Prometheus, Vol. 19, No. 4, 2001

Asia's Leap into E-commerce: Analysis of Developments in Some Countries

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ABSTRACT *The Internet is creating a global digital economy with new opportunities. Developing countries have to catch up with the developed world by establishing the required information infrastructure to overcome the dangers of isolation and polarisation. The growth path is through the development of IT industries and greater application of IT in society. These IT industries must be compatible with local conditions and conducive to industrialisation.*

Keywords: Asian scene, digital economy, e-commerce, IT industries, Internet, telecommunications.

The Asian Scene

The Internet is creating a global digital economy with new opportunities. It has graduated from being a new technology to a medium going through the process of consolidation, leading to the transition to a mature Internet economy. Developing countries have to catch up with the developed world by establishing the required information infrastructure in order to overcome the dangers of isolation and polarisation. Studies confirm that sustained economic growth in the US in the past decade could primarily be attributed to growth in the IT sector. The US Government Digital Economy Reports of the last couple of years suggest that IT industries—the key enablers of e-commerce—were responsible for 35% of real economic growth while representing only 8% of US GDP. The path to more employment growth in the economy and growth in the standard of living of citizens in the new world order is through the development of IT industries, and the greater application of IT in society. The resulting information-based or knowledge-based society is comprised of the manufacturing industry for IT products, IT powered industries, and an extensive application of IT in economic and social life as a whole. It is not confined to building of IT infrastructure or simply developing the IT industry; knowledge-based society changes the ways of economic operation, social operation, government operation and even the life of ordinary people; in short, the economic and social relationships change. The focus in each country,

Prometheus ISSN 0810-9028 print/ISSN 1470-1030 online © 2001 Taylor & Francis Ltd
http://www.tandf.co.uk/journals
DOI: 10.1080/08109020110091422

however, has to be on the development of an IT industry that is compatible with its local conditions, and conducive to industrialisation.

The most distinguishing feature of the knowledge-based society is that it seeks to make Internet access as universal as the telephone. The development of infrastructure, therefore, is a key area of growth in this society. IDC estimates that more money will be spent building technology and business infrastructures in the years leading up to 2004 than the actual amount of e-commerce transacted. In the year 2004, IDC estimates that US $1.98 trillion will be spent in infrastructure building, while e-commerce spending will be US $2.5 trillion.[1] The total Internet economy in 2004 will thus be US $4.48 trillion. The figures forecast by various research and consulting companies vary widely depending on what they measure and how they measure it. The total value of B2B goods and services bought over the Internet in the year 2004 is predicted to be as follows: AMR Research—US $5.8 trillion; Gartner Research—US $2.4 trillion; Forrester Research—US $2.7 trillion; and Jupiter Research—US $4.6 trillion.[2]

The Gartner Group predicted in April 2001 that B2B e-commerce in the Asia–Pacific region will reach US $220 billion this year, which will be 24% of the worldwide total. In the year 2000, this figure was US $96.8 billion, or 22% of the worldwide total. In the year 2005, the Asia–Pacific region will account for 28% of the worldwide B2B e-commerce transactions, which itself will grow to US $2.4 trillion.[3] The Asia–Pacific figure will thus be US $616 billion in the year 2005. Forrester Research, on the other hand, projects that by the year 2004, B2B e-commerce in the Asia–Pacific will grow to US $1500 billion.

Gartner has also predicted that the e-marketplace in this region, which was pushed by overseas buyers' e-procurement initiatives in the first phase, will be characterised by private investment and consortia-funded supplier marketplaces working to shorten manufacturing and delivery time. Forrester Research, on the other hand, predicts that Asian countries will benefit from local e-commerce development efforts and tight links to international supply chains in a number of key industries. However, according to the Boston Consulting Group, more than 750 horizontal and vertical e-marketplaces that have sprung up in the region will not survive in the challenges of implementation. Asian companies serving global markets are at greatest risk because Western companies have already embraced B2B e-commerce and have the advantage of reduced costs. Also, firms in developing countries that lack the reputation to bid on the e-exchanges or the technology to interact efficiently with companies that are online, may see reduced demand.

A recent report by eMarketer released in May 2001 says that the number of Internet users in the Asia–Pacific region will increase dramatically from 48.7 million in the year 2000 to 173 million in the year 2004. It will then comprise more than 27% of the global Internet user community compared with 21% in the year 2000. The accelerated growth will take the number of Internet users in China to 17.4%, compared with 18.5% of Japan in the year 2004. The same report estimates that the number of Internet users in India will be nearly one third that of China, about 5.8% of the total number in the Asia–Pacific region. Australia, on the other hand, is estimated to have around 7 million Internet users in the year 2004.[4]

This paper presents a comparative analysis of e-commerce developments in India, China, Sri Lanka and Bangladesh. Progress in China is remarkable. It is poised to lead the growth of e-commerce in Asia in the next few years. India too is moving fast, though it is way behind in e-infrastructure. Sri Lanka is improving its telecom sector, while Bangladesh has practically non-existent Internet connectivity.

E-commerce in India

The Government of India has long recognised the need for development of IT industry and information infrastructure, as these are twin engines for growth of the economy. Deeper penetration of IT applications in the economy and in society as a whole can help boost the economy. E-commerce applications can make it easier for the country to better integrate with the global markets, the e-marketplace. This has led the government over the last few years to formulate liberal policies for the development and growth of the IT industry. A high level National IT Task Force was set up in 1997 to recommend a framework for speeding up growth of this sector. Most of its recommendations have already been implemented.

The IT sector as a whole has grown at a compounded annual growth rate of about 30% every year for the last few years. The total production during the current year was Rs. 687 billion, out of which software exports account for Rs. 285 billion (US $6.6 billion).

During the last 5 years, the telecom sector has been liberalised. Telecom services, which were the sole monopoly of the government until 1994, were opened to the private sector. The National Telecom Policy announced in 1994 separated the policy making functions of the government from those of providing services, and allowed the private sector to provide telecom services. It also recognised the need for the establishment of an independent telecom regulator. As a result, a number of private companies were given licences for providing mobile telephone services, and more recently for fixed-line telephone services. International gateways were allowed to be set up by private operators. The policy was further liberalised in 1999. The Department of Telecommunications, which was providing telecom services as a sole monopoly, was corporatised last year and was made to compete with the private sector on a level playing field. The national long distance services on the domestic routes that were the sole monopoly of the government were also opened to the private sector.

Existing backbone networks of public and private companies like the power grid, railways and gas authorities have been allowed to set up national long distance carriers for data transmission. A large data communication backbone with extremely high bandwidth is in the process of construction.

In January 2001, the government paved the way for unrestricted competition in basic phone services. The move will help consolidate the position for those telecom companies that can offer a basket of services—basic, cellular, Internet, national long distance and broadband—to their customers with flexible tariff packages and single billing as the country moves towards convergence. The basic telecom players will also be allowed to offer mobile WLL services.

The telecom also recognises the convergence of different media, and has permitted direct inter-connectivity among service providers. Two-way communication through cable has been permitted for voice, data and information services. A cable service provider can also obtain a licence as a fixed service provider. In fact, the country is moving towards full convergence, with the Convergence Bill having been introduced in Parliament. This takes care of increasing convergence between telecom, IT and broadcasting services. The Communication Convergence Bill, 2001, envisages the setting up of a Communications Commission of India (CCI) to promote the plurality of different media, forms and structure and provide access to a range of competing viewpoints and information resources, in

addition to ensuring a consistent approach to regulation of new activities in the era of convergence.

These telecom policies have had a positive effect in the last few years. The teledensity rose to 3.5% in March 2001 and is projected to grow to 7% by the year 2005 and to 15% by 2010. The rural density is expected to grow from the current level of 0.7% to 4% by 2010. (The urban teledensity is 8.35%.) The number of mobile phones is very small—merely 3.3 million. The telecom sector saw an investment of US $4.46 billion by the government alone during the last year. By 2005, a total investment of US $37 billion will be required, and this figure will rise to US $69 billion in the year 2010.[5] Many of the private companies have set up national long distance backbone and also fibre optic networks to wire the major cities and the trunk routes for providing all kinds of services. A number of them have also set up international gateways for providing bandwidth to the ISPs. Private sector companies like Reliance Telecom, Powergrid Corporation, Railways, Bharti Telecom, BPL and GAIL are creating cross-country optical fibre networks for broadband services. Even non-telecom players like Enron, Zee TV, and Spectranet are making huge investments in the broadband sector. It is estimated that investments of the order of Rs. 318 billion (US $7.4 billion) have been made.[6]

International connectivity is also attracting huge investment. VSNL, the state owned international carrier, was a monopoly until recently. It invested Rs. 102 billion (US $2.4 billion) for a bandwidth of 59 Gbps. The private investment of about US $1.4 billion by Bharti Telecom, Dishnet DSL will bring a bandwidth of 16.08 Tbps connecting India with the world through Singapore, Jakarta, Guam, Portland, Los Angeles, Hawaii and Japan.[7]

A number of companies are providing broadband access over cable. Set top boxes and cable modems can enable existing TVs to act as Internet devices. All major cities are being wired with optical fibres to provide cable TV services, and broadband Internet. The existing 85 million TV sets have the potential of accessing the Internet.

As a result of these policies, a number of Internet Service Providers (ISPs) have come into being which have spearheaded the growth of Internet connectivity in a big way. Over 120 ISPs are fully operational in the country which have taken the number of Internet connections from a mere half a million 2 years ago, to 2.3 million at the end of March 2001. Each Internet connection is used by multiple users. The estimated number of Internet users is 7 million. By 2003, Internet connections are expected to go up to 10 million while the number of Internet users will rise to 30 million.[8] The Goldman Sachs Report, however, expects that the number of Internet users will touch 70 million by the year 2003.[9]

The Nasscom survey finds that there are 382 cities that have at least 2000 Internet connections. This number will double in the next year. This shows that the Internet has penetrated well beyond the metros to smaller cities and towns across the country. The survey on the profile of Internet users revealed that nearly 49% are in the age bracket 18–24 years, while 28% belong in the age group 25–39 years. The gender inequality stands at 82% males, 18% females.

The current level of Internet bandwidth available in India stands at 1.2 Gbps. The bandwidth demand by the end of 2001 is estimated at 10 Gbps. By 2003, the bandwidth demand will be at the level of 300–350 Gbps. By the year 2005, data traffic which is 5% today, will account for 50–65%. Wireless, broadband and

convergence of media are emerging in response to the demands of the growing number of Internet users in the country.

Investments in the Internet projects including dot.com companies rose from Rs. 20 billion (US $0.45 billion) in the year 2000 to nearly Rs. 40 billion (US $0.9 billion) in the year 2001. The number of PCs in the country stands at 5.8 million.

Content for Indian viewers, both within the country and the large diaspora around the world, has emerged as one of the most promising segments of the dot.com world. Initially, most of the sites hosting content of Indian interest were hosted in the US. This trend is now changing. From media companies and newspapers, to grocery stores and government agencies, content on the Net is steadily growing to meet the information needs of Indian users. A majority of these sites started out with only information hosting. Interactivity has been introduced in some of them, while even fewer sites have enabled online procurement.

Domain names can now be registered in Indian languages too. Vishwabharat.com offers domain names using the alphabet in Indian languages. These will be valid like other domain names and are expected to help non-English speaking people take advantage of the benefits of the Internet. Currently, one can register in Hindi or Kannada scripts.

Most of India's banks and financial institutions have set up websites. Online stock trading has also taken off in India with the Securities and Exchange Board of India (SEBI) making efforts to standardise message formats and address issues pertaining to technology, connectivity, security, surveillance and monitoring. Companies such as indiabulls.com and 5paisa.com actively promote online trading on their websites. A number of websites cater exclusively for expatriate Indians and offer valuable information on investment decisions, real estate, etc. Online portals have been set up for B2B e-commerce exchanges in the areas of automobiles, the steel industry, construction, insurance, shipping and pharmaceuticals. A number of sites also deal in auctions. Most of the sites are in the B2B segment, while there are some in the B2C segment as well. Portals which cater to specific information needs and provide services across areas as diverse as cooking, women, online worship, specific sports—e.g. cricket—matrimonial, jobs, travel and tourism in India have also appeared in large numbers. Entertainment and games too have moved online and a number of portals catering to these areas are already in business.

A number of e-payment gateways have sprung up for B2B and B2C e-commerce financial transactions. The B2C transactions can be enabled by the credit cards which are growing in number. The credit cards today number 5.1 million with total spending of Rs. 81 billion (US $1.9 billion).[10]

The industry is alive to the need of being active players in the Internet world. It has aggressively participated in the recent round of ICANN's appointment of new registrars in this region. Two companies have been accredited as registrars in the. com domain. While registration of websites for. com,. org and. net could earlier only be done through Network Solutions Inc., a number of new websites such as 123registry.com and planet4domains.com are now offering this service in India.

It may be added here that the software industry which is the greatest strength of India continues to grow at a compound aggregated growth rate of nearly 39%. The software exports of US $4 billion during 1999–2000 rose to US $6.3 billion

in the current year. A majority of the *Fortune 500* companies have outsourced their software requirements to India. The software solutions from India have been moving up the value chain and are engaging more and more electronic commerce and web based technologies. Internet and e-commerce related software and services export from India accounted for nearly US $1200 million in the current year. This figure is expected to rise to US $3 billion by 2003–04.[11] Many of the software companies are specialising in supply chain and distribution management solutions which are the key drivers of the global e-commerce solutions market. As a major growth factor for B2B transactions, supply chain management is spurring the growth of e-commerce.

The e-commerce figure last year stood at Rs. 23 billion (US $0.5 billion). A recent survey by the Confederation of Indian Industry projects that e-commerce volume will grow to Rs. 250 billion (US $5.8 billion) in the year 2005. Nearly all of it will be on account of B2B e-commerce transactions. India has witnessed a strong shake-up of dot.com companies much like every other country. A report estimates that out of 50,000 dot.coms, which are of Indian origin or are India oriented, only 5–10% will survive in the near future. The same is expected for content providers.[12] The B2B e-commerce transactions will revolve around major e-marketplaces both in the horizontal and vertical segments of the market.

It has been seen that in e-commerce, while the websites are set-up by technically-oriented entrepreneurs, they have no experience of the logistics involved in delivering products to distant areas. B2C e-commerce is likely to remain small because of these constraints. In fact, when the e-tailing market grows in size, high delivery costs, logistical bottlenecks as well as regulatory requirements will act as major barriers. Coupled with this are the cultural barriers where most shoppers are uncomfortable buying items they are unable to see or touch. Consumer protection is also not very effective. If goods are not delivered after electronic placement of orders, the consumers may have to follow a long process to redress their grievances. These are some of the limiting factors for B2C e-commerce.

Besides developing the e-infrastructure in the country through effective telecom policy measures, the Indian Government is taking appropriate steps as confidence building measures for the growth of e-commerce. It has created the necessary legal and administrative framework through the enactment of the Information Technology Act which rolled e-commerce transactions and computer misuse and frauds into an omnibus Act. While, on the one hand, it seeks to create the Public Key Infrastructure for electronic authentication through digital signatures, on the other hand, it seeks to build confidence among the public that the frauds in cyberspace will not go unpunished. The Controller of Certifying Authorities has been put in place for effective implementation of the IT Act. The Act also enables e-governance applications for electronic delivery of services to citizens.

The e-governance projects initiated by governments at various levels are built around the following concepts: government-wide information infrastructure, reengineering of government processes, service delivery to citizens on a commercial basis, and best practices. The websites designed for information dissemination must move from the publish mode to the interact mode and then to the transact mode. Establishment of Public Key Infrastructure for the issuance of certificates to citizens and government agencies, creating electronic payment gateways for accepting service charges, involving banks and credit card agencies,

and establishing service delivery points are some of the important elements of e-governance. Finally, there is a realisation, and consequent emphasis, that the digital divide in the country should be minimised; it must not be worse than the existing gaps in other amenities such as the electric power or supply of drinking water between the rich and poor, between the urban and rural people. An effective policy framework is required to ensure this. The Indian Government has launched community information centres that provide broadband Internet access to populations in the underdeveloped and underprivileged areas such as in the northeast and hill-area states.

E-commerce in China

The Chinese Government launched the China Electronic Commerce Challenge Project in April 1998 with the objective of promoting understanding and development of e-commerce in China as it operates in an increasingly global environment. Through the joint efforts of government and industry experts, the project provides a forum for analysis, recommendations and ongoing cooperation in developing responsive policies, regulatory frameworks and operational practices.

In a report entitled *Scaling the Great Wall of E-Commerce: Strategic Issues and Recommended Actions, China Electronic Commerce Project* [Initial Report 1999 prepared by the Centre for Information Infrastructure and Economic Development (CIIED), The Chinese Academy of Social Sciences, Beijing, China in cooperation with The Cyber Century Forum, Washington, DC] it is observed that 'E-Commerce has the potential of increasing domestic and international trade by significantly lowering the cost of doing business. It has many applications for a wide variety of industries, including manufacturing, retail, financial services—for business-to-business transactions, and especially for small-to-medium-sized enterprises'.

E-commerce can facilitate China's objective to become a relatively developed economy in the mid-21st century. It can help the country raise economic efficiency, transform the economic system from labor intensive mode to technology and capital intensive mode, and reduce the risk in economic and financial activities'.

Guided by the importance of e-commerce for the growth of its economy, the Chinese government has paid special attention to a large number of factors responsible for the growth of e-commerce. These include development of value added data networks, credit card projects, electronic customs networks and competition in basic telecom services.

China has made dramatic progress in building the basic telecom services needed to support e-commerce. At the beginning of 1990, China had only 35 million telephone lines for over a billion people. By the middle of 1999, China had installed 98.8 million fixed telephone lines (installed capacity of exchanges 145 million), and 33.5 million mobile phones (installed capacity of exchanges 61.44 million). The teledensity reached 13% by the end of 2000. This corresponds to 150 million lines. By the end of the year 2000, mobile phones numbered 60 million. The number of mobile phones will reach 100 million by the end of 2001.

The massive and rapid expansion of the telecom infrastructure has been possible because of the aggressive policies of the Chinese Government which

include separation of government administration from telecom management, and the abolition of the monopoly of China Telecom. The Ministry of Posts and Telecommunications was consolidated into a new ministry called the Ministry of Information Infrastructure. It is committed to substantially reducing basic phone installation and toll charges. It also announced the break-up of China Telecom into more 'bite size pieces' and decided to support competition in value added services.

China created competition with the giant China Telecom, the country's dominant fixed-line telecom operator with over 140 million fixed-line users nationwide, through the establishment of China Railcom, the second biggest fixed-line telecom operator. It started services in March 2001.[13] With competition, China Telecom is already becoming more responsive to its customers' needs. The government is stepping in to assure inter-connectivity of the operators for users. International competition in the sector has strengthened the development of the telecom sector as a whole.

Today, China Telecom competes with China Union Telecom (Unicom). Internet services are based on four interconnecting networks: ChinaNet and China GBN (commercial networks), CST Net and CERNet (academic networks). All these four networks have been licensed to directly link with the global Internet. ISPs operate as branches of these networks or are independent of them. China's Internet is largely built on China Telecom's physical networks. Many ministries also operate their own private networks: Railways, Power, China National Power Corporation etc. The government has a large CATV network with over 100 million connections. This is being converted into a broadband network. Some of these companies are allowed to invest in Internet telephony too. Broadband services are being offered through fibre optic networks, DSL and ADSL connections over the existing telephone networks. Over 200 ISPs using the above-mentioned telecom network provide Internet services to users in China.

Massive demand for new consumer technologies and services such as ISDN, intelligent network, multimedia communication, and personal communication has been generated. Digitalising the country's public and private networks with fibre optic cable and satellite system expansion of mobile communication systems/networks is ongoing presently. Cable TV and the future merger of CATV and ISDN are the other drivers of information infrastructure expansion.

China's IT and Telecom industries account for 4% of GDP, while the contribution of IT to GNP is estimated to be 10% or more. In the last 5-year plan of 1996–2000, IT industry accounted for 1000 billion yuan (US $120.5 billion) while the Telecom industry was of the size of 400 billion yuan (US $48 billion).[14] Estimated investment on network construction during the period was US $65 billion. Today, China's information infrastructure scale ranks second in the world, next only to the US. By 2010, China will account for 20% of the global telecom industry and market. Yet another interesting indicator is China's IT export of US $50 billion in the year 2000.

These developments have led to the concept of 'Digital China', which has been further triggered by Premier Zhu Rongji's report on the outline of the new 5-year plan (2001–2005) delivered on 5 March 2001. It foresees the rapid development of infrastructure for IT industry, popularisation of the use of IT in different sectors so as to bring about integration of industrialisation and the IT industry in the country. It is the first time that an industry has been listed as a separate item in a 5-year plan. It shows the government's determination to

achieve fast economic growth by boosting the IT industry.[15] According to this 5-year plan, China will exert greater efforts to develop broadband information networks across the country in a bid to accelerate development of the national economy as a whole. Incentives in the form of low tax rates will be extended to domestic software companies and IC products. The growth of IT industry in the previous plan period (1996–2000) was four times that of the national economy. In the next 5 years, the IT industry will grow at a rate of 20% and will account for 8% of China's GDP.[16]

Senior leaders in China perceive that the main obstacle for building up a 'Digital China' comes from a fragmentation of the industry, characterised by the existence of separate IT centres established by different enterprises and government departments, which is contrary to the nature of networking technology—the cornerstone of the knowledge-based society. The focus must, therefore, be on the development of IT industry that is compatible with local conditions and which facilitates industrialisation. The traditional industries can be transformed through the use of IT with the ratio of investment to return being one to four. According to a survey, this can be as high as one to 20.

China is investing heavily in information infrastructure construction to boost the growth of Internet access and e-commerce development. The investment of several billion dollars in the underground fibre optic network and the satellite system will create great economic efficiency. China perceives e-commerce as the new driving force for China's economy, and for economic and social development of the country. It is the traditional industries, rather than dot.coms, which are at the centre of activities and which expect that the utilisation of e-commerce technology, will help improve management and cut costs. As an example, in the year 2000, the China Oil and Petroleum Group sold 2.6 billion yuan worth of products and bought 2.3 billion yuan worth of raw materials online.[17] Not only traditional industries but other sectors, such as infrastructure construction and the software industry, are also expected to be the beneficiaries of e-commerce development.

China predicts sustained growth of the B2C e-commerce market according to the report released by the China E-commerce Association at the Fifth China International E-Commerce Summit held in April 2001. From a total business volume of US $62.9 million, B2C e-commerce will grow to US $190 million in the year 2001, and US $3.2 billion in the year 2004. The report says that 90% of Internet users in China are willing to buy online in the future, though they are presently worried about the security of e-transactions. There are more than 600 online shops in China that account for 60% of the total number of e-commerce websites.[18] They serve consumers in large cities such as Beijing, Shanghai and Guangdong. Major commodities sold online include information products, daily necessities, books and magazines, and audio and video products.

China Post is adopting a number of measures including the postal computer banking network, initiating e-remittance business etc. to speed up the development of e-post. The comprehensive e-post network will comprise an information platform, an e-banking system and a logistics network. China Post will take advantage of its network of banking cards: 'green cards', and the traditional mailing network to develop e-commerce. On its ISP network connecting Beijing, Shanghai and Guangdong, China Post will extend e-business from Beijing to other large cities.

It is projected that a more prosperous China is poised to drive the growth of e-commerce in Asia over the next few years as more SMEs shift their businesses to

online marketplaces. Chinese online trading communities are linking global buyers with mainland-based suppliers. Ariba, the global e-commerce collaboration developer and systems provider, predicts that China's B2B market is likely to be worth US $125 billion by the year 2005,[19] up from its value of US $9.25 billion in the year 2000 (76.77 billion yuan).[20] This will be around 20% of the e-commerce in the Asia–Pacific region. Chinese suppliers trade globally in consumer products such as apparel, food and beverage, furniture and furnishings, and office equipment and suppliers.

Sparkice, a Chinese e-commerce company, supporting thousands of SMEs, has tied up with Ariba for setting up e-marketplaces. It also entered into an alliance with Los Angeles-based AsiaDemand, which provides trade and logistics services to Chinese companies trading with buyers in the US. This is resulting in significant growth of B2B e-commerce in China.

The Interactive Audience Measurement Asia (Iamasia), an Internet analyst company, in its report released in June 2001 estimates that there are currently 12.3 million Internet users in China. Hong Kong accounts for 1.85 million. In China, 5.7 million people use the Internet at home, and 5 million at work. Only 38% of users are women. China's user base is young, with 63% being in the age bracket 15–29 years. Some 5% of Internet users have already purchased online.[21] Books, groceries, hardware and software are the top sellers. The number of Internet users at the end of 2000, according to another report, was 22.5 million compared with 8.9 million at the end of 1999. The number of online computers stands at 8.9 million.[22]

China will have 69 million wireless Internet users by 2004, while the number of mobile phones will be 236 million. In the same year, the total number of Internet users will reach 120 million.[23] China Mobile, the country's largest mobile telecommunication operator is firmly moving ahead with WAP services.

It is worth noting that China is taking necessary steps to introduce online governance, and encourage its State Owned Enterprises to adopt e-commerce to reduce costs and reach out to a larger customer base. By the year 2000, it had a target of getting 80% of government organisations at different levels to move online, for effective processing, transmission and sharing of information.

Telecom in Sri Lanka

Sri Lanka, with a population of 19 million, like many other developing countries in Asia, started the telecom reform process in order to provide communication access to larger number of people. In fact, it started this process much before India did. New legislation separating policy, regulatory and operational functions was enacted in 1991. The Telecom Act was amended in 1996 to strengthen the regulator, introduce competition in fixed-access and to privatise Sri Lanka Telecom (SLT). In 1996, direct competition to SLT was introduced while SLT was privatised in 1997 with 38.5% shares sold to NTT, Japan. In 1991, two licences were issued for the provision of data and other telecom services using WLL technology. No further wireline licences will be issued until August 2002. Fixed-access teledensity at the end of 1999 stood at 3.55%.

In 1989, the first mobile access licence was granted. In 1995, four mobile access operators were licensed. At the end of 1999, mobile phones were 1.35%.

Microwave radio links and optical fibres form the backbone of the network in the country. Colombo has been wired with optical fibre in multiple rings.

Worldwide connectivity is provided through international gateways in the form of submarine cables and satellite stations.

A number of operators are being licensed to provide datacom including Internet services on the basis of leased facilities. New services, like ISDN, have also been introduced. Internet access over mobile phones and WAP services have also been started. The total number of Internet connections were 31,723 at the end of June 2000.

Sri Lanka has started a number of Electronic Data Interchange (EDI) projects, especially in Customs. A special agency called CINTEC has been created to promote the growth of EDI and e-commerce. A large number of government departments have established a web presence for information dissemination, and are trying to move to provide services electronically. E-commerce is yet to take off in any noticeable way.

Telecom in Bangladesh

Bangladesh, with a population of 126 million, has a very low teledensity of 0.5%. Cell phones number 62,000. The number of Internet connections is a mere 3500, and that too is mostly in the capital. Clearly it is a non-starter in so far as e-commerce is concerned.

The government announced a new telecom policy in 1998 with the objective of increasing teledensity to 4% by 2010. The policy includes the introduction of competition, private and foreign investment in basic and fixed services, access to new technology, and the creation of modern information infrastructure based on fibre optic, radio and satellite systems. Four cell phone companies were the first to be licensed by the government. In order to provide fair competition to the erstwhile state monopoly BTTB, its interconnection to the private fixed and mobile operators, resolving other related issues on tariffs, and spectrum management, an independent regulator has also been created. A transparent licensing procedure is being implemented.

Internet services are provided through a 2 Mbps backbone of a UK company, 512 kbps backbone of Teleglobe, Canada. An 8 Mbps link is expected to be operational by June 2001. DSL services are provided from five digital exchanges. By the end of 2001, all districts will be connected through digital transmission links—mostly optical fibres.

Bangladesh has just started the journey into the digital telecom world. Internet and e-commerce will follow.

Comparative Analysis

A developing country can become industrialised and modernised if it can extensively apply IT to enhance productivity and international competitiveness, develop e-commerce and adopt intelligent industrial equipment. An information-based or knowledge-based society is composed of IT products, and IT applications in society and the economy as a whole. Many countries in Asia are taking advantage of e-commerce through opening of economies, which is essential for promoting competition and diffusion of Internet technologies. The Internet is boosting efficiency and enhancing market integration in developing countries.

The developed world has had a long lead over developing countries in telecom infrastructure. The world average of teledensity is 15% compared to the developed

world average of 55–60%. The same is true of PCs, Internet connections, and the number of Internet hosts.

Even a couple of years ago, the Internet was very US-centric. It was cheaper for ISPs in other countries to send traffic to the US than to transmit it directly to regional centres. During 1998–99, European parts of the Internet have become much more interconnected with high bandwidths, so that the European traffic stays in Europe. Asia began to form an intra-Asian mesh network effectively joining its major national centres. Today, the infrastructure in Europe and Asia is no longer as US-centric as it was a year ago. There are large bandwidth undersea cables with capacities of hundred of gigabytes connecting Asian centres; from Singapore to South Asia to China to Japan to Australia. Bandwidth is no longer a problem. The Internet world is becoming relatively more symmetric—not skewed as US-centric—although the users and hosts are still larger in the US, Canada and Europe.

As seen above, Asia already accounts for 24% of worldwide B2B e-commerce. Nearly 21% of global Internet users are in Asia. This is expected to increase to 27% in the year 2004. B2B e-commerce will increase to 28% of the worldwide figures in the year 2005. This is no small achievement. Unfortunately, however, Asia in these figures includes only China and India in addition to Japan, Singapore and Taiwan as the main players. The former two are the most recent entrants in the Internet world in a big way. Although small, if measured by the traditional indicators of teledensity, Internet and PC penetration, they are large in absolute numbers. Large enough to have a critical mass of 10–20 million users to be able to make an impact on e-commerce, e-governance. In the next 3–5 years, both these countries will have 50–100 million Internet users which will equal, if not surpass, many of the developed countries. The Internet economy will, then, become more meaningful in these Asian countries. The number of e-transactions will be large enough to sustain the Internet economy. China and India will then take their rightful place in the Internet world.

A comparison of China and India will conclude this paper. China has already overtaken Japan in the number of Internet users in the Asia–Pacific region. India continues to lag behind China in terms of all indicators, and will continue to do so in the foreseeable future. China's lead in IT penetration and infrastructure as seen above will continue, notwithstanding the Indian Telecom and related reforms. A recent study conducted by the Manufacturer's Association for Information Technology (MAIT) in India lists some of the important indicators.[24] China's teledensity is 20.1% compared to India's 3.5%. Over the next 10 years, India has plans to add 1.4 million lines a month, while China has been adding 2 million new lines a month. By the time India's teledensity touches 15%, China will be nearly 40%. China has 16 PCs per thousand compared to India's 5.8. China's Internet users are 22 million while India has only 6.7 million. China's Internet bandwidth is 5 Gbps compared to India's 1.2 Gbps.

During the last 5 years, China invested US $97 billion in telecom infrastructure and US $50 billion in Internet infrastructure. India, on the other hand, invested only US $15 billion in telecom and only US $1 billion on Internet infrastructure. The gap in investment can partly explain the digital divide between China and India. China's B2B e-commerce in 2005 is expected to be US $125 billion, compared to India's projected figure of US $5 billion.

India has a highly skilled IT workforce and a booming software industry, but the telecom infrastructure is still under development and relatively unreliable. It is, however, the country's fastest growing infrastructure with a 30 million fixed

telephone line network, with a target of adding 1.4 million lines every month. India's telecom network is the third largest growing network in Asia (after China and South Korea). The English language advantage that India has hitherto enjoyed in IT may get eroded with the tremendous emphasis that China is placing on English language teaching on a massive scale. China's telecom and e-infrastructure is also relatively much more developed and continues to grow more rapidly. The government has embarked on a path to create a 'Digital China'. The conclusion is inescapable: China will drive the growth of e-commerce in Asia.

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