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Author(s): Madanmohan Rao, Sanjib Raj Bhandari, S. M. Iqbal, Anjali Sinha and Wahaj us Siraj
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Struggling with the Digital Divide

Internet Infrastructure, Policies and Regulations

Madanmohan Rao
Sanjib Raj Bhandari
S M Iqbal
Anjali Sinha
Wahaj us Siraj

This paper provides an overall framework for analysing the ISP market in south Asia, compares and contrasts the scenario in member countries, and concludes with a set of progressive recommendations. The regulatory climate in south Asia has only recently welcomed private sector ISPs, but a key challenge lies in creating a level playing field between government-owned and private sector ISPs. Work has begun on initiatives to extend the Net beyond urban concentrations to rural areas via Internet kiosks, community centres, wireless delivery and non-PC devices, but much innovation and investment is still called for here. From the ability to improve software and education to boosting handicrafts and human rights, the Net has a lot to offer to a wide array of humanity in south Asia. But without a progressive ISP environment, the Internet will continue to exacerbate the digital divide between rural and urban, non-English and English-speaking south Asia.

THE Internet is growing at the rate of 30 per cent per annum in number of users, and 100 per cent per annum in hosts on Internet. It is expected that by the end of the year 2000, the user base will touch 200 million. It is estimated that there are 7,000 ISPs worldwide, mostly in the US. In fact more than 60 per cent of the users and ISPs in the Internet world are in the US [Sinha 1999]. In addition to the worldwide online user base, Web technologies also impact inter-organisational and intra-organisational publishing, messaging and collaboration systems via Intranets and Extranets.

Advanced Internet economies have also moved beyond basic Internet infrastructure to dynamic e-commerce infrastructure: payment gateways, secure channels, digital certification authorities, overnight courier services, third party audit services, and online tracking capabilities.

The ISP business in general is shaped by emerging technologies, communications standards, new business models, government regulations, regional cooperation, and alliances with other sectors of the Internet delivery chain like community, content and commerce.

The material for this paper has been drawn from discussions and presentations at the first south Asian Internet Workshop, organised by the International Centre for Mountain Development (ICIMOD) based in Nepal and hosted by the Local Government Engineering Department (LGED) of Bangladesh, in Dhaka in April 1999.

In south Asia, Internet access has matured beyond the basic email services of the early 1990s to full-fledged World Wide Web access. National ISP regulations and policies are only slowly following global trends in deregulation and international peering arrangements. Value-added services, wireless Internet and non-PC devices for Internet access are still in the embryonic stage.

Costs of dial-up and leased lines are dropping, but could become more affordable. Organisational adoption of Intranets and Extranets is only slowly emerging. Universal access issues, ensuring level playing fields between government and private sector ISPs, and Asian peering agreements will continue to dominate the ISP scenario in south Asia for the coming years.

For the software industry – especially in India – the Net is seen as a key enabler for tapping into global IT markets. The importance of connectivity is being realised by other sectors of the economy as well, and the need to plug in to e-commerce and e-business will continue to be a major driver for calls to improve the Internet environment.

Evolution of the ISP Market in South Asia

The late 1980s saw the emergence of electronic bulletin board systems in some south Asian countries, along with non-profit Internet access through educational and government initiatives. Full access to the World Wide Web for the consumer and commercial markets was offered by ISPs in the mid-1990s.

For instance, in India, the first dial-up e-mail network was set up between National Centre for Software Technology (NCST) and the Indian Institute of Technology (IIT) Bombay in 1986, followed by connections to the US and Europe. In 1994, a satellite communications network for the Education and Research Network (ERNET) was set up with assistance from the United Nations Development Programme (UNDP). The Software Technology Parks of India (STPI) and National Informatics Centre (NIC) opened the Internet gates to software exporting companies and government agencies as well. And in August 1995, Videsh Sanchar Nigam (VSNL) introduced commercial Internet access in India. Private sector operators began offering services in 1998, and the number of cities and towns in India with Internet access is expected to increase from the current 40 to over 70 by the end of 1999.

Internet access via VSAT was introduced in Bangladesh in 1996. The number of ISPs grew to a dozen in 1997 and now amounts to 18. Some of these ISPs have been experimenting with value-added services like Internet fax and Internet telephony.

In Nepal, email services were introduced in 1993 by Ronast and Mercantile Office Systems, using dial-up facilities provided by ERNET, New Delhi. Connections to the Internet in the US and Singapore were then set up, and full access to the World

Wide Web was launched in 1996. In 1997 Internet usage began to spread outside Kathmandu, but in 1998 growth of Internet usage reportedly slowed down due to bandwidth constraint and high access rates [Bhandari 1999].

With assistance from UNDP, a pilot phase of the Sustainable Development Networking Programme was started in Pakistan in 1993 as part of a resource conservation initiative. UNDP also provided funding for EDUNET, an educational networking project [Dadupota 1995]. The ISP market was opened up to the private sector in 1995, and a few dozen ISPs began to set up operation.

In sum, Pakistan now has close to 40 ISPs in operation accounting for about 250,000 users. There are 18 ISPs in Bangladesh and about 40,000 Internet users, and there are four ISPs in Nepal with a total of about 8,000 Internet and e-mail users. India has a dozen ISPs, and close to a million Internet users.

National Connectivity and Peering Agreements

Bandwidth to the international Internet has grown to about 80 Mbps in India, 10.5 Mbps in Pakistan, 512 Kbps in Bangladesh, and 320 Kbps in Nepal. Connectivity to the external Internet is via the US, western Europe, or Singapore.

Fourty cities in India, 20 in Pakistan, and five each in Bangladesh and Nepal have access to the Internet. Maximum inter-city link capacity between the major metros in India is 2 Mbps; links between other south Asian cities are generally of the order of 64 Kbps.

No peering agreements for forming national (let alone regional) Internet exchanges exist between south Asian ISPs. As a result, all inter-ISP traffic is routed via the US, Europe or south-east Asia.

In India, only government-owned ISPs are currently providing international gateway access. Private ISPs will be allowed to do so only if they allow for screening of traffic by the monitoring facilities of national security agencies such as the Intelligence Bureau (IB) and RAW. The department of telecommunications (DoT) is the nodal agency for security clearances. A committee comprising the representatives of DoT, department of electronics (DOE), ministry of defence, ministry of home, department of space, National Informatics Centre (NIC) and National Association of Software and Service Companies (NASSCOM) will clear the gateway proposals.

Internet Access Costs: Dial-up and Leased Lines

Dial-up and leased line costs in south Asia are high by world standards, but continue to drop. Per-hour costs of dial-up Internet access (excluding high local telecom tariffs) currently are about $ 0.39 in India, $ 0.97 in Pakistan, $ 7.12 in Nepal and $ 1.5 in Bangladesh. Unlimited-usage, flat-rate pricing for dial-up Internet access still seems a distant reality for most of south Asia.

A leased T1 link in the US costs about $ 2,000 per month and a T3 link about $ 40,000 per month. But a dedicated 64 Kbps link in south Asia costs $ 1,900 in India, $ 6,500 in Pakistan, $ 8,000 in Bangladesh and $ 7,000 in Nepal.

ISPs in Bangladesh connect to the global Internet via VSAT links, which have restricted bandwidth and also introduce a natural time delay of more than 500 milliseconds for uplink and downlink paths. High satellite link costs also restrict the number of VSAT circuits per ISP to only one circuit.

Price wars between ISPs in India are beginning to drive dial-up costs down, so much so that some private ISPs are complaining that they may find it difficult to be competitive if the government telecom providers (some of whom are also doubling as ISPs) continue to drop access rates.

Market Players

The ISP players in south Asia include government-owned agencies, large domestic corporate groups, VSAT/email operators, public sector infrastructure bodies, multinational corporations (MNCs), small entrepreneurs, and NGOs.

Large MNCs (like AT&T and UUNet) have yet to establish a significant foothold in the south Asian ISP marketplace due to regulatory uncertainties. Small entrepreneurs are chipping away at the access market via cybercafes, but large corporates are still struggling with established government Internet providers (like VSNL in India). In Bangladesh, the ISP market is dominated by government and NGO players.

Much potential lies in the hands of the public sector units, such as the power grid and railway authorities who have existing secure cable connections across the region. National ISP organisations are also emerging (e g, Internet Services Provider Association of India) to create greater collective bargaining power and to pool assets.

In addition to the structured and organised market, there is a definite market place for the unorganised segment. It is expected that they will play a significant part, by cornering as much as 25 per cent of the total market in countries like India by 1999. However, these will be restricted to small regions and single city operations only.

Value-Added Services

South Asian ISPs have only recently begun to move beyond basic connectivity services to offer value-added services like news and entertainment, roaming services, e-commerce, security solutions, Intranets and Extranets. For instance, Satyam Infoway in India offers news updates and entertainment information on its Web site. ETH Dishnet (www.eth.net) plans to launch educational services to residential users. Wipro Infotech and Global E-Commerce are addressing VPN solutions. In Nepal, WorldLink is aiming at providing telemedicine services to hospitals and doctors.

In key performance categories like network design (such as peering agreements, average bandwidth, diesel backup), content hosting and applications (dedicated servers, mirroring, security, Intranet services), customer service (online help desks, 24-hour service, billing formats), and performance guarantees (packet loss, uptime, network delays), south Asian ISPs continue to lag behind their counterparts in countries like the US. Hence most south Asian web sites continue to be hosted in countries such as the US, where the hosting charges are more affordable to begin with.

Internet telephony is causing some concern to government telecom operators due to the anticipated drop in international telecom revenues when domestic users make long-distance and international phone calls via the Net. In India, the ISP VSNL blocked access to the web site of Internet telephony company Vocaltec for some time. Other Internet content issues in south Asia are discussed in Rao et al (1999).

National ISP Regulations and Policies

Through much of south Asia, the datacom environment is still governed by colonial-era legislation like the Indian Telegraph Act of 1885, with some modifications and revisions [Sinha 1999]. Other relevant laws include the Indian Wireless Telegraphy Act 1933, which stipulates that the government is the sole owner and

controller of the radio communication channel (including VSAT links for Internet traffic).

For issues ranging from Internet telephony to e-commerce, these antiquated pieces of legislation continue to hamper the growth of a progressive Internet environment. For instance, India's liberalised ISP policy in 1998 decreed that "the licensee will not take any measure which amounts to carriage of voice over Internet".

Other regulatory blocks in some south Asian countries include the forbidding of coupling between different service infrastructures (e g, VSAT and Internet backbones in India), lack of mechanisms for creating a level playing field between government and private sector players, high costs of leased lines, and taxes on data communications.

On the other hand, more exemplary policy practices include the lack of restrictive criteria on ISP licence application in India, a progressive import policy for the IT sector in India, the early privatisation of the ISP business in Pakistan, and the lack of multiple metering for Internet access (also in Pakistan). In India, Internet policy recommendations were made by a high-level national IT task force whose policy recommendations were also made available on the Internet.

Unfortunately, the policy making environment for the south Asian Internet continues to be dominated by party politics, foot-dragging by erstwhile government monopolies, and infighting between various communications agencies.

For instance, the regulatory situation in Bangladesh is complicated by the fact that the Bangladesh Telegraph and Telephone Board (BTTB), a state monopoly provider of land line phones and VSAT links, has also launched its own Internet services in direct competition with private ISPs.

Regulatory bodies – such as the National Telecommunications Authority of Nepal and the Telecommunications Regulatory Authority of India – have been formed to regulate issues like awarding of ISP licences, fixing tariffs, and settling of inter-agency ISP disputes.

Universal Access Issues

The Internet – especially in south Asia – is still an urban-centric, largely English-oriented medium. Greater penetration of the Net in south Asia will depend on factors like affordability of access in rural areas, and relevance of content and services in local languages.

Hence much attention is beginning to focus on the creation and adoption of Internet kiosks, community centres, and non-PC devices like Web-TV. World-Tel (www.world-tel.com) is unveiling ambitious plans for thousands of Internet Community Centres (ICCs) in Indian states like Kerala, Tamil Nadu, Andhra Pradesh, Gujarat, Bengal, and Maharashtra. Trials for delivering Internet access via cable TV have already begun in some Indian cities.

Bangladesh's Grameen Communication is developing a kiosk-based programme for email access in villages. The M S Swaminathan Research Foundation is developing "knowledge centres" in south Indian villages to help ensure food security; the project includes local language content and wireless Internet access.

Global and Regional Imbalances

According to Bram Dov Abramson, an analyst at the datacom traffic tracking organisation Telegeography, the growth of the global Internet is also skewing international ISP maps, tariff structures and content hosting towards the US.

According to Abramson (*Economic Times*, India; March 12, 1999).

> US networks have always been central to the Internet, of course: what's important is how that persists when the Internet reaches people everywhere. ISPs gateways of newly connecting countries are invariably hubbed in the US. As a result, the fastest route between two regions, even neighbouring countries, is often through the US. Maps of Asian or European backbones tell the story vividly: the Internet is spreading, but the US remains its central switching office.

But Asian ISPs currently pay the full cost of connection of Internet links to the US, and not half as in the case of other telecommunications links. This is the problem pointed to in the January 29, 1999 joint statement by eight Asian telcos (Communications Authority of Thailand, Chunghwa, Indosat, KDD, Korea Telecom, Philippine Long Distance Telephone, Singapore Telecom, Telekom Malaysia) calling on US operators to share the costs of the international cables connecting between the US and the rest of the Internet. Such considerations have yet to be formally raised by south Asian ISPs. Issues pertaining to Internet imbalances are generally focused on the urban-rural divide, and between English and non-English speaking populations.

Recommendations

Based on the outcome of the recent south Asian Internet Workshop held in April 1999 in Dhaka organised by ICIMOD, several recommendations can

Appendix

Surfboard: South Asia on The Net

(1) ISP news in South Asia	
ISPIndiaInfo.com	www.ispindiainfo.com
Indialine	www.indialine.com
Cybermedia India Online	www.ciol.com
Dawn	www.dawn.com
Bangladesh Web	www.bangladesh-web.com/news
(2) ISP Sites	
India	
VSNL	www.vsnl.com
National Informatics Centre	www.nic.in
STPI	www.stpi.soft.net
Satyam Infoway	www.satyaminfoway.com
MTNL	www.mtnlonline.com
ETH	www.eth.net
Bharti-BT	www.mantraonline.com
Palcom	www.palcomonline.com
Pakistan	
SuperNet	www.super.net.pk
Comsats	www.comsats.net.pk
Nepal	
CCSL	www.ccsl.com.np
HTP Communication	www.htp.com.np
Mercantile Communications	www.mos.com.np
WorldLink	www.wlink.com.np
Bangladesh	
Global Information Network	www.globalctg.net
Grameen CyberNet	www.citechco.net
Pradeshta	www.pradeshta.net

be made to policy-makers and Internet professionals in the region, to boost adoption of the Net and harness its potential to local advantage.

(1) A level playing field should be created between basic infrastructure and service companies, and between wholesale and retail Internet providers. A government ISP player with a monopoly in one area (e g, VSAT links, last mile connectivity, international telecoms) should not use this monopoly power to wipe out an entire industry in another sector.

(2) More public-private partnerships need to be launched between government/public and private sector ISPs.

(3) A regional Internet exchange should be created to facilitate more efficient traffic flows in the region.

(4) Regional co-operation should be increased between ISPs and other infrastructure players, through forums, conferences and joint projects.

(5) Local skill sets in datacom infrastructure should be increased and refined.

(6) Special attention should focus on Internet kiosks and community centre projects for rural areas.

(7) Power grid and railway authorities should actively participate in creating regional Internet backbones.

(8) Government telecom players should invest heavily in Research and Development on Internet telephony, so that the technology is seen as a market opportunity on a global scale and not a threat on a local scale.

(9) Internet radio should be explored as a viable means of extending communication channels and information services to a wider audience.

(10) South Asian ISPs should work co-operatively with their counterparts in the rest of Asia to better understand and overcome issues of imbalance with US based ISPs.

(11) South Asian ISPs must co-operate if they are to foster the regional infrastructures which local content will demand, and which will in turn encourage the creation of such content.

(12) Regulatory bodies for ISP issues should include not just members of government agencies but also network specialists and private sector participants.

(13) More effort needs to be devoted to tracking and providing convenient access to ISP market parameters, such as overall number of users, geographical diffusion, leased line availability, sectoral absorption, last mile technologies, regulatory bodies and documents, and peering agreements between ISPs.

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