite*, [Dataquest India](#), October 31, 2003; and *About eSeva*, [www.e sevaonline.com](#).

¹⁵⁰ *Notes on Demands for Grants: 2002-2003*, Department of Information Technology.

¹⁵¹ *Microsoft Partners AP with Project Shiksha*, [Hindu Business Line](#), January 14, 2004 and *Nine Oracle-aided E-gov Projects Underway*, [Hindu Business Line](#), January 20, 2004.

been involved with Indian partners in e-governance projects in 28 states and began work on nine new projects in 2003. Its efforts have included the deployment of Oracle technologies in Tamil Nadu's Urban Development Project, the Mumbai Port Trust, and AP's eSeva Project.¹⁵¹

4.4 Legal and Regulatory Framework for Electronic Commerce

As noted in Chapter 1, the GOI enacted the Information Technology Act (ITA) in August 2000 to provide the legal and administrative infrastructure for e-commerce in India. The main purposes of the act are to give legal recognition to all electronic records as substitutes for written paper-based documents and to other activities carried out by electronic means, to punish computer misuse and frauds, and to enable e-governance applications for the delivery of services to Indian citizens. The act states that the acceptance of a contract may be expressed by electronic means of communication, unless otherwise agreed, and the same shall have legal validity and enforceability. However, the act does not apply to the following types of transactions: negotiable instruments (except for checks)¹⁵²; a power of attorney; a trust; a will including any other testamentary disposition; any contract for the sale and conveyance of immovable property; and any other documents or transactions as may be decided by the GOI. The act also creates a Controller of Certifying Authorities (CCA) charged with effectively implementing it and provided with the authority to oversee, license, and regulate the activities of certifying authorities that issue digital signature certificates. The areas that it does not address are: consumer protection and data privacy; the infringement on the Internet of copyright laws and the protection of domain names; the jurisdiction aspect of electronic contracts (e.g., the jurisdiction of courts and tax authorities); and taxation of goods and services exchanged through e-commerce.¹⁵³

Information Security and CyberCrimes

The ITA defined certain acts as cyber crimes including damage to or tampering with computer source code, computer systems, and networks, hacking, online pornography, and publication of false and fraudulent digital signatures. The act set penalties for hacking and destruction or tampering with information contained in any computer, computer network, database, or software at three years imprisonment and a fine up to \$4,350 and for online pornography at five years and a fine of up to \$2,200 for the first instance and double for subsequent instances. It also set compensation for many of covered offenses up to \$220,000 to the affected person.

While providing a framework for dealing with cyber crimes, the act did not cover offenses like spam, online theft, cyber stalking, harassment, defamation, the control of cyber laundering of money, and the breaking of computer encryption or technological protection devices. It did extend the application of the act's penal provisions to persons outside of India, regardless of their

¹⁵² The Negotiable Instruments Act, 2003 recently amended the Information Technology Act, 2000 to provide legal validity to 'a cheque in electronic form', 'a truncated cheque', and 'an electronic image of a truncated cheque', but did not do so for electronic funds transfers.

¹⁵³ Pravin Anand, *India's First Cyber Law and a Primer on Regulatory Norms in 'Indian' Cyberspace*, NASSCOM, 2002 and *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003.

¹⁵⁴ *India's Cyber Laws*, *PC Quest*, December 31, 2001 and *IT Act Languishes Thanks to Government Negligence*, *Express Computer*, August 26, 2002.

nationality, if the offense related to a computer located in that country. However, the GOI's ability to enforce these provisions extraterritorially is limited.¹⁵⁴

The Minister for Communications and Information Technology (MCIT) formally established the Indian Computer Emergency Response Team (Cert-IN) in July 2003 to oversee cyber security in India and to serve as the agency that will respond to security incidents, facilitate communication among experts working to solve computer emergencies, and form international linkages in this area. Cert-IN is developing security guidelines based on worldwide best practices for operating systems, web and mail servers, firewalls, and intrusion detection systems and has several incidence response teams with expertise in a wide range of major hardware and software platforms. The ministry has also begun working with the Asian School of Cyber Laws (ASCL) to draft rules and regulations governing computer security under various sections of the ITA. Its efforts include creating a code of conduct and practices for cyber cafes/chat rooms around the country and developing procedures for police and other law enforcement agencies to follow in dealing with recovery of digital evidence.¹⁵⁵

As of September 2003, Cert-IN handled over 7,000 complaints of computer crime and abuse. During the period from January 1, 2001 through December 31, 2002, data theft incidents were the most widespread (33%) followed by email abuse (22.5%) and unauthorized access (18.5%). Enforcement of India's cyber laws has been lacking though. The GOI has yet to set up a Cyber Appellate Tribunal, as required under the ITA, to look into cyber crimes. Furthermore, only 11 cases have been registered under the act since advocates, police officials, and even judges are not familiar with the provisions of India's cyber laws. Critics have urged the GOI to provide training on cyber crime issues to alleviate this problem.¹⁵⁶

Digital Signatures

As provided for in the ITA, the CCA is responsible for establishing of the Public Key Infrastructure (PKI), a combination of software, encryption technologies, and services for electronic authentication of communications and transactions on the Internet through digital signatures that are formally recognized as substitutes for physical ones. It operates the Root Certifying Authority of India (RCAI) used for digitally signing the certificates of certifying authorities (CAs) and maintains the National Repository of Digital Certificates that contains all of the certificates issued by licensed CAs. Beginning in February 2002 onwards, the CCA has licensed five CAs to issue digital signature certificates. The CAs currently in operation are the GOI's National Informatics Centre in New Delhi and the Institute of Development and Research of Banking Technology in Hyderabad, Tata Consultancy Services in Mumbai, SafeScript in

¹⁵⁵ASCL Drafts Rules for Information Technology Act, *The Financial Express*, September 26, 2003 and Arun Shourie Opens CERT-IN to Oversee Cyber Security, *The Economic Times*, January 20, 2004.

¹⁵⁶ *Computer Crime & Abuse Report*, Asian School of Cyber Laws, March 1, 2003; ASCL Drafts Rules for Information Technology Act, *The Financial Express*, September 26, 2003; and *Kings in IT, Laggards in Cyber Law*, *The Times of India*, October 15, 2003.

¹⁵⁷ *Digital Signatures Slow to Take Off*, *The Hindu Business Line*, January 29, 2003; *Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises*, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003; and *Digitally Yours*, *Dataquest India*, October 30, 2003.

Chennai, and government majority-owned Mahanagar Telephone Nigam Ltd. These entities have the power to suspend or revoke digital signature certificates held by subscribers.¹⁵⁷

The use of digital signatures has grown slowly thus far in India due to several problems. First, their use is legal, but not binding on anyone. Second, the cost of the certificates is high. They start around \$16 per year depending on the security features encrypted on the e-signature. Finally, the other major issues are the lack of awareness of the value of digital signatures in conducting online transactions and the non-availability of software applications that are PKI-enabled. One estimate places the number of digital signatures in circulation at no more than 20,000 nationwide through early 2004.¹⁵⁸

A serious flaw in the ITA regarding digital signatures is the mandate to use asymmetric encryption system, thus limiting the scope of technology used and discouraging the growth of online transactions. The U.S. Government and IT sector is encouraging the GOI to take a technology-neutral approach to digital signatures along the lines of the U.S. E-SIGN Law and the UNCITRAL Model on Electronic Signatures.

Consumer Protection

The GOI is still considering an amendment to the Consumer Protection Act, 1986 to address the problems consumers face in using e-commerce. India has no regulatory body to certify e-trading web sites and the framing of disclosure norms, thereby leaving district fora and consumer commissions to resort to creative interpretations to handle consumer protection issues. In early 2003, the Tamil Nadu government asked the state's Consumer and Civic Action Group to investigate the functioning of existing web sites and received some startling findings. Specifically, the group found that Indian web sites failed to offer information about suppliers of products, leaving consumers with no means of taking care of grievances, and provided incomplete information about products such as delivery charges and hidden costs. They also noted that these sites did not clearly state modes of payment and the rules for refund, return, and exchange. Regarding consumer protections, the group found that the websites lacked clear delivery contracts with dates and times of delivery and provisions for compensation if schedules were not met, did not offer guarantees or warranties for products sold online, and did not provide any assurance that any private information sought would not be divulged or a contact person that could be held responsible if there was a breach of contract in divulging personal information. Furthermore, they found that most of them did not have a forum for consumer complaints or a mechanism in place for alternative dispute resolution.¹⁵⁹

¹⁵⁸ *Digital Signatures Slow to Take Off*, The Hindu Business Line, January 29, 2003; *Digitally Yours*, Dataquest India, October 30, 2003; *E-governance Projects Slip on Security*, The Hindu Business Line, November 16, 2003; and *20,000 Digital Signatures Issued in India*, The Hindu Business Line, March 16, 2004.

¹⁵⁹ *Amend Consumer Protection Act Sooner than Later*, The Financial Express, March 15, 2003.

Data Privacy

India has no data privacy protection laws in place at present and did not cover this area in the ITA. The GOI does interpret privacy as the right to be left alone and has enshrined this principle in Article 21 of the Indian Constitution. The right to privacy has also been upheld in case law (e.g., the Supreme Court of India's ruling on the People's Union for Civil Liberties' telephone tapping suit). However, the courts have not yet considered privacy issues relating to the Internet, such as unauthorized use of personal data collected online, and have not provided recourse against private parties, only the government's invasion of personal privacy.¹⁶⁰

NASSCOM began urging the GOI to enact legislation in May 2003 so that Indian IT services companies could ensure expanded business opportunities and unimpeded data transfers from European Union (EU) countries. The EU's 1995 Directive on Data Protection prohibits the transfer of personal data to countries that do not provide "adequate" privacy protections, as defined by the EU.¹⁶¹ NASSCOM is believed to be working with the GOI's Central Committee on this issue. It is unclear whether the GOI will develop privacy legislation modeled after the United Kingdom's law that implements the EU Directive on Data Protection or simply modify existing legislation to incorporate privacy protections. Few details are known about the provisions of any draft law, including whether it will protect against unsolicited commercial e-mail (spam), a growing concern among Indian Internet users.¹⁶² A recent Economic Times article reported that the GOI was looking at amending the ITA to insert data protection clauses for India's BPO industry and had consulted a group of industry bodies and legal experts that has been asked to submit a report to the IT Secretary by March 10th.¹⁶³

At least one state government has looked at the data privacy issue. AP is considering the adoption of "special contracts" to be used by companies collecting and processing data. However, the AP government would make the "special contract" voluntary rather than compulsory and would limit the law's use to that state. It has also taken a minimalist approach when drafting the contract, including only the most basic features in common with other privacy structures they reviewed, and has given itself the power to add or reduce protections of the contract to accommodate different privacy regimes/laws. Given AP's importance to U.S. companies, the U.S. IT sector wants to ensure that the contract that the AP government adopts will not impose any burdensome requirements that would adversely affect trans-border data flows. In particular, it is concerned that the contract may be misused in the EU if the European Commission forces the adoption of special contracts when EU companies/data subjects are involved in personal data transfer in and from AP.¹⁶⁴

¹⁶⁰ Pravin Anand, *India's First Cyber Law and a Primer on Regulatory Norms in 'Indian' Cyberspace*, NASSCOM, 2002 and Rodney D. Ryder's commentary on privacy and data protection in India appearing in *Cyber India Online*, December 10, 2003. Mr. Ryder is a consultant on trade and technology law.

¹⁶¹ Currently, data transferred to Business Process Outsourcing (BPO) firms in India is ensured through the use of proper contractual agreements that meet EU data protection requirements.

¹⁶² *NASSCOM Seeks Data Protection Laws*, *The Hindu Business Line*, May 22, 2003 and Rodney D. Ryder's commentary on privacy and data protection in India appearing in *Cyber India Online*, December 10, 2003.

¹⁶³ *IT Act May Get Data Protection Teeth*, *The Economic Times*, February 25, 2004.

¹⁶⁴ Jeff Rohlmeier, paper on *U.S./India Data Privacy Issues*, Office of Information Technologies and Electronic Commerce, U.S. Department of Commerce, 2003.

Content Restrictions

The ITA allowed for the monitoring of websites that endanger the public order, the integrity and security of India, and relations with other countries and the blocking of pornographic websites. However, the GOI's DIT issued an order (No.GSR529E) in July 2003 that some critics feel amounts to censorship of Internet content. The order permits the banning of "websites promoting hate content, slander or defamation of others, promoting gambling, promoting racism, violence and terrorism and other such material..." It also gives various government agencies the right to submit complaints to Cert-IN which will work with DIT and the law or Home Ministry to make a determination on whether or not the website should be blocked. What disturbs many Indian civil libertarians is that neither the producers of the website nor any people with an opposing view will be given a hearing as part of this process. These critics were also upset by Cert-In's decision in September 2003 to block a Yahoo! Group site because the site allegedly contained "anti-national" views and had material objectionable to the GOI and the government of Meghalaya, a state in northeast India that has many active insurgent groups. This was the first case of the GOI attempting to regulate Internet content.¹⁶⁵

The GOI has exempted Internet service providers (ISPs) from any liability arising from third party acts, such as slander and defamation, as long as they can prove that the offence was committed without their knowledge or that they have taken reasonable measures to prevent such offence. However, it expects ISPs to be careful about the kind of data transmitted over their networks and to install appropriate software to screen out pornographic material and protect against viruses.¹⁶⁶

Intellectual Property Rights Protection

India has nothing comparable to the Digital Millennium Copyright Act in the United States. The ITA does not address the issue of intellectual property rights (IPR) protection as these rights apply to cyberspace and electronic information. It does not contain any provisions for copyrighting, trade marking, or patenting of electronic information and data. Furthermore, it does not define what domain names are or cover IPR and liabilities of domain name holders. As a result, these weaknesses in the act have engendered considerable controversy in India. In the area of domain names, foreign companies have had the domain names of their brands registered by unrelated parties (cyber squatters), have had to fight in court to protect them, and have even paid to get their domain names back in some cases. Indian firms have also been involved in disputes. However, in the cases of Titan Industries (a Tata group company) and Yahoo India, the

¹⁶⁵ Shabnam Minwalla, *Watch What You Surf, Net Police are Here*, Times of India, August 1, 2003 and Dinesh C. Sharma, *India Bans a Yahoo Group*, CNET News.com, September 23, 2003.

¹⁶⁶ *India's Cyber Laws*, PC Quest, December 31, 2001.

¹⁶⁷ Pavan Duggal, *The Economic Times Domain Name Victory: Some Cyberlaw Perspectives and Domain Names*, Cyberlaw India, <http://cyberlaws.net>; *IT Bill Has Missed Out Key Areas*, The Hindu Business Line, June 17, 2000; Pravin Anand, *India's First Cyber Law and a Primer on Regulatory Norms in 'Indian' Cyberspace*, NASSCOM, 2002; and *IT Act Languishes Thanks to Government Negligence*, Express Computer, August 26, 2002.

Delhi High Court has ruled in favor of these companies and granted them interim injunctions restraining the defendants from using their domain names. Indian companies such as The Economic Times have also used the Uniform Domain Name Dispute Resolution Policy approved by the Internet Corporation for Assigned Names and Numbers (ICANN) to win judgments from the WIPO Arbitration and Mediation Center.¹⁶⁷

Electronic Contracts

Several problems exist as far as electronic contracts are concerned. One is that the ITA recognizes the validity of electronic information only in cases where the information is also in written, typewritten, and printed form. This raises the question of how to enforce an electronic contract when such documentation is absent. The second pertains to how this electronic contract is to be proved in court. Section 64 of the Indian Evidence Act, 1872 requires that the contents of a document must be proved by the original document itself being produced in a judicial proceeding. Moreover, if a computer printout or any information visible on the screen is included in the definition of a document, there is still some question as to what is an original and if the information stored in a computer has been altered by one party without the other being aware. The third problem pertains to when the acceptance of an electronic contract is conveyed. Section 4 of the Indian Contract Act, 1872 states that the communication of a contract's acceptance is complete when it reaches the knowledge of the offeror. However, the Indian Supreme Court has ruled that an acceptance communicated by oral means, by telex, or by telephone is complete only when it is received by the offeror. These conflicting views make it even more difficult to determine acceptance in the case of e-commerce when acceptance may be made via e-mail or by pressing the 'Accept' or 'Buy' icons on a computer screen. Is the acceptance of an electronic contract complete when the e-mail is sent? Or received by the addressee? Or when it reaches the host computer that provides the e-mail facility to the addressee?¹⁶⁸

Taxation of E-Commerce

The ITA does not address the issue of taxation of e-commerce transactions. India's Central Board of Direct Taxation (CBDT) established the High-Power Committee on Electronic Commerce and Taxation to look into this issue and received recommendations from it in March 2001. The committee essentially recommended to subject the income of content providers, ISPs, and other persons engaged in e-commerce to the same taxation as traditional commerce and gave the opinion that the existing provisions of the Income Tax Act would not have to be amended. However, the GOI decided to take under consideration the views of all parties affected by this issue before making a ruling on whether or not e-commerce transactions ought to be taxed. It set

¹⁶⁸Pravin Anand, *India's First Cyber Law and a Primer on Regulatory Norms in 'Indian' Cyberspace*, NASSCOM, 2002

¹⁶⁹*Taxing E-Commerce: Existing Laws Inadequate*, [The Hindu Business Line](#), June 10, 2000; Hema Ramakrishnan, *E-com Deals May Be Kept Out of I-T Net*, [The Hindu Business Line](#), February 4, 2002; and *Task Force on Taxation Issues on the Cards*, [The Hindu Business Line](#), March 2, 2003.

up an Emerging Issue Task Force in early 2003 to take up the issues of e-commerce taxation, transfer pricing, and other tax matters. The GOI has not come out with any ruling to date.¹⁶⁹

In its budget submission for FY 2002, NASSCOM urged the GOI to place a five-year moratorium on taxing e-commerce and has continued to take this position. As of February 2004, the GOI has not imposed or signaled any intent to impose tariffs on goods and services transmitted electronically.

HTCG Working on E-Commerce Issues and Telehealth

Formed in November 2002 to find ways to boost high technology trade between the United States and India, the U.S.-India High Technology Cooperation Group (HTCG) is working on data privacy and cyber security issues as part of its current Action Plan. The U.S. side of the group has provided the GOI with information on the U.S. experience with the U.S.-EU Safe Harbor Agreement to help in its examination of various approaches to data protection. The group will also support a cyber security workshop that NASSCOM and the Information Technology Association of America (ITAA) will organize together and hold during the second half of 2004. In the area of telehealth, the Technology Administration within the U.S. Department of Commerce is working with the GOI to schedule a series of public-private sector workshops on telehealth technologies in the Spring of 2004.

CHAPTER V: MARKET OPPORTUNITIES AND ENTRY STRATEGIES IN INDIA¹⁷⁰

5.0 OPPORTUNITIES IN TELECOMMUNICATIONS SERVICES*As Investors*

Despite existing limitations on direct foreign investment in most segments of the Indian telecom services market and the withdrawal of several foreign firms from the market, investors may find portfolio investments in existing Indian companies attractive. Such occasions arise when minority stakeholders in those telecom firms sometimes seek to reduce or sell off their shares in a company. While the mobile services market in India is undergoing explosive growth, current margins are not high, and a trade association has opined that it will be a year or two before any operator is generating a profit. Some of the smaller GSM operators may be interested in selling their licenses in the near future as they face increased competition in their service areas. Prospects for the mobile sector appear bright over the next decade or two, however, as wireless firms complete their network build outs and data applications gain popularity in the market. Becoming a *strategic partner* if and when India's state-owned telecom operators are privatized could appeal to a global telecom operator that wants to establish a significant presence in a fast-growing telecom market like India's.

As Telecommunications Service Providers

Corporate telecom services constitute a large share (perhaps one-third) of the Indian market, and companies, especially international firms with offices in India, want the reliability and advanced service offerings available in virtual private networks (VPNs). A consulting group has estimated that VPN services in India will increase from \$22 million in revenue in 2001 to \$190 million in 2006.¹⁷¹ Although lack of IP domestic infrastructure is a constraint upon growth, the trend toward outsourcing will drive IP VPN services in India, and several global telecom carriers are establishing IP hubs in India to facilitate their provision of international VPNs.

There currently are three telecom regulations in India that severely restrict market opportunities for small and medium-sized U.S. telecom service firms to provide telecom services in India. First, the resale of existing network facilities and services at wholesale rates to competitors is not permitted. For example, a company cannot install a switch in New Delhi and Mumbai and then lease long distance circuits from BSNL at wholesale rates to offer switched voice traffic

¹⁷⁰ Published statistics tend to be based on the government's fiscal year (April 1 to March 31). FY2003 refers to the period from April 1, 2003 to March 31, 2004. Hence, the latest official statistics are for FY2002 (year ending March 31, 2003). In this report, "2002" refers to the calendar year, not the government's fiscal year.

¹⁷¹ IDC new release, March 25, 2003

throughout India. (In the United States, small telecom suppliers are allowed to buy AT&T facilities and services at a discounted rate and resell the services at a competitive rate to customers—often small businesses—in a targeted industry or within a specific geographical area.) Second, the prohibition of phone-to-phone IP telephony in India closes off another area in which entrepreneurial firms in the United States have carved out a niche for themselves by offering low-cost telephony. Third, the high fees (and other financial obligations) required to obtain a license in India to provide international services also preclude participation from small firms that would not be able to pay the license fee and raise the capital necessary to make additional infrastructure investments.

While small firms can obtain licenses easily and at no cost (nominal payment of one rupee) to become Internet service providers, that business is becoming commercially unviable for the firms that offer only dial-up access to the Internet. India's Internet Service Providers Association has recently asked that its member companies be allowed to offer unrestricted IP telephony within India upon an annual payment of five percent of revenues as a license fee, but the incumbent telecom operators strongly oppose this proposal, and it is considered unlikely that the TRAI would recommend a change in the existing policy on Internet telephony.¹⁷²

As New Telecom Services/applications Developers

Previously, "value-added services" in India were defined as a category of eight or nine discreet services, like voice mail and videotext, where the Indian market either was undeveloped and/or the services were not viable as stand-alone offerings. For a firm to provide a new service outside the given definitions required it to make a proposal to the government and accept whatever conditions the Department of Telecommunications decided to impose. Now with a unified licensing regime and with Indian telecom suppliers seeking to offer a full range of services, U.S. firms with innovative, niche-market applications or services may find Indian operators interested in distributing, becoming a licensed supplier of, or otherwise partnering to make new value-added services available in India. Some U.S. firms might want to provide specific value-added services and not want or need the broad authority it would receive under a unified license. It remains unclear whether a firm wishing to offer selective value-added services such as managed data network services on a cross-border basis, can do so under a license that does not require it to pay the fees and meet the obligations of the international license for switched voice.

As Sellers to or Partners with existing Indian Telecom Service Providers

As noted above, both wireline and wireless telecom firms in India are seeking to offer new and better services as a way to retain their customers and differentiate them from their competitors. Indian mobile service suppliers look to unified messaging services (UMS) and news and entertainment services as important future revenue generators. Software products that can

¹⁷² "Not quite the world of ISPs," *India Telecom News*, January 12, 2004

enhance UMS systems and incorporate multimedia features in mobile handsets will be in demand. Software applications for such new technologies as General Packet Radio Service (GPRS) and Enhanced Data Rate for GSM Evolution (EDGE) would interest wireless service providers. U.S. companies that have developed specialized, value-added services for either the commercial or residential market may find Indian telecom operators interested in exploring how such innovative offerings could best be introduced in the Indian marketplace. Value-added services are also critical for the survival of smaller or regionally-based ISPs in India, and they lack the expertise or resources to develop such services by themselves.

As Sellers of International Bandwidth

One area where smaller U.S. firms could play a role is the sale of international bandwidth at discounted rates. Indian carriers holding international telecom service licenses are eager to find “better” (e.g., lower cost) alternatives for routing and terminating their traffic for overseas destinations than provided by the traditional method of signing operating agreements with a multitude of international carriers. Companies that can offer worldwide termination of minutes via VoIP networks should find potential customers among the carriers in India’s increasingly competitive international services market. Similarly, both facilities-based and resale U.S. telecom providers may find that one of the newer Indian carriers can offer lower costs to terminate calls in India than the former monopoly VSNL. U.S. carriers may find that using alternative networks in India to route international traffic provides other benefits as well.

As Consultants

There are opportunities in India for U.S. firms that are not themselves providers of telecommunications services. As the focus shifts in India from the number of subscribers a firm has to the revenues, profits and return on investment it earns, the newer private telecom companies in India will be ripe for professional advice on a number of subjects.¹⁷³ These include how carriers can achieve optimum network design and utilization, how they can manage their businesses more efficiently, how to best utilize their human and capital resources, the best competitive pricing and marketing strategies, and how to provide top quality customer service. Since the former state-owned carriers grew to maturity in non-competitive markets, they too might benefit from advice on these subjects that consulting organizations can provide.

As Developers of Software Systems

U.S. firms design and sell products that can help the Indian telecom carriers realize many of the corporate objectives noted above. Network management systems and operations support systems (OSS) increase network and operational efficiencies. Billing systems and solutions can provide competitive advantages in selling to large corporate accounts.¹⁷⁴ Fraud management systems are important to prevent “revenue leakage” and to detect ingenious schemes users may

¹⁷³ Interview with Spice Telecom official in Bangalore, September 19, 2003

¹⁷⁴ A Frost & Sullivan study states that India’s billing solutions market should reach \$200 million in 2004. The Economic Times, December 16, 2003

devise to obtain communications services at less than tariffed rates, if not for free. (The electric and cable TV industries in India reportedly lose large amounts of revenues to fraud.) Order management systems and service provisioning can equip the carriers to provide rapid and accurate implementation of customer orders.

As Indian networks consolidate and infrastructure licensed to deploy one type of technology can now be used to offer other telecom services as well, the carriers will provide a ready market for software/hardware systems that combine different networks that tie mobile, fixed, Internet, ATM connections and other contact points into a single system at the carrier's office. Such technologies that combine multiple networks into a single processing system reduce operating costs and allow a better deployment of skilled personnel.

Indian carriers have expressed interest in data warehousing solutions as a response to high churn and stagnate average revenue per user rates. The operators are supplementing their focus on customer acquisition with a new focus on customer retention. U.S. firms can design specialized data models for the telecom industry that offer telecom carriers centralized and scalable data warehousing systems. Such systems allow telecom carriers to gain a single view of the customer using multiple data sources (billing records, call-detail records, etc.) Carriers then can identify and take steps to mitigate areas of risk, such as lost revenue, slower receivables, and customer dissatisfaction. Data warehousing systems allow the collection and analysis of huge amounts of data that can provide a carrier with competitive intelligence on such issues as which types of customers it is losing and why, what tariff offers would be most attractive, and what service issues it needs to address. Telecom operators can use such data to proactively target customers based on specified criteria and offer them the most appropriate and attractive calling plans and terms of service.

As developers of special application/services which the government seeks to promote the Indian government is eager to use the country's communications infrastructure to promote the development of services like tele-medicine and tele-education. These services would be of great benefit to people living in the rural and more remote areas of the country, where access to medical and educational services is more difficult and hospitals and schools are located at great distances. Tele-banking represents another potential activity in a sector in which the government has vital interests. U.S. firms that can design and implement such service applications that ride over India's growing state-of-the art communications infrastructure will interest BSNL, which is seeking to develop prototypes in tele-medicine and tele-education. Other Indian telecom providers that have installed high capacity digital networks to accommodate video and large data transmissions would also be candidates for other commercial applications in health care, transportation, and other sectors of the economy.

5.1 TELECOM PRODUCTS AND EQUIPMENT OPPORTUNITIES

In Chapter 2, we mentioned some of the technologies, products and services that will be in demand in India's telecom marketplace the next two to three years. The country's telecom market is growing fast, becoming more competitive, and operators are looking for new services to offer and practical ways to help them operate their businesses more economically and

efficiently. The objectives of the telecom operators are to increase revenues, add new customers while retaining current ones, increase network efficiencies, strengthen their competitive position in the market, and operate at a profit.

Chapter 2 also referred to the plans and objectives of the largest Indian telecom carriers. Those firms will continue to invest large sums in expanding their networks. In FY2004¹⁷⁵, for example, BSNL plans to invest \$2.8 billion; Bharti \$122 million; Hutchinson \$395 million; and Tata Teleservices \$650 million (over 15 months). These sums will be spent for a wide variety of equipment, and there are concrete opportunities for small U.S. telecom vendors with the right products and strategies to sell into the Indian market.

While sales of telecom equipment in India are driven by the rollout of new telecom infrastructure, the requirements for specific products may vary from year to year depending on the individual carrier plans for network expansion, the timing of their tenders, and the technologies they have selected. As noted already, more than half of equipment sales in 2002 were for carrier equipment manufactured by large global vendors. However, there is ample scope for sales of many types of specialized telecom products produced by small and medium-sized U.S. manufactures. The major Indian telecom players are in the market for all types of sophisticated equipment and “solutions” that meet their business needs and give them the capability to offer high quality services in an increasingly competitive market. The attitude of the best Indian telecom firms can be characterized as “show us your available (not a prototype) product, demonstrate how it enables us to run our business better and compete more effectively, and we will consider it.” The larger private firms in particular have funds available to spend, can make business decisions quickly and want to install new infrastructure without delay. The days of Indian operators taking a year or two to prepare and issue a tender, pre-qualify bidders, then perhaps withdraw the tender, reissue it later on, accept bids, evaluate bids, ask for clarifications from bidders, etc., before making a final announcement are over.

Several points about the current telecom equipment market in India are worth emphasizing:

- In 2004, it is estimated that India will import more than \$5 billion of telecom equipment, and \$2 billion of that amount or more could be sourced from the United States.¹⁷⁶ The U.S. Commercial Service in India ranks telecommunications equipment as the number one (most promising) industry sector in India for U.S. exports. With growth in total telephone subscribers growing at more than 20 percent annually the past five years, expansion in 2004 is expected to accelerate even more. India’s telecom market also has great potential for investment, although foreign direct investment in telecom operators continues to await favorable policy changes by the government and a more stable and predictable regulatory environment.

¹⁷⁵ The fiscal year for the Government of India runs from April 1 through March 31.

¹⁷⁶ Department of Commerce, “2004 Country Commercial Guide: India”.

- Most wireless infrastructure equipment is not manufactured in India. Even for equipment that can be produced domestically, inadequate supplies and/or tight tender deadlines for procurement and installation can make the importation of that equipment the only feasible alternative.
- Since most private Indian telecom operators are not conducting their own research and development, they are receptive to foreign-made equipment incorporating innovative technologies. Firms that do develop software and manufacture telecom products look to work with U.S. firms on a joint venture basis to develop new products.¹⁷⁷ Some operators may want the U.S. supplier to establish a base in India, so that the two firms can work more closely in designing and producing products to meet the carrier's future needs.¹⁷⁸ The U.S. firm, wherever it may manufacture its products, may find it advantageous to establish a presence in India where it can utilize local talent and be in a better position to learn about and help shape its customers' requirements.
- Opportunities exist for small U.S. firms to tie up with large U.S. vendors as subcontractors to supply telecom products not available in India. Many of those same products will be in demand in other rapidly growing telecom markets like China, Brazil, and Russia.
- Telecom operators and businesses purchasing telecom equipment in India may also seek technical support and specialized after-sale services from their suppliers. This may require firms that want to make significant sales in India to establish a base of operations in the country if they do not already have one.
- Small U.S. firms that offer such products as billing solutions and provisioning and fraud management systems, etc., may want to explore the possibility of partnership not only with Lucent and Motorola but with other foreign firms like Ericsson, Nortel and Siemens, and Indian organizations like C-DOT and ITI that are selling their network products to Indian carriers. U.S. firms developing open systems that work or can easily be modified to work with any digital switch are particularly well-positioned to sell to all network equipment vendors in India.
- Likewise, firms selling network products that support both GSM and CDMA systems will be in an advantageous position to compete for sales in India.

Based on our interviews and recently published material, telecom equipment most likely to be in demand during FY2004 in India includes:

¹⁷⁷ Interview with BPL Telecom officials, Bangalore, September 18, 2003

¹⁷⁸ Interview with Lucent officials in Gurgaon, September 16, 2003

Telecom switches. BSNL and MTNL will install about 80 percent of the new subscriber fixed lines during 2004. They will procure some switches from Indian firms that manufacture them with technical and financial collaboration from foreign firms. Private basic service operators will make smaller purchases. Government and private operators are implementing plans to install more wireless in local loop (WLL) projects. Recently, for example, BSNL awarded a contract for 750,000 CDMA lines.

The growth in the Internet and in specialized business services such as frame relay and managed data network services will increase the need for ATM, ISDN, and international gateway switches. Purchases of cellular switches and bay stations will support the continued expansion of GSM networks in many circles (service areas) where coverage is yet to reach most rural parts of the district.

Platforms that support Intelligent Network Services (INS) enable operators to provide new services quickly upon customer demand. BSNL, as well as the largest private carriers that are building national networks, will depend on INS platforms to roll out such telecom services as toll-free calling, account card calling, universal access numbers, conference calling, virtual card calling, and user defined routing.

Indian long distance carriers and public utility companies are buying optical transmission equipment based on SDH (synchronous digital hierarchy) technology. These products provide large capacity, high reliability and perform well in monitoring and measurement of network operations. BSNL and other firms are also interested in DWDM and WDM (wave length division multiplexing) equipment that increase the amount of capacity provided on a single pair of optical fibers.

CDMA network carriers are beginning to deploy multi-service provisioning platforms within their optical transmission access and backbone networks. With such a platform the carrier can upgrade its network and meet increased demands for capacity without the need to invest in additional network equipment. There also is good potential in India for sales of ADSL (asynchronous digital subscriber line) and HDSL (high bit digital subscriber line) equipment that enables data transmission over existing copper wiring at data rates hundreds of times faster than analog modem, while allowing simultaneous delivery of voice, video and data.

Successful utilization of certain technologies can have a big impact on the development of telecommunications services in India. One U.S. firm is developing "BREW", an underlying technology in mobile phones that makes it possible to download new applications such as games, news, and movies on cellular handsets. This technology increases the functionality of mobile phones and offers mobile carriers new revenue streams based on increased usage of data services.

With the movement toward convergence and the anticipated growth of data services in India, IP technology will come to play a vital role in India during the next few years. IP-based networks

provide platforms that promote interoperability and have the capacity to integrate voice, data, and video in multiple applications. Voice is only one of a number of applications that can be deployed over IP platforms. IP networks and their attached gateways are more receptive to innovation than are the legacy circuit switched networks. IP networks become attractive as revenues from voice traffic level off and revenues from data application increase. It then makes sense to migrate voice traffic from dedicated, long haul transmission facilities for switched telephony to multi-purpose packet-based data networks.

VoIP technology offers one solution in an environment where carriers seek to protect revenue volumes by cutting costs. IP telephony requires lower network capital costs, as packet infrastructure can be 40 percent cheaper than the public switched network infrastructure and has lower bandwidth and operational costs. Users of IP-delivered communications find services available at lower costs. IP telephony has potential appeal for India's national long distance and international operators, mobile operators, and enterprise network providers. IP-enabled voice solutions are fueling India's burgeoning call center operations, and several foreign telecom operators are establishing IP-based hubs in India. IP technology can help meet identified social goals too. IP voice gateways can provide access to the Internet for people without computers, while packet data networks are well-suited for distance learning applications.

The demand for IP-PBX is growing in India, while sales of IP-enabled systems will increase over time. The total market for enterprise IP-based solutions presently is estimated at just under \$200 million. Current government policy is impacting growth, since unrestricted IP telephony can be offered only in closed-user groups.¹⁷⁹ While the VoIP switch market in India is still in its initial stage, operators such as Bharti, BSNL and VSNL began to deploy VoIP equipment in their local and national networks during FY2003.

Public telephones offering fixed telephone services but compatible with GSM systems are in demand. Village public telephones are still the primary communications links for many people in India. Carriers are interested in pay telephones that accept cashless payments and operate by smart cards or optical cards. Information kiosks that provide access to many communications services including access to the Internet can help meet the communications needs of people in rural areas. Cost effective solutions are needed in rural areas where telecom services need to be provided at low prices. Further work on developing digital wireless technologies to deploy in village and rural areas and reduce costs per line can result in commercial applications that should find a ready market in India.

Demand is increasing for broadband access equipment and broadband digital loop carrier equipment for fixed access networks. BSNL in particular has an ambitious plan to introduce broadband services consisting of cable TV, video on demand and high speed Internet through a franchisee scheme. The carrier will use optic fiber rings to provide bandwidth on demand in large cities.

¹⁷⁹ *Voice&Data*, June 2003, p. 46

Other types of foreign-designed and/or produced equipment currently being sold in India include VSAT terminals, DSLAM,¹⁸⁰ routers, radio trunk line hand sets, and a variety of network security products (e.g., firewalls, anti-virus solutions, and encryption.) In addition, millions of cellular telephones will be sold in India in 2004. The telecom carriers are interested in providing additional services and applications that subscribers can access via their mobile handsets. These new services will generate additional revenues for the wireless carriers.

5.2 OPPORTUNITIES IN INFORMATION TECHNOLOGY

India offers significant opportunities and challenges for U.S. IT exporters, especially small and medium sized enterprises (SMEs). As noted in Chapter 1 of this report, the Indian economy is booming and its GDP growth is expected to exceed that of each of the G8 countries and other major developing nations, including China, in the future. This should act as a powerful engine for IT demand in the public and private sectors. India's per capita income will also rise substantially which bodes well for the consumer segment of the IT market. On the policy front, the GOI is attempting to develop India as an IT hardware leader following the country's success in custom software and IT services and to increase IT and Internet use among the masses to deal with societal problems such as illiteracy and poverty. It is actively encouraging foreign investment to build India's IT hardware industry. In addition, to help this industry compete more effectively with "grey market" suppliers there and to make computers more affordable to its citizens, the GOI has recently reduced tariffs on computer equipment and components and, as a signatory nation to the ITA, is committed to removing them entirely by 2005. As far as challenges are concerned, new-to-market SME U.S. exporters face strong competition from domestic suppliers and both U.S. and foreign multinational corporations (MNCs) that are well entrenched in the Indian IT market. They must also deal with hardware counterfeiting and software piracy.

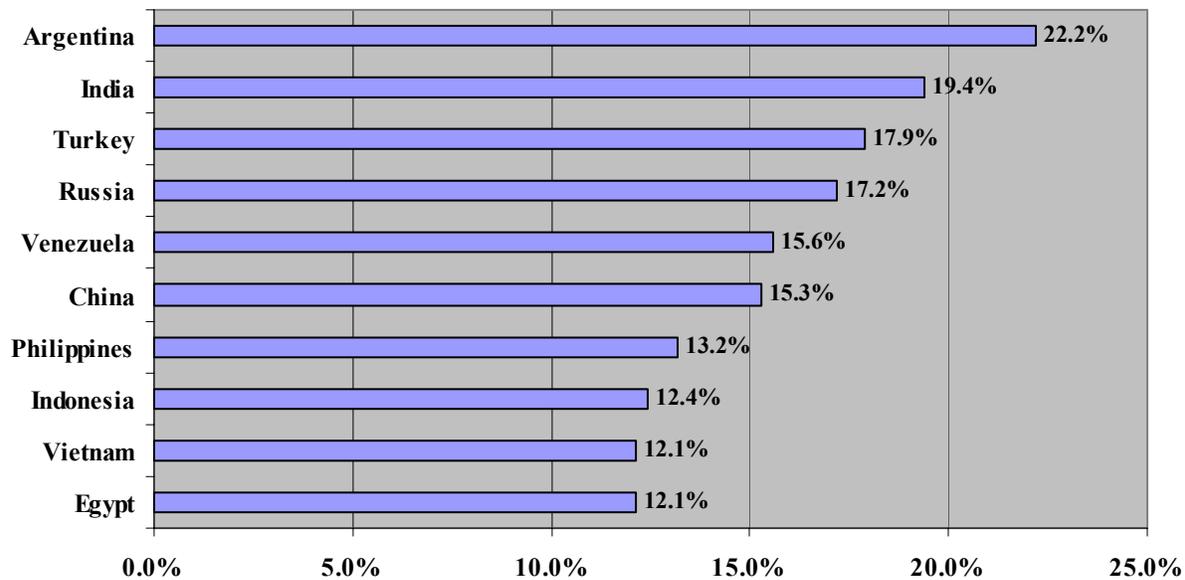
According to IDC, India is expected to trail only Argentina in growth of spending on IT with purchases more than doubling to \$13.7 billion by 2008 (Figure 5-1 next page). U.S. IT suppliers are very competitive in computing and networking equipment and stand to benefit from the Indian market's continued strong orientation toward IT hardware. They should also find significant opportunities in packaged software since India's demand for these products should increase nearly 20 percent annually over the next five years.

In developing their strategies for penetrating the Indian IT market, U.S. IT firms would do well to target SMEs and the small office/home office (SOHO) segments in the private sector. India has 1.9 million SMEs who now represent more than half of the IT spending activity in that country and are buying IT hardware and packaged software at a faster rate than large businesses.¹⁸¹ The Indian public sector also reportedly plans to spend lavishly on IT for e-

¹⁸⁰ Digital Subscriber Line Access Multiplexers that connect DSL lines with some combination of ATM, frame relay or IP networks

¹⁸¹ *Small is Big for MNCs*, [Cyber India Online](#), September 19, 2003.

**Figure 5-1: Top Ten Nations by Growth in IT Spending
2003-2008**



Source: IDC, April 2004

governance initiatives to the tune of \$8.9 billion over the next five years. The government of Andhra Pradesh, in particular, has given preference to SME suppliers in specific projects and is working to open up more opportunities for them as part of its new ICT policy.¹⁸²

As far as specific vertical markets are concerned, the big Indian IT spenders in telecommunications, banking, financial services, and insurance (BFSI), manufacturing, IT-enabled services, and education may generate substantial business opportunities for U.S. IT firms. As noted above, the telecommunications industry is building out its infrastructure (especially wireless and broadband technologies) and developing new telecommunications services. The banking community is growing rapidly and has become more involved in offering to its customers automatic teller and electronic banking services that require substantial computing resources as well as large numbers of automatic teller machines and networking equipment. Indian manufacturers are computerizing their operations, and large enterprises in the automotive, steel, chemical, and pharmaceutical industries are engaged in business-to-business (B2B) electronic commerce (e-commerce) that is expected to spread to other manufacturing and services industries in the near future. IT-enabled services companies have increased in number, thanks to the global outsourcing boom, and are continuing to expand the IT infrastructure. Finally, in education, many efforts are underway to introduce personal computers (PCs) into public and private schools and to provide them with Intranet and Internet connectivity.

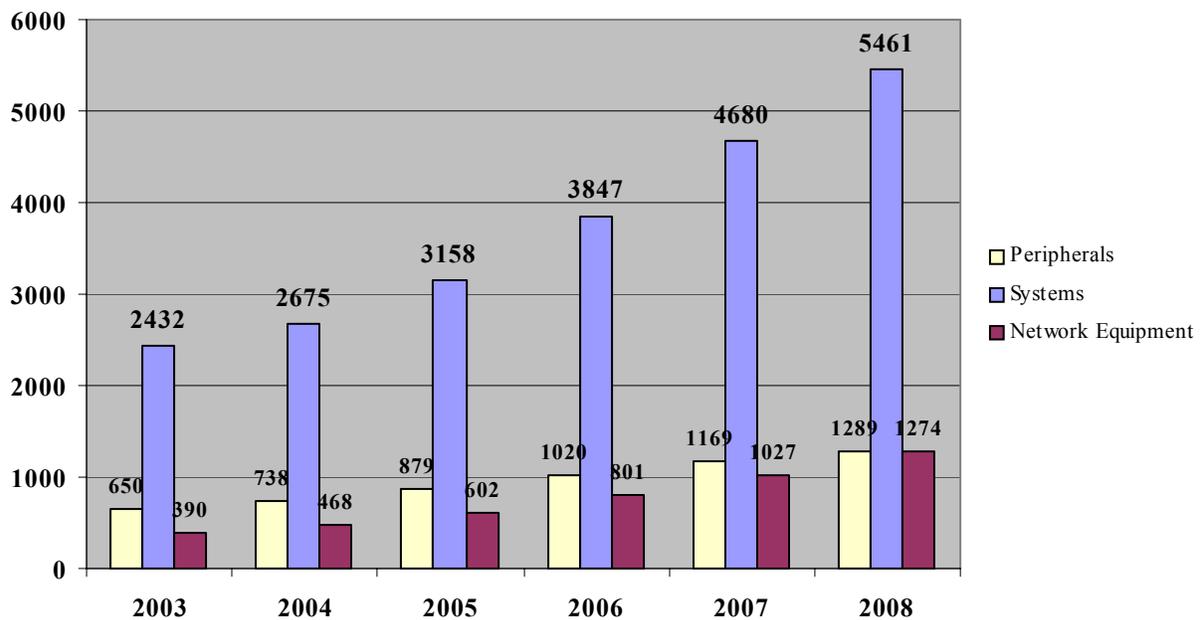
¹⁸² *E-governance will be Worth Rs 41, 000 Crore over the Next Six Years*, *Express Computer*, January 19, 2004.

Universities, colleges, and technical institutes are also investing heavily in upgrading their IT infrastructure and some are actually using or experimenting with electronic learning.¹⁸³

IT Hardware

The majority of IT hardware spending will go toward purchases of computer systems, especially PCs, over the next five years (Figure 5-2). PC sales are expected to increase 19 percent annually to more than \$4.9 billion by 2008, according to IDC. The key factors driving this

Figure 5-2: India's IT Hardware Spending (\$Millions)



Source: IDI, April 2004

growth will be: 1) the replacement of older desktops already underway in larger businesses and new systems buys by SMEs and SOHOs; 2) significant public sector PC purchases for e-governance applications and schools; and 3) greater use of notebooks by Indian corporations and professionals now that the price of these systems has dropped appreciably and in the future from the growth in wireless technologies, such as WiFi. The prospects for U.S. MNC vendors in this market segment are good since Indian users place great value on service, customer support, and supplier reliability and rate U.S. companies highly in these areas. Recent tariff cuts on computer

¹⁸³ Lillian Tay, Vinod Nair, and Jennifer Wu, *India: PC and PDA Plans for 2003*, Gartner, April 11, 2003; interviews with Vinnie Mehta, Executive Director, MAIT, September 15, 2003 and Sudhir Narang, Vice President, Cisco Systems India, September 17, 2003.

equipment and parts and their total elimination in 2005 should have a positive effect on both Indian branded manufacturers and foreign MNCs competing against “grey market” assemblers for SMEs, SOHOs, and home users, particularly in the highly price-sensitive B and C class cities and towns where demand is picking up substantially. However, U.S. SME exporters will probably find their opportunities for selling new systems in India limited by this domestic and MNC competition. They would probably do better serving the burgeoning market for second-hand PCs in less affluent homes and in educational institutions in towns and rural areas if the GOI decides to lift the current embargo on these imports.¹⁸⁴

The high performance computer and server market segments also hold great potential for U.S. IT firms, given the easing of U.S. export controls on high tech products. Although the Indians have been developing their own high performance computers such as the PARAM for many years, they have a significant need for the enormous computational power of U.S. vector and massively parallel systems. They are interested in acquiring these computers for climate modeling and weather forecasting, the life sciences, other non-defense-related science applications in government, and research and development in industry. As noted in Chapter 3, India has one of the fastest growing server markets in Asia, with spending projected to reach \$528 million by 2008, according to IDC. Demand should continue to come primarily from BFSI and telecom users and increase among the distribution and manufacturing sectors and SMEs. Market growth will be spurred by deregulation of the insurance industry, server consolidation among service providers, branch-level automation in banking, and infrastructure expansion in the mobile telecom services segment. Key applications for which servers will find use are business support (e.g., billing, mediation, and fraud management) and operations support (e.g., networking management and control, and call switching). In the public sector, another major user of these computers, demand will be driven by e-governance and e-learning projects. More widespread use of Linux-based systems should occur and will be closely linked to Internet infrastructure expansion and the replacement of Unix server installations for applications in education and research that do not require significant processing power. U.S. companies are well positioned to gain a significant share of these high performance and server sales, given their technological prowess and strong reputation for product quality and customer support.¹⁸⁵

This surge in computer systems purchases will benefit peripheral equipment suppliers who have also cut prices to boost demand in the SME, SOHO, and the home user market segments. IDC estimates that Indian peripheral equipment spending will rise 14.6 percent each year to \$1.3 billion by 2008. Best prospects for U.S. IT firms at the PC level should be inkjet and laser printers, multi-functional devices that combine scanning, copying, and fax capabilities, and hard disk drives. At the server level, purchases of high-end data storage devices should continue to grow at a healthy pace due to the large amounts of data generated by new and existing applications in key industries and government. They will be spurred as well by ongoing

¹⁸⁴ Interview with Vinnie Mehta, Executive Director, MAIT, September 15, 2003.

¹⁸⁵ Aman Muglani, *Servers & Workstations: Back in Business*, *Dataquest India*, August 2003 and V. Rishi Kumar, *Acer Bullish on Server Market*, *The Hindu Business Line*, November 19, 2003.

corporate concern about disaster recovery and business continuity planning in the wake of the September 11th terrorist attacks on the United States and the Gujarat earthquake in January 2002.¹⁸⁶

Demand for Smart Handheld Devices (SHDs) is currently at a nascent stage, but will grow at a staggering 51 percent annual rate through 2008 to \$192 million— faster than any other IT hardware market segment, according to IDC. U.S. IT suppliers will face competition in this market from the “Simputer” and other similar devices that Indian firms have to offer. They will need to develop local language applications to sell SHDs across India, not just to the English-speaking population in the major metropolitan areas. They should target their use in the private sector for mobile applications in large corporations (particularly within middle and upper management), for work in the healthcare and legal professions and in restaurants and hotels, and for access to agricultural information (e.g., weather reports, seed and crop prices) by farmers. In the public sector, they should focus on national and state e-governance projects.¹⁸⁷

Networking equipment is the other hot area of the Indian IT hardware market with IDC projecting a 27 percent increase each year to nearly \$1.3 billion by 2008 and Cisco Systems India predicting a much more bullish 35 to 40 percent growth rate. The major customers for this equipment should remain the BFSI sector, the business process outsourcing (BPO) industry, and telecom while the manufacturing and healthcare verticals, public sector companies and government agencies, and education will emerge as significant purchasers over the next several years. As in the case of other developing nations, GOI policy is one of the key demand drivers since the on-going build out of the telecom infrastructure is seen as critical to industrial development generally and to India’s digital divide efforts. Large businesses should continue to establish corporate intranets so that internal resources are more available to employees and extranets that will allow them to work more efficiently with suppliers, customers, and strategic partners. They will also be shifting from data-only networks to networks optimized for voice, video and data. Education and healthcare will invest heavily in networks as PC and Internet use expands on university campuses, in schools, and among hospitals, clinics, and other medical facilities. However, home networking will have to wait until PC use among more affluent households rises and goes beyond single system installations.¹⁸⁸

Smart cards are outside the realm of traditional computing equipment, but will represent an enormous market that U.S. IT firms should not ignore. The Smart Card Forum of India (SCAFI) predicts that 500 million smart cards could be in use in India over the next five years. Their major applications will include financial transactions, healthcare, citizen identification, drivers’ license and vehicle registration, and toll and public transportation. Their use should receive a

¹⁸⁶ *Buoyant Economy Propels Peripherals Sector to New Highs and Falling Prices Widen Personal Storage Options*, Express Computer, January 26, 2004.

¹⁸⁷ Lillian Tay, Vinod Nair, and Jennifer Wu, *India: PC and PDA Plans for 2003*, Gartner Group, April 11, 2003. Interviews with Vinnie Mehta, Executive Director, MAIT, September 15, 2003 and Anoop Khandelwal, Country Manager for Business Operations, HP India, September 17, 2003.

¹⁸⁸ Interviews with Sudhir Narang, Vice President, Cisco Systems India, September 17, 2003 and Anand Mehta, Manager for New Business Development, D-Link, September 23, 2003 and Vishwanath Kulkarni, *3Com Aggressive on India: Targets Enterprise Segment*, The Hindu Business Line, October 31, 2003.

boost from India's fast-growing cellular telephone base. State governments such as Delhi, Gujarat, Madhya Pradesh, Maharashtra, and Punjab have already issued tenders for smart card-based driving and registration documents.¹⁸⁹

Software and IT Services

Packaged software offers the best opportunities for U.S. SME IT exporters in the Indian software and IT services market over the next five years, given the strength of Indian and MNC suppliers in custom software development, other IT services, call centers, and BPO. Projected to grow 21 percent annually to \$1.4 billion by 2008, according to IDC, demand for this software will continue to come mainly from the BFSI sector and government users (for e-governance and educational applications), but will increase in the healthcare, pharmaceutical, textiles, and telecommunications industries. The SME user segment in India has become increasingly important to packaged software vendors since it promises to be a potentially huge market in the near future even though IT deployment is still low. Moreover, this segment is shifting away from using customized enterprise applications toward standard, but proven packaged applications in its drive to find low-cost solutions that will increase operational efficiencies. U.S. companies that plan to sell in the Indian market currently face very little competition from Indian suppliers who hold less than a 9 percent share of sales. They should focus on packaged software in the areas of digital imaging, graphics, messaging, core-banking applications, insurance solutions, retail backends, enterprise resources planning (ERP), supply chain management (SCM), customer relationship management (CRM), business intelligence, data mining, and security. They should also focus on developing applications for open source platforms such as Linux that is growing in popularity in many industry sectors and government agencies. To address the broad Indian market, U.S. SME IT exporters should consider working closely with Indian partners on localization of their products into various Indian languages. Protection of intellectual property rights (IPR) remains an issue, but NASSCOM, the Business Software Alliance (BSA), and U.S. and Indian vendors have been collaborating in education and enforcement initiatives that have increased awareness of the significant impact piracy has on the Indian software industry and the national economy.¹⁹⁰

As noted in Chapter 3, U.S. MNCs already have a strong presence in the Indian software and IT services sector and market. They should continue to play a major role in applications packages and systems infrastructure software (e.g. operating systems). In IT services which may reach \$4.3 billion by 2008, according to IDC, U.S. MNCs will compete aggressively against Indian suppliers for BPO, facilities and specialized network management services, consulting, and

¹⁸⁹ Gov't, *Service Sector Drive Smart Card Growth*, *Express Computer*, June 23, 2003 and *500m Smart Cards in 5 Yrs*, *The Economic Times*, September 15, 2003.

¹⁹⁰ U.S. and Foreign Commercial Service, *India Country Commercial Guide FY2004*, 2003; Manjiri Kalghatgi, *Packaged Software: Good Things in Small Packs*, *Dataquest India*, August 2003; Sarita Rani and T.V. Mahalingam, *Indian Software Products: The Untold Story*, *Dataquest India*, September 20, 2003 and Sunila Paul, *Packaged Software: Packing More Punch*, *Dataquest India*, October 21, 2003.

systems integration contracts. They may also find some opportunities in IT training and education, an area that is crucial to the GOI's plans to expand PC and Internet use throughout the country and to meet the Indian IT sector's considerable need for skilled personnel in the future.¹⁹¹

5.3 OPPORTUNITIES IN ELECTRONIC COMMERCE

Although still at an early stage of development, Indian e-commerce is expected to grow very rapidly over the next five years and will continue to be driven by spending on B2B e-commerce. B2B was adopted originally by MNCs and larger Indian corporations who established online portals for exchanges and auctions and invested heavily in ERP and electronic data interchange (EDI) for handling business transactions and are moving into SCM and CRM. It is now spreading to SMEs as well. B2B has quite a promising future in India since many companies have become aware of the advantages of using e-commerce to reduce costs and increase productivity and efficiency in a more highly competitive domestic and international business environment. This market should provide substantial opportunities for U.S. IT exporters who can supply e-business solutions to Indian SMEs that are interested in electronic procurement and sales automation technologies.¹⁹²

Business-to-consumer (B2C) e-commerce is very limited, given low PC use and Internet penetration in India and the many constraints on it such as high Internet access and delivery costs and the public's concerns about security and confidentiality of data. It is also limited by the fact that the ISP industry has gone through a boom and bust cycle and has only a few players that have a presence in most parts of the country. However, this situation should change in the future with government action and growth in wireless and broadband deployment that will bring not only greater Internet access to consumers beyond the major metropolitan areas, but also a wider range of products and services (e.g., entertainment on demand, electronic learning, telemedicine). When B2C takes off, demand from Indian firms for content creation, web development and web hosting services, and CRM applications such as online order management, sales and marketing, and customer service and support should grow significantly. U.S. IT exporters should take advantage of their strengths in these areas and compete aggressively for this business.¹⁹³

5.4 MARKET STRATEGIES

Large multinational IT and telecommunications firms can make strategic investments in foreign markets through manufacturing subsidiaries, direct sales operations, and joint ventures based on brand and product recognition. However, SMEs should engage in careful research and planning regarding market entry strategies before they make a final choice on where they should export.

¹⁹¹ Manjiri Kalghatgi and Neetu Katyal, *Training & Education: A Near-Death Experience*, *Dataquest India*, August 2003.

¹⁹² *Strategic Review 2003: The IT Industry in India*, NASSCOM, February 2003; *E-Biz: Here for Good*, *Dataquest India*, March 2003; and *Initiatives for E-Commerce Capacity Building of Small and Medium Enterprises*, Trade and Investment Division, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2003.

¹⁹³ Confederation of Indian Industry, *India Broadband Economy: Vision 2010-A Discussion Paper*, 2003 and interview with Dilip Chenoy, Deputy Director, CII, September 15, 2003

The U.S. and Foreign Commercial Service's publication *India Country Commercial Guide FY 2004* is a good resource for information on setting up an office, creating a joint venture company, or finding agents and distributors and can be found on the following website (<http://www.export.gov/cs>). Excerpts from this study are directly quoted or paraphrased below:

Joint venture/licensing: A joint venture company is generally formed under the Indian Companies Act and is jointly owned by an Indian and a foreign company. This type of arrangement is quite common because India encourages foreign collaborations to facilitate capital investments, import capital goods, and transfer technology. Joint ventures can be financial, technical, or techno-financial. Software development is among India's 35 high priority industries (called Annexure III industries) where investment is sought on a priority basis. IT hardware has been another area that India has targeted more recently for development and foreign investment as noted in Chapter 3.

Foreign firms, which do not choose to set up a subsidiary or form a joint venture with an Indian partner, can establish one of several types of offices. None of the following entities are permitted to acquire immovable property without prior approval. However, they are allowed to lease property in India for a maximum period of five years.

Liaison or representative office: Many foreign companies initially establish a presence in India by establishing a liaison or representative office that is not directly engaged in commercial transactions. These offices are usually opened to oversee existing business interests, to promote awareness of products, and to explore further opportunities for business and investment. They cannot generate any revenue or repatriate money out of India and, therefore, are not taxed.

Branch office: A branch office, like a liaison office, is not an incorporated company, but an extension of the foreign company in India. As such, it is limited to the following activities by the Reserve Bank of India (RBI): representing the parent company, as a buying/selling agent; conducting research for the parent company, provided that the research results are made available to Indian companies; carrying out import and export trading activities; promoting technical and financial collaborations between Indian and foreign companies; rendering professional or consulting services; rendering services in IT and development of software in India; and rendering support to the products supplied by the parent/group companies. Since business is actually conducted in India, a branch office is subject to tax and is allowed to repatriate the profits generated from the Indian operations from the Indian operations to the parent company after payment of taxes. The branch office is not allowed to carry out manufacturing and processing activities either directly or indirectly.

Project office: A project office is a method to establish a business presence for a limited period of time, usually to undertake projects in India awarded to the parent company.

There are some practical guidelines that new companies establishing offices in India should consider: identify the right decision-makers; keep these decision-makers and other key players briefed about your project; avoid getting into the land acquisition process from private sources;

handle labor issues carefully because Indian laws essentially prohibit firing workers; and take the opposition seriously whether it is local politicians or residents.

Business Centers: Given the shortage of good commercial office space at reasonable prices in major Indian cities, business centers are a viable option for new companies wanting to establish a physical presence. They are facilities that are ready to move in, wired for communications, and air-conditioned. Billing is normally done on a monthly basis, and discounts are available for long-term use. For selected industry sectors like software, electronics (including IT hardware), and biotechnology, states have established special Technology Parks and are continuing to open them up across the country. They often provide special support and incentives to attract investments in these locations (see Chapter 1).

Agents and distributors: With the gradual opening of markets in line with India's WTO commitments, U.S. exporters should find a high response rate from potential agents and distributors for many products. The agent/distributor approach can be a cost effective-way to gain entry into a new market. Local representatives can assist U.S. firms by providing knowledge of the domestic market, regulations, and tax laws. However, agents and distributors should be qualified to ensure they understand the product and can provide after sales service if necessary. They should be selected based on the following criteria: business reputation and standing; business capacity and marketing strength; expertise and previous experience in the line; financial capacity and willingness to invest in the line; and creditworthiness.

DISTRIBUTION CHANNELS

Most Indian manufacturers use a three-tier selling and distribution structure: distributor, wholesaler, and retailer. In recent years, companies have shown a growing interest in improving their distribution logistics in their effort to address a fiercely competitive market. This trend in turn has led to the emergence of independent distribution and logistics agencies to handle this important function. Marketers are increasingly outsourcing some of the key functions in the distribution and logistics areas to courier and logistics firms and searching for more efficient ways to reach the consumer.

While there are no major national store chains, the number of department stores, branded stores, specialty stores, malls, and supermarkets is growing rapidly in many large and medium-sized cities. India has both organized and unorganized channels for selling goods. However, with government liberalization resulting in lower taxes and customs duties for IT products, the volume of business in smuggled goods has fallen. Computer parts, cellular telephones, and other consumer goods once routinely sold through thriving unorganized channels are now sold through direct channels. These more organized channels of distribution and support are used for products such as computer systems, peripherals, and software ranging from commodity products to high-end IT equipment. The typical distribution structure has been two-tiered with a distributor servicing dealers and retailers.

In addition to the traditional marketing channels, Indian and foreign firms are beginning to use the Internet to sell their products and services. B2C is expected to grow as the number of Internet users expands in the future.

Important Issues to Consider When Entering India

Be Patient—As is the case with other Asian nations, it generally takes more time to conduct business transactions in India than in the United States.

Price Appropriately—India's IT and telecommunications markets are extremely price competitive, and Indian buyers, especially SMEs, are very price conscious. European and Japanese suppliers are often able to offer concessionary financing packages on larger infrastructure projects that U.S. competitors may find difficult to match.

Protect your Intellectual Property Rights—IPR violation remain a serious concern in India so U.S. companies should take precautions to use appropriate contractual and legal measures to protect their intellectual property.

Localization is Essential—U.S. firms looking to address a broader customer base than just the English-speaking population of India need to localize their products and services. The translation of product literature and labeling is only one element of this process. The other is to make electrical products compatible with local current supplies.

Get to Know Local Trade Associations and Government Offices

There are a number of trade associations that may be useful to U.S. IT and telecommunications companies in India, including the Association of Basic Telecom Operators, the Cellular Operators Association of India, the Indo-American Chamber of Commerce, the Manufacturers Association for Information Technology (MAIT), the National Association of Software and Service Companies (NASSCOM), the Telecom Equipment Manufacturers Association, and the Telecom Industry Service Association.

There are also a number of Indian government offices that oversee the IT and telecommunications sectors so it is important for U.S. firms to develop a good working relationship with them.

Overviews of the trade associations and key Indian government agencies are included in Chapter 1. The names and addresses of contacts in these associations and government agencies can be found in the appendices of this report.

Work with the U.S. and Foreign Commercial Service

U.S. companies that have made recent sales in India uniformly praise the superb assistance they have received from officials and staff of the Department of Commerce's U.S. and Foreign Commercial Service (US&FCS) post based at the embassy in New Delhi and consulates in

Mumbai, Bangalore, Hyderabad and Chennai. The US&FCS has expertise in the telecom and IT sectors, knowledge of the latest developments, and maintains valuable contacts in government and the private sector. It can offer business advice to U.S. firms, set up appointments for them, and provide advocacy support when appropriate. U.S. companies interested in exploring Indian telecom and IT market opportunities further should stop by and introduce themselves to US&FCS personnel when they are in India, or contact them directly by telephone or e-mail. The names and addresses of Commercial Service contacts can be found in the appendices of this report.

For help in exporting, U.S. firms should also contact U.S. Department of Commerce IT and telecommunications market specialists located in district offices throughout the United States. The names and addresses of these specialists can be found on the US&FCS website (<http://www.export.gov/cs>).

Consider Participating in Trade Shows

Trade shows provide a good opportunity for U.S. companies to learn about India's IT and telecommunications market sectors. There are several national IT and telecommunications exhibitions each year which provide attendees a good overview of the various products and technologies currently available in the Indian market. Trade shows that focus on specific vertical industries are an excellent avenue for SMEs that offer niche-market or vertical industry-specific products or services. A partial list of key trade shows is also available in the appendices of this report.

The U.S. Department of Commerce organizes a variety of trade missions and matchmaker events each year throughout the world. Agency personnel participate in many foreign trade fairs with, or on behalf of, U.S. firms offering them market exposure at prices far below regular trade fair participation costs. International Trade Specialists in the Department manage trade missions and matchmakers. These trade events can be an excellent way for SMEs to gain knowledge of a foreign market, including making valuable business contacts in a short period of time. For a partial list of IT and telecommunications trade fairs in India and elsewhere that are supported by the U.S. Department of Commerce's U.S. and Foreign Commercial Service, visit the US&FCS website (<http://www.export.gov/cs>). The U.S. Department of Commerce's Information Technology Industries offices' website can be found at <http://www.export.gov/infotech/>.

CHAPTER VI: THE ROLE OF THE U. S. DEPARTMENT OF COMMERCE

6.0 INTERNATIONAL TRADE ADMINISTRATION

The mission of the U.S. Department of Commerce's International Trade Administration (ITA) is "to create economic opportunity for U.S. workers and firms by promoting international trade, opening foreign markets, ensuring compliance with trade laws and agreements, and supporting U.S. commercial interests at home and abroad." The Trade Development (TD) and the U.S. Commercial Service (US&FCS) divisions of ITA are responsible for export promotion. For more information on ITA, visit <http://www.trade.gov>. For more information on how the U.S. Government assists U.S. businesses export, visit <http://www.export.gov>.

Export.gov Web site

Export.gov is a multi-agency trade portal that brings together U.S. Government export-related information under one easy-to-use web site, organized according to the intended needs of exporters, especially small businesses. Whether a company is exploring the possibility of exporting, searching for trade partners, seeking information on new markets, or dealing with trade problems, this web site can help. Additionally, the site has easy links to information on advocacy, trade events, trade statistics, tariffs and taxes, market research, export documentation, financing export transactions, and much more. For more information, visit the Web site at: <http://www.export.gov>.

6.1 TRADE DEVELOPMENT

ITA's Trade Development (TD) unit is the Commerce Department's link to U.S. industry. TD provides industry and market analysis, export promotion services, advocacy for U.S. companies bidding on foreign government contracts, and support for trade negotiations. TD offers an array of services to help small businesses increase their export potential.

Industry Expertise

TD's industry expertise encompasses the majority of U.S. business sectors. Industry sector specialists provide U.S. firms with: information and analysis of domestic and foreign industry trends; foreign market conditions and opportunities for specific products or services; information on foreign market tariffs and non-tariff barriers and regulations; advocacy assistance; business and cultural practices; and advice on business and cultural practices.

Trade Negotiations and Agreements

TD's industry expertise is the primary source used in trade negotiations by the President of the United States and the Office of the U.S. Trade Representative (USTR). TD's close interaction with industry, understanding of restrictions on market access, product standards and testing requirements, and knowledge of trade data assist negotiators in the drafting of trade agreements with maximum benefits for U.S. firms. Additionally, TD industry experts help monitor and enforce foreign governments' compliance with trade commitments through collaboration with other ITA units, including the US&FCS and Market Access and Compliance (MAC) regional desk officers, as well as the USTR.

TD'S INFORMATION TECHNOLOGY INDUSTRIES

TD's Deputy Assistant Secretary for Information Technology Industries (ITI) oversees the activities of the three (3) high-tech industry-focused offices: the Office of Information Technologies and Electronic Commerce (OITEC); the Office of Telecommunications Technologies (OTT); and the Office of Microelectronics, Medical Equipment, and Instrumentation (OMMI).

6.2 Office of Information Technologies and Electronic Commerce

OITEC focuses on numerous IT industry segments including but not limited to: computers and peripherals; software; networking equipment; and Internet and e-commerce technologies. The office conducts market research and provides general trade and policy analysis of the IT industry, including policy reviews of foreign countries' e-commerce laws and initiatives.

OITEC actively supports U.S. IT firms' efforts to expand their business overseas. Industry specialists track the growth and competitiveness of domestic and foreign IT industries; counsel U.S. businesses on overseas market conditions and the practical aspects of exporting their products; identify market barriers as they affect IT exports; and work closely with USTR to negotiate the removal of such barriers. The office's export promotion activities include trade missions, trade fairs, catalog shows, and technical seminars that introduce U.S. businesses to end-users and potential trading partners located overseas.

OITEC also fosters a favorable policy environment by focusing on keeping both the Internet and foreign markets open to private sector-driven global growth. OITEC participates in various fora such as the Organization for Economic Co-operation and Development (OECD), the World Trade Organization (WTO), the Asia Pacific Economic Cooperation forum (APEC), the U.S.-Japan information technology working group under the Regulatory Reform Initiative, the Free Trade Agreement of the Americas (FTAA) negotiations, as well as bilateral free trade agreements with Australia, Chile, and Singapore. The office oversees the Administration's E-Commerce Joint Statements with other governments, manages the Industry Functional Advisory Committee (IFAC-4) on E-Commerce, and participates in formal as well as informal policy dialogues with other nations.

Industry specialists compile and disseminate detailed information and analyses on the IT industry sectors they cover, contribute to the Department of Commerce *U.S. Industry & Trade Outlook* publication that describes current and future IT industry and market trends on a domestic and global basis and prepare with other ITI offices ExportIT reports on key foreign markets. These specialists also work to update and expand the export.gov/infotech Web site with information on foreign markets and regulations, including tariff and tax rates for IT products, U.S. and foreign policies that affect IT exports, upcoming trade events, and additional government and private sector resources. The office also distributes a free electronic newsletter highlighting trade leads, partnering opportunities, and trade events.

To obtain more information, including a list of OITEC international trade specialists and the regions/industry sectors they cover, contact:

Office of Information Technologies and Electronic Commerce (OITEC)
U.S. Department of Commerce, Room 2003
14th Street & Constitution Avenue, N.W.
Washington, DC 20230
Tel: (202) 482-0216
FAX: (202) 482-5522
Internet: <http://www.export.gov/infotech>

6.3 Office of Telecommunications Technologies

OTT's mission is to support the growth and competitiveness of the U.S. telecommunications equipment and services industries in foreign markets.

OTT provides business counseling to U.S. telecommunications firms seeking to enter or expand in specific markets by developing and disseminating information on the telecommunications market in foreign countries based upon information from US&FCS and a wide range of other industry resources. The office promotes international trade and investment opportunities for the U.S. telecommunications industry by sponsoring events that offer direct contact with foreign government and industry officials. OTT, in conjunction with sister ITA units and government agencies, acts as an intermediary between U.S. firms and foreign governments to provide advocacy on behalf of U.S. companies bidding on public projects abroad. It supports the USTR in trade negotiations to open foreign markets for U.S. telecommunications equipment and services exports. Additionally, OTT monitors both bilateral and multilateral telecommunications agreements and provides input to the USTR regarding compliance by foreign countries.

OTT conducts market research and statistical analysis of the domestic and international telecommunications industry and posts a variety of industry information to the export.gov/infotech Web site. The office distributes complimentary electronic newsletters that deliver up-to-date information on foreign market opportunities and changes affecting the industry. OTT contributes the telecommunications chapters featured in the Department of Commerce *U.S. Industry & Trade Outlook* publication.

To obtain more information, including a list of OTT international trade specialists and the regions/industry sectors they cover, contact:

Office of Telecommunications Technologies (OTT)
U.S. Department of Commerce, Room 4324
14th Street & Constitution Avenue, N.W.
Washington, DC 20230
Tel: (202) 482-4466
FAX: (202) 482-5834
Internet: <http://www.export.gov/infotech>

6.4 Office of Microelectronics, Medical Equipment, and Instrumentation (OMMI)

OMMI covers electronic components such as electron tubes, printed circuit boards, semiconductors, capacitors, resistors, transformers, and connectors, as well as semiconductor manufacturing equipment. Additionally, the office supports several industry sectors with high IT content, including medical and dental equipment and electronic medical apparatus, process control instruments, laboratory analytical instruments, optical instruments, and instruments used to measure electricity and electrical signals.

OMMI's primary mission is to promote exports and increase the international competitiveness of U.S. industry working in these sectors. It counsels U.S. firms on foreign market conditions and the specifics of exporting, using information from overseas US&FCS offices and a wide range of industry-related resources. OMMI staff work with private sector and Department of Commerce colleagues to develop trade missions, trade fairs, catalog shows, seminars, and other trade events that offer direct contact with foreign government officials, industry representatives, and end-users. In cooperation with other parts of ITA and U.S. government agencies, the office participates in trade negotiations and supports USTR efforts to eliminate or reduce regulatory and other types of barriers that hinder trade and investment in these industries.

OMMI staff gathers and disseminates market research and statistical analyses of the domestic and international microelectronics, medical equipment, and instrumentation industries. Trade and industry reports, trade statistics, information on foreign markets and regulations, U.S. and foreign policies that affect exports, trade events, and links to additional government and private sector resources are available on the export.gov/infotech Web site. OMMI industry specialists profile current and future industry and market trends on a domestic and global basis in the Department of Commerce *U.S. Industry & Trade Outlook* publication.

To obtain more information, including a list of OMMI international trade specialists and the regions/industry sectors they cover, contact:

Office of Microelectronics, Medical Equipment, and Instrumentation (OMMI)
U.S. Department of Commerce, Room 1015
14th Street & Constitution Avenue, N.W.
Washington, DC 20230

Tel: (202) 482-2470

FAX: (202) 482-0975

Internet: <http://www.export.gov/infotech>

6.5 OTHER TRADE DEVELOPMENT OFFICES AND PROGRAMS

Trade Information Center

TD's Trade Information Center (TIC) is an excellent first stop for new-to-export companies seeking export assistance from the federal government. TIC Trade Specialists: 1) advise exporters on how to find and use government programs; 2) guide businesses through the export process; 3) provide country and regional business counseling, foreign import tariff/tax rates and customs procedures, trade opportunities and best prospects for U.S. companies, distribution channels, standards, and common commercial difficulties; 4) provide information on domestic and overseas trade events; and 5) provide sources of public and private sector export financing. TIC trade specialists also assist exporters in accessing reports and statistics from the computerized National Trade Data Bank and direct them to state and local trade organizations that provide export assistance. To contact the TIC, call 1-800-USA-TRADE; FAX (202) 482-4473; e-mail: TIC@ita.doc.gov; or visit the Web site <http://tradeinfo.doc.gov>.

Advocacy Center

The Advocacy Center (AC) aims to ensure that U.S. companies of all sizes are treated fairly and evaluated on the technical and commercial merits of their proposals for foreign government tenders. Advocacy assistance is wide and varied, but often involves U.S. companies that must deal with foreign governments or government-owned corporations. Assistance can include the visit of a high-ranking U.S. government official to a key foreign official; direct support by U.S. officials (including Commerce and State Department officers) stationed overseas at the U.S. Embassies and Consulates; or, coordinated action by U.S. government agencies to provide maximum assistance. The AC is at the core of the President's National Export Strategy and its goal is to ensure opportunities for American companies. Since its creation in 1993, the AC has helped hundreds of U.S. companies in various industry sectors win foreign government contracts valued at more than \$2.5 billion. For more information, visit the AC's Web site: <http://www.trade.gov/advocacy>.

Trade Missions And Events

Working in coordination with the private sector and the US&FCS, TD industry analysts help plan, organize, and execute trade events, including high-level executive missions with the Secretary or Under Secretary of Commerce. Additionally, there are a host of trade conferences and shows held throughout the U.S. and abroad. A searchable list of all ITA trade events can be found at <http://www.usatrade.gov>.

Small Business Program

ITA's Small Business Program is the focal point for trade policy issues concerning SMEs. The program brings the small business point of view to international trade policy discussions, primarily through the Industry Sector Advisory Committees (ISAC) on Small and Minority Business for Trade Policy Matters (ISAC 14), the only advisory committee to the U.S. Government on small and minority business export concerns. The Small Business Program also provides outreach to and plans events for small, women-owned, and minority-owned firms.

Additional information can be found on the Industry Consultations Program's Web site at <http://www.trade.gov/td/icp>, or by contacting the:

Industry Consultations Program
U.S. Department of Commerce
Tel: 202-482-3268
FAX: 202-482-4452
E-mail: Trade_Advisory_Center@ita.doc.gov

Industry Consultations Program

Industry has a voice in U.S. trade policy formulation through the Industry Consultations Program (ICP). The ICP includes more than 500 members and is comprised of seventeen (17) Industry Sector Advisory Committees (ISACs) on Trade Policy Matters and four (4) Industry Functional Committees (IFACs) on Trade Policy Matters. The ISACs represent industry sectors of the U.S. economy, including IT and small and minority businesses. The IFACs address crosscutting issues affecting all industry sectors - customs, standards, intellectual property rights, and e-commerce. Advisors on these committees have direct access to trade policymakers at the Department of Commerce and the USTR and help develop their industry's positions on U.S. trade policy and negotiation objectives.

Additional information can be found on the ICP's Web site at <http://www.trade.gov/td/icp>, or by contacting the:

Industry Consultations Program
U.S. Department of Commerce
Tel: 202-482-3268
FAX: 202-482-4452
E-mail: Trade_Advisory_Center@ita.doc.gov

Export Trading Companies and Trade Intermediaries

The Office of Export Trading Company Affairs (OETCA) promotes the formation and use of export trade intermediaries and the development of long-term joint export ventures by U.S. firms. OETCA administers two programs available to all U.S. exporters. The Export Trade Certificate of Review Program provides antitrust protection to U.S. firms for collaborative export

activities. The MyExports.com™ program is designed to help U.S. producers find export partners and locate export companies, freight forwarders, and other service firms that can facilitate export business. For more information, visit <http://www.trade.gov/oetca> and <http://www.myexports.com>.

Market Development Cooperator Program

MDCP is a competitive matching grants program that builds public-private partnerships by providing federal assistance to nonprofit export multipliers such as states, trade associations, chambers of commerce, world trade centers, and small business development centers. These multipliers are particularly effective in reaching and assisting SMEs. Applicants use their own creativity to design projects that will help SMEs to enter, expand, or maintain market share in targeted overseas markets. MDCP awards help underwrite the start-up costs of new export marketing, ventures which these groups are often reluctant to undertake without federal government support. For more information, visit <http://www.trade.gov/mdcp>.

6.6 THE U.S. COMMERCIAL SERVICE (US&FCS)

The US&FCS, one of TD's sister units in ITA, assists U.S. firms in realizing their export potential by providing: 1) exporting advice; 2) information on overseas markets; 3) assistance in identifying international trading partners; 4) support for trade events; and 5) advocacy, among other services. US&FCS trade specialists work in more than 100 Export Assistance Centers across the United States and in more than 150 overseas posts, in approximately 80 foreign countries, which combined represent more than 96 percent of the world market for exports. Lists of trade specialists by U.S. city or country can be found at <http://www.usatrade.gov>.

International Operations

Overseas US&FCS offices are housed in U.S. Embassies and Consulates where Commercial Officers serve as intermediaries to businesses and government officials in foreign markets. US&FCS staff members are industry-focused and offer numerous products and services that assist U.S. companies to enter or expand their sales in a particular market. The main activities of these offices include establishing key industry and foreign government contacts, helping match U.S. suppliers with local buyers, developing market research, and organizing or facilitating trade events. Contact information for US&FCS trade specialists who cover the IT, telecommunications, and e-commerce sectors in China is listed in the appendices of this report.

Domestic Operations

The US&FCS provides export counseling and marketing assistance to the U.S. business community through its 1,800 trade experts working in more than 100 domestic Export Assistance Centers (USEACs) located across the country. USEAC staff coordinate work closely with their US&FCS colleagues stationed overseas to match U.S. suppliers with foreign buyers. USEACs help firms enter new markets and increase market share by identifying the best markets for their

products and services, and developing an effective market entry strategy informed by input generated in the overseas offices. They also advise clients on practical exporting matters such as distribution channels, programs and services, and relevant trade shows and missions, as well as assisting with trade finance programs available through federal, state, and local entities.

US&FCS Services

Market Research

Industry Sector Analysis (ISA)

ISAs are structured market research reports produced on location in leading overseas markets and cover market size and outlook, with competitive and end-user analysis for the selected industry sector. ISAs are available through the U.S. Commercial Service's Web site <http://www.usatrade.gov> and are a component of the National Trade Data Bank (NTDB) subscription service detailed below.

International Marketing Insight (IMI)

IMIs are written by overseas and multilateral development bank staff and cover information on the dynamics of a particular industry sector in one foreign market. IMIs are available through the U.S. Commercial Service's Web site (<http://www.usatrade.gov>) and are a component of the NTDB subscription service detailed below.

Country Commercial Guide (CCG)

CCGs are prepared annually by U.S. Embassy staff and contain information on the business and economic situation of foreign countries and the political climate as it affects U.S. business. Each CCG contains the same chapters, covering topics such as marketing U.S. products, foreign trade regulations and standards, investment climate, business travel, and in-country contact information. CCGs are available through the U.S. Commercial Service's Web site (<http://www.usatrade.gov>) and are also a component of the NTDB subscription service noted below.

National Trade Data Bank (NTDB)

The U.S. Commercial Service contributes to the NTDB, a one-stop source of international documents, including market research reports, trade leads and contacts, statistical trade data collected by federal agencies that contains more than 200,000 trade-related information, and Country Commercial Guides. The NTDB subscription may be purchased on CD-ROM, accessed through the Internet (<http://www.stat-usa.gov>), or is accessible free of charge at federal depository libraries. Call 1-800-STAT-USA for more information and ordering instructions.

Export Prospects

Platinum Key Service

The Platinum Key offers customized, long-term assistance to U.S. companies seeking to enter a new market, win a contract, lower a trade barrier, or resolve complex issues. Fees depend on the scope of work.

Gold Key Service

The Gold Key is a custom-tailored service for U.S. firms planning to visit a country. This service provides assistance in developing a sound market strategy, orientation briefings, introductions to pre-screened potential partners, interpreters for meetings, and effective follow-up planning. The fees range from \$150 to \$700 (for the first day) per country.

Flexible Market Research (FMR)

FMR provides customized responses to questions and issues related to a client's product or service. Available on a quick turnaround basis, the research addresses overall marketability of the product, key competitors, price of comparable products, customary distribution and promotion practices, trade barriers, potential business partners, and more. Fees vary according to scope of work.

International Partner Search (IPS)

IPS provides a customized search that helps identify well-matched agents, distributors, licensees and strategic alliance partners. A fee of \$600 per country is charged.

BuyUSA.com

BuyUSA.com (<http://www.buyusa.com>) provides a one-stop international marketplace for U.S. small to medium-sized enterprises to identify potential international partners and transact business on-line. The BuyUSA.com e-marketplace includes pre-screened trade leads from around the world, as well as automated searching and sourcing of sales offers on-line.

BuyUSA.com is the only Web site of its kind to combine an on-line interface with a worldwide network of one-on-one trade counselors.

Export Promotion

International Buyer Program (IBP)

IBP, supporting 28 major domestic trade exhibitions annually, undertakes for each show a worldwide promotional campaign aimed at maximizing international attendance through work with the overseas network of Commercial Service and Embassy offices. Qualified buyers and prospective distributors, many brought as part of delegations led by overseas commercial staff, are assisted in meeting with interested exhibiting firms and provided services aimed at helping them find new suppliers and trade partners. Each show features an International Business Center

at which export counseling, matchmaking, interpreter, and other business services are provided to international visitors and exhibitors.

Video Conferencing Programs

The “Virtual Matchmaker,” “Video Gold Key,” and “Video Market Briefing” programs provide an effective tool to help U.S. companies assess an overseas market or overseas business contacts before venturing abroad to close a deal. Companies can use these cost-effective video services to interview international contacts, get a briefing from overseas industry specialists on prospects and opportunities, or develop a customized solution to international business needs.

Matchmaker Trade Delegations

The Matchmaker Trade Delegation Program is designed to match small to medium-sized new-to-market or new-to-export U.S. firms with qualified business contacts abroad. Each mission targets major markets in two or three countries that have strong potential for U.S. goods and services. Delegation members travel to each country and benefit from export counseling, interpreter service and logistics support, market research, in-depth market briefings, and a personalized itinerary of business appointments screened by commercial specialists at U.S. Embassies and Consulates.

Product Literature Centers

This program showcases U.S. company product literature through exhibits in international trade shows held in both mature and emerging markets. The Product Literature Center is a low cost, efficient way for small and medium-sized firms to get worldwide sales leads in their particular industry. A Commerce Department industry/international specialist or the U.S. Embassy operates Product Literature Centers. Visitors to Product Literature Centers are required to register and may take company literature with them. All sales leads are sent directly to the Product Literature Center participant.

Multi-State Catalog Exhibitions Program

This program showcases U.S. company product literature in fast-growing markets within a geographic region. The U.S. Department of Commerce and representatives from state development agencies present product literature to hundreds of interested business prospects abroad and send the trade leads directly to U.S. participants.

Commercial News USA (CNUSA)

CNUSA, a catalog-magazine containing advertisements of U.S. products serves to promote U.S. products and services to more than 400,000 potential buyers and partners in 145 countries.

**APPENDIX A: INFORMATION TECHNOLOGY AGREEMENT PRODUCTS
BY HARMONIZED SYSTEM CLASSIFICATION NUMBER**

Source: World Trade Organization

HS96	HS description
3818	Chemical elements doped for use in electronics, in form of discs, wafers or similar forms; chemical compounds doped for use in electronics
8469 11	Word processing machines
8470	Calculating machines and pocket-size data recording, reproducing and displaying machines with a calculating function; accounting machines, postage franking machines, ticket issuing machines and similar machines, incorporating a calculating device; cash registers:
8470 10	Electronic calculators capable of operating without an external source of electric power and pocket size data recording, reproducing and displaying machines with calculating functions
8470 21	Other electronic calculating machines incorporating a printing device
8470 29	Other
8470 30	Other calculating machines
8470 40	Accounting machines
8470 50	Cash registers
8470 90	Other
8471	Automatic data processing machines and units thereof; magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included:
8471 10	Analogue or hybrid automatic data processing machines
8471 30	Portable digital automatic data processing machines, weighing no more than 10 kg, consisting of at least a central processing unit, a keyboard and a display
8471 41	Other digital automatic data processing machines comprising in the same housing at least a central processing unit and an input and output unit, whether or not combined
8471 49	Other digital automatic data processing machines presented in the form of systems
8471 50	Digital processing units other than those of subheading 8471 41 and 8471 49, whether or not in the same housing one or two of the following types of units : storage units, input units, output units
8471 60	Input or output units, whether or not containing storage units in the same housing
8471 70	Storage units, including central storage units, optical disk storage units, hard disk drives and magnetic tape storage units
8471 80	Other units of automatic data processing machines
8471 90	Other
ex 8472 90	Automatic teller machines
8473 21	Parts and accessories of the machines of heading No 8470 of the electronic calculating machines of subheading 8470 10, 8470 21 and 8470 29
8473 29	Parts and accessories of the machines of heading No 8470 other than the electronic calculating machines of subheading 8470 10, 8470 21 and 8470 29
8473 30	Parts and accessories of the machines of heading No 8471
8473 50	Parts and accessories equally suitable for use with machines of two or more of the headings Nos. 8469 to 8472
ex 8504 40	Static converters for automatic data processing machines and units thereof, and telecommunication apparatus
ex 8504 50	Other inductors for power supplies for automatic data processing machines and units thereof, and telecommunication apparatus
8517	Electrical apparatus for line telephony or line telegraphy, including line telephone sets with cordless handsets and telecommunication apparatus for carrier current line systems or for digital line systems; videophones:
8517 11	Line telephone sets with cordless handsets
8517 19	Other telephone sets and videophones
8517 21	Facsimile machines
8517 22	Teleprinters
8517 30	Telephonic or telegraphic switching apparatus
8517 50	Other apparatus, for carrier current line systems or for digital line systems
8517 80	Other apparatus including entry phone systems
8517 90	Parts of apparatus of heading 8517

- ex 8518 10 Microphones having a frequency range of 300 Hz to 3,4 KHz with a diameter of not exceeding 10 mm and a height not exceeding 3 mm, for telecommunication use
 - ex 8518 30 Line telephone handsets
 - ex 8518 29 Loudspeakers, without housing, having a frequency range of 300 Hz to 3,4 KHz with a diameter of not exceeding 50 mm, for telecommunication use
 - 8520 20 Telephone answering machines
 - 8523 11 Magnetic tapes of a width not exceeding 4 mm
 - 8523 12 Magnetic tapes of a width exceeding 4 mm but not exceeding 6,5 mm
 - 8523 13 Magnetic tapes of a width exceeding 6,5 mm
 - 8523 20 Magnetic discs
 - 8523 90 Other
 - 8524 31 Discs for laser reading systems for reproducing phenomena other than sound or image
 - ex 8524 39 Other : for reproducing representations of instructions, data, sound, and image, recorded in a machine readable binary form, and capable of being manipulated or providing interactivity to a user, by means of an automatic data processing machine
 - 8524 40 Magnetic tapes for reproducing phenomena other than sound or image
 - 8524 91 Media for reproducing phenomena other than sound or image
 - ex 8424 99 Other : for reproducing representations of instructions, data, sound, and image, recorded in a machine readable binary form, and capable of being manipulated or providing interactivity to a user, by means of an automatic data processing machine
 - ex 8525 10 Transmission apparatus other than apparatus for radio broadcasting or television
 - 8525 20 Transmission apparatus incorporating reception apparatus
 - ex 8525 40 Digital still image video cameras
 - ex 8527 90 Portable receivers for calling, alerting or paging
 - ex 8529 10 Aerials or antennae of a kind used with apparatus for radiotelephony and radiotelegraphy
 - ex 8529 90 Parts of: transmission apparatus other than apparatus for radio broadcasting or television transmission apparatus incorporating reception apparatus digital still image video cameras, portable receivers for calling, alerting or paging
 - 8531 20 Indicator panels incorporating liquid crystal devices (LCD) or light emitting diodes (LED)
 - ex 8531 90 Parts of apparatus of subheading 8531 20
 - 8532 Electrical capacitors, fixed, variable or adjustable (preset):
 - 8532 10 Fixed capacitors designed for use in 50/60 Hz circuits and having a reactive power handling capacity of not less than 0,5 kvar (power capacitors)
 - 8532 21 Tantalum fixed capacitors
 - 8532 22 Aluminium electrolytic fixed capacitors
 - 8532 23 Ceramic dielectric, single layer fixed capacitors
- 8532
Ceramic
- 24 dielectric, multilayer fixed capacitors 8532
- 25 Dielectric fixed capacitors of paper or plastics
- 8532 29 Other fixed capacitors
 - 8532 30 Variable or adjustable (preset) capacitors
 - 8532 90 Parts
 - 8533 Electrical resistors (including rheostats and potentiometers), other than heating resistors:
 - 8533 10 Fixed carbon resistors, composition or film types
 - 8533 21 Other fixed resistors for a power handling capacity not exceeding 20 W
 - 8533 29 Other fixed resistors for a power handling capacity of 20 W or more
 - 8533 31 Wire-wound variable resistors, including rheostats and potentiometers, for a power handling capacity not exceeding 20 W
 - 8533 39 Wire-wound variable resistors, including rheostats and potentiometers, for a power handling capacity of 20 W or more
 - 8533 40 Other variable resistors, including rheostats and potentiometers
 - 8533 90 Parts
 - 8534 Printed circuits
- ex 8536 50 Electronic AC switches consisting of optically coupled input and output circuits (Insulated thyristor AC switches)
 - ex 8536 50 Electronic switches, including temperature protected electronic switches, consisting of a transistor and a logic chip (chip-on-chip technology) for a voltage not exceeding 1000 volts
-

- ex 8536 50 Electromechanical snap-action switches for a current not exceeding 11 amps
- ex 8536 69 Plugs and sockets for coaxial cables and printed circuits
- ex 8536 90 Connection and contact elements for wires and cables
 - 8541 Diodes, transistors and similar semiconductor devices; photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes; mounted piezoelectric crystals:
 - 8541 10 Diodes, other than photosensitive or light emitting diodes
 - 8541 21 Transistors, other than photosensitive transistors, with a dissipation rate of less than 1 W
 - 8541 29 Transistors, other than photosensitive transistors, with a dissipation rate of 1 W or more
 - 8541 30 Thyristors, diacs and triacs, other than photosensitive devices
 - 8541 40 Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes
 - 8541 50 Other semiconductor devices
 - 8541 60 Mounted piezoelectric crystals
 - 8541 90 Parts
 - 8542 Electronic integrated circuits and microassemblies
 - 8542 12 Cards incorporating an electronic integrated circuit ('smart' cards)
 - 8542 13 Metal oxide semiconductors (MOS technology)
 - 8542 14 Circuits obtained by bipolar technology
 - 8542 19 Other monolithic digital integrated circuits, including circuits obtained by a combination of bipolar and MOS technologies (BIMOS technology)
 - 8542 30 Other monolithic integrated circuits
 - 8542 40 Hybrid integrated circuits
 - 8542 50 Electronic microassemblies
 - 8542 90 Part
 - 8543 81 Proximity cards and tags
- ex 8543 89 Electrical machines with translation or dictionary functions
- ex 8544 41 Other electric conductors, for a voltage not exceeding 80 V, fitted with connectors, of a kind used for telecommunications
- ex 8544 49 Other electric conductors, for a voltage not exceeding 80 V, not fitted with connectors, of a kind used for telecommunications
- ex 8544 51 Other electric conductors, for a voltage exceeding 80 V but not exceeding 1000 V, fitted with connectors, of a kind used for telecommunications
 - 8544 70 Optical fibre cables
- 9009 11 Electrostatic photocopying apparatus, operating by reproducing the original image directly onto the copy (direct process)]
- 9009 21 Other photocopying apparatus, incorporating an optical system
- 9009 90 Parts and accessories
- 9026 Instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases (for example, flow meters, level gauges, manometers, heat meters), excluding instruments and apparatus of heading No 9014, 9015, 9028 or 9032:
 - 9026 10 Instruments for measuring or checking the flow or level of liquids
 - 9026 20 Instruments and apparatus for measuring or checking pressure
 - 9026 80 Other instruments and apparatus for measuring or checking of heading 9026
 - 9026 90 Parts and accessories of instruments and apparatus of heading 9026
 - 9027 20 Chromatographs and electrophoresis instruments
 - 9027 30 Spectrometers, spectrophotometers and spectrographs using optical radiations (UV, visible, IR)
 - 9027 50 Other instruments and apparatus using optical radiations (UV, visible, IR) of heading No 9027
 - 9027 80 Other instruments and apparatus of heading No 9027 (other than those of heading No 9027 10)
- ex 9027 90 Parts and accessories of products of heading 9027, other than for gas or smoke analysis apparatus and microtomes
- 9030 40 Instruments and apparatus for measuring and checking, specially designed for telecommunications (for example, crosstalk meters, gain measuring instruments, distortion factor meters, psophometers)

Semiconductor manufacturing and testing equipment and parts thereof

HS Code	Description	Comments
ex 7017 10	Quartz reactor tubes and holders designed for insertion into diffusion and oxidation furnaces for production of semiconductor wafers	For Attachment B
ex 8419 89	Chemical vapor deposition apparatus for semiconductor production	For Attachment B
ex 8419 90	Parts of chemical vapor deposition apparatus for semiconductor production	For Attachment B

ex 8421 19	Spin dryers for semiconductor wafer processing	
ex 8421 91	Parts of spin dryers for semiconductor wafer processing	
ex 8424 89	Deflash machines for cleaning and removing contaminants from the metal leads of semiconductor packages prior to the electroplating process	
ex 8424 89	Spraying appliances for etching, stripping or cleaning semiconductor wafers	
ex 8424 90	Parts of spraying appliances for etching, stripping or cleaning semiconductor wafers	
ex 8456 10	Machines for working any material by removal of material, by laser or other light or photo beam in the production of semiconductor wafers	
ex 8456 91	Apparatus for stripping or cleaning semiconductor wafers	For Attachment B
8456 91	Machines for dry etching patterns on semiconductor materials	
ex 8456 99	Focused ion beam milling machines to produce or repair masks and reticles for patterns on semiconductor devices	
ex 8456 99	Laser cutters for cutting contacting tracks in semiconductor production by laser beam	For Attachment B
ex 8464 10	Machines for sawing monocrystal semiconductor boules into slices, or wafers into chips	For Attachment B
ex 8464 20	Grinding, polishing and lapping machines for processing of semiconductor wafers	
ex 8464 90	Dicing machines for scribing or scoring semiconductor wafers	
ex 8466 91	Parts for machines for sawing monocrystal semiconductor boules into slices, or wafers into chips	
		For Attachment B
ex 8466 91	Parts of dicing machines for scribing or scoring semiconductor wafers	For Attachment B
ex 8466 91	Parts of grinding, polishing and lapping machines for processing of semiconductor wafers	
ex 8466 93	Parts of focused ion beam milling machines to produce or repair masks and reticles for patterns on semiconductor devices	
ex 8466 93	Parts of laser cutters for cutting contacting tracks in semiconductor production by laser beam	For Attachment B
ex 8466 93	Parts of machines for working any material by removal of material, by laser or other light or photo beam in the production of semiconductor wafers	
ex 8456 93	Parts of apparatus for stripping or cleaning semiconductor wafers	For Attachment B
ex 8466 93	Parts of machines for dry etching patterns on semiconductor materials	
ex 8477 10	Encapsulation equipment for assembly of semiconductors	For Attachment B
ex 8477 90	Parts of encapsulation equipment	For Attachment B
ex 8479 50	Automated machines for transport, handling and storage of semiconductor wafers, wafer cassettes, wafer boxes and other material for semiconductor devices	For Attachment B
ex 8479 89	Apparatus for growing or pulling monocrystal semiconductor boules	
ex 8479 89	Apparatus for physical deposition by sputtering on semiconductor wafers	For Attachment B
ex 8479 89	Apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays	
		For Attachment B
ex 8479 89	Die attach apparatus, tape automated bonders, and wire bonders for assembly of semiconductors	
		For Attachment B
ex 8479 89	Encapsulation equipment for assembly of semiconductors	For Attachment B
ex 8479 89	Epitaxial deposition machines for semiconductor wafers	
ex 8479 89	Machines for bending, folding and straightening semiconductor leads	For Attachment B
ex 8479 89	Physical deposition apparatus for semiconductor production	For Attachment B
ex 8479 89	Spinners for coating photographic emulsions on semiconductor wafers	For Attachment B
ex 8479 90	Part of apparatus for physical deposition by sputtering on semiconductor wafers	For Attachment B
ex 8479 90	Parts for die attach apparatus, tape automated bonders, and wire bonders for assembly of semiconductors	
		For Attachment B
ex 8479 90	Parts for spinners for coating photographic emulsions on semiconductor wafers	For Attachment B
ex 8479 90	Parts of apparatus for growing or pulling monocrystal semiconductor boules	
ex 8479 90	Parts of apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays	
		For Attachment B
ex 8479 90	Parts of automated machines for transport, handling and storage of semiconductor wafers, wafer cassettes, wafer boxes and other material for semiconductor devices	
		For Attachment B
ex 8479 90	Parts of encapsulation equipment for assembly of semiconductors	For Attachment B
ex 8479 90	Parts of epitaxial deposition machines for semiconductor wafers	
ex 8479 90	Parts of machines for bending, folding and straightening semiconductor leads	For Attachment B
ex 8479 90	Parts of physical deposition apparatus for for semiconductor production	For Attachment B
ex 8480 71	Injection and compression moulds for the manufacture of semiconductor devices	

- ex 8514 10 Resistance heated furnaces and ovens for the manufacture of semiconductor devices on semiconductor wafers
- ex 8514 20 Inductance or dielectric furnaces and ovens for the manufacture of semiconductor devices on semiconductors wafers
- ex 8514 30 Apparatus for rapid heating of semiconductor wafers For Attachment B
- ex 8514 30 Parts of resistance heated furnaces and ovens for the manufacture of semiconductor devices on semiconductor wafers
- ex 8514 90 Parts of apparatus for rapid heating of wafers For Attachment B
- ex 8514 90 Parts of furnaces and ovens of Headings No 8514 10 to No 8514 30
- ex 8536 90 Wafer probers For Attachment B
- 8543 11 Ion implanters for doping semiconductor materials
- ex 8543 30 Apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays For Attachment B
- ex 8543 90 Parts of apparatus for wet etching, developing, stripping or cleaning semiconductor wafers and flat panel displays For Attachment B
- ex 8543 90 Parts of ion implanters for doping semiconductor materials
- 9010 41 to 9010 49 Apparatus for projection, drawing or plating circuit patterns on sensitized semiconductor materials and flat panel displays
- ex 9010 90 Parts and accessories of the apparatus of Headings No 9010 41 to 9010 49
- ex 9011 10 Optical stereoscopic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles For Attachment B
- ex 9011 20 Photo micrographic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles For Attachment B
- ex 9011 90 Parts and accessories of optical stereoscopic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles For Attachment B
- ex 9011 90 Parts and accessories of photo micrographic microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles For Attachment B
- ex 9012 10 Electron beam microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles For Attachment B
- ex 9012 90 Parts and accessories of electron beam microscopes fitted with equipment specifically designed for the handling and transport of semiconductor wafers or reticles For Attachment B
- ex 9017 20 Pattern generating apparatus of a kind used for producing masks or reticles from photo resist coated substrates For Attachment B
- ex 9017 90 Parts and accessories for pattern generating apparatus of a kind used for producing masks or reticles from photo resist coated substrates For Attachment B
- ex 9017 90 Parts of such pattern generating apparatus For Attachment B
- 9030 82 Instruments and apparatus for measuring or checking semiconductor wafers or devices
- ex 9030 90 Parts and accessories of instruments and apparatus for measuring or checking semiconductor wafers or devices
- ex 9030 90 Parts of instruments and appliances for measuring or checking semiconductor wafers or devices
- 9031 41 Optical instruments and appliances for inspecting semiconductor wafers or devices or for inspecting masks, photo masks or reticles used in manufacturing semiconductor devices
- ex 9031 49 Optical instruments and appliances for measuring surface particulate contamination on semiconductor wafers
- ex 9031 90 Parts and accessories of optical instruments and appliances for inspecting semiconductor wafers or devices or for inspecting masks, photo masks or reticles used in manufacturing semiconductor devices
- ex 9031 90 Parts and accessories of optical instruments and appliances for measuring surface particulate contamination on semiconductor wafers

Attachment B

Positive list of specific products to be covered by this agreement wherever they are classified in the HS. Where parts are specified, they are to be covered in accordance with HS Notes 2(b) to Section XVI and Chapter 90, respectively.

Computers: automatic data processing machines capable of 1) storing the processing program or programs and at least the data immediately necessary for the execution of the program; 2) being freely programmed in accordance with the requirements of

the user; 3) performing arithmetical computations specified by the user; and 4) executing, without human intervention, a processing program which requires them to modify their execution, by logical decision during the processing run. The agreement covers such automatic data processing machines whether or not they are able to receive and process with the assistance of central processing unit telephony signals, television signals, or other analogue or digitally processed audio or video signals. Machines performing a specific function other than data processing, or incorporating or working in conjunction with an automatic data processing machine, and not otherwise specified under Attachment A or B, are not covered by this agreement.

Electric amplifiers when used as repeaters in line telephony products falling within this agreement, and parts thereof
Flat panel displays (including LCD, Electro Luminescence, Plasma and other technologies) for products falling within this agreement, and parts thereof.

Network equipment: Local Area Network (LAN) and Wide Area Network (WAN) apparatus, including those products dedicated for use solely or principally to permit the interconnection of automatic data processing machines and units thereof for a network that is used primarily for the sharing of resources such as central processor units, data storage devices and input or output units including adapters, hubs, inline repeaters, converters, concentrators, bridges and routers, and printed circuit assemblies for physical incorporation into automatic data processing machines and units thereof.

Monitors : display units of automatic data processing machines with a cathode ray tube with a dot screen pitch smaller than 0,4 mm not capable of receiving and processing television signals or other analogue or digitally processed audio or video signals without assistance of a central processing unit of a computer as defined in this agreement. The agreement does not, therefore, cover televisions, including high definition televisions.

Optical disc storage units, for automatic data processing machines (including CD drives and DVDdrives), whether or not having the capability of writing/recording as well as reading, whether or not in their own housings.
Paging alert devices , and parts thereof .

Plotters whether input or output units of HS heading No 8471 or drawing or drafting machines of HS heading No 9017.
Printed Circuit Assemblies for products falling within this agreement, including such assemblies for external connections such as cards that conform to the PCMCIA standard. Such printed circuit assemblies consist of one or more printed circuits of heading 8534 with one or more active elements assembled thereon, with or without passive elements "Active elements" means diodes, transistors, and similar semiconductor devices, whether or not photosensitive, of heading 8541, and integrated circuits and micro assemblies of heading 8542.

Projection type flat panel display units used with automatic data processing machines which can display digital information generated by the central processing unit.

Proprietary format storage devices including media therefore for automatic data processing machines, with or without removable media and whether magnetic, optical or other technology, including Bernoulli Box, Syquest, or Zipdrive cartridge storage units.

Multimedia upgrade kits for automatic data processing machines, and units thereof, put up for retail sale, consisting of, at least, speakers and/or microphones as well as a printed circuit assembly that enables the ADP machines and units thereof to process audio signals (sound cards).

Set top boxes which have a communication function : a microprocessor-based device incorporating a modem for gaining access to the Internet, and having a function of interactive information exchange.

**APPENDIX B: U. S. - INDIA DUAL-USE EXPORT CONTROL
POLICIES AND PROCEDURES**

OBJECTIVES:

- To summarize licensing requirements for exports of dual-use goods and technologies to India.
- To clarify current export licensing policies with respect to India.
- To address misperceptions regarding controlled trade with India.

RECENT DEVELOPMENTS IN U.S.-INDIA RELATIONS

- October 2001: President Bush waives sanctions placed on India in 1998 in response to Indian nuclear tests.
 - Number of Indian companies on Entity List reduced from 159 to 2 primary and 14 subordinate entities.
 - Licensing policy for nuclear and missile controlled items changed from “policy of denial” to case-by-case review.
 - November 2001: President Bush and Indian Prime Minister Vajpayee meet in Washington, D.C. and agree to take steps to qualitatively transform U.S.-India relations.
 - Agree to “discuss ways to stimulate bilateral high-technology commerce.”
 - Commit to “broaden dialogue and cooperation” in the area of export controls.
 - November 2002: U.S. Under Secretary of Commerce Juster and Indian Foreign Secretary Sibal establish the U.S.-India High Technology Cooperation Group (HTCG).
 - Establishes framework for discussing steps to stimulate bilateral high-technology commerce.
 - February 2003: U.S. Under Secretary of Commerce Juster and Indian Foreign Secretary Sibal sign the Statement of Principles on U.S.-India High Technology Cooperation.
 - Addresses the need to consider economic and systemic issues inhibiting high-technology trade and the need to engage in outreach and trade promotion on market opportunities.
 - Recognizes the shared commitment to preventing the proliferation of sensitive goods and technologies.
 - States that the “Government of India will cooperate with the Government of the United States in verifying Indian end users and end uses.”
-

- July 2003: HTCG convenes in Washington, D.C. to discuss issues relevant to creating the conditions for more robust bilateral high-technology commerce.
 - Discusses market access, tariff and nontariff barriers, and export controls.
 - A public-private forum on U.S.-India trade and investment is convened under the auspices of the HTCG and includes presentations on the climate for U.S.-India trade and investment, and on financing innovation. The forum also includes breakout sessions on the information technology, defense technology, life sciences, and nanotechnology sectors.
- November 2003: HTCG convened in New Delhi, India to build on the progress made in Washington, D.C.
 - Parties continued discussions on market access, tariff and nontariff barriers, and export controls.
 - A public-private forum, similar to the July forum in Washington D.C., held in Bangalore, India on November 19 to continue discussions on U.S.-India trade and investment.

GENERAL LICENSING REQUIREMENTS FOR INDIA

- Many commodities controlled on the Commerce Control List (CCL) for National Security (NS) reasons may be exported to India using License Exception GBS (for shipments to Country Group B countries).
 - Computer technology and software also are eligible for certain license exceptions (e.g., License Exception TSR for “technology and software under restriction,” License Exception ENC for “encryption software and commodities”).
 - More than 75 percent of encryption products are eligible for export to India under License Exception ENC, after a review, unless destined to a listed entity. A license is required only for technology and “non-retail” encryption products to certain government end-users.
 - Anti-terrorism (AT) controls generally apply only to the terrorist-designated states (Cuba, Iran, Libya, North Korea, Sudan, and Syria). There is no license required for an AT item for India unless it is destined for a listed entity.
 - EAR99 items (items not specified on the Commerce Control List) may be shipped to most end users in India without an export license. The vast majority of U.S. commercial exports fall into this category.
 - Exports of EAR99 items to end users on the Entity List require a license.
 - During Fiscal Year 2003, approximately one third of the dual-use license applications processed for India were for EAR99 items. The United States approved approximately 83 percent of these applications.
-

NUCLEAR, MISSILE, AND CHEMICAL/BIOLOGICAL ITEMS

- A license is required to export to India items controlled for nuclear (NP), missile (MT), or chemical/biological weapons (CB) proliferation reasons.
 - Such licenses are reviewed on a “case-by-case” basis and are not subject to a policy of denial.
 - Such licenses generally are approved unless the export would make a material contribution to nuclear, missile, or chemical/biological programs of concern, or pose an unacceptable risk of diversion to such programs.

THE ENTITY LIST

- Items intended for Indian companies identified on the Entity List still require an export license.
 - There is a “presumption of approval” for applications to export EAR99 items to listed entities.
 - Other applications are subject to a “case-by-case” review.
 - The complete list of Indian end users identified on the Entity List.

PROLIFERATION CONCERNS

- Exports of controlled items to India will be approved provided that such items do not contribute to or pose a risk of diversion to Indian nuclear or missile programs of concern.
- U.S. exporters should know their customers and be aware of the following “catch-all” requirements applicable to certain programs of concern.

“CATCH-ALL” CONTROLS FOR MISSILE PROGRAMS

- U.S. exporters must apply for a license if they know or have reason to know that their export will be used in a specified missile program in India.
 - Specific missile programs of concern are listed in Supplement No. 1 to Part 740 of the Export Administration Regulations.
 - Exports to Indian missile programs of concern will be denied.
 - NOTE: There are numerous commercial space programs in India that may not pose a

proliferation concern. The United States is committed to enhancing cooperation with Indian commercial satellite programs for the peaceful use of space.

“CATCH-ALL” CONTROLS FOR NUCLEAR PROGRAMS

- U.S. exporters must apply for a license if they know or have reason to know that their export will be used in certain nuclear activities in India.
 - Items intended to ensure the safety of safeguarded civilian nuclear power facilities generally will be reviewed favorably.
 - Exports of all EAR99 items – including “balance of plant” commodities – generally will be reviewed favorably for use in safeguarded facilities.
 - Exports to specified unsafeguarded nuclear activities and nuclear weapons programs will be denied.

“CATCH ALL” CONTROLS FOR CHEMICAL/BIOLOGICAL WEAPONS ACTIVITIES

- U.S. exporters must apply for a license if they know or have reason to know that their export will be used in certain chemical/biological weapons activities in India.
 - A license is required for any export or reexport if at the time of export or reexport you know that the item will be used in the design, development, production, stockpiling, or use of chemical or biological weapons in or by India.
 - License applications will be reviewed to determine if the export or reexport would make a material contribution to a program of concern.

EXPORT LICENSING STATISTICS

Fiscal Year 2003 Export License Applications for India:

Approved: 619 (\$57 million)
Denied: 72 (\$15 million)
Returned Without Action: 229 (\$36 million)
TOTAL: 920 (\$108 million)

Estimated Total Fiscal Year 2003 U.S. Trade with India: approximately \$4.8 billion.

Average license processing time: 41 days

ANALYSIS OF STATISTICS

- Most trade with India does not require a license.
 - The United States requires a license for only a small percentage of overall trade with India. In both Fiscal Years 2002 and 2003, approximately one percent of all U.S. trade with India required an export license.
- The United States approves the vast majority of exports that require a license.
 - For over five years, India has been among the top five countries for approved license applications. In Fiscal Year 2003, the United States approved approximately 90 percent of the applications that required an export license.
- Many submitted applications do not require a license.
 - Of the 229 cases that were returned without action in Fiscal Year 2003, 65 percent were returned to the applicant because the exports were eligible for shipment under a license exception or no license was required.

SUMMARY

- Export licensing requirements apply to only a very small percentage of overall U.S.-India trade.
 - Many items subject to export controls can be exported to India without a license or under a license exception.
 - Exporters that are uncertain about license requirements for India should contact the Office of Exporter Services to determine if an item intended for export requires the submission of a license application.
 - Areas of continued proliferation concern include entities involved in certain Indian nuclear and missile programs.
 - Applications for controlled items are reviewed on a “case-by-case” basis; there is no longer any policy of denial.
 - The United States and India are committed to working toward enhancing a qualitatively transformed relationship and continuing efforts to stimulate bilateral high-technology commerce under the auspices of the HTCG.
-

Appendix C: U.S.-India Statement of Principles for High Technology Commerce

During their November 2001 meeting in Washington D.C., Prime Minister Vajpayee and President Bush affirmed their commitment to qualitatively transform India-U.S. relations. They further agreed that the two sides should discuss ways to stimulate bilateral high technology commerce as a step toward enhancing the new relationship between the United States and India.

1. In pursuit of this goal, the Governments of the United States and India decided in November 2002 to work expeditiously toward developing a new statement of principles regarding bilateral cooperation in high technology trade, including trade in “dual-use” goods and technologies, in a way that broadly advances the relationship between the two countries in this area and reinforces their mutual interest in stemming the proliferation of sensitive goods and technologies.

The two Governments have set forth the principles to further promote and facilitate bilateral high technology commerce in its broadest sense:

1. The two Governments note that there is immense untapped potential for India-U.S. high technology commerce and recognize the importance of taking steps to remove systemic tariff and non-tariff barriers, identify and generate awareness of market opportunities, and build additional confidence in the two countries for such trade, in a way that reflects their new relationship and common strategic interests.

2. The two Governments recognize that the private sectors in India and the United States are important partners in this endeavor.

3. The two Governments should focus on steps to create the appropriate environment for successful high technology commerce. The Government of India appreciates the importance that the Government of the United States attaches to a supportive regulatory and institutional environment in India for robust bilateral high technology commerce, including easing barriers to such commerce. The Government of India intends to do its utmost in this regard.

4. The two Governments should seek to identify market opportunities in high technology commerce and related regulations that affect such commerce.

5. The two Governments, in partnership with the private sector, should consider steps for trade promotion efforts to generate awareness about market potential, relevant regulatory issues, collaboration opportunities, and financing possibilities.

6. The two Governments understand the importance of enhancing trade between India and the United States in “dual-use” items, including controlled “dual use” goods and technologies, while protecting the national security and foreign policy interests of both countries, and intend to take steps to facilitate such trade, which is a component of high technology commerce.

7. The two Governments should encourage outreach and educational activities to ensure that the private sectors in India and the United States have full and accurate information regarding the export control laws, regulations, and policies of the two countries.

8. The two Governments attach the highest importance to preventing the proliferation of sensitive goods and technologies. They further recognize the importance of continuing their export control cooperation program and activities to achieve the shared goal of strengthening export control systems through laws, regulations, and enforcement, in accordance with modern export control standards.

9. The Government of the United States appreciates the importance that the Government of India attaches to the widest possible access to U.S. “dual-use” goods and technologies and to efficiency, continuity, stability, and transparency in the export license application process. The Government of the United States intends to do its utmost in this regard, consistent with its laws and national security and foreign policy objectives, including compliance with international commitments.

10. The two Governments recognize that U.S. “dual-use” export controls currently apply to only a very small fraction of total U.S.-India high technology commerce, and that a broad range of “dual-use” goods and technologies is currently available to India.

11. The Government of the United States should seek to identify and review licensing processes and policies for exports to India of goods and technologies controlled for reasons of anti-terrorism (AT), crime control (CC), encryption (EI), national security (NS), regional stability (RS), and short supply (SS), in a manner that seeks to facilitate further trade in these “dual-use” goods and technologies.

12. For authorized transfers of “dual-use” goods and technologies controlled for missile technology or nuclear proliferation reasons, including exports to entities in civilian space and civilian nuclear energy fields, the Government of India will consider a mutually satisfactory system of assurances regarding end use, diversion, transfers and re-transfers within and outside India, re-export, and, where necessary, physical protection and access to the controlled items by third parties.

13. The two Governments should examine cooperative steps to ensure that all parties adhere to license conditions for “dual-use” goods and technologies and should outline the manner in which suspected violations and infractions are to be addressed. The Government of India will cooperate with the Government of the United States in verifying Indian end users and end uses.

14. The two Governments should seek to keep each other informed about changes in their export control laws, regulations, and policies; exchange information on export licences that are approved, denied, or returned without action; and establish a mechanism for prompt discussion of any bilateral “dual-use” export control issues.

15. This Statement of Principles constitutes the basis for further steps to enhance high technology commerce between the two countries.

16. The two Governments plan to convene as soon as possible the India-U.S. High Technology Cooperation Group (HTCG), decided upon in November 2002, to further this Statement of Principles and develop a schedule of meetings and activities for this purpose.

Kenneth I. Juster
Under Secretary
U.S. Department of Commerce

Kanwal Sibal
Foreign Secretary
Indian Ministry of External Affairs

February 5, 2003

APPENDIX D: USEFUL CONTACTS

U.S. DEPARTMENT OF COMMERCE

INTERNATIONAL TRADE ADMINISTRATION

U.S. Department of Commerce/International Trade Administration staff located throughout the United States can answer many questions that U.S. IT, telecommunications, and e-commerce firms have about doing business abroad.

TRADE DEVELOPMENT

Office of Information Technologies and Electronic Commerce (OITEC)

Eric Holloway (Information Technologies)
U.S. Department of Commerce
14th Street & Constitution Avenue, N.W.
Room 2802
Washington D.C. 20230
Phone: (202) 482-4936
Fax: (202) 482-0952
E-mail: eric_holloway@ita.doc.gov
Web address: <http://www.export.gov/infotech>

Andrea Da Silva (E-commerce)
U.S. Department of Commerce
14th Street & Constitution Avenue, N.W.
Room 2001A
Washington D.C. 20230
Phone: (202) 482-3686
Fax: (202) 482-5522
E-mail: andrea_dasilva@ita.doc.gov
Web address: <http://www.export.gov/infotech>

Office of Telecommunications Technologies (OTT)

Daniel Edwards
U.S. Department of Commerce
14th Street & Constitution Avenue, N.W.
Room 4327
Washington D.C. 20230
Phone: (202) 482-4331
Fax: (202) 482-5834
E-mail: daniel_edwards@ita.doc.gov; Web address: <http://www.export.gov/infotech>

U.S.-BASED IT AND TELECOMMUNICATIONS TRADE ASSOCIATIONS***American Electronics Association (AEA)***

William T. Archey
President
1225 Eye Street, NW
Suite 950
Washington, DC 20005
Tel: (202) 682-9110
Fax: (202) 682-9111
Email: Bill_Archey@aeonet.org
Web address: <http://www.aeonet.org>

Business Software Alliance (BSA)

Robert Holleyman, II
President
1150 18th Street
Suite 700
Washington, DC 20036
Tel: (202) 872-5500
Fax: (202) 872-5501
Email: software@bsa.org
Web address: <http://www.bsa.org>

Cellular Telecommunications & Internet Association (CTIA)

Thomas Wheeler
President and CEO
1250 Connecticut Avenue, NW, Suite 800
Washington, DC 20036
Tel: (202) 785-0081
Fax: (202) 785-0721 or (202) 467-6990
Contact: Robert Roche, Research Director;
Jeffrey Nelson, Communications Director
Web address: <http://www.wow-com.com>

Computer & Communications Industry Association (CCIA)

Ed Black
President
666 11th Street, NW
Suite 600
Washington, DC 20001
Tel: (202) 783-0070
Fax: (202) 783-0534
Email: ccia@aol.com
Web address: <http://www.ccianet.org>

Information Technology Association of America

Harris Miller

President

1616 North Fort Myer Drive, Suite 1300

Arlington, VA 22209

Tel: (703) 522-5055

Fax: (703) 525-2279

Email: ccayo@itaa.org

Web address: <http://www.itaa.org>

Information Technology Industry Council

Rhett B. Dawson

President

1250 Eye Street, NW

Suite 200

Washington, DC 20005

Tel: (202) 737-8888

Fax: (202) 638-4922

Email: rdawson@itic.nw.dc.us

Web address: <http://www.itic.org>

Personal Communications Industry Association (PCIA)

Jay Kitchen

President

500 Montgomery Street, Suite 700

Alexandria, VA 22314-1561

Tel: (703) 739-0300

Fax: (703) 836-1608

Contact: Mark Golden

Web address: <http://www.pcia.com>

Satellite Industry Association (SIA)

Richard DalBello

Executive Director

225 Reinekers Lane, Suite 600

Alexandria, VA 22314

Tel: (703) 549-8697

Fax: (703) 549-9188

E-mail: info@sia.org

Web address: <http://www.sia.org>

Software and Information Industry Association

Kenneth Wasch
President
1730 M. Street, NW
Suite 700
Washington, DC 20036
Tel: (202) 452-1600
Fax: (202) 223-8756
Email: kwasch@spa.org
Web address: <http://www.siaa.net>

Telecommunications Industry Association (TIA)

Jason Leuck
Director, International Affairs
1300 Pennsylvania Avenue, NW, Suite 350
Washington, DC 20004
Tel: (202) 383-1493
Fax: (202) 383-1495
E-mail: jleuck@tia.eia.org
Web address: <http://www.tiaonline.org>

U.S.-India Business Council

Dr. Michael T. Clark
Executive Director
U.S. Chamber of Commerce
1615 H Street NW
Washington, DC 20062
Tel:(202) 463-5323
Fax: (202) 463-3173
Web address: <http://www.usibc.com>

United States Council for International Business (USCIB)

1212 Avenue of the Americas
New York, NY 10036
Tel: (212) 354-4480
Policy Advocacy Fax: (212) 575-0327
Membership Fax: (212) 391-6568
General information: info@uscib.org
Membership: membership@uscib.org
Web address: <http://www.uscib.org>

United States Telecom Association (USTA)

Walter B. McCormick, Jr.

President & CEO

1401 H Street, NW, Suite 600

Washington, DC 20005-2164

Tel: (202) 326-7300

Fax: (202) 326-7333

Contact: Kathleen Kelleher

Tel: (202) 326-7357

E-mail: kkellehe@usta.org

Web address: <http://www.usta.org>

USEFUL CONTACTS: INDIA

Government of India

Ministry of Communications and Information Technology

Sanchar Bhawan

Room No. 103

Ashoka Road

New Delhi 110 001

Tel: 91-11-2371-0350

Fax: 91-11-2337-2425

Web Address: <http://www.dotindia.com>

Centre for Development of Telematics

9th Floor Akbar Bhawan

Chanakya Puri

New Delhi 110 021

Tel: 91-11-2467-7525

Fax: 91-11-2688-5558

Web address: <http://www.cdote.com>

Development Commission (Industries)

Government of Maharashtra

New Administration Bldg., 2nd Floor

Madame Cama Road

Montralaya,

Mumbai 400 032

Tel: 91-22-202-8616

Fax: 91-22-202-6826

Web address: <http://www.it.maharashtra.gov.in>

Indian Institute of Technology, Bombay

Kanwal Rekhi School of information Technology

Powai,

Mumbai 400 076

Tel: 91-22-2576-7910

Fax: 91-22-2572-0022

Web address: <http://www.it.iitb.ac.in>

Software Technology Parks of India

Block III, KSSIDC Complex

KEONICS Electronic City, Hosur Road

Bangalore 560 100

Tel: 91-80-852-0444

Information Technology Industries

A-21

Fax: 91-80-852-0958

Web address: <http://www.soft.net>

Software Technology Parks of India

International Infotech Park

Tower #7, Floor #6, Vashi Railway Station Complex
Vashi,

Navi Mumbai 400 705

Tel: 91-22-781-2102

Fax: 91-22-781-2034

Web address: <http://www.stpmum.soft.net>

Telecommunications Regulatory Authority of India

A2/14, Safdarjung Enclave

New Delhi 110 029

Tel: 91-11-2616-5623

Fax: 91-11-2610-3294

Telecom Engineering Centre

Khushid Lal Bhawan, Gate No. 5

Janpath,

New Delhi 110 001

Tel: 91-11-2332-0252

Fax: 91-11-2332-9088

Web address: <http://www.dotindia.com/tec/>

Wireless Planning & Co-Ordination Wing

501, Sanchar Bhawan

20, Ashoka Road

New Delhi 110 001

Tel: 91-11-2375-5420

Fax: 91-11-2371-6111

Industry Associations

All Indian Association of Industries

106, Uttam House, 69, P.D'Mello Road

Carnac Bunder

Mumbai 400 009

Tel: 91-22-341-2632

Fax: 91-22-341-5685

E-mail: aiiai@giasbm01.vsnl.net.in

American Chamber of Commerce in India

Suite No 1262, Maurya Sheraton Hotel
S P Marg, Diplomatic Enclave
New Delhi-110 021
Tel : 011 24102690/91
Fax : 011 2302 3109
E-mail : amcham@amchamindia.com

Association of Basic Telecom Operators

B-601, Gauri Sadan
5, Hailey Road
New Delhi 110 001
Tel: 91-11-2335-8585
Fax: 91-11-2332-7397
E-mail: abtro@eth.net

Cellular Operators Association of India

14, Bhai Veer Singh Marg
New Delhi 110 001
Tel: 91-11-2334-9275
Fax: 91-11-2334-9276
Web address: www.coai.com

Confederation of Indian Industry (CII)

23, Institutional Area, Lodi Road
New Delhi 110 003
Tel: 91-11-2460-1437
Fax: 91-11-2462-6149
Web address: <http://ciionline.org>

Indo-American Chamber of Commerce

1-C. Vulcan Insurance Bldg.
Veer Nariman Road
Churchgate
Mumbai 400 020
Tel: 91-22-2282-1413
Fax: 91-22-2204-6141
Web address: <http://www.indous.org>

Internet Service Provider Association of India

612-A, Chiranjiv Tower
43, Nehru Place
New Delhi 110 016
Web address: www.ispai.com

Manufacturers' Association for Information Technology (MAIT)

4th Floor, PHD House

New Delhi 110 016

Tel: 91-11-2685-4284

Fax: 91-11-2685-1321

Web address: <http://www.mait.com>

National Association of Software and Service Companies (NASSCOM)

International Youth Centre, Teen Muri Marg

Chanakyapuri

New Delhi 110 021

Tel: 91-11-2301-0199

Fax: 91-11-2301-5452

Web address: <http://www.nasscom.org>

Telecom Equipment Manufacturers Association

4th Floor, PHD House

New Delhi 110 016

Tel: 91-11-2685-9621

Fax: 91-11-2685-9620

Web address: www.tematelecom.org

Telecom Industry Service Association

30, Community Centre

New Delhi 110 048

Tel: 91-11-2622-5323

Fax: 91-11-2622-5313

U.S. Department of Commerce

International Trade Administration

The U.S. Commercial Service

Embassy of the United States of America

U.S. Commercial Service

The American Center

24 Kasturba Gandhi Marg

New Delhi 110 001, India

Tel: 91-11-2331-6841

Fax: 91-11-2331-5172

Web address: <http://www.buyusa.gov/india>

Contacts:

Donald G. Nay, Deputy Commercial Counselor

E-Mail: Donald.Nay@mail.doc.gov

Tel: 91-11-2331-6841

Sandeep Maini, Commercial Specialist (IT and telecommunications)
E-Mail: Sandeep.Maimi@mail.doc.gov
Tel: 91-11-2331-5841, x2222

American Consulate General

U.S. Commercial Service
JMC House, Suite #41/42
Ambawadi, Opp. Parimal Garden
Ahmedabad 380 006, India
Tel: 91-79-656-5210
Fax: 91-79-656-0763
Web address: <http://www.buyusa.gov/india>

Contact:

Savio Gonsalves, Commercial Specialist (IT and telecommunications)
E-Mail: Savio.Gonsalves@mail.doc.gov
Tel: 91-79-656-5210

American Consulate General

U.S. Commercial Service
C/o. ITC Hotel Windsor Sheraton & Towers
Rooms Nos. 1034-37
25 Sankey Road
Bangalore 560 052, India
Tel: 91-80-2220-6401
Fax: 91-80-2220-6405
Web address: <http://www.buyusa.doc.gov/india>

Contact:

Leonard Roberts, Director
E-Mail: Leonard.Roberts@mail.doc.gov
Tel: 91-80-2220-6401

American Consulate General

U.S. Commercial Service
The American Center
38-A, Jawaharlal Nehru Road
Calcutta 700 071, India
Tel: 91-33-2288-1200
Fax: 91-33-2288-1207
Web address: <http://www.buyusa.doc.gov/india>

Contact:

Ashoke Kanjilal, Commercial Specialist (IT and telecommunications)

E-Mail: Ashoke.Kanjilal@mail.doc.gov

Tel: 91-33-2288-1200

American Consulate General

U.S. Commercial Service

220 Mount Road

Chennai 600 006, India

Tel: 91-44-2811-2034

Fax: 91-44-2811-2036

Web address: <http://www.buyusa.doc.gov/india>

Contacts:

Bruce M. Quinn, Principal Commercial Counselor

E-Mail: Bruce.Quinn@mail.doc.gov

Tel: 91-44-2811-2034

Swaminathan Ramakrishnan, Commercial Specialist (IT and telecommunications)

E-Mail: Swaminathan.Ramakrishnan@mail.doc.gov

Tel: 91-44-2811-2034

American Consulate General

U.S. Commercial Service

#555, "E" Level., Taj Residency Hotel

Road No.1, Banjara Hills

Hyderabad 500 034

Tel: 91-40-2330-5000

Fax: 91-40-2330-0130

Web address: <http://www.buyusa.doc.gov/india>

Contact:

Pandurangi Radhakishore, Commercial Specialist (IT and telecommunications)

E-Mail: Pandurangi.Radhakishore@mail.doc.gov

Tel: 91-40-2330-5000

American Consulate General

U.S. Commercial Service

The American Center

4, New Marine Lines

Mumbai 400 020, India

Tel: 91-22-2265-2511

Fax: 9122-2262-3850

Web address: <http://www.buyusa.doc.gov/india>

Contacts:

Richard Rothman, Commercial Consul
E-Mail: Richard.Rothman@mail.doc.gov
Tel: 91-22-2265-2511

Mayank Bhatt, Senior Commercial Specialist
E-Mail: Mayank.Bhatt@mail.doc.gov
Tel: 91-22-2265-2511

Charles Pinto, Commercial Specialist (IT and telecommunications)
E-Mail: Charles.Pinto@mail.doc.gov
Tel: 91-22-2265-2511

**APPENDIX E: SELECTED IT AND TELECOMMUNICATIONS
TRADE EVENTS IN INDIA**

Participation in trade fairs is one of the most cost effective ways of testing a foreign market's receptivity to a product and investigating competitors, and of finding customers or potential agents and distributors. In India, participants use trade fairs to do business, not merely to advertise their products.

The events listed below are some of the major ones in India. They are international in scope, giving visitors, buyers, and exhibitors alike the foundation needed to start business relations. For a complete list of IT, telecommunications, and related trade fairs in India supported by the U.S. Department of Commerce, see <http://www.usatrade.gov>. In addition, the Department's Information Technology Industries' web site (<http://www.export.gov/infotech>) lists IT- and telecommunications-related trade fairs.

U.S. Department of Commerce personnel participate in many of these trade fairs with or on behalf of U.S. firms, offering them market promotion and additional services such as trade lead generation. These trade promotion events facilitate participation at prices far below regular trade fair participation costs or offer additional services not elsewhere available. In addition, U.S. firms on the waiting list for exhibit space, or not interested in exhibiting but needing qualified assistance and meeting rooms at specific trade shows, should contact the Department's commercial specialists in the particular country (see Contacts) to discuss options.

Bangalore***First South Asian IPv6 Summit/SANOG***

<http://www.ipv6forum.org.in>

Date: January 2005

Location: Hotel Taj Residency, Bangalore

Organizer: IPv6 Forum India

Chennai***Connect 2004***

<http://www.ciionline.org/events/>

Date: September 2004

Location: Chennai Trade Centre

Organizers: Confederation of Indian Industry and the Government of Tamil Nadu
Tel: 91-44-2498-7648, 7649
Fax: 91-44-2466-0312
E-mail: businessfairs@cionline.org

Goa

GSM India

<http://www.gsmconferences.com/india>
<http://www.ibctelecoms.com/gsmindia>
Date: January 2005
Location: Leela Palace Hotel, Goa
Organizer: GSM Association
Tel: 91-11- 2669 –2058

Hyderabad

The First iTech 2004, Annual IT&ITES Summit

Date: January 12-13, 2004
Location: ITC Kakatiya Sheraton & Towers,
Begumpet, Hyderabad
Organizer: NASSCOM & State Government of Andhra Pradesh along with GITEX Hyderabad
2004
Tel: 91-40-2340-0132, Ext: # 1834 / 1835 / 1836
E-mail: resv.kakatiya@welcomgroup.com

Kolkata (Calcutta)

Infocom 2004

<http://www.indiainfocom.com>
Date: November 2004
Location: Oberoi Grand Hotel, Kolkata
Organizer: Businessworld and NASSCOM
Tel: 91-33-2260-0627
Fax: 91-33-2225-8002
Email: infocom2003@bworldmail.com

Mumbai (Bombay)

NASSCOM 2004: India Leadership Forum

<http://www.nasscom.org>

Information Technology Industries

A-29

Date: February 3-6, 2004

Location: Hotel Oberoi, Mumbai

Organizers: Indian Institute of Management, Ahmedabad (IIMA) in collaboration with
The Ministry of Information Technology, New Delhi, and NASSCOM

Tel: 91-22-2823-4851

Fax: 91-11-2301-5452

Broadcast India 2004 Exhibition

<http://www.saicom.com/broadcastindia>

E-mail: saicomtradefairs@vsnl.com

Date: October 28-30, 2004

Location: World Trade Centre, Mumbai

Organizers: Saicom Trade Fairs & Exhibitions

Tel: 91-22-2215-1269

Fax: 91-22-2215-1269

New Delhi

SUPERCOMM INDIA 2004

<http://supercomminindia2004.com>

Date: February 4-6, 2004

Location: Pragati Maidan Exhibition Centre, New Delhi

Organizer: Telecommunications Industry Association/InterAds Ltd

Tel: 91-11-2686-1758

Fax: 91-11-2686-1112

E-mail: hwieland@tiaonline.org

info@interadsindia.com

Linux Asia 2004

<http://www.linuxasia2004.com>

Date: February 11-13, 2004

Location: India Habit Centre, New Delhi

Organizers: EFY Group, MAIT, Technetra

Tel: 91-11-2577-1471

Fax: 91-11-2577-1470

E-mail: info@linuxasia2004.com

INDIASOFT

<http://www.escindia.org>

Date: February 10-12, 2004

Location: Taj Palace Hotel, New Delhi
Organizer: The Electronics and Computer Software Export Promotion Council
Tel: 91-11-2696-5103, 2696-4463
Fax: 91-11-26853412
E-mail: esc@vsnl.com

12th Convergence India 2004

<http://www.convergenceindia.org>
Date: March 18-20, 2004
Location: Pragati Maidan Exhibition Centre, New Delhi
Organizer: Exhibitions India Pvt. Ltd.
Tel.: 91-11- 2463-8680, 5155 2001
Fax: 91-11- 2462-3320, 2463 3506
E-mail: www.exhibitionsindia@vsnl.com

NASSCOM eGov 2004

<http://www.nasscom.org>
Date: April 20, 2004
Location: New Delhi
Organizer: NASSCOM

South Asia Communications Infrastructure Conference

Date: April 21-23, 2004
Location: New Delhi
Organizer: U.S. Trade and Development Agency
Contact: MFM Group, 4856 SW 72 Ave., Miami, FL 33155
Tel: 306-667-4705
E-mail: ustda1@mfmgroup.com

**APPENDIX F: LIST OF ORGANIZATIONS
CONTRIBUTING INFORMATION FOR THIS REPORT**

GOVERNMENT OF INDIA

Bishal Nagar Nigam Limited, New Delhi
Centre for Development of Telematics, Bangalore
Department of Information Technology, New Delhi
Department of Telecommunications, New Delhi
Development Commission (Industries), Government of Maharashtra, Mumbai
India Satcom, Bangalore
Indian Institute of Technology, Bombay
ITI Limited, Bangalore
Mahanagar Telephone Nigam Limited, New Delhi
Software Technology Parks of India, Bangalore and Mumbai
Telecommunications Regulatory Authority of India, New Delhi

NON-GOVERNMENT

All Indian Association of Industries, Mumbai
Analog Devices, Bangalore
Association of Basic Telecom Operators, New Delhi
Avaya, Mumbai
Bharti Telecom, New Delhi
BIRD: Research-based Consultancy for B2B Technology Markets, New Delhi
BPL Telecom, Bangalore
Cellular Operators Association of India, New Delhi
Cisco Systems, New Delhi
Confederation of Indian Industry, New Delhi
Cybermedia, Gurgaon
Digital GlobalSoft, Bangalore
D-Link (India), Mumbai
Encore Software, Bangalore
HCL Infosystems, Noida
Hewlett-Packard of India, New Delhi
IDC India, Gurgaon
Indo-American Chamber of Commerce, Mumbai
Infosys Technologies, Bangalore
Lightbridge, New Delhi
Lucent Technologies, Gurgaon

Manufacturers' Association for Information Technology (MAIT), New Delhi
MCI, Mumbai
Mastek, Mumbai
National Association of Software and Services Companies (NASSCOM), New Delhi
Patni Computer Systems, Mumbai
Qualcomm, New Delhi
Reliance Infocomm, Mumbai
Sasken Communication Technologies, Bangalore
Spice Telecom, Bangalore
Syntel (India), Mumbai
Talisma, Bangalore
Tata Telecom, Gurgaon and Mumbai
Voice & Data, Gurgaon
VSNL, Mumbai
Wipro Technologies, Bangalore

