

III. US TEAM

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Summary of the US Team

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1. IT POLICIES AND ISSUES: US AND THE AMERICAS

Online users worldwide have shown phenomenal growth in every aspect of the new telecommunications technology since the introduction of the World Wide Web in the early 1990s. During the last decade, the number of people who have access to the Internet has increased from a virtually negligible number to the range of 300-500 million. NUA's estimate put the figure at 513 million in August, 2001. Despite such extraordinary successes, adequate and effective access to the Internet continues to be limited to a few countries and, within each country, to those who are in middle to upper income brackets. In 2000, about half of Internet users were located in the US and Canada, slightly down from 57 percent in 1999, according to CommerceNet. Worldwide, top-ten countries accounted for 85 percent of the total Internet population in 2001.

The growing disparity in Internet access among countries or socio-economic groups is called 'the digital divide.' A deepening digital divide in the Internet age is a critical policy issue because the Internet as a general purpose technology has become essential not only for communications needs but also in economic, social and political arenas. To promote better Internet access, US and other countries in the Western hemisphere have implemented significant changes in telecommunications policy, infrastructure management, and e-business promotional strategies. In the papers presented by the US team, we evaluated the current status of such

policies and their effects on increasing access to the Internet.

1.1. Internet Infrastructure and Internet Access

First, we focus on Internet penetration rates. Most available data indicate that access to the Internet is distributed unequally across nations. But even among those who are leaders in Internet usage, Internet penetration rates vary widely. Among the 28 countries for which Nielsen Net Ratings provide detailed data, the penetration rate varies from 3.4 percent (South Africa and Mexico) to 61.8 percent (Sweden). Especially notable is the fact that three Latin American countries included in the survey — Brazil, Argentina and Mexico — have the lowest penetration rates except for South Africa. This is the first indication of their serious problem in terms of expanding Internet opportunities to the majority of their population. On the other hand, penetration rates for the leading countries in North America, Europe and the Asia-Pacific are surpassing or approaching the 50 percent mark.

Low penetration rates for Latin American countries are due to several factors, including the limited access to the basic telecommunications infrastructure, the low level of income, along with associated problem of uneven income distribution, and the lack of public Internet access points.

In the US, broadband users — including cable modems, DSL, satellite and ISDN connections — have increased rapidly from 1.3 million in September 1999 to 12 million at the end of 2000. Among at-home Internet users, 12 percent reported to have broadband connection in 2000. Currently, US Internet users are upgrading Internet connection through 56K modems but the most explosive growth is seen in the broadband adoption.

Broadband Internet access is exceptionally strong in the Asia-Pacific region where there are over 6 million users with high-speed access, usually through DSL, according to a Gartner Dataquest report. A few European countries are also increasingly connecting to the Internet via cable or DSL high-speed lines.

On the other hand, Argentina, Brazil and Mexico are far behind in broadband access. Access to the Internet is determined by several factors, including the adequacy of basic telecommunications infrastructure, which is a critical reason why many Latin American countries face serious challenges in catching up with other Internet leaders. In certain senses, however, low telephone penetration rates may not matter if policies

are chosen to bypass or leapfrog technological developments. For example, although the diffusion of DSL broadband networks suffers from inadequate telephone networks, access using cable modem, satellite or wireless can be an alternative. However, except for Argentina, the prospect for cable broadband is also low due to low cable penetration rates.

American online users do not rely on public access sites. Internet uses primarily occurred at home (37 percent), work (35 percent) or school (27 percent) in 1999, according to Nielsen Home Technology Report. The remaining 28 percent accessed it from somewhere else. These access sites include someone else's home or public places such as libraries or community technology centers. In Asia and Europe, public access sites are primarily commercial operations such as Internet cafes or cybercafes. Particularly in Asia, commercial access sites have great success in expanding Internet access to the masses. In Korea, there were about 16,000 'PC-bangs' (meaning PC-rooms) by 2000 according to Donga.com analysis. There were 2,000 similar Internet cafes in Taiwan.

These public access sites offer a very inexpensive alternative to owning a PC and subscribing to an ISP. For example, PC-bangs in Korea are open 24 hours and offer DSL-level connectivity, at a price of about US\$1.00-2.00 an hour. The great number of PC-bangs may be an odd phenomenon in Korea, where residential access and broadband availability are already outstripping the level seen in North America or Europe. Most users are young males and primary activities are interactive games and Web surfing. Users are also not limited to low income, disadvantaged population. Rather, PC-bangs are concentrated in the areas near colleges and business offices.

In the US and most other countries, public access sites are established by government grants or community initiatives for the expressed purpose of expanding Internet access to those who would otherwise be excluded. But publicly funded Internet centers may not be as inviting as PC-bangs where users can do whatever or go whenever they wish.

1.2. Telecommunications Reforms and Internet Usage

The telecommunications industry worldwide has undergone major changes during the last two decades toward a more open and competitive market. Digitization, computers and the Internet, and the convergence in analog, digital, and wireless technologies are the market forces that made

reforms imperative in many countries.

In the US, the long struggle among AT&T, the Justice Department and new technology companies ultimately led to the breakup of AT&T and the Telecommunications Act of 1996 which aimed at reducing federal regulation, creating competition and promoting economic convergence in the telephony, cable and computer industries. During the formative years of Bell Telephone and later AT&T, its growth was aided by the simple economics of network externality, the economies of scale and scope. These factors favored one giant network firm instead of many smaller providers, which AT&T exploited to acquire competitors. The heavy investment required to build a network also meant that only a monopoly would be able to provide such an essential service without failing in the market. By linking universal service with economics of efficient networking, AT&T was able to amass a vast network of telephone providers.

The Telecommunications Act of 1996 was a major revision to the Communications Act of 1934. While encompassing past developments in the AT&T telephony case, cable television legislation, and new technologies of microwave, the Internet and wireless, the 1996 Act was an affirmation of the new reality evident in the rapidly converging telecommunications sector and computer-based networks. As such, it included provisions dealing with the broadcasting industry (spectrum usage and cross-industry ownership), local access issues in telephone networks, cable franchise regulation, universal access, and obscenity and violence issues.

The economic changes mandated by the Act have the greatest effect on market structure in the broad categories of industries that fall under the telecommunications industry. These include basic telecommunication services such as voice, packet- or circuit-switched data services, telex and telegraph, FAX and private leased-line services. In addition, various types of value-added services such as e-mail, voice mail, EDI and online data processing services are affected. The immediate effect of the Act on the telecommunications industry was that of relaxing market ownership restrictions and lowering entry barriers.

In terms of Internet access, the 1996 Act is the final step toward opening up the local access market. Since the breakup of AT&T, markets for long-distance and other enhanced services became competitive, where AT&T's share dropped from 90 percent in 1984 to 38 percent by 2000. At the time of the legislation, AT&T's share was already below 50

percent of the market. The intent of the Act was to encourage the same kind of competition in the local access market that connects end users where local Bell operating companies (LBOCs) maintained a monopoly in the 'final mile.' At the same time, increased market competition brought down long-distance charges significantly, continuing the long-term trend that began with AT&T's divestiture in 1983. By 1996, per minute charge had fallen by half from that of 1984. Most significantly for market competition AT&T's access charges for local loop dropped from an average of US\$60 to less than US\$20.

1.3. Competition in Local Loop and Broadband Service

The loosening of cross-market entry restriction meant that competitive local exchange carriers could build new networks or lease lines from incumbent carriers. Cable operators and satellite communications enterprises are now free to offer voice service in addition to video, data and other enhanced services. As a result, the latter players face a lower barrier to entry into local network markets. More competition and choices for Internet access are expected at the local level. However, according to the latest FCC report, only 56 percent of the surveyed Zip code areas reported at least one competitive local exchange provider or more. 46 percent of the Zip codes still rely on one incumbent provider.

Also competitive local exchange carriers (CLECs), instead of building their own network infrastructure that includes the last mile, largely rely on leasing existing lines from incumbent carriers. For example, about 35 percent of their customers are served by CLECs' own last mile or local loop facilities in 2000. The rest are served by leased lines. Furthermore, new entrants tend to focus on medium and large businesses, institutions and large organizations with voluminous demand. About 60 percent of CLEC lines are targeted at large users while 80 percent of the customers served by incumbents are small businesses and consumers. Thus, the majority of residential consumers are largely ignored by the increasingly competitive market players.

As for high-speed Internet access, during the year 2000, broadband services penetrated to 75 percent of the Zip code areas reported by the FCC, growing from 56 percent the year before. The largest broadband connection is through coaxial cable (3.6 million lines at the end of 2000). Although DSL subscriber lines are smaller than cable at 2 million in 2000, it is growing three times faster than coaxial cable lines. Still, a

quarter of US Zip code areas have no high-speed Internet access providers and another quarter is served by only one provider.

The lack of competition in high-speed Internet access providers and their focus on high-density, urban areas is creating unequal access to the Internet in selected areas and population segments. Compared to the top 10 percent of the most populous Zip code areas, where high-speed Internet access is available at 98 percent, low-density, rural areas lag significantly behind. The gap between the rich and the poor is also evident. In the lowest income areas, only 56 percent of the Zip codes reported at least one subscriber, compared to 96 percent for the highest income areas. In the lowest five deciles, high-speed connection is available for less than 70 percent of the areas. Nevertheless, even in this lowest income decile, 92 percent of the population lived in Zip code areas where high-speed service was available. In other words, the disparity in high-speed Internet access is more prominent in terms of population density than household income.

1.4. Costs of Access

For consumers, Internet access costs consist of two elements: local access charges (dial-up charges) and fees levied by an Internet access provider (ISP). Broadband access often does not require ISP charges, although some telephone operators may require existing telephone service and cable operators may demand a subscription to basic cable television service.

Despite increasing competition in the local telephone service, average monthly charges as well as initial connection charges for new service have not shown any significant change over the last ten years. In 2000, an average monthly charge for telephone connection was US\$20.78. In addition, an average Internet user also pays for ISP. According to the OECD, ISP charges constituted a larger portion of the total Internet access charges (i.e. telephone access charges + ISP charges) in 1995. By 1998, increased competition in the ISP market had lowered ISP charges significantly (OECD [2000]). However, local telephone charges did not decrease substantially due to the market's non-competitive nature. In 1998, a survey of OECD countries showed that on average 65 percent (57 percent off-peak) of total Internet access fees were paid to local telephone access providers.

A typical dial-up charge for an ISP in 1998 was US\$19.85 in the US

where most dial-up services are charged a low price for initial hours and a flat rate schedule that varies by usage. Together with charges for local telephone access, a typical dial-up Internet access cost just below US\$40, a lower than average figure compared to an OECD average of US\$46.62. Internet access costs vary widely from Finland at US\$19.77 to a high of US\$68.44 for Germany. The share of ISP in total cost also varies widely, from the low of 18.6 percent (Mexico) to 81.5 percent (Switzerland). Finland (as well as Denmark and Norway) offers the least expensive Internet access. These countries also use a flat-fee schedule. But Internet access in Switzerland and Greece, despite offering a flat rate plan, is relatively expensive.

1.5. The Digital Divide in the US

Even though the US is one of the leaders in Internet access and usage, the digital divide exists between rural and urban areas, although the extent is minor compared to other variables. Central cities are particularly affected by the disparity.

But more prominent digital divide runs along education and income levels. The households in the highest income group (over US\$75,000) are six times more likely to have an Internet access than those in the lowest income group (less than US\$15,000). The disparity in terms of education level is as severe. The significant gap between racial groups, and to a minor degree the plight of central city areas, are strongly affected by the fact that minority races (Blacks and Hispanics) tend to dominated low income, low education groups.

Given such significant disparities, universal access to the Internet now has the same level of urgency among policymakers in the age of information. The Telecommunications Act of 1996 specifically stipulated that "access to advanced telecommunications and information services should be provided in all regions of the Nation (Section 254(b)(2))," thereby making Internet access one of its defined goals of universal access. The Act also put a new emphasis on explicitly funded projects to promote universal access in contrast to the previous approach that relied mostly on implicit support through rate balancing and tariffs. Instead of subsidizing rural areas from high-cost urban service prices, equitable and nondiscriminatory contributions are distributed to target programs such as lifeline and link-up programs and to specific groups such as health care providers in rural areas, educational institutions and libraries, and

low-income customers. The collected contributions are deposited in the Universal Service Fund, administered by the Universal Service Administrative Company, which focuses on four areas: high cost, low income, rural health care, and school and library projects as mandated by the 1996 Act.

A major funding effort is carried out through the so-called E-rate grants, which provide discounts to public and private schools, libraries and consortia. The majority of E-rate funding involves 70 percent to 90 percent discount levels that are distributed mainly for internal networking needs (57 percent) with 33 percent on telecommunications services, and 10 percent on Internet access. Relatively speaking, grants are primarily used to install and enhance basic telecommunications needs rather than for increasing Internet access. Grantees are located in both rural and urban areas but emphasis has been on low-income urban areas. In its third year (2001-2001), 25 percent of E-rate grants have been given to rural applicants, compared to 62 percent urban and 12 percent of unknown.

A similar program is NTIA's Technology Opportunities Program (TOP) that has awarded US\$150 million to 456 programs, which were also matched by US\$221 million by local funds. The type of funded projects and target institutions are similar to the E-rate program but TOP's main concern is to lower technological barriers to accessing advanced telecommunications technology (i.e. Internet). Out of 42 TOP projects surveyed by NTIA in 2001, 83 percent proposed and implemented an access site where community members could access the Internet. Other activities included launching resource sites or Web-based information sites, supporting alliances and community networks that enhanced Internet access, and improving network services to extend health care and governmental services. Access sites and resource centers established by TOP are mostly located in non-profit entities, K-12 schools and school districts, and in colleges.

1.6. US and the Americas: Telecommunications Connection

There is an immense, insurmountable disparity in terms of Internet access and the use of advanced telecommunications networks between the US and Latin American countries. However, computer and information industries in the US are closely connected to their counterparts in Latin American countries through exports of telecommunications equipment and services and through US-based Internet sites. With telecommu-

nications reforms, privatization and opening up domestic markets to foreign ownership and competition, US and European telecommunications players are increasingly active in these countries. Telecommunications exports to these countries represent billions of dollars each year, and are growing rapidly. Mexico alone imported US\$2.8 billion worth of US telecommunications equipment in 2000, a 20 percent increase from 1999. Top ten markets including Mexico, Brazil and Argentina accounted for US exports of more than US\$5 billion in 2000.

The telecommunications industry, particularly the Internet and e-commerce, in Latin America is seen as an important market for US companies. Although Internet penetration is limited to the top 10 or 20 percent of income groups, the potential is in the liberalized market conditions that present more favorable investment and operational opportunities in those countries. Whether past telecommunications reforms and market privatization efforts will lead to increased Internet access for the majority of the Latin American population is still a question. But increasingly, US telecommunications corporations and their business models will be impacting the way the Internet is accessed in Latin American countries.

1.7. Conclusions

PC and Internet penetration rates and the availability of Internet in the US are growing steadily, aided in part by telecommunications reforms during the 1990s. However, the digital divide still plagues many US population groups, mainly those with low income and low education levels. These groups are also predominantly ethnic minorities and more likely reside in urban, inner-city areas or remote rural regions. In particular, inner city neighborhoods have the lowest Internet penetration rates.

Economic or market forces are often inadequate to address their interests. Universal service policies formulated under the Telecommunications Act of 1996 rely primarily on equitably collected funds that are distributed as grants or cost sharing measures such as discounts on telephone charges. Such community-oriented projects are also becoming more prevalent in Latin American countries. While these are in line with the dominant trend in the telecommunications industry and political leadership, i.e. market liberalization and reduction in active government intervention in telephone tariff settlement, their effect on increasing Internet access to underserved and disadvantaged populations will be minimal.

2. INTERNET AND TELECOMMUNICATIONS OUTLOOK IN LATIN AMERICA

Most countries in Latin America during the 1990s opened up their telecommunications markets, privatized government-owned monopolies, and liberalized regulatory policies relying more on market forces than decrees. Such reforms coincided with the introduction of the Internet and the World Wide Web, offering them an opportunity to participate in the new information age as a full-fledged member. Still, Latin America as a region lags far behind North America, Europe and Asia-Pacific in terms of Internet penetration. Here we focus on the current status of telecommunications markets, Internet access and e-business in Latin America, and investigate pricing, telecommunications policies and technological factors that affect current and future growth rates in Internet penetration.

2.1. Current Status of Internet Development

Brazil, Mexico, Argentina and Chile are the top four leaders in Latin America. In terms of top-level Internet domain, significant growth is evident in these four countries, although some Internet sites may be operating under .com, .net and .org domain names. Brazil also is ahead in terms of Internet penetration: 32 percent of upper and middle income groups have access to the Internet in Brazil, compared to 14 percent for Mexico, 12 percent for Argentina and 11 percent for Chile. Active Internet users who have online accounts also indicate that Brazil leads other nations. 40 percent of total online subscribers in Latin America are in Brazil, compared to 22 percent for Mexico, 9 percent for Argentina, and 6 percent for Chile.

However, the correspondence between the number of existing Internet users and future growth potential is a tenuous one. Growth in Internet usage critically depends on providing basic telecommunications infrastructure. For example, Dial-up Internet subscribers in developed markets such as Chile and Argentina grew by 150 percent and 136 percent, respectively, during 2000-2001 period. They are comparably better equipped with main telephone lines than Brazil, Mexico and other Latin American countries.

Latin America in general needs better telecommunications infrastructure such as traditional telephone networks, advanced telecommunications networks, Internet backbone, interconnection points and access

points. In most of these measures, the region is ill equipped to sustain future growth. Another limitation in Latin America is the lack of interconnection between major network access points within the region. Most international traffic is routed to and from US NAPs, adding considerable costs to the users. More concerted investment effort for interconnection is a significant issue if it is to stimulate e-commerce initiatives in the evolving regional economy. Finally, the low level of income is a critical factor that overshadows any future development. Latin America's PC ownership, although growing steadily, is well below 10 percent of population in 2000, compared to 55 percent in the US. Projections indicate that Chile and Argentina will approach the 20 percent level by 2005. But others will struggle to reach 15 percent. Latin American countries must focus on providing Internet access through schools, work places and other public access sites.

2.2. E-Commerce in Latin America

In e-commerce, the Brazilian market accounted for over 80 percent of all e-commerce spending in the region in 1999. The dominance of Brazil will continue. Brazil will account for more than 50 percent of total US\$8.3 billion B2C sales in 2005 according to some projections. Most of these figures are based on Brazil's dominant position in Internet users and online sites. However, growing Internet users in Mexico, Argentina and Chile will present new e-commerce growth areas in the next few years.

Like other countries, Latin American e-commerce is dominated by business-to-business (B2B) transactions. The lack of online consumer buying in Latin America stems from several reasons. For example, the number one reason why people do not buy on the Internet was that they liked to examine products before buying (47 percent). But a large number of people also indicated that they were unfamiliar with e-commerce (44 percent) and they feared for unsafe payment methods (42 percent). Other peculiarly Latin American factors include its relatively unreliable mail delivery service, preference of B2C sites outside of the region, primarily in the US, the low level of credit card usage in Latin America, and the low income level of Latin American consumers.

2.3. Telecommunications Deregulation and Policy Issues

Most Latin American countries have implemented telecommunications

reforms, market liberalization and privatization efforts during the 1990s. Most telecommunications services were provided by the private sector prior to being nationalized. Private companies, under heavy pressure by governments to maintain low prices, invested little to improve basic network infrastructure and telephone services in Latin America were in general extremely poor. Nationalization and other forms of government intervention, however, did not produce improved networks and services.

Between 1984 and 1997, the majority (14 out of 24) of Latin American countries privatized their state-owned telephone companies in the hope of improving telephone infrastructure. In addition, the biggest telephone market player, Brazil, privatized its Telebra system in 2000. In most measures, privatization seemed to have accelerated the growth in main telephone lines. However, some researchers found that market competition helped increase telephone penetration but not the privatization efforts. Others show contradictory results that privatization increased network expansion while competition did not. Privatization sometimes had positive effects on telephone deployment but only in those countries with relatively high income (above per capita GNP of US\$1,500). Improving telecommunications and Internet access is a matter of combined efforts in regulatory reforms, privatization as well as other positive developments in national income and the political and economic environment.

Other measurements of effective reforms are seen in the level of competition in telecommunications service markets and in the growing broadband services. For example, consumers in Argentina by 2000 had four competitors for domestic and international long-distance service from only one in 1995. In addition to two privatized companies (Telecom Argentina and Telefónica Argentina), new entrants such as AT&T, Bell South-Movicom, and CTI-GTE are offering new services in the pager, cellular and Internet markets. Fierce competition in the long-distance service market is evident in the flat or diminishing levels of revenues during the period of 1996-2000, at just over US\$10 billion. Mexico, Argentina, and Peru each had more than 20 operators in the long-distance market in 2000.

For dial-up and broadband Internet access, both improvements in basic infrastructure (such as telephone lines, DSL networks and cable penetration) and market competition must occur simultaneously. Argentina is best poised for broadband expansion. With 5.2 million cable households, Argentina is the only Latin American country with more

than a 50 percent cable penetration rate. However, the DSL revolution being experienced in Asia, especially in Korea, is influenced by market reforms as well as fierce competition among multiple service providers. Simply liberalizing and opening up the telecommunications market will not guarantee improvements in Internet access and the availability of advanced telecommunications services to the general population. The most serious problem in the Latin American telecommunications market is the cannibalization of the existing market by new entrants without significantly enlarging the number of people who are connected and can afford to subscribe to new service offerings.

2.4. Expanding Internet Access in Latin America

Many developing nations, and especially disadvantaged groups in those countries, are still struggling to access traditional telephone services. Telephone lines in many low-income countries are less than 2 per 100 inhabitants, compared to 70 for the US and an average of 39 for European countries. Many Latin American countries face the daunting task of improving basic telecommunications infrastructure while at the same time attempting to expand the level of access to the Internet.

Some of the new technologies indeed help late-comers. For example, with satellite and cellular networks, countries are no longer dependent on fixed-line networks which can be very expensive to connect to sparsely populated areas. Distance is now a lesser barrier to universal service than before. Internet access centers and telecenters can be established in any remote area with a satellite uplink, providing voice as well as data services for a large number of inhabitants. However, most Internet access modes require fixed lines such as plain old telephone networks, or coaxial cables. Thus, insufficient development in basic telecommunications infrastructure continues to be a critical obstacle in expanding Internet access in those countries. Wireless communications, despite lofty expectations, are stumbling to come to market. High investment costs associated with expensive spectrum licensing also tend to preclude any possibility that wireless providers will offer affordable services to low-income populations. Under these circumstances, universal service objectives in the Internet age have not changed significantly from those for conventional telephone access.

The impact of new technologies such as cellular phones shows up in the number of telephone lines per 100 inhabitants in several countries. In

Chile, for example, there were 22.4 cell phone lines per 100 inhabitants in addition to 22.1 fixed telephone lines. Inclusion of cell phone lines improve telephone availability in Latin America significantly. Nevertheless, the best performers, Chile and Argentina, have no or flexible universal service objectives within their national telecommunications reform agenda. Both Chile and Argentina began market liberalization early, in 1988 and 1990 respectively, and as a result competition is significant in the telecommunications sector. Other countries have yet to witness significant competition to develop from privatization efforts.

Another measure of success is accessibility, mainly through public telephones and community technology centers. Brazil, Peru, Mexico and Venezuela, who were relatively low in availability measure, successfully expanded public phone lines following telecommunications reforms. A different kind of public Internet access sites are commercial Internet cafes and cybercafes. In Mexico, there were 286 registered cybercafes in 1998. Although these private/public sites can offer very inexpensive opportunity to access the Internet, its popularity in Latin America is comparatively low as there were over 16,000 PC-bangs in Korea in 2000, greatly expanding Internet access to beyond home PC users.

Finally, one of the most important objectives of reform is to lower prices and improve affordability. However, privatizing a state-owned monopoly often translates into private monopoly, without competition. Lack of competition will increase prices beyond the reach of many within the population. The emphasis on privatization instead of market competition has resulted in high costs, low quality and discouraging levels of service. The cost of monthly telephone subscription in Latin America far outstrips per capita income level. In Peru, for example, the monthly residential subscription rate was seven times greater than monthly per capita income in 1998. Annual telephone charges are one third of per capita income in Chile and Mexico.

Some innovative schemes have been used to introduce different pricing regimes for traditional voice traffic and Internet data traffic. Argentina, in particular, experimented with a special long-distance area code for dial-up users to encourage Internet access. The important aspect of this experiment was the realization that simple privatization did not consider fundamental differences between conventional phone networks and Internet access.

2.5. Outlook for Future Internet Growth

The basic premise that pushed for privatization and market competition in the telecommunications industry was that these measures would improve investment in basic telecommunications infrastructure and access to telecommunications services, including the Internet, for the masses. The vigor toward privatization and competition was one constant policy variable in most Latin American countries during the past ten years. Nevertheless, the results are mixed.

The fundamental roadblock seems to be a level of income that is unable to support a wider diffusion of telecommunications technologies. Privatization initiatives, while removing government controls, leave pricing to private companies at a level that the majority of the population cannot afford basic service. More importantly, deregulation may not be the answer to promoting wider telephone and Internet access. Some researchers have argued that an environment of predictable policymaking is most significant, after such usual variables as income levels and telephone lines, in explaining the growth in Internet hosts and users. For example, Argentina has a relatively liberal telecommunications policy but somewhat unfavorable environment for entrepreneurship conditions. In comparison, Singapore's telecommunications policies are relatively interventionist in that service operators and ISPs are tightly controlled by the government. But regardless of policy framework, Singapore is far ahead of Argentina because of its favorable business environment.

This perspective highlights the different types of hurdles that include the overall income level, economic policies, and political stability. Simple privatization, which is often made ineffective by monopolized private companies, may not bring about substantial gains that enable the majority of their population to participate in the digital revolution.

3. POLICIES FOR INTERNET ACCESS: CASES OF MEXICO AND ARGENTINA

Mexico and Argentina, besides Brazil, are the largest economies in Latin America, with populations of 99 million and 37 million, respectively, and gross domestic products of US\$484 billion and US\$283 billion, respectively, in 2000. In terms of Internet population, these countries are also ranked within the top 20 in the world. Nevertheless, Hong Kong with a population of just under 7 million has more Internet population

than either of these countries. Typical of other Latin American countries, both Argentina and Mexico have a 10 percent or lower rate of Internet penetration while leading Internet nations surpass the 50 percent rate.

This disparity is in part due to their comparatively low GDP, per capita income levels, the inadequacy in basic telecommunications infrastructure and associated problems of high costs of telephone/Internet access, limited network service options and uneven income distribution all contributed to their low performance. But as a result of reform policies, substantial progress has been made in terms of telephone and network availability. Case studies of Mexico and Argentina will offer some lessons on the overall effectiveness of these initiatives and further understanding of their prospects for full participation in the digital revolution in the coming years.

Mexico represents in many ways a typical case of Latin American political, economic and regulatory environment where a large privatized company, Telmex, dominates the telecommunications industry. Argentina, offering a more pro-competitive market, has instituted several innovative strategies, e.g. a special area code for Internet dial-up access and has become the leader in Internet growth.

3.1. Telecommunications in Mexico

Teléfonos de Mexico (Telmex), the giant monopoly, was focused more on generating a steady flow of income rather than improving the network infrastructure and its service level. The privatization took place in 1990 when a consortium of Grupo Carso, BellSouth and France Telecom obtained 51 percent of Telmex stock. In return for local monopoly status, Telmex was required to achieve a 12 percent increase in main telephone lines annually through 1994 and to expand pay phone access to various underserved communities. By 1996, Telmex was completely privatized. The long-distance service market became competitive in early 1997.

Telmex maintains a strong, monopoly position in most markets. The mobile cellular market was established as regional duopolies, for which Telmex is a main player through its subsidiary, Telcel, and although there are seven major regional cellular players, Telcel is the only player that provides nationwide coverage. Cable television subscription is low, at below 20 percent, far behind Argentina, Uruguay and Colombia.

The government of Mexico now controls telecommunications policy through an independent regulatory body, Comisión Federal de Tele-

comunicaciones (COFETEL), established in 1996 as part of privatization initiatives. COFETEL oversees various regulatory activities such as registration of tariffs and equipment certification as well as spectrum auctions for new communications services.

Mexico's telecommunications market generated revenue of US\$13.7 billion in 2000, second only to Brazil's US\$24.9 billion. The largest market segment is voice service over fixed telephone lines, followed by mobile voice services (22 percent). Internet service revenues accounted for 8 percent of total market revenues. In 2000, the number of cell phone lines per 100 inhabitants exceeded that of fixed telephone lines, and is expected to grow even more in the coming years. Mobile service revenues are expected to account for 28 percent of the US\$30 billion total by 2005. The next most active growth area is Internet service, projected to be 20 percent of the total, where Telmex also plays a leading role as the largest ISP.

Mexican consumers pay one of the highest rates for access to the Internet. The OECD survey for 1998 showed that the largest Mexican ISP, Telmex Internet Directo charged US\$24.78, the highest among all OECD countries, for 3 hours of access per month. Since it had a flat-rate plan, the relative amount decreased when considered 20 or more hours of access. Telmex Internet Directo's pricing structure is significantly skewed toward charging low for telephone service and levying a hefty sum for Internet access. Telephone charges account for only 18.6 percent of the total basket, compared to 56.5 percent average for OECD countries.

3.2. Mexican Telecommunications Reforms

Mexico's new regulatory law enacted in 1995 allowed competition in the entire telecommunications markets, including local, long-distance, cellular, cable and satellite communications. By 1999, all local, trunk and international telecommunications markets in Mexico were competitive, with 10, 14 and 7 players in each market segment, respectively. The market share of new entrants in the international market share jumped from zero to 32 percent in one year following liberalization in 1996. For this reason, Telmex leveraged its market position in commercial negotiations with competitors to set interconnection charges, where regulatory bodies faced the first challenge in managing the new competitive, market-oriented regulatory environment, where the incumbent Telmex still controlled local exchange services as well as long-distance and mobile ser-

vices. Mexico's professed goal of letting market negotiations resolve any disputes meant that the regulatory authorities could play only a minor role as an arbiter. This tended to strengthen the position of the incumbent monopolist such as Telmex.

Perhaps the best indicators of telecommunications reform are the growth trends in telephone infrastructure investment and penetration rates and the measure of telephone affordability. From the initial privatization in 1990 till 1994, Telmex was required to invest in telephone lines. The effect is seen in the steady growth in the number of main lines per 100 households. However, after the market was completely liberalized and investment decisions were left entirely to market forces, the rate of growth had been stagnant and even negative.

During the late 1990s, it was apparent that high income, high margin services were expanded while the basic telephone service suffered from both insignificant investments in infrastructure and continuing increases in costs. Monthly telephone subscription fees were 1.8 times greater than monthly per capita income in 1990. This steadily increased to 4 times that of income level by 1998. At the same time, market competition in the high-end cellular services brought down cell phone prices substantially, from over 10 times of monthly income at the beginning to a low of 7 times by 1998. If telecommunications reforms were primarily targeted to increase investments in basic infrastructure, expand access, and lower prices, privatization and competition have hardly been adequate to meet those purposes.

In sum, Mexico's telecommunications reforms have produced mixed results. Prices and affordability for consumers have not improved, if not worsened. Although new technologies such as cellular communications grew rapidly, its benefactors seemed to be limited to those who already had access to telephone service. Local Telmex struggled to survive in the face of foreign-financed competitors. Instead of improving cost structure and productivity, Telmex mostly relied on leveraging its monopoly status to survive. Opening up the market to competition does not automatically improve services. Although Telmex is privatized, it still behaves very inefficiently as it did under government ownership.

3.3. Internet and E-Commerce in Mexico

Mexico is the second largest e-commerce market in Latin America. As in other Latin American countries, business-to-business (B2B) transactions

dominate Mexico's e-commerce, up to 70 percent of the total. While B2B e-commerce revenues are estimated to be in billions of dollars, business-to-consumer (B2C), or online consumer retailing, is relatively small.

Most Internet users access Websites via dial-up services through an ISP, in school or at work. Telmex, at 56 percent, dominates the ISP market. Most traffic is directed to major portal sites which are mostly operated by groups based in Mexico, the US and Argentina. These portal sites incorporate retail sales on their sites, but there are a number of sites specializing in online retailing and other services. Although there is no specific data, many Mexican shoppers use the Internet to buy products from the US. As a result, many Spanish language sites in the US cater to Mexican e-commerce from their US sites as well as through establishing a Mexican Web presence.

Future prospects for e-commerce in Mexico will ultimately depend on the continuing growth in Internet access. However, low telephone penetration, high Internet access costs, low PC ownership and slow broadband expansion will become significant barriers to e-commerce growth. Even with new free ISPs (Gratis1 and Terra), local connection is a serious barrier to e-commerce growth. Other structural problems include consumers' concerns about payment security. Also, the low usage of credit cards among Mexicans prevent many of them from participating in online commerce. Finally, most Websites on the Internet are not in Spanish, limiting availability and accessibility, although most Internet users in Mexico are more or less proficient in English, to the level that they prefer US-based, English sites for more reliable information and products.

3.4. Telecommunications in Argentina

After Brazil and Mexico, Argentina has the third largest Internet population in Latin America, with 2.5 million users in 2000. Argentina is unique in some aspects. Argentina has the highest per capita income among all major Latin American countries (US\$7,731 in 2000). Per capita IT spending at US\$68.7 is larger than that of Chile or Brazil, although only slightly, and far greater than that of Mexico. Its high cable penetration rate, which, at 57 percent, is comparable to the US and other developed countries means Argentina is well positioned to lead the broadband transition in Latin America.

The state-owned monopoly, Empresa Nacional de Telecomunicaciones (ENTel) was privatized in 1990, broken into two regional monopolies (Telefónica and Telecom), each with a share of the profitable Buenos Aires market. By 1998, both companies had converted their lines fully into digital networks, while adding more lines and introducing DSL technologies. Since 1999, Argentina's wireless providers, Movicom (led by BellSouth) and CTI (GTE-led consortia) were also allowed to offer fixed line telephone services by the Comisión Nacional de Comunicaciones (CNC), a quasi-independent regulatory body created in 1996. In 1997, Argentina instituted major initiatives to revamp its telecommunications policy and to enhance a lagging Internet industry. Since ENTel's privatization, telephone access grew steadily, second only to Chile in 2000. But compared to Chile, Mexico and Brazil, Argentina was far behind in several measures of Internet development. But by 2001, Argentina was leading all Latin American countries in terms of Internet penetration. It is of great interest to investigate what factors or policy measures enabled it to greatly improve Internet access during the late 1990s.

3.5. Initiatives for Internet Growth: Argentina

To a certain degree, the peculiarity of Argentina's experience points to the fact that privatized, liberalized market forces were not the only important factors. Rather, Argentina instituted several, some unorthodox, measures that included regulatory interventions regarding local access tariffs, an innovative calling plan, and a concerted push to expand community Internet access programs.

In June 1997, a Presidential Decree declared that the Internet was a matter of national interest, promulgating universal service mandates which aimed at providing its citizens with access to modern multimedia applications with reasonable tariffs and quality. During the public hearing phase that was intended to garner public input toward a set of strategies, local ISPs focused on the problem of high fees for leased lines where there was little competition. Through a decree, Argentina instituted price regulation on leased lines, lowering it as much as 45 percent. The market for ISPs grew at an accelerated pace, from 35 at the end of 1995 to 136 in 1997 and to 170 in 1999. The reduction in leased-line fees also encouraged ISPs in underserved areas outside of Buenos Aires. Prior to 1997, the capital commanded 70 percent of total ISPs. After the

price reform, 50 percent of ISPs operated in the interior.

The second major initiative was concerned with high Internet access fees. Dial-up access to the Internet was expensive mainly because Internet traffic was charged the same way voice traffic was charged. Since telephone service was metered, long hours of Internet connection could lead to an enormous sum of fees. Furthermore, when local ISP numbers were not offered, Internet calls had to be made as long-distance calls. To reduce the financial burden and explore a differential pricing scheme that differentiated voice from data traffic, Argentina instituted a special dialing area code (0610). Under the 0610 plan, calls were metered differently than voice connection. On average, this new area code resulted in saving up to 45 percent in local access fees. It would be safe to assume that such a special rate arrangement did lower the cost of Internet usage substantially.

The third component of Argentina's Internet initiative was a part of the universal access objective through community telecenters. Through "Argentin@Internet.todos," the government initiated a project to establish 1,000 Centros Tecnológicos Comunitarios (CTC) in 1998. Although such projects are by no means unique to Argentina, the pace and scope of CTC is much wider than most community access projects in other Latin American countries.

The net effect of these initiatives partially explains the rapid growth in Internet hosts, ISP services and Internet usage in Argentina. New rate policies in 1997 resulted in substantial decreases in local access and leased-line charges. In addition, cost reductions and the 0160 plan also affected the way its population access the Internet. Over a third of dial-up Internet accounts are associated with the so-called free ISPs. Although charges for Internet access are subsumed in local phone access payments, the new rate plan enables consumers to benefit from substantially lower overall costs or near-flat-rate schedule.

The question remains whether improvements in telecommunications infrastructure will have a significant effect on long-term growth of Internet usage. Even when there is a favorable network environment, the ultimate user preference will depend on the availability and type of online content and activities. To make advances in content areas, the next stage of efforts must focus on providing legal and commercial environments that are conducive to consumers and businesses alike. One critical shortcoming is the lack of concerted effort to improve broadband capacity and connection. Argentina has the unique opportunity to deploy

broadband faster than any other Latin American country due to its high cable penetration rate. In the multimedia-rich Internet era, accessing usable contents will require high bandwidth. To sustain past rapid growth, Argentina will need new initiatives that target the changing Internet environment.

3.6. Lessons Learned

The three major economies in Latin America, Brazil, Mexico and Argentina, have experienced significant improvements in telecommunications infrastructure and high growth in Internet user rates during the past few years. Nevertheless, a striking feature in these countries is the low Internet penetration rate: while other Internet leaders are surpassing or approaching the 50 percent level of penetration, Brazil's rate remains at 7 percent, Mexico at 3.4 percent and Argentina at 10 percent.

The majority of their populations are precluded from the digital network. To achieve the level of universal service, governments must make investments in underserved and disadvantaged areas. However, a side effect of privatization is the inability to collect revenues that can be used for infrastructure investment. Market forces alone are inadequate to induce companies to invest in traditionally underserved areas. Competitive forces also tend to encourage providers to focus on high margin groups, neglecting disadvantaged, low-income populations. Given the economic problems and income distribution in Latin America, past rapid growth in telecommunications services and the Internet may have affected mostly the unfulfilled demand by upper and middle income households. There is a significant skepticism about a sustained penetration beyond these segments in the future.