

# 14. The Provision of Internet Services in India

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## 1. Introduction

In the years following its founding in 1947, the Republic of India implemented a set of policies designed to enhance the self-reliance and political integrity of this highly diverse and expansive country. A highly regulated and protectionist domestic market emerged, overseen by a bloated bureaucracy. In response to economic crises during the 1970s and 1980s, domestic and international pressure, and global trends in trade and investment, the Government of India implemented a set of economic reforms in the 1990s. The realization that information and computing technologies (ICT) constitute a critical part of the economy of modern states was an important element of these reforms.

In 1998, Prime Minister Vajpayee offered a vision of a 21<sup>st</sup> century India in which information technology (IT) would enable significant change in the lives of individuals, communities and governments, and in India's relationship with the world. In his words (Vajpayee, 1998),

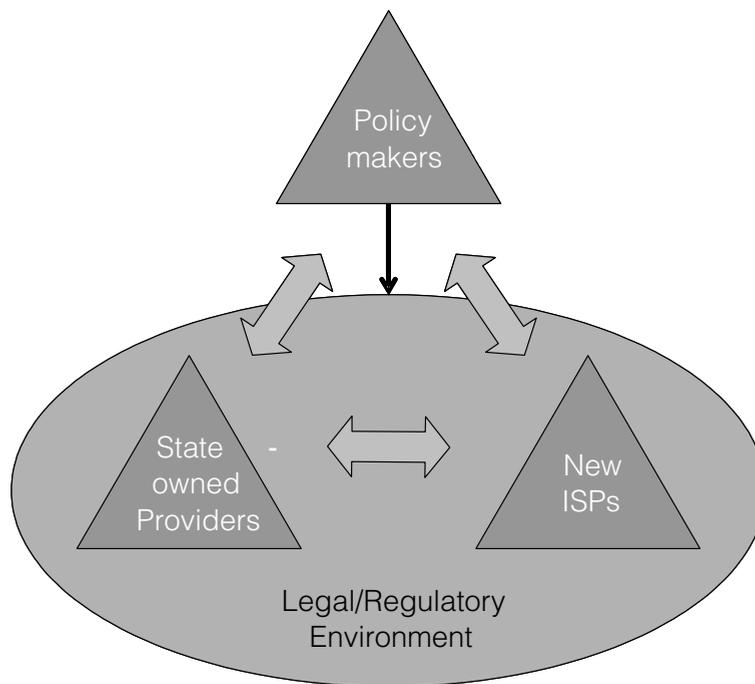
- [IT] is revolutionizing life on this planet like no other technology has in human history. It has been impacting on the economy, communication, culture, educational system and social interaction in all the countries, bringing them closer in a world transformed into a Global Village and laying the foundation for a new civilization. India, as the cradle of civilization, is poised to become a major IT power in the coming years and contribute to the realization of its many promises for our own benefit and for the global good.

The Internet is central to the new vision of India as an IT power in many respects. Technologically, the Internet provides the infrastructure for a range of applications supporting person-to-person, business-to-consumer, and business-to-business interaction. In many nations, the desire to expand the presence of the Internet has driven the build-up of extensive communications infrastructure. Economically, the Internet supports or enhances critical technology industries such as telecommunications and export-oriented software development, creates opportunities for innovation and new business, offers new channels by which companies can reach their customers, enables

the growth of domestic and international markets, and facilitates the execution of transactions even when the parties are geographically distant. Politically, the Internet may support more direct and transparent relationships between governments and the populace. In addition, the Internet has been a driver of changes in policies, laws and government services to accommodate the digital age. Socially, the Internet, in its very nature, is a technology for the masses; Internet penetration rates are often viewed as an indicator of a nation's technological status.

Critical to the development of the Internet in any country is the development of the organizational infrastructure necessary to bring Internet services to the populace (Wolcott *et al.*, 2001). A key question is how India, with extensive poverty and a large and cumbersome bureaucracy, can transform itself into a nimble provider of Internet services. A solid understanding of the factors that promote or inhibit such development can help policy-makers establish an environment in which the Internet can thrive. This descriptive study examines the development of the market for Internet services in India. In particular, it reveals the creative tension between policy-makers, the incumbent state-owned telecommunications services providers, and the new Internet Service Providers (ISP) that has fuelled a good deal of the growth of the Internet observed in India (Figure 14.1). Developments in India can partly be understood by applying a framework for analyzing strategies of ISPs (Wierstra *et al.*, 2001).

Figure 14.1  
Key Relationships Shaping the Growth of the Internet



Following this introduction, the second section provides some background on the evolution of the telecommunications regime in India. The third section describes the birth of the Internet in India through 1998. Section four describes the growth of Internet services since 1998 policy changes permitting commercial ISPs to proliferate. In the fifth section, a framework for analyzing strategies of ISPs is used to understand developments in India. Throughout, the role of policy-makers, private ISPs and state-owned providers is discussed. Portions of this chapter are based on Wolcott and Goodman (2003).

## 2. Background

As a result of the Telegraph Act of 1885, the Government of India held a total monopoly on all types of communications until the late 1990s. The government controlled not only the operational aspects of telecommunications services, but also the policy-making and regulatory functions (Dossani and Manikutty, 2002).

In the mid-1980s, the first tentative steps towards a more liberalized regime were taken. Two state-owned corporations were founded to provide limited communications services: Mahanagar Telephone Nigam Limited (MTNL) for telecommunications services in Mumbai and Delhi and Videsh Sanchar Nigam Limited (VSNL) for international long-distance. The Department of Telecommunications (DoT) and its parent ministry, the Ministry of Communications (now called the Ministry of Information Technology) handled all other aspects of telecommunications in India, including licensing, policy-making, regulation, tariff setting and cross-subsidies. The *National Telecommunications Policy, 1994* (NTP 1994) sought to expand telecommunications services throughout the country, in part by opening the possibility of the private sector providing some basic services.

To fulfil commitments made when India joined the World Trade Organization (WTO) in 1995, the Ministry of Communications separated its regulatory and operating functions. As a result, the Telecommunications Regulatory Authority of India (TRAI) was created in 1997. Operating functions remained in the DoT. The DoT divisions providing operational services were transformed into a corporation—Bharat Sanchar Nigam Limited (BSNL)—in 2000, and VSNL was successfully privatized in 2002.

In liberalizing the telecommunications regime, the Government of India has tried to balance competing concerns. On the one hand, policy has been driven by a desire to allow market factors to shape the development of telecommunications in general and the Internet in particular. On the other hand, successful privatization of state-owned entities requires that their income streams be sustained to keep them attractive to potential investors. Stripping them of all their monopoly rights at a stroke would likely have devastated these entities and greatly reduced their market value. The Indian government's solution to this dilemma has been to peel away the monopoly

rights of VSNL and BSNL gradually, but persistently, forcing them to compete with new entrants, while leaving them with the fiscal health to do so. Table 14.1 shows the years in which monopoly rights were removed from the state-owned providers.

Table 14.1  
Loss of Monopoly Rights

Monopoly Right	Monopoly Holder	Year Monopoly Ended
Internet service provision	VSNL	1998
International gateways	VSNL	1999
Domestic long distance	BSNL	1999
Access to international terrestrial cable	VSNL	2000
Domestic local telephone	MSNL, BSNL	2002
International telephony	VSNL	2002
International long distance	VSNL	2002

### 3. Birth of the Internet in India (1986–1998)

From 1986–1998, the Indian government supported a variety of programs to establish nationwide networks. Targeting the needs of the government, academia and industry, these projects contributed to the creation of organizations and institutional know-how that helped support the Internet in its early days. Three of these were initiated in 1986–1987: INDONET, initially to serve the country's hundreds of IBM mainframe installations; NICNET, the National Informatics Centre Network, a nationwide very small aperture terminal (VSAT) network for public sector organizations; and the Education and Research Network (ERNET), to serve the academic and research communities. VSNL also initiated several wide-area networks (WAN) during the 1980s.

ERNET ([www.eis.ernet.in/](http://www.eis.ernet.in/)) was established in 1986 by the Department of Education (DoE) and seven other government organizations: the National Centre for Software Technology (NCST); the Indian Institute of Science (IISc), Bangalore; and the Indian Institutes of Technology (IITs) in Chennai (Madras), Kanpur, Kharagpur, Mumbai and New Delhi. The project received technical and financial support from the UN Development Program (UNDP). The goals of the project were to set up a nationwide computer network to enable the academic and research communities to conduct research and development in computer networking, and to provide network training and consulting services (Anonymous, 1998a). The NCST was the first institution in India to establish an international connection to the Internet and subsequently acquired the responsibility for managing the *.in* (India) national top-level domain,

since the organization established a root-server and the first *.in* Internet domain (ncst.ernet.in).

The first connection to the global Internet, a 9.6 Kbps link between NCST and UUNet (UNIX-to-UNIX Network) Technologies in the United States, was established in 1989. The international link was up-graded to 64 Kbps in 1992.

In 1995, VSNL became the first commercial Internet service provider by offering public Internet services via a gateway earth station and router in Mumbai that provided a single connection to MCI in the USA. Local access nodes were installed in Kolkata, Chennai, Mumbai and New Delhi, permitting connections via dial-up lines through the DoT or MTNL or an I-NET connection. Within two years, VSNL/DoT had 75,000 Internet subscribers on the network and double that number in 1998 (Anonymous, 1998b; Kumar, 1998; Pai, 1998).

## 4. Internet Boom

In the latter half of the 1990s, the pace of reform quickened considerably, with the Internet playing an integral role, both as a factor driving reform and as a beneficiary of change. The election of the Bharatiya Janata Party (BJP) in 1997 signalled enhanced interest in IT and the Internet. The BJP advocated economic liberalization and listed IT as one of the government's top five priorities, along with more traditional issues such as the provision of potable drinking water and education.

One of the clearest signs of a changing government attitude was the creation of the National Task Force on Information Technology and Software Development (it-taskforce.nic.in/). The National Agenda for Governance, issued in March 1998 by the BJP, outlined India's goal of becoming a software superpower and announced the creation of a National Informatics Policy aimed at achieving this end. The Task Force was directed to produce an Action Plan within 30 days and a National Informatics Policy within 90 days. The Task Force was created on May 22, 1998 under the chairmanship of Jaswant Singh, Deputy Chairman of the Planning Commission.

Less than three weeks after convening, the Task Force published a Background Report on the state of IT in India. An Action Plan, outlining 108 recommendations, followed on July 4, 1998 (Anonymous, 1998c). The Task Force could act quickly because it built upon the experience and frustrations of state governments, central government agencies, universities, the software industry, other nations, and the recommendations of the WTO, the ITU and the World Bank.

The Internet was featured prominently in the Action Plan, with nine of the recommendations, including the very first, specifically addressing Internet development issues. The first recommendation directed the DoT "and authorized ISPs" to open Internet access nodes in all district headquarters by January 26, 2000.

The IT Action Plan of 1998 was followed by several major pieces of legislation changing the telecommunications regime. The *New Telecommunications Policy, 1999* (NTP 1999) went much further than NTP 1994 in liberalizing the telecommunications sector (Anonymous, 1999e). The *Information Technology Act 2000* placed electronic transactions and commerce on a firmer legal footing (Anonymous, 2000). The pending Convergence Bill or an alternative unified license policy seeks to establish an integrated regulatory regime for voice, data and broadcasting communications (Rambabu, 2004).

The *New Internet Policy* (Anonymous, 1997) went into effect in November 1998, allowing any Indian company with a maximum foreign equity of 49% the possibility of providing Internet services. It established three categories of license:

- Category “A” licenses apply to the entire country.
- Category “B” licenses apply to one of the 20 territorial telecom circles (which roughly correspond to the boundaries of a state) or the large metropolises.
- Category “C” licenses are for individual cities.

The policy removed restrictions on the number of licenses a single company could acquire or the number of licenses that could be held by different companies in the same area. Licenses would be issued for 15 years and ISPs would be free to set their own tariffs. In addition, ISPs could lease transmission network capacity from private basic service operators, the railways, the state electricity boards and the National Power Grid, thus ending the DoT’s monopoly on domestic long distance data networks. ISPs could also build their own transmission networks, upon approval from the DoT.

When the *New Internet Policy* went into effect on November 6, 1998, companies rushed to acquire licenses to provide Internet services. As shown in

Figure 14.2, the growth in the number of licenses issued remained linear through the end of 2000, when the total exceeded 400. New license issuance came to a standstill in 2001, as India felt the effects of the bursting of the global dot-com bubble and the cooling incentives and declining support for new entrants into the Internet services market. The decline in 2002 reflects the issuance of an exit policy for license holders that would enable them to surrender their licenses by paying a surrender charge of 5% of the Performance Bank Guarantee (PBG) (Anonymous, 2002).

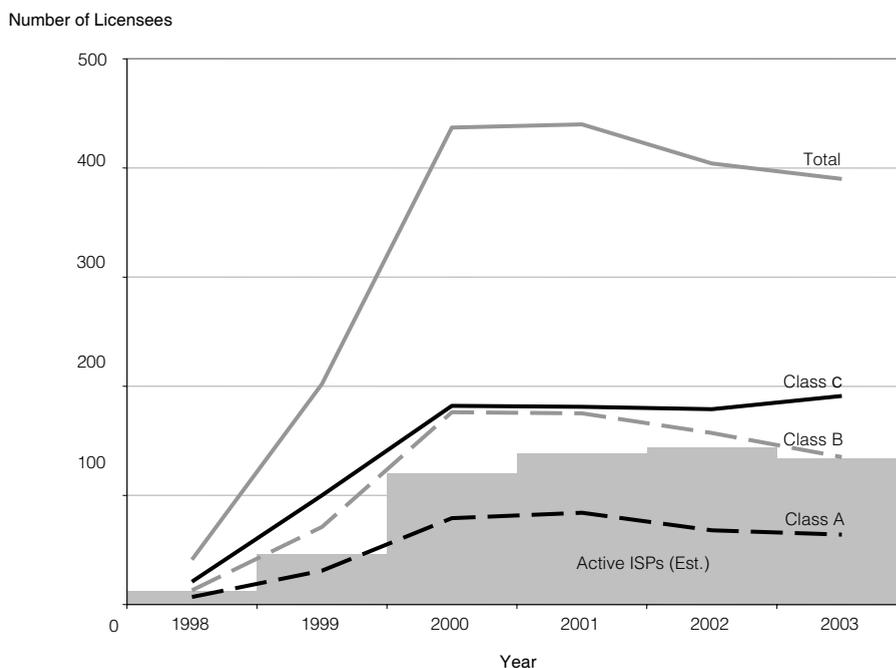
The actual number of operating ISPs at any given point in time is difficult to determine, although an estimate is given in

Figure 14.2. The gap between the number of companies licensed to provide Internet services and the number that are operational can be explained in a number of ways. Part of the explanation is that offering Internet services is considerably more difficult than acquiring a license to do so. Many ISP aspirants underestimated the effort involved in establishing a viable business. But other factors played a role.

One factor appears to be the role played by the state-owned ISPs. As the only commercial ISP from 1995 to 1998, VSNL was able to accumulate experience, estab-

lish an extensive infrastructure for ISP services and gain early and elite users as customers. In addition, since VSNL was the monopoly provider of international Internet leased lines, it was able to hinder the growth of ISPs by delaying their applications for leased lines and by offering them connectivity at rates that squeeze their profit margins. VSNL's internal costs for connectivity are lower than what it charges ISPs. Consequently, if VSNL and the ISPs charged comparable rates to the end user, VSNL would have a wider profit margin and could thus tolerate lower prices than could the ISPs (Ganapati, 1999). For example, in August 1999, VSNL received permission to reduce the rate it charged corporate customers for international Internet connections by 15%, while leaving the rates for private ISPs unchanged (Mani, 1999; Mohan, 1999). These lower rates would be made available to recognized educational institutions, government organizations, newspapers and news agencies and corporations located in a business cluster, such as a software technology park.

Figure 14.2  
ISP License Holders



Source : Anonymous, 1999a, b, c, 2001a; Antonelli, 1986

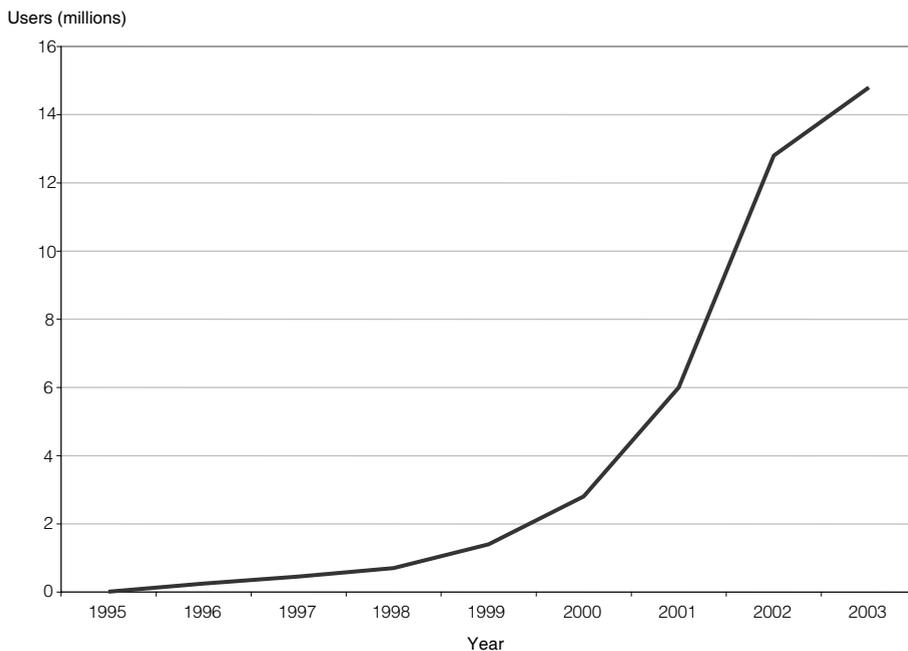
A similar situation existed in Delhi and Mumbai, where MTNL was a monopoly provider of phone services. In July 1999, MTNL reduced its prices for certain institutional end users by 15% (Anonymous, 1999d), while the profit margins of competing ISPs in these cities were less than this amount. Consequently, MTNL was either subsidizing a service it was offering below cost, or its costs were lower than the ISPs. Either answer could be viewed as an anti-competitive practice.

On January 3, 2001, VSNL introduced a popular pricing package called "Monsoon" which reduced dial-up costs by 50% (Sengupta, 2001). This reduction came at a time when many ISPs were considering increasing access rates to improve their financial footing. The price reduction and resulting price-war among ISPs forced many to curtail their plans for expansion, or cease service altogether in certain cities (Goswami, 2001; Raman, 2001). In contrast, VSNL experienced steady increases in its subscriber base and acquired a reputation for high quality connections (Anonymous, 2001b).

The intensive competition has continued to the present. According to reports in August, 2003, VSNL, MTNL and BSNL were the first, third and fourth largest ISPs in India, together having 45% of the nation's subscriber base. With the exception of Satyam Infoway (Sify), the second largest ISP with 17% of the subscriber base, the private ISPs lag the public ones by a considerable margin. Industry observers attribute this to a combination of network capacity, accessibility and aggressive marketing (Kumar, 2003). As

Figure 14.2 shows, the competition does not appear to have led to a substantial reduction of the total number of active ISPs. It is quite possible, however, that the slight decline in 2003 will intensify in 2004 and 2005, leading to a competitive, but less diverse market for Internet services in the years to come. What, if anything, policy-makers and regulators should do to address this scenario is likely to be a subject of discussion.

Figure 14.3  
Estimated Number of Internet Users in India



One of the consequences of the aggressive competition has been dramatic growth of the Internet as measured by number of users, number of ISP points of presence and number of cities served. Figure 14.3 shows the growth of the estimated number of Internet users in India. Figure 14.4 shows the growth of the number of ISP points of presence.

From 1998–2003, the number of cities with points of presence grew by an order of magnitude, from approximately 45 to nearly 500, as shown in Figure 14.5. Figure 14.5 also reveals the growing competitiveness in the Indian market for Internet services. Markets with more than 10 competing ISPs emerged for the first time in 1999 (Hyderabad). In 2000, five cities were serviced by 20 or more ISPs: Bangalore, Chennai, Delhi, Hyderabad and Mumbai, with the greatest concentration in Delhi and Mumbai. A year later, Kolkata, Ahmedabad and Pune were added to this list.

A comparison of Figures 14.3–5 illustrates other significant points about Indian Internet expansion. The rate of increase of total cities served in 2001–2002 is greater than the rate of increase of ISPs, which in turn is greater than the rate of increase of users. The underlying reason is that ISPs tended either to offer localized service (Class ‘C’ or ‘B’ licenses), or to target primarily the larger metropolitan areas. The exception was BSNL. While 2001 was a year in which private ISPs did little to expand service into previously un-served areas, most of the growth in 2002 occurred through BSNL’s efforts to expand the number of cities served. During 2001 and 2002, multi-year efforts by BSNL to implement a national Internet backbone to provide Internet services in all districts finally began to bear fruit. Most of the expansion in points of presence (Figure 14.4) and in cities (Figure 14.5) is due to the rollout of the Sanchar Net Internet service in districts nationwide (Anonymous, 2003b). These points of presence do not generate the numbers of users that points of presence in the more populous cities do, a fact reflected in the more modest rate of growth of users (Figure 14.3).

Figure 14.4  
Estimated Number of ISP Points of Presence

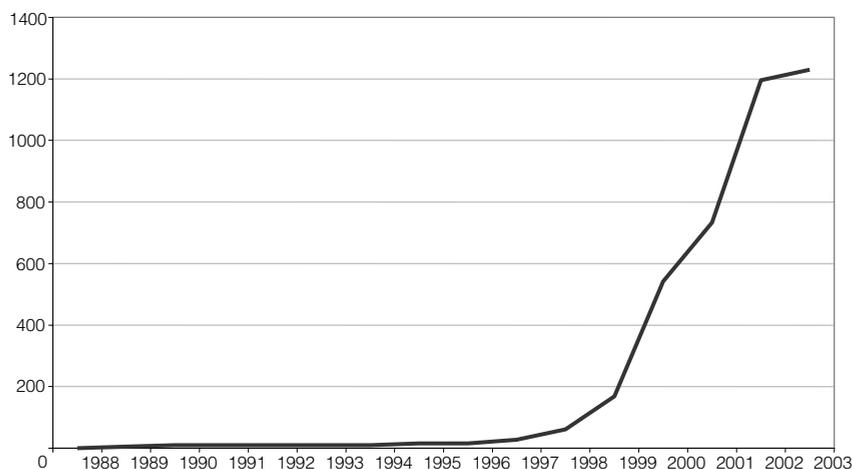
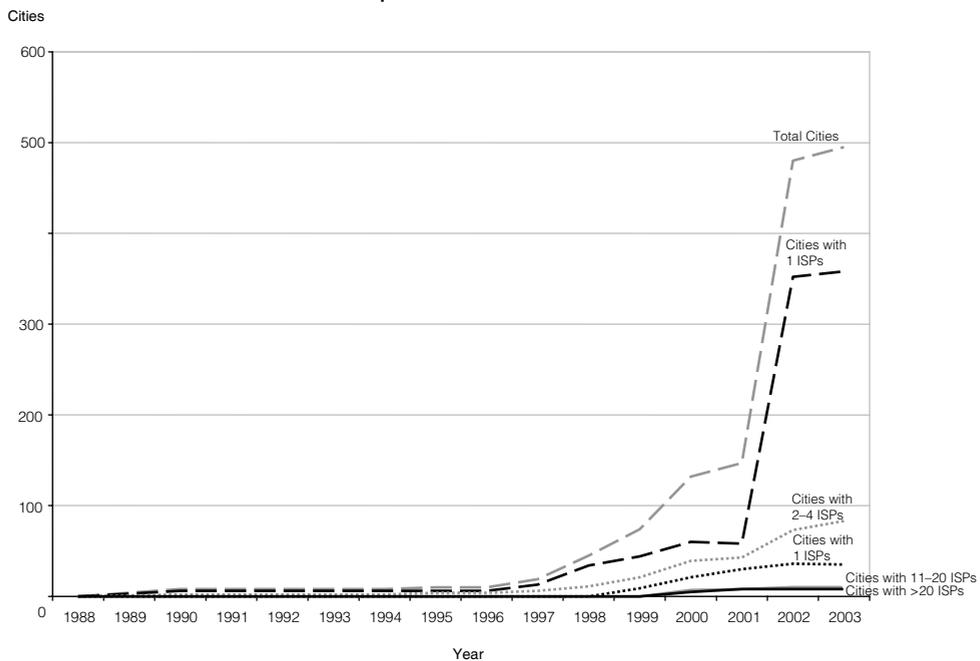


Figure 14.5  
ISP Competition within Indian Cities



With points of presence in over 400 cities, BSNL's Sanchar Net provides service to eight times the number of cities of the next most widespread ISP (Sify). This fact reflects a cornerstone of policy-makers' attitudes towards telecommunications services in general. While policy-makers have been eager to introduce market forces into the telecommunications industry, the dedication to achieving universal service remains a prominent part of policies. While market forces have succeeded in driving Internet expansion in more heavily populated areas, a universal service objective and government investment have been necessary to push the technology beyond major cities. The universal service objective has been behind the DoT's expansion of telecommunications infrastructure from a teledensity of 1.5 lines per 100 people in 1998 to 6.2 in 2003 (Anonymous, 2003a). It has also motivated DoT/BSNL efforts to build the national Internet backbone (Agarwal, 1999; Rajawat, 2001) and Sanchar Sagar's (Anonymous, 2003c; Kumar, Neeraja, 2000) two major efforts to build national Internet infrastructure and roll out service to all district headquarters.

## 5. Discussion

A framework for analyzing strategies of ISPs has been suggested by Wierstra and others, based on their analysis of ISPs in Europe (Wierstra *et al.*, 2001). They identify

three principal types of providers of Internet service. *Incumbent telecommunications companies* are characterized by their ownership of national or international infrastructure, a highly vertically integrated set of services and a broad portfolio of basic and value-added services which they offer to a broad spectrum of residential and business customers. *New carrier companies* are characterized by high capital investments to build new infrastructure which is used primarily for providing IP-transport and intranet services to businesses, including large national firms (LNF), multinational enterprises (MNE) and ISPs. *Small, regional ISPs* do not generally own their own infrastructure, are not vertically integrated and offer a portfolio of Internet access services and consultancy to residential and small and medium sized enterprises (SME).

These companies can compete on any combination of five strategy dimensions. *Factor inputs* relate to the technology employed and to specific capital and labour inputs. The *functional value* chain refers to how vertically integrated a company is. The *product portfolio* reflects the breadth and depth of services offered, with a basic portfolio consisting of basic IP transport, web hosting and e-mail. *Pricing policies* include both prices in absolute terms and whether the pricing policy is a flat fee or usage based. *Market segmentation* includes the geographic scope (regional, nation-wide, or international) and residential vs. business user categories.

Based on these factors, the authors suggest the following competitive balance between the incumbent telecommunications companies and the small, regional ISPs.

- These companies compete primarily in the residential user market rather than the large national firms and MNEs.
- Incumbent telecommunications companies may enjoy competitive advantages through:
  - a nation-wide supply of POPs,
  - established relationships through supply of telephony,
  - cost advantages due to ownership of infrastructure,
  - economies of scale in development of content as a result of broader user bases.
- Small ISPs may enjoy competitive advantages through:
  - Customized support services.
- A weakness of the incumbent ISPs is that they use relatively old technology and may face threats from new entrants in the market for backbone capacity.
- The regional ISPs may face weaknesses from their dependency on the incumbent telecommunications for infrastructure and their inability to gain economies of scale.

To some extent, the evolution of the Internet services market in India supports this characterization of the competitive landscape. The competition between the state-owned and the private ISPs for residential customers is intense. The incumbent state-owned providers (VSNL, MTNL and BSNL) have exhibited an aggressive strategy of reduced costs and bundling of services that leverages their control of existing infrastructure and existing relationships with customers. According to the Internet Service

Providers Association of India (ISPAI), the incumbents bundle their Internet and telecom services and force unequal interconnect terms on private players (Nair, 2003). It is not clear, however, that nation-wide coverage is a significant factor, particularly for MTNL which is limited to two major metropolitan areas. The fraction of users who depend on the ability to access their accounts from numerous cities within India is likely to be small.

A substantial portion of the competitiveness of the state-owned providers has been their aggressive build-out and upgrading of infrastructure, thus broadening the geographic scope of coverage, improving the quality of Internet service, and reducing the unit costs of network capacity. In this manner, the state-owned ISPs have worked vigorously to mitigate a potential weakness identified in the Wierstra analysis framework.

While it partially helps explain the evolution of Internet Services in India, Wierstra *et al.*'s (2001) framework is incomplete in several respects. First, the Internet service providers of India are not so easily placed into the "small, regional ISP" and "nationwide incumbent telecommunications company" categories. First, of the incumbent telecommunications companies, only VSNL and BSNL offer nationwide services. In addition, a number of private ISPs, such as DishnetDSL and Sify, hold Class A licenses and some have begun to build their own infrastructure and enter the telephony markets. These companies have begun to exhibit more of the characteristics of the incumbents and enjoy some of their strategic benefits.

Second, there are factors besides those listed above that have strongly shaped the competitive environment. The authors acknowledge that a company's competitive position is affected by other market conditions, such as demand technological factors, policy and regulation, and the number and strategies of competitors, though such factors are not explicitly a part of their framework. Yet it is these that have had such a strong impact on the Indian ISP landscape. In particular, the Indian government's decisions to gradually replace monopoly rights with competitive environments has invigorated these environments yet left the incumbent providers with sufficient resources to compete aggressively with new entrants. The competitive environment has driven the state-owned providers to reduce their costs, increase reliability, and offer an innovated set of services (Kumar, 2003).

Finally, the expansion of BSNL to over 400 cities throughout the nation cannot be explained solely by a desire to increase the number of subscribers. Most ISPs have concentrated their efforts in the densely populated areas where per-subscriber costs are lower. BSNL's strategy reflects government policy, particularly that of universal service, and the need to bring the Internet to all parts of the country if India is to become a "major IT power".

## 6. Conclusion

Though India's experience with the Internet and the telecommunications sector shares many similarities with the experiences of other countries, its unique history, size, and demographics give it distinctive qualities which offer insights into Internet diffusion. While the discussion here is limited to government policy and selected aspects of the expansion of Internet services, it underscores the critical nature of one of the factors related to Internet growth: the relationship between policy-makers, state-owned telecommunications providers, and private Internet service providers.

India's experience offers a number of insights into and lessons for the development of the Internet. This country's experience has been, on the whole, successful, and offers one model of how countries can transition from Internet laggard to one with a vibrant Internet presence.

First, government policy makes an enormous difference in Cyberspace. In spite of those who claim that the Internet transcends national boundaries, the Indian experience provides an excellent illustration of how fundamental, focused changes in policy and legislation can unleash forces that can accelerate Internet diffusion. A number of factors shaped telecommunications policy, but the legislative acts and regulatory decisions of the Indian Government have been quite coherent and forward looking. Global trends, Indian leadership, and domestic conditions converged to support changes in policy that have benefited the Internet greatly. Among the key changes were the creation of a regulatory regime that grants start-up companies rather easy entry into the Internet services market, and reasonably fair access to existing infrastructure.

Second, the nature of the relationship between the government, the state-owned telecommunications service provider(s), and the private sector is a critical variable. While many variations on this three-way relationship exist, India offers one example in which the relationships have a tension that ultimately helped the Internet grow. Indian policy-makers have helped shape an environment in which the incumbent telecommunications providers have neither withered away in the face of competition by start-ups nor overpowered the latter. The result has been a strong market ultimately benefiting the end users.

Third, Indian policymakers have been rather successful using both market and non-market forces to encourage the growth of the Internet. Gradual but deep changes in the regulatory environment have created a highly dynamic milieu for Internet services. At the same time, major infrastructure projects and mandates for publicly-owned providers have enabled the expansion ISP services to parts of the country not well served by the private ISPs. An important lesson is that both public and private initiatives play important roles; neither should be relied on exclusively.

Barriers to the Internet remain significant. Poverty remains extensive. While tele-density figures have improved considerably, they remain well below those of developed countries. The climate for foreign direct investment is questionable. The gov-

ernment has not always been able to carry out large-scale infrastructure projects in an efficient, timely manner. Whether the creative tension between Internet service providers can be maintained is an open question. With only approximately 1.5% of the population using the Internet, India still has a long way to go to become the “IT Power” envisioned by Vajpayee. However, India has made enormous strides. Current trends and policies are promising.

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