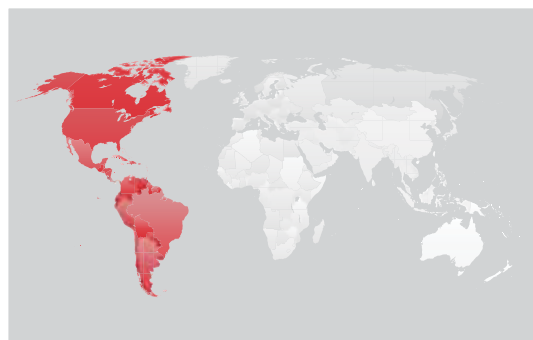




Information Society Statistical Profiles 2009

Americas

v1.01



I n t e r n a t i o n a l T e l e c o m m u n i c a t i o n U n i o n

Information Society Statistical Profiles 2009

Americas

Acknowledgements

The *Information Society Statistical Profiles 2009: Americas*, the third of a series of regional statistical reports in preparation for the next ITU World Telecommunication Development Conference (WTDC-10), was prepared by the Market Information and Statistics Division within the Telecommunication Development Bureau of ITU. The team included Susan Teltscher (Head of Division), Vanessa Gray, Esperanza Magpantay, Doris Olaya and Desirée Van Welsum. Part of the Report was drafted by Ivan Vallejo, consultant to the ITU. Michael Minges also contributed. The work was carried out under the overall direction of Mario Maniewicz, Chief, Policies and Strategies, Telecommunication Development Bureau.

The Report includes data sourced from the UNESCO Institute of Statistics and Purchasing Power Parity conversion factors received from the World Bank, which is greatly acknowledged.

The desktop publishing was carried out by Stéphane Rollet and Nathalie Rollet and the cover was designed by Sarah Roxas. Administrative support was provided by Herawasih Yasandikusuma.

Original language of publication: English.

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International Telecommunication Union
Place des Nations
CH-1211 Geneva, Switzerland

Foreword

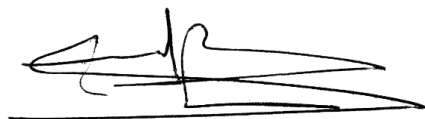
This report is the third of a series of regional statistical profiles on the information society prepared by ITU in 2009, as an input to the regional preparatory meetings (RPMs) for the ITU World Telecommunication Development Conference 2010 (WTDC-10). The third RPM – for the Americas region – takes place on 9-11 September 2009 and is hosted by the Government of Colombia.

When it comes to information society developments in the Americas region, a promising development is mobile cellular uptake, and several of the region's developing countries have a higher level of mobile penetration than its developed countries. During the past few years, mobile telephony has grown rapidly and is likely to exceed 100 per cent penetration in most countries in the near future. It is notable that no other region has such a strong presence of strategic investors, which account for three out of every four mobile subscriptions in Latin America and the Caribbean. The Americas region also stands out in terms of VoIP traffic, which has been growing steeply in Central and South America.

An important advantage the region has is that languages that are represented on the Internet globally, such as English, Spanish, Portuguese and French are all languages that are widely spoken throughout the Americas. This allows application developers and users to leverage on content developed in the Americas, as well as on content available from other regions. Indeed, the region has been among the leaders in developing web presence of the public administration. The success of e-government applications could be broadened to other sectors such as business, education and health, to maximize the benefits of ICTs.

While Internet use has grown steadily in the Americas, thanks in part to a proliferation of public access facilities in the region's developing countries, more efforts must be made to increase broadband uptake and household access to the Internet. High levels of ICT penetration in the United States and Canada stand in stark contrast to most other countries in the region, where important urban-rural gaps also continue to exist. Of particular importance is the need for training and skills to enhance the awareness of the benefits of ICTs and the ability of people to use them effectively.

This report highlights the latest ICT developments in the Americas region and presents key statistical indicators for each country. The report also features a regional analysis of the ITU ICT Development Index (IDI) and the ICT Price Basket, two ICT benchmarking tools that were launched in March 2009. I am confident that the findings of the report as well as the resulting policy conclusions will provide useful inputs to our members in preparation of the WTDC-10.



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Chapter 1.

Market Overview

This chapter provides an analysis of the latest Information and Communication Technology (ICT) trends and developments in the Americas. It covers the following ICT markets: fixed telephony, mobile cellular, television broadcasting and Internet. The chapter also reviews the regulatory environment for these markets, particularly where it impacts market developments. This includes the degree of competition in various market areas and liberalization of services such as Voice over Internet Protocol (VoIP) or Internet Protocol Television (IPTV).

1.1 General trend and developments

Overall, ICT trends within the Americas mirror those of other regions. Fixed telephone line growth has stagnated while mobile subscriptions have grown rapidly. Indeed, a number of the region's developing nations have a higher level of mobile penetration than the region's developed countries. Broadband is also growing but at a much slower pace than mobile cellular technology. Like other regions, there is a large gap in broadband penetration between developed and developing countries. For most ICTs, the Americas comes after Europe (Chart 1.1), but its average is dominated by the developed North American countries.

Several developing countries in the Americas have a higher level of mobile penetration than the region's developed countries

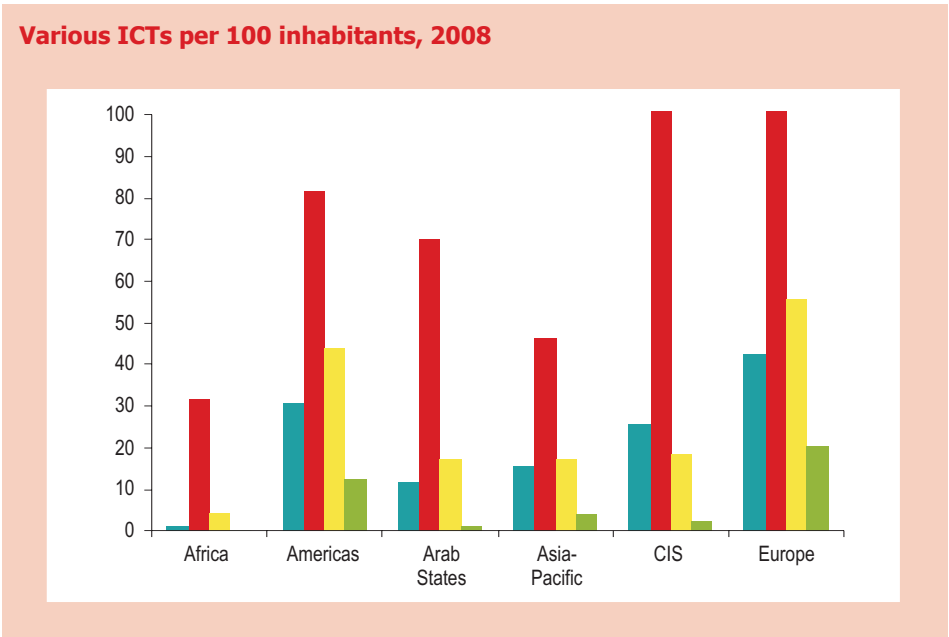


Chart 1.1

- Fixed telephone lines
- Mobile cellular subscriptions
- Internet users
- Fixed broadband subscribers

Source: ITU World Telecommunication/ICT Indicators database.

1.2 Fixed telephone lines

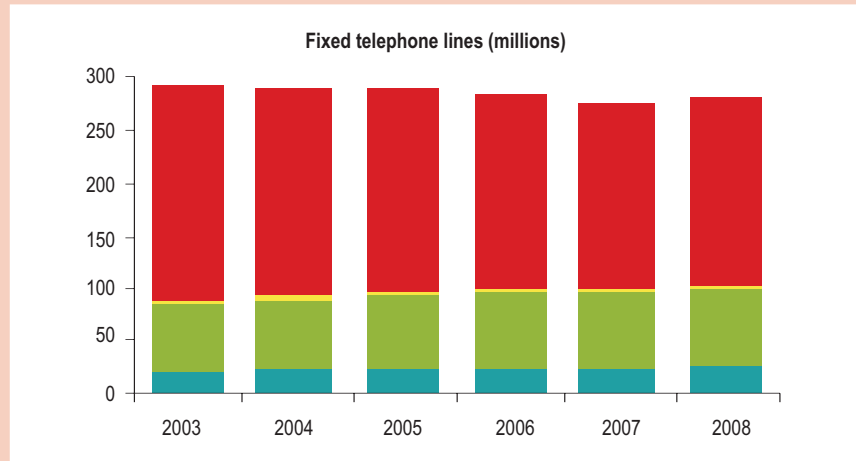
The drop in fixed telephone subscriptions in North America is due to shifts to mobile-only households and Voice over Broadband (VoB)

The Americas region had 280 million fixed telephone lines at the end of 2008, down slightly from 294 million in 2003 (Chart 1.2, top). The decline is the result of a 13 per cent drop in the United States and Canada while the number of lines went up in Latin America and remained constant in the Caribbean. The drop in fixed telephone subscriptions in the United States and Canada was caused by shifts to mobile-only households and *Voice over Broadband* (VoB) subscriptions.¹ Despite the decline, fixed line teledensity in the United States and Canada is almost three times higher than in Latin America and the Caribbean (Chart 1.2, bottom). Average teledensity in Central and South America is roughly the same (18 and 19 per cent respectively). The regional average for the Caribbean is the lowest mainly due to very low values for Cuba, the Dominican Republic and Haiti. In 2008, the average teledensity for Anglophone Caribbean countries was just above Central and South America at 20 per cent.

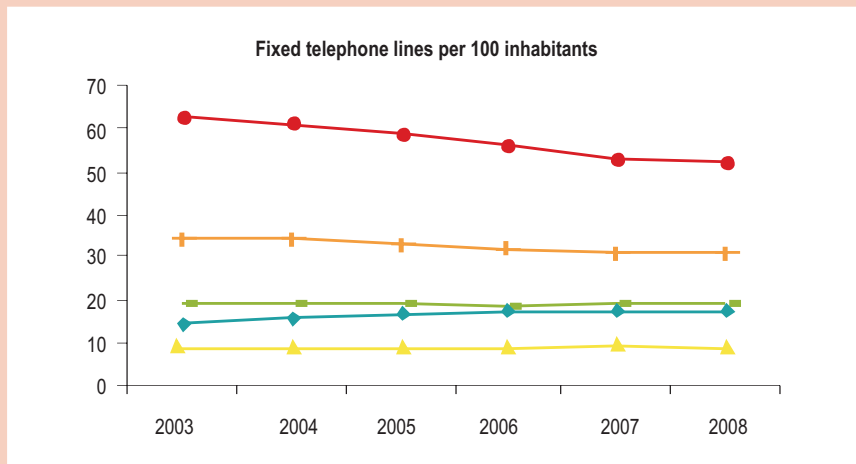
Chart 1.2

Fixed telephone lines in the Americas region

- US & Canada
- Caribbean
- South
- Central



- US & Canada
- Americas
- South
- Central
- Caribbean



Source: ITU World Telecommunication/ICT Indicators database.

With respect to universal service for fixed telephone lines, less than half the countries have a home penetration level of more than fifty per cent (Chart 1.3). The two developed North American countries (Canada and the United States) and three Caribbean countries have a household fixed line penetration of 90 per cent or higher. The widespread popularity and growth of mobile has impacted home fixed line penetration and the rate has declined over the last few years in some countries.

Less than half the countries in the Americas have a fixed line home penetration level of more than 50%

Proportion of households with a fixed telephone line, latest available year

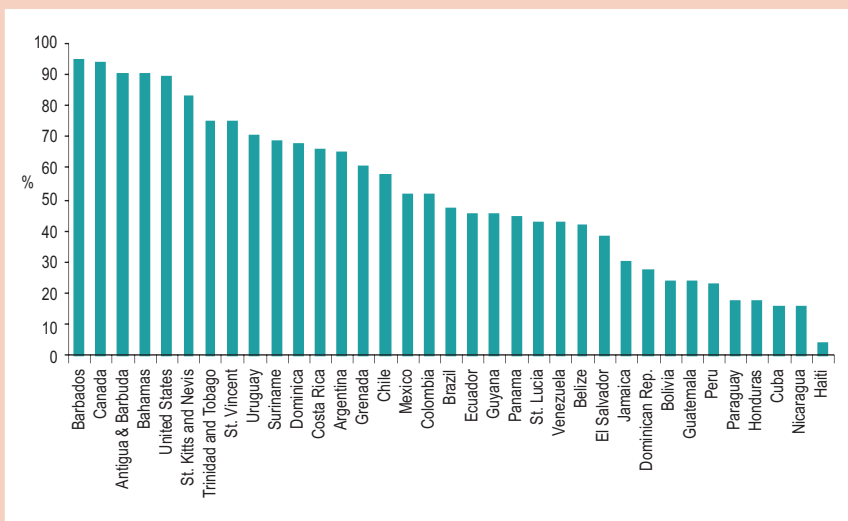


Chart 1.3

Source: ITU World Telecommunication/ICT Indicators database.

Level of competition in local fixed line and international services, Americas, 2008

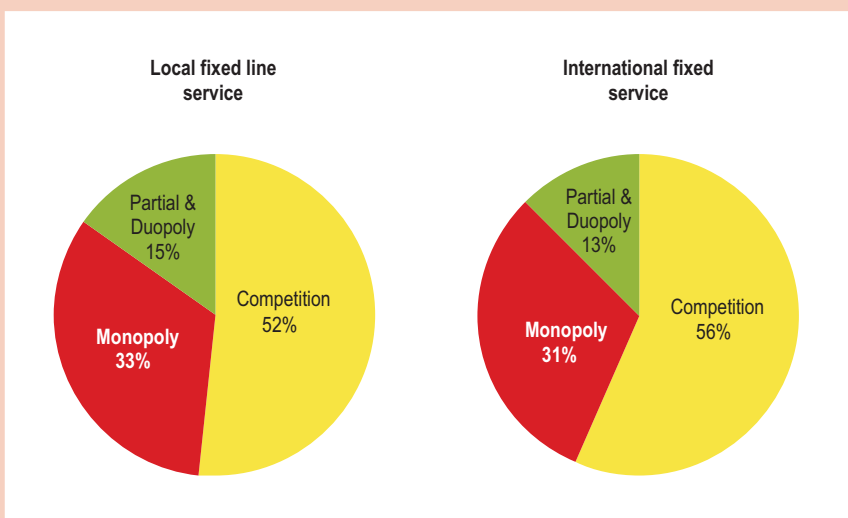


Chart 1.4

Source: ITU World Telecommunication Regulatory Database.

A majority of countries have liberalized fixed line calling services but one third still does not allow competition in this market segment. Similarly, one third of countries prevent competition in international long distance (Chart 1.4). This suggests that there remains considerable scope for deeper liberalization, for example by fully opening markets with only partial competition or monopolies.

Wireless Local Loop (WLL) use is not as prevalent in Latin America and the Caribbean as in other developing regions. One reason is that there is already a relatively high level of fixed line penetration compared to other developing regions. There is also more regulatory uncertainty surrounding the provision of limited mobility over WLL in relation to other regions. Operators in ten countries in Latin America and the Caribbean provide WLL services including seven networks using the 450 MHz frequency, an attractive solution for rural areas since it provides broader coverage and requires less base stations.²

There remains considerable scope for deeper liberalization of fixed line calling services

Chart 1.5 shows the status of IP telephony in the region, which is not always clear given the variety of possibilities for IP calling (e.g. PC-phone, phone-phone, etc.), whether a particular service is legal and whether a license is required. Only around a dozen nations in the region have a totally liberalized IP telephony regime. This would be characterized as any mode (e.g. PC-phone, phone-phone, etc.) being totally liberalized and the ability to freely provide a commercial Voice-Over-Broadband (VoB) service with licenses (if required) available on demand for free or low administrative costs. Box 1.1 gives more details about the status of IP telephony in the region.

Chart 1.5



Source: ITU. The industry transition to IP. 2009 (forthcoming).

Regulatory Status of VoIP in Latin America & the Caribbean



VoIP in Latin America and the Caribbean

Adoption of VoIP has historically varied considerably across Latin America and the Caribbean, with governments and operators concerned about the potential loss of revenues, profits and taxes. Although several VoIP operators had introduced retail VoIP services in Latin America in 2007, retail VoIP services were not yet common by 2007, although “it is clear that most carriers already use it for their long-haul transmissions, because it makes the use of the network much more efficient”.³

By 2009, VoIP has been legalized in many Latin American countries, with Mexico “by far the largest destination for VoIP traffic in both Latin America and the world” with 19 billion minutes or one quarter of all international VoIP traffic, according to Telegeography. Brazil is the second-largest VoIP destination in Latin America (and fourth-largest globally). Indeed, in terms of VoIP traffic, Central and Southern America remain some of the fastest-growing regions. By 2009, eleven countries had explicitly legalized VoIP services, up from just five in 2004. However, this number excludes the flourishing VoIP markets of Brazil and Argentina, where VoIP services still remain outside the regulatory framework. There has been a loosening of the regulatory approach to VoIP in Honduras and Bolivia, where most cybercafés offer VoIP services. Licensing requirements restrict which operators can offer VoIP in Mexico, Venezuela, Colombia, Ecuador, Peru and the Dominican Republic, although licensing restrictions are not enforced in many countries.

In 2009, VoIP for private consumer use officially remains illegal in six countries – Antigua & Barbuda, Costa Rica, Cuba, Paraguay, Guyana and Nicaragua. Both Costa Rica and Paraguay have initiated proceedings to regulate VoIP, but have experienced immense difficulties. Incumbents have also been reported as blocking VoIP services in Belize and Guyana. In October 2006, even after deregulation, Telefónica Chile was fined nearly one million US dollars for anti-trust violations in blocking VoIP calls.⁴

There are also several countries where VoIP has been officially legalized, but there are some problems in implementation. Colombia and Mexico both allow VoIP services and treat them as a voice telephony service, but one that can only be offered by licensed voice operators. The high costs of licenses in Colombia means that there have been few new entrants. The Bahamas and Belize have both officially legalized VoIP, but have done so in a way where the provision of VoIP is restricted to the incumbent only, as the operator with the monopoly over international services. Bolivia and Ecuador are other examples of countries where only licensed voice operators are permitted to provide VoIP. Many governments have committed to investing in public access points and community telecentres such as cybercafés, where many users in the region access the Internet and VoIP services.

Developments in the Caribbean are especially interesting. Many Governments acknowledge the importance of cheap communication services as vital to their economic competitiveness as destinations for tourism and banking. However, the development of VoIP services have been hampered by monopoly operators and exclusivity contracts. Throughout the Caribbean, Cable & Wireless (C&W) resisted the introduction of VoIP. For example, in June 2008, C&W threatened that if the legislative restriction on VoIP is removed and VoIP service is legalized in Antigua & Barbuda prior to the enactment of the new Telecommunications Act, it would consider this a violation of its contract.⁵ There are also reports of the operator challenging governments and regulators in Barbados and Dominica.⁶

Market liberalization, the growth of mobile and the entry of competitors such as Digicel, with deep pockets and aggressive roll-out plans, have transformed this situation. After years resisting the growth of VoIP services, Cable & Wireless has now embraced the inevitable and introduced its own Netspeak service.

Box 1.1

Source: ITU, GSR 2009 Discussion Paper on VoIP Regulatory Trends (forthcoming).

Table 1.1

Note: VoB refers to a telephone service over broadband Internet connection where the user has his/her own telephone and a telephone number and the ability to place and receive calls to/from other telephone subscribers. In contrast to PC-based Internet telephony services such as Skype, or a VoIP subscription.

Source: ITU adapted from leading VoB operators.

VoB subscribers, 2007

	Total (000s)	% households	% broadband subscribers
Canada	1,871	15	22
United States	12,404	10	18

Canada and the United States are among world leaders in VoB, accelerating the trend away from traditional voice services using the public switched telephone network towards next generation networks. At the end of 2007, some 15 per cent of Canadian households and ten per cent of US households had a VoB subscription accounting for around 20 per cent of broadband subscriptions (Table 1.1).

1.3 Mobile cellular

The number of mobile cellular subscriptions in the Americas has more than doubled over the last five years, from just under 300 million in 2003 to almost 750 million in 2008 (Chart 1.6, top). As a result, average mobile penetration rose from around one in three people to four in five by 2008 (Chart 1.6, bottom). The Latin American averages are close to the regional average and converging with the United States and Canada. Although the Caribbean average is significantly less, there is a split in the sub-region between the three large non-Anglophone countries (Cuba, Dominican Republic and Haiti) and the others. Penetration in only Anglophone Caribbean is the highest in the region at over 100 per cent.

At the end of 2008, a dozen Latin America and the Caribbean countries had a mobile penetration exceeding 100 per cent. In the Caribbean, practically all of the Anglophone island states have a mobile penetration over 100 per cent. Mobile telephony has turned one aspect of the digital divide on its head in the Americas region, with numerous developing Latin American and Caribbean nations, including Trinidad and Tobago, Argentina and Panama having achieved higher mobile penetration levels than developed Canada and the United States (Chart 1.7). America Móvil, Latin America’s largest wireless group, predicts that average mobile penetration will reach 94 per cent in its operating area by 2012.⁷ This estimate is conservative; at current rates of growth, overall regional penetration is likely to exceed 100 per cent by 2010.

At the end of 2008, a dozen Latin American and Caribbean countries had a mobile penetration exceeding 100%

Mobile cellular subscriptions in the Americas

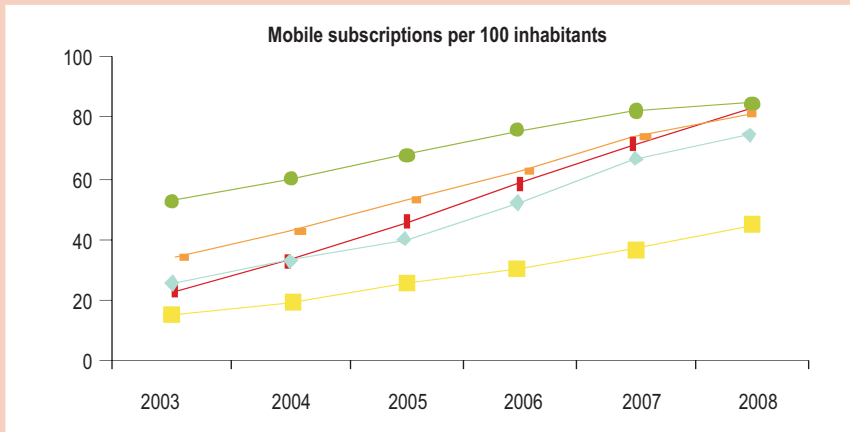
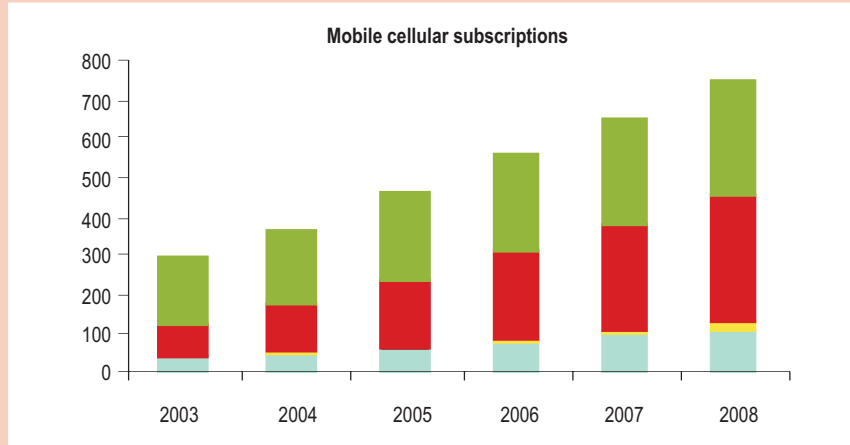


Chart 1.6

US & Canada
South
Caribbean
Central

US & Canada
South
Americas
Central
Caribbean

Source: ITU World Telecommunication/ICT Indicators database.

Mobile cellular subscriptions per 100 inhabitants in the Americas, 2008

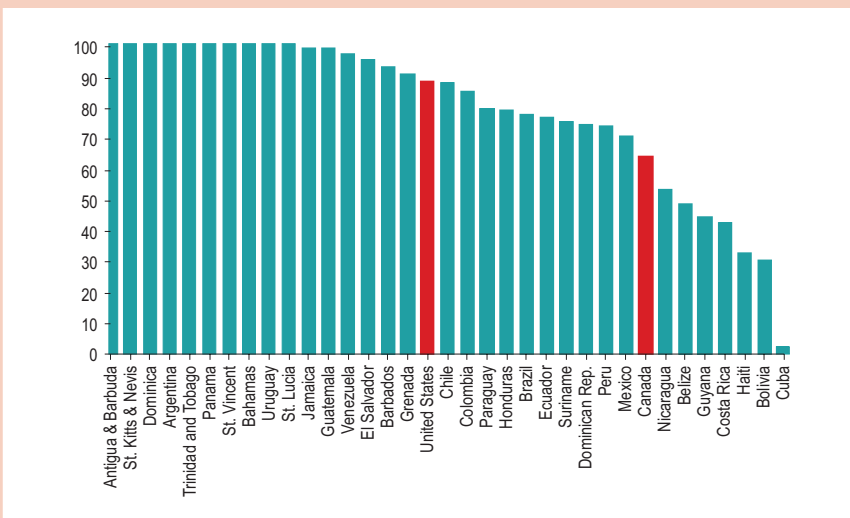


Chart 1.7

Source: ITU World Telecommunication/ICT Indicators database.

Chart 1.8

Proportion of households with a mobile phone, 2007



Source: ITU and ECLAC/OSILAC.

No other region has such a strong presence of strategic investors, which account for three out of every four mobile subscriptions in Latin America and the Caribbean

Mobile cellular penetration statistics can be somewhat misleading. The high proportion of prepaid subscriptions in Latin America and the Caribbean results in some double counting due to multiple subscriptions and inactive accounts. In terms of mobile household penetration, the available data indicate that no country has yet reached 100 let alone 90 per cent (Chart 1.8). Survey data on the availability of mobile phones in homes is not available for many Caribbean countries where subscription penetration exceeds 100 per cent. ITU recommends the inclusion of two indicators related to mobile cellular telephony in household surveys. The first is the number of *households* with a mobile cellular telephone and the second is the number of *individuals* using a mobile telephone.⁸

One characteristic of the region's mobile market is the influence of strategic investors. No other region has such a strong presence of multinational mobile groups. The largest groups, as measured by the number of subscriptions, are *America Móvil* of Mexico and *Telefónica* of Spain with others such as *Millicom* or *Digicel* (particularly in the Caribbean) also active in a number of countries but on a smaller scale. *Cable and Wireless* is also to be mentioned given its historical presence as the incumbent operator in the Caribbean and *Digicel's* main competitor. Collectively, these five strategic investors account for some three out of every four mobile subscriptions in Latin America and the Caribbean. These groups bring many benefits to the region in terms of the large investments they have undertaken to build and upgrade networks, and economies of scale in terms of pooling equipment purchases and sharing software systems and common marketing platforms. On the other hand, there are some drawbacks since the large influence these groups have sometimes goes contrary to competition. Since large and multinational operators can leverage on their economies-of-scale, smaller and local operators may find entry into the market more difficult.

Strategic mobile investors in Latin America and the Caribbean, 2008

Operator (Country)	Subscriptions (000s)	Number of countries	Revenue (US\$ m)	CAPEX (US\$ m)
América Móvil (Mexico)	182'724	17	\$26'692	\$10'743
Telefónica (Spain)	123'385	13	\$32'441	\$5'903
Millicom (Luxembourg)	18'642	6	\$2'396	\$663
Digicel (Bermuda)	6'540	26	\$1'500	N/A
Cable & Wireless (UK)	3'797	15	\$635	\$279
TOTAL	335'088		\$63'664	\$17'588

Table 1.2

Note: Number of countries refers to those where commercial service was available at the end of 2008. Revenue and CAPEX for America Móvil and Telefónica includes fixed operations. Subscriptions are total whereas revenue and CAPEX are proportional to share of investment within each country. Cable & Wireless and Digicel refer to fiscal year ending March. Cable & Wireless revenue and CAPEX excludes Trinidad & Tobago.

Source: ITU adapted from company reports.

Unlike other regions, the transition of mobile from first generation to subsequent second and third generation technologies has followed a rocky path in the Americas. The gains of technology standardization have only recently started to materialize through higher mobile penetration rates. Instead of GSM, many countries in Latin America and the Caribbean transitioned from first generation mobile to TDMA and CDMA second generation technologies following North American trends. Since then they have begun switching to GSM networks in line with trends in the rest of the world. By standardizing on a single technology such as GSM, strategic investors can capitalize on economies of scale to reduce costs as well as enhance roaming capabilities. GSM has only recently become the predominant mobile technology in the region. Take Brazil, the largest mobile market in Latin America and the Caribbean, where GSM networks have only become predominant in the last few years, rising from 15 per cent of all subscriptions in 2003 to 90 per cent in 2008 (Chart 1.9).

Brazil, mobile cellular subscriptions by technology

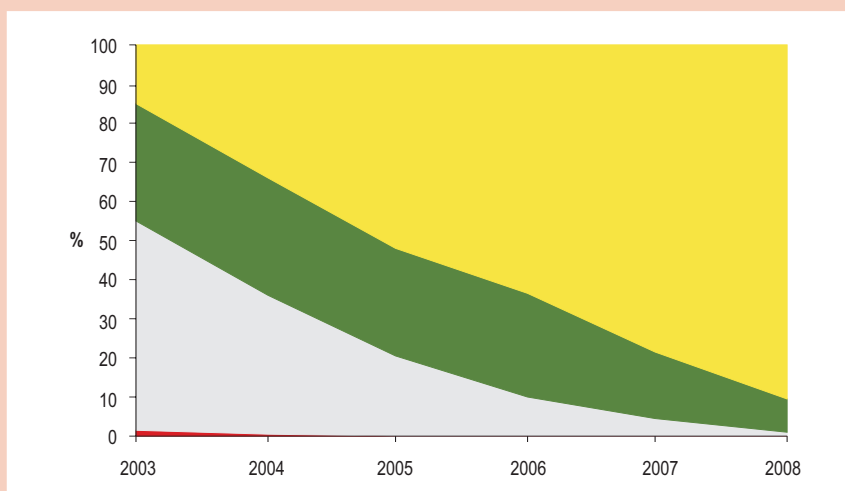


Chart 1.9

■ GSM
■ CDMA
■ TDMA
■ AMPS

Source: Adapted from Anatel.

Competition by itself is not sufficient to ensure high penetration, coverage and use – regulators also have to be vigilant about spectrum allocation and termination rates

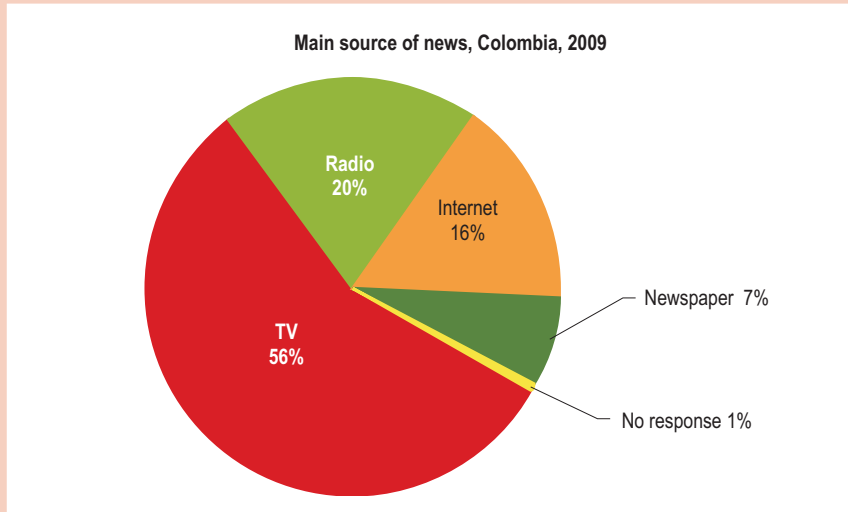
The region's uneven mobile technological transition has also impacted the introduction of third generation (3G) networks. A number of countries have launched 3G using EV-DO technology because it does not require new frequency assignment. However, unlike most other regions, the Americas has been slow to launch WCDMA-based networks. One issue has been delays in the allocation of 2.1 GHz spectrum with only Brazil, Canada and the United States having awarded such frequency. In order to get around this delay in spectrum allocation, operators have launched WCDMA in the 900 MHz frequency band using their existing spectrum allocation. This has allowed them to deploy 3G networks but at the expense of using their existing spectrum that they had anticipated using for voice services. Without additional spectrum, this situation is likely unsustainable in the long run as networks will eventually become saturated from growing data use.

Practically all of the countries in the region have liberalized their mobile market – the only exceptions being the Bahamas, Costa Rica⁹ and Cuba. The degree of competition varies with countries having 2, 3 or 4 or more operators. A higher degree of competition helps to lower prices and increase coverage, thereby increasing access. This is especially important in order to spread coverage to the last inhabited areas without coverage and to reduce tariffs for low-income groups. Countries continue to make incremental changes. Competition by itself is not sufficient to ensure high penetration, coverage and use. Regulators also have to be vigilant about other issues such as spectrum allocation and termination rates. For example, the Americas lags in the implementation of Mobile Number Portability (MNP). Although this is beginning to change as more countries implement the ability for users to change providers, while keeping their phone number. The United States was the first country to implement MNP back in 2003. It was followed by Canada in 2007, and Mexico and Brazil in 2008. Chile, Colombia, the Dominican Republic, Ecuador, Panama and Peru have announced plans to introduce MNP in the near future.

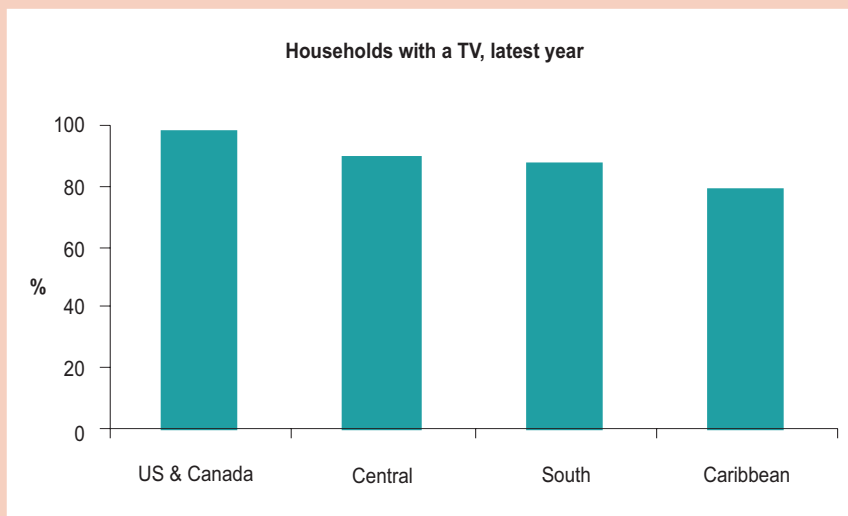
1.4 Television broadcasting

Television is an important ICT for a variety of reasons. It is typically the primary method of obtaining information and entertainment in the region. According to a survey sponsored by the television regulator in Colombia, TV is by far the main source of news in that country (Chart 1.10). In the Americas, like in other parts of the world, household television penetration is the highest of any ICT. Almost nine out of ten households have a television in Latin America (Chart 1.11). The region is home to several broadcasting heavyweights, feeding the demand for Portuguese and Spanish language programming. Mexico's Televisa is the world's leading producer of Spanish-language television content.¹⁰ Brazil's Globo is the fourth largest television network in the world and its "telenovelas" are widely popular in Latin America and are distributed to over 80 per cent of countries in the region.¹¹

Television is also an important ICT because cable television networks can be used to provide high-speed Internet access using cable modem technology. Cable modem provides an alternative to ADSL and other broadband technologies, helping to increase competition, to lower prices and to increase quality. Along with voice telephony and Internet access, television is one of the three ingredients of *triple play* service.

Main source of news in Colombia, 2009**Chart 1.10**

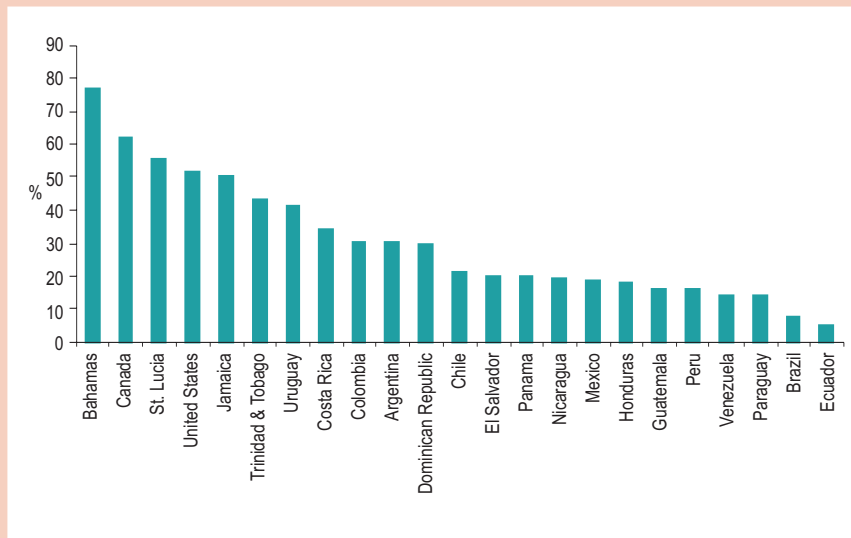
Source: CNTV Colombia.

Proportion of households with a television, Americas, latest available year**Chart 1.11**

Source: ITU World Telecommunication/ICT Indicators database.

Unlike most other developing regions, cable television is fairly prevalent throughout Latin America and the Caribbean. Practically every country in the region has cable television. About one in five households with a television also has cable in the region's developing countries; in Canada and the United States, over half of television households have a cable subscription (Chart 1.12).

Chart 1.12

Cable television subscribers as a % of households with television, latest available year

Source: ITU World Telecommunication/ICT Indicators database.

Cable modem accounts for a significant share of broadband subscribers in the region. This is unlike other regions where DSL accounts for the large majority of broadband connections. The data are distorted by the United States, which accounts for around 90 per cent of all cable modem subscribers in the Western Hemisphere. Nevertheless, cable modem accounts for around one third of broadband subscribers in Argentina, Colombia and Chile and around one quarter in Brazil and Mexico.

Cable operators are proving to be serious competitors to incumbent telephone companies through the provision of telephone service and broadband access in addition to television. VTR in Chile passes 2.5 million households and had 883'000 TV subscribers, 606'000 broadband subscribers and 598'000 telephone subscribers at March 2009.¹² It is Chile's largest pay television and broadband operator and second largest telephone operator. In the Bahamas, the cable operator is the largest broadband provider and has installed its own island-wide and international fiber optic connectivity. The Cable Bahamas broadband network covers 96 per cent of Bahamian homes. Subscriptions are available with speeds up to 9 Mbps; the entry level package with 1 Mbps is around \$11 per month, one of the cheapest in the region.

Incumbent telephone operators are keen to complete their triple play offerings by providing television service using IP (i.e., *Internet Protocol Television* (IPTV)) in order to compete more effectively with cable television companies that have entered the voice telephone and Internet access markets. However, telecommunication operators in most of the major markets in Latin America have been prevented from providing IPTV. For example, the Argentine courts recently ruled in favor of a petition filed by the Argentina Cable Television Association to prevent telephone companies from

Unlike most other developing regions, cable television is fairly prevalent throughout Latin America and the Caribbean

providing IPTV on the grounds that public utilities cannot provide broadcasting under Argentine law.¹³ Although Mexico recently adapted laws to allow telecommunication companies to provide television services, Telmex has been delayed from providing IPTV due to regulatory technicalities. Some Brazilian operators have launched IPTV but due to regulatory constraints, most have only been able to offer limited services. As a result, Latin America and the Caribbean lags other regions in IPTV implementation.

In North America, the first region in the world to commercially launch IPTV, the service has started to take-off, particularly in the United States, where major telecommunication operators such as AT&T and Verizon are aggressively deploying services over fiber optic cable. By the end of 2008, there were some 2.7 million IPTV subscribers in North America (Chart 1.13).

Given the regulatory restrictions with IPTV, incumbent telecommunication operators have pursued alternative strategies for offering television service. In some markets, they have allied with satellite providers or started their own satellite television services. In Chile, the incumbent telephone operator launched a DTH satellite service in 2006 with over a quarter million subscribers by the end of 2008, accounting for six per cent of its total revenues. In some cases, traditional telephone operators are acquiring their own cable television business. Telmex, Mexico's incumbent telephone operator has bought several cable television companies in Colombia, emerging as that country's largest cable operator and enabling it to provide triple play service.¹⁴ Mobile operators are also becoming involved through the provision of mobile TV over their new 3G networks as well as buying existing television operators. For example, in 2008, strategic mobile investor Millicom bought Amnet, a cable television and Internet broadband provider operating in three markets in Central America, in order to complement its mobile operations.¹⁵

Latin America and the Caribbean lags other regions in IPTV implementation

Fibre-based IPTV subscribers, United States and Canada

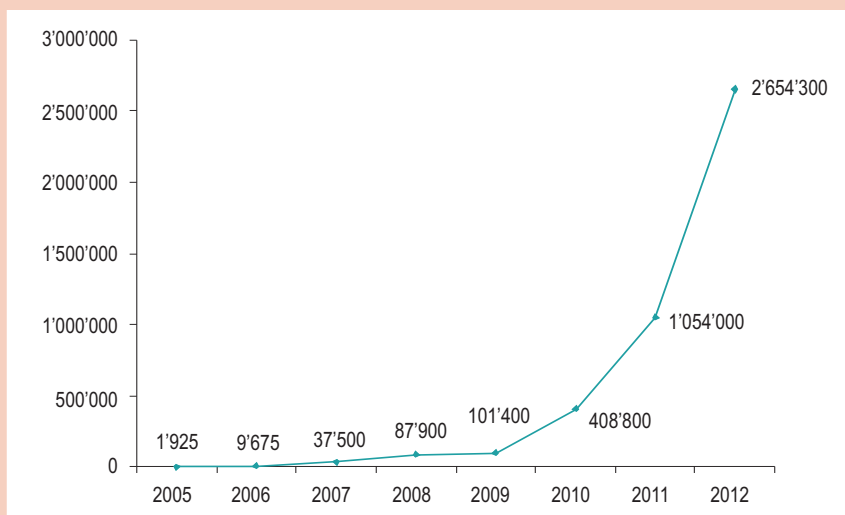


Chart 1.13

Source: Fiber to the Home Council, North America.

1.5 Internet

As in other regions, the Internet market in the Americas is in the process of transformation from dial-up to broadband access. A handful of countries are close to completing this process, with broadband representing over 90 per cent of all Internet subscribers (Chart 1.14).

The overall number of Internet subscribers in the region grew from around 80 million in 2003 to almost 115 million in 2008 (Chart 1.15, top). This growth is small compared to the number of Internet users. Replacement of dial-up accounts by broadband connections could be one explanation for this slow growth as a single broadband connection can replace several dial-up subscriptions (especially in Internet cafes, businesses and governments). As a result, the uptake in broadband is often linked to a slowdown in the number of overall Internet subscribers. The number of Internet subscribers is strongly dominated by the United States and Canada, which accounts for almost 80 per cent. Penetration in the United States and Canada (around a third of the population) is six times higher than that in Latin America and the Caribbean (Chart 1.15, bottom).

Household Internet penetration confirms a huge gap in the region between the United States and Canada and the other countries and shows how far the region has to go to achieve universal service in Internet (Chart 1.16).

Internet subscription and household penetration figures are somewhat misleading for the region since a significant portion of Internet access takes place from public locations such as Internet cafes, educational establishments and government-sponsored community centres. The number of Internet users gives another perspective on Internet growth throughout the region. A growing number of countries in the

Internet subscriber penetration is six times higher in the United States and Canada than in Latin America and the Caribbean

Chart 1.14

Fixed broadband as % of total Internet subscribers, 2008



Note: * Data refer to 2007.
Source: ITU World Telecommunication/ICT Indicators database.

Internet subscribers, Americas region

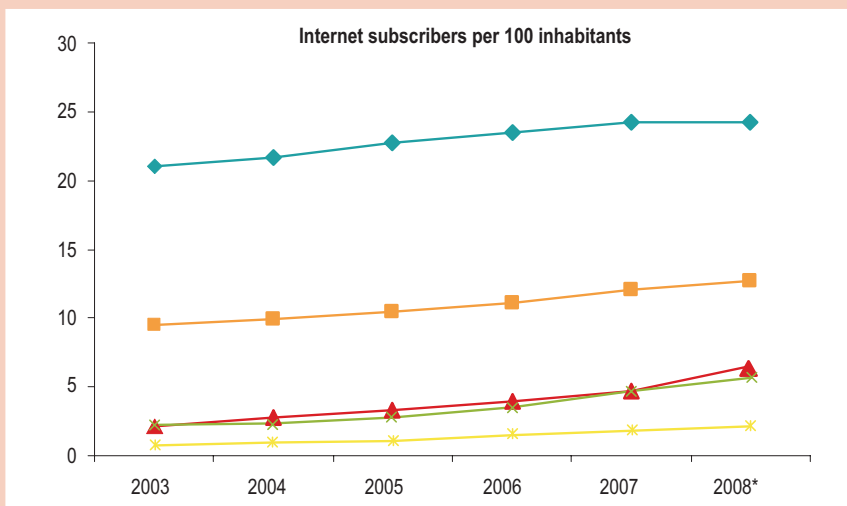
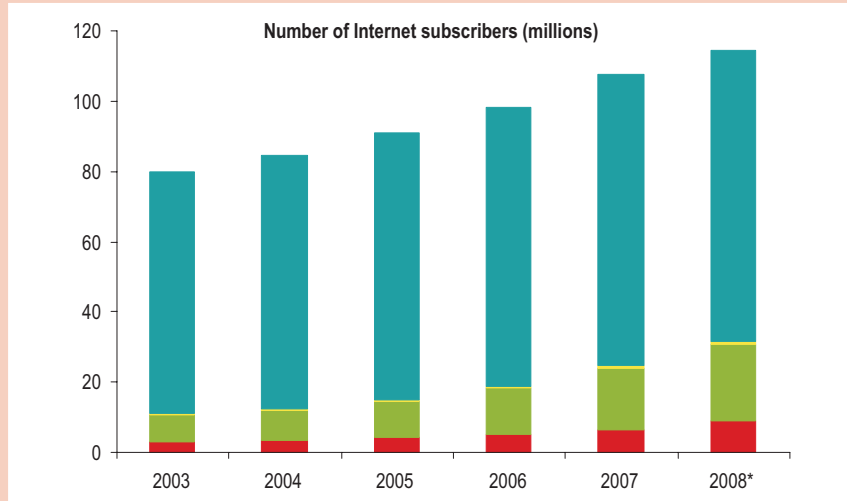


Chart 1.15

■ US & Canada
■ Caribbean
■ South
■ Central

◆ US & Canada
■ Americas
▲ Central
× South
* Caribbean

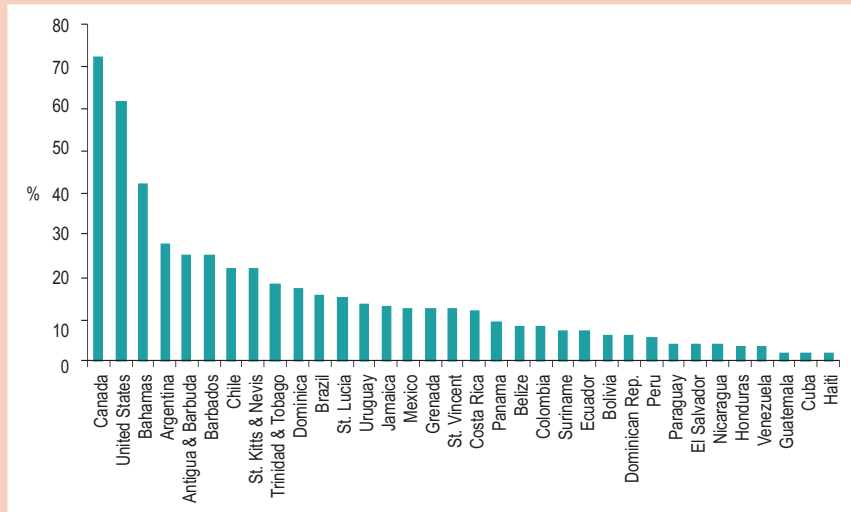
Note: * Data for US & Canada refer to 2007.
 Source: ITU World Telecommunication/ICT Indicators database.

region carry out surveys on the number of users, but not all. Also, surveys are not always conducted on a regular basis and there are differences in comparability in terms of age of individuals included in the target population or frequency of use. Therefore the data are indicative of general growth and overall trends.

The Americas region was home to almost 400 million Internet users in 2008, up from 265 million in 2003 (Chart 1.17). The region's average was 44 users per 100 people but this masks large differences in usage among the regions. Penetration in the United States and Canada, with two out of every three people on line, is almost two and half times higher than the Latin America and the Caribbean average. South America has the highest penetration among the region's developing country groups, with around one third of the population on-line. Central America and the Caribbean have the region's

Chart 1.16

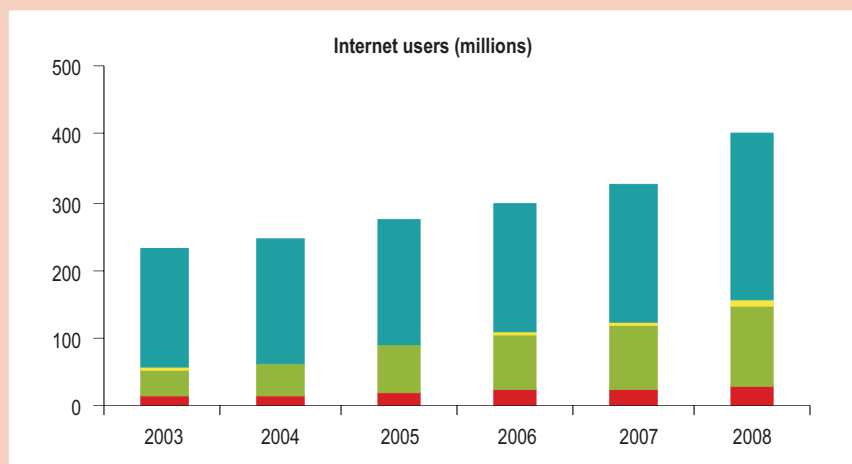
Proportion of households with Internet access, Americas, latest available year (2005-2007)



Source: ITU World Telecommunication/ICT Indicators database.

Chart 1.17

Internet users in the Americas



lowest penetration levels, at around 20 per cent but in the Anglophone Caribbean countries, levels are much higher than in other Caribbean countries and about the same as the regional average.

Broadband

This section describes developments in fixed, wireless (WiMAX) and mobile broadband (3G). Fixed broadband dominates in Latin America and the Caribbean where there is significant inter-modal competition with cable television networks.

Internet users in the Americas (Continued)

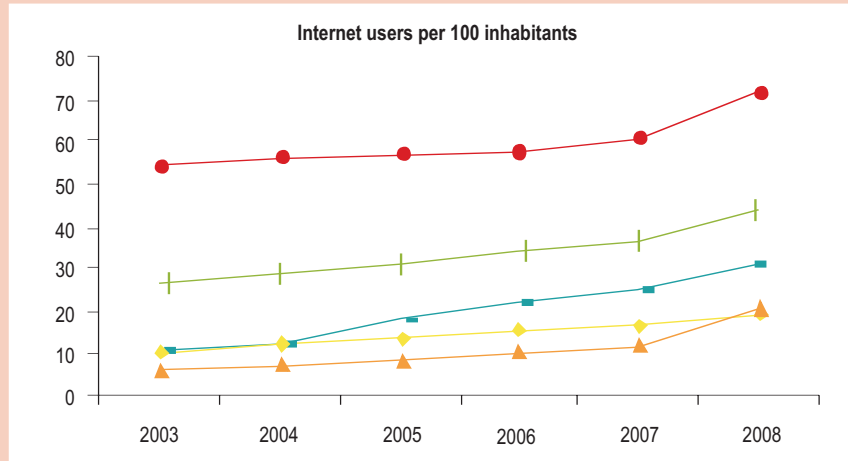
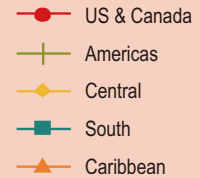


Chart 1.17



Source: ITU World Telecommunication/ICT Indicators database.

To date, WiMAX take-up has been low as a proportion of total subscribers. Mobile broadband has been held back in Latin America and the Caribbean by spectrum constraints and licensing delays. However there are signs that it has begun to develop over the last year.

Fixed broadband

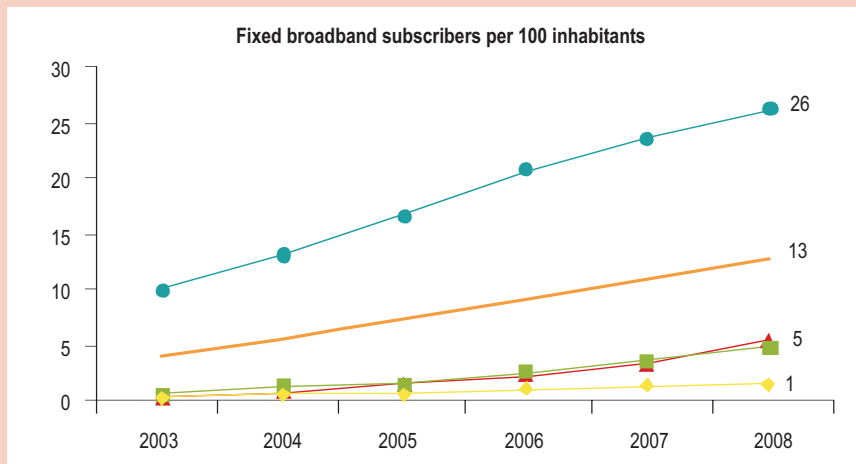
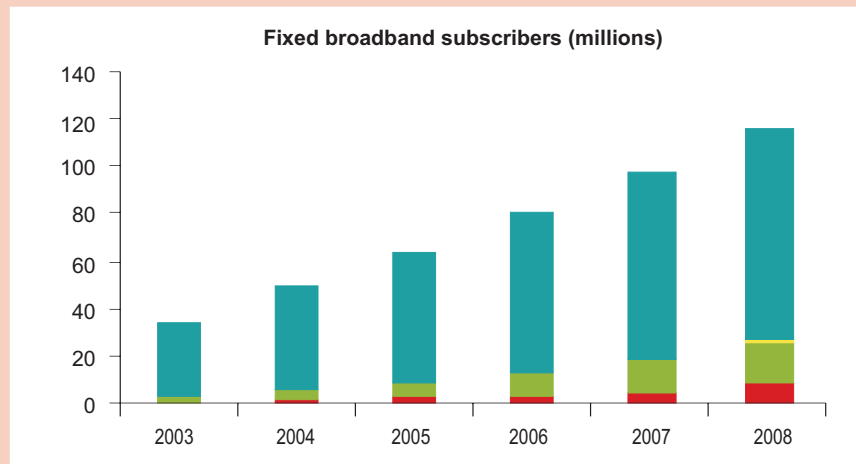
There were 116 million fixed broadband subscribers throughout the region at the end of 2008. Three quarters are in the United States and Canada (Chart 1.18, top). There is a large gap in broadband penetration between the United States and Canada and the other countries in the region (Chart 1.18, bottom). The overall regional average was 13 subscriptions per 100 people in 2008; in the United States and Canada, the corresponding figure was 26, compared to five for Latin America and the Caribbean. The overall penetration gap between the United States and Canada and Latin America and the Caribbean increased from nine in 2003 to 22 in 2008. The average of one fixed broadband subscription per 100 people in the Caribbean is deceptive. The low broadband level in non-Anglophone countries impacts the Caribbean average, with the average for Anglophone Caribbean equaling that of the overall Americas. Furthermore, while the two highest levels of broadband penetration in the region are found in Canada and the United States, the next six top ranked countries are all from the Caribbean.

There are several fixed broadband technologies used in the region. Most incumbent telephone operators offer *DSL* broadband service over their copper twisted-pair infrastructure. DSL speeds vary by country. In Guatemala, the highest speed available from Telgua is 1 Mbps whereas Telecommunication Services of Trinidad and Tobago offers DSL speeds up to 10 Mbps. Like DSL, speeds vary among *cable modem* providers. In Mexico, Cablevision offers a top speed of 1.5 Mbps whereas VTR

There is a large gap in broadband penetration between the United States and Canada and the other countries in the region

Chart 1.18

Fixed broadband subscribers in the Americas



Source: ITU World Telecommunication/ICT Indicators database.

in Chile offers speeds up to 15 Mbps. Canada's Shaw Communications is offering cable modem speeds of 100 Mbps using the DOCSIS 3.0 standard.¹⁶ Although much higher bandwidth is possible with *Fiber-to-the-Home* (FTTH), the top commercially available speed in the United States is 50 Mbps (and 20 Mbps upstream).¹⁷

Non-DSL fixed broadband accounted for 52 per cent of subscriptions in the region in 2008 though the proportion varies between North America and Latin America and the Caribbean. In the United States and Canada, DSL accounts for 44 per cent of all fixed broadband with cable modem the predominant technology. In Latin America, DSL accounts for 61 per cent, followed by cable modem access.

Outside the United States and Canada, FTTH deployment is very low. The right incentives for investment in FTTH still lack, particularly the ability to provide television service. Offering only broadband Internet access is perceived as generating insufficient revenue to make the investment in FTTH commercially viable.

Even in the United States, fiber build-out has been slowed by the need to obtain permission from local authorities to provide television service. Nevertheless, the United States now ranks sixth in the world in FTTH penetration and with six million subscriptions in 2008, has the second largest number of homes with fiber after Japan.¹⁸ In 2009, the American Recovery and Reinvestment Act was passed to help stimulate the economy in the wake of the financial crisis.¹⁹ The so-called “stimulus” legislation featured a provision calling on the Federal Communications Commission to develop a national broadband plan proposing measures to ensure broadband access for all citizens. The Act also allocated US\$7.2 billion for expanding broadband investment, particularly in rural and underserved areas.

WiMAX

WiMAX is often touted as an answer for improving broadband access as its wireless nature suggests it is cheaper to deploy than fixed broadband. WiMAX is also considered an attractive solution for rural and remote areas. The reality is that so far, WiMAX has not made a considerable dent in broadband access. According to statistics from Maravedis, an industry research outfit, the number of worldwide WiMAX subscribers was only 2.7 million at the end of the third quarter of 2008.²⁰ With 1.3 million WiMAX subscribers, the Americas region accounted for 47 per cent of the world total (Chart 1.19). However, 69 per cent of those subscribers were in North America. WiMAX accounted for only around one per cent of total fixed broadband subscriptions in the region at the end of the third quarter of 2008.

WiMAX being a nascent technology, it has encountered initial growing pains due to interoperability issues between different network components and limited end user devices. A lack of spectrum has also impacted WiMAX in some markets.

The United States ranks sixth in the world in FTTH penetration, but outside of North America, FTTH deployment is very low

WiMAX subscriptions, distribution by region, Q3 2008, in %

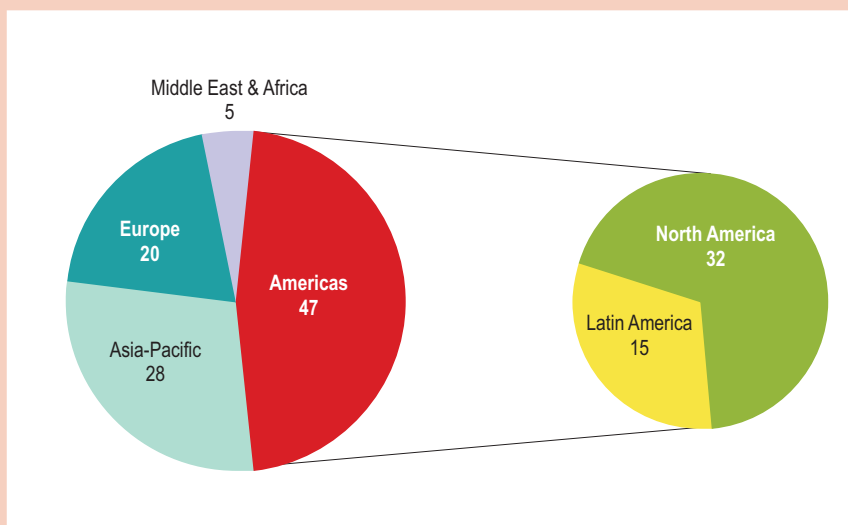


Chart 1.19

Source: Adapted from Maravedis.

Box 1.2

Clearwire betting big on WiMAX

Backed by some of the largest cable television and computer hardware and services companies in the United States, Clearwire is hoping that WiMAX can rival fixed and 3G mobile broadband technologies. Strategic investors include Comcast and Time Warner, two of the largest cable television companies in the United States as well as Intel, the world's largest semiconductor company (and a leading manufacturer of WiMAX chips) and Google, the giant Internet company. Perhaps the most significant investor is Sprint, the third largest mobile company in the United States. Sprint's current mobile technology is based on CDMA2000 1x and EVDO as well as iDEN (a trunking technology inherited from Sprint's acquisition of NEXTEL USA). Sprint is hoping to leapfrog other mobile operators that have based their mobile evolution on either WCDMA/HSDPA or LTE. Mobile WiMAX is advertised as a 4G broadband technology. Thus far, Clearwire has two mobile WiMAX deployments in Baltimore, Maryland and Portland, Oregon in addition to the 50 or so fixed pre-WiMAX deployments in other areas. Clearwire is planning to spend between US\$ 1.5 – 2.0 billion in 2009 on expanding its networks with the goal of covering 120 million people by 2010.²²

Source: ITU adapted from Clearwire.

Another problem has been a lack of capital for many of the companies offering WiMAX services. Fixed network operators have been extending their copper wire networks in order to offer DSL at higher speeds or upgrading to fiber optic cable. Mobile companies have been investing in 3G technology as their broadband solution. Most companies offering WiMAX are alternative operators with limited access to capital, particularly in light of the financial crisis that hit towards the end of 2008. As the CEO of Venezuela's leading WiMAX operator says: "We're in a contradictory position in that we're the only ones [providing WiMAX connectivity] but we don't have access to financing."²¹ The interest rates charged by banks is too high, vendor financing is limited and the risk is considered high. Many WiMAX operators are anxiously watching the results of Clearwire in the United States, the world's largest WiMAX operator, as it builds out its network, particularly for mobile WiMAX (Box 1.2).

Mobile broadband

Latin America has lagged other regions in third generation (3G) mobile adoption. That is beginning to change and according to 3G Americas, an industry association, there were 46 W-CDMA based networks in 23 economies in the region in the first quarter of 2009 (Chart 1.20).

Although more countries are launching third generation (3G) mobile networks in the region, there are methodological problems distinguishing subscriptions from actual users. For example, the United States government counts all subscribers with 3G handsets as mobile broadband subscribers. It reported 51 million mobile high-speed lines in December 2007, a figure equivalent to 42 per cent of all broadband subscribers in the country.²³ In contrast, a market research firm found

Latin America has lagged other regions in 3G mobile adoption but that is beginning to change with W-CDMA subscriptions increasing steeply

that only 13 per cent of US mobile users accessed information from a mobile browser in January 2008.²⁴

Given the low take-up of 3G subscriptions thus far, most countries have not yet published 3G subscription data. Notable exceptions are the United States, but also Brazil where the regulator reported two million W-CDMA subscriptions at the end of 2008. Across the region, there were around 25 million W-CDMA subscribers in 2008, more than double the 2007 figure.²⁵ However, over 80 per cent of W-CDMA subscribers are in North America. Nonetheless, W-CDMA is growing rapidly throughout Latin America and the Caribbean, with subscriptions increasing 75 times between 2007 and 2008 to 4.7 million (with 43 per cent in Brazil).

While much focus is on W-CDMA as a mobile broadband technology due to its widespread implementation throughout the world, CDMA 2000 based EV-DO is more prevalent throughout the region (Chart 1.21). At the end of 2008, there were almost 70 million EV-DO subscribers in the Americas with 63.2 million in North America and 5.9 million in Latin America and the Caribbean.²⁶ EV-DO in the 450 MHz band is particularly relevant for providing broadband in rural and remote areas since one base station can cover considerable more territory than 3G networks operating in higher frequencies. Telephone operators in Argentina, Ecuador, Peru and Suriname are offering services using EV-DO 450 MHz Wireless Local Loop technology.

This chapter highlights specific developments in the region in Internet access and applications, including the role of public Internet facilities in filling the

At the end of 2008, there were 70 million CDMA 2000 based EV-DO subscriptions, which is the predominant mobile technology in the region

W-CDMA networks in Latin America and the Caribbean, Q1 2009

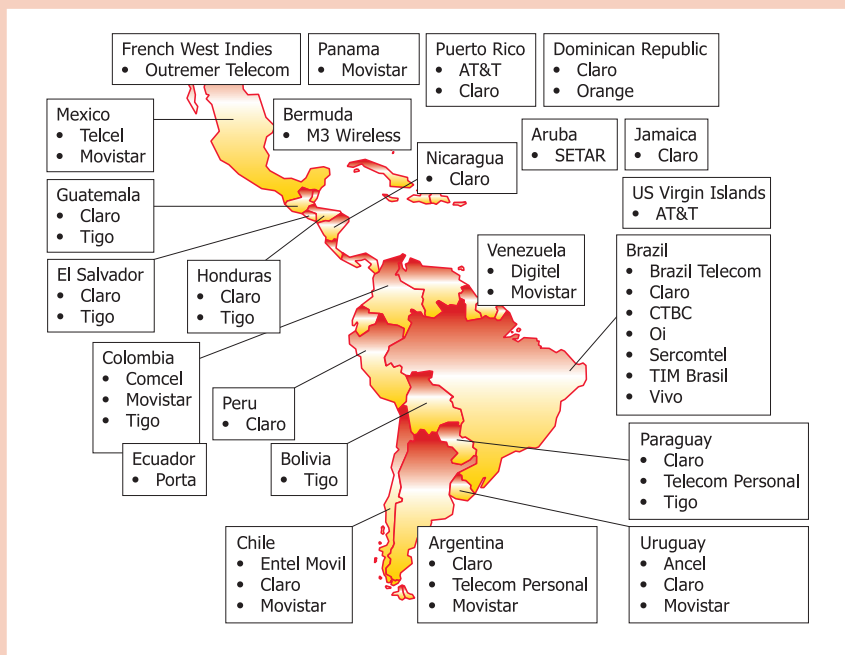
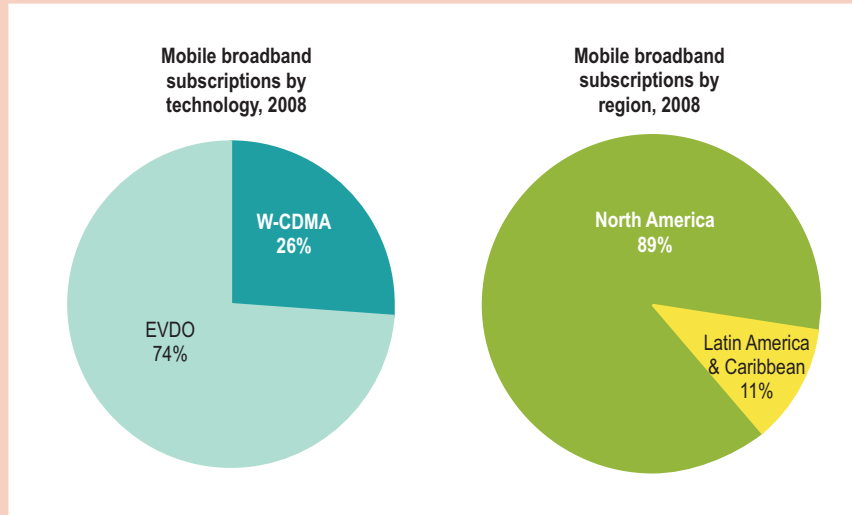


Chart 1.20

Source: 3G Americas.

Chart 1.21

Mobile broadband subscriptions in the Americas, 2008



Source: ITU adapted from 3G Americas and CDMA Development Group.

access void caused by low household ICT penetration. In addition, the chapter explores trends in use of mobile phones for Internet access. The chapter also looks at key applications underpinned by Internet infrastructure in government and business. One fundamental advantage the region has in this area is that languages that are widely spoken, such as English, Spanish, Portuguese and French, are represented on the Internet globally, allowing application developers and users to leverage on content developed in the Americas, as well as on content available from other regions.

Endnotes

- ¹ Voice over Broadband refers to a telephone service over a broadband Internet connection providing the user with their own telephone number and ability to place and receive calls to/from other telephone subscribers. This is in contrast to the broader category of Voice over Internet Protocol (VoIP) which includes PC to PC or PC to phone services
- ² CDG. “Mobile Broadband, international roaming, CDMA450 and Low-cost Handsets are Driving CDMA Business in Latin America.” Press Release. May 13, 2008. Available at: http://www.cdg.org/news/press/2008/May13_08.asp.
- ³ Rendon, Garcia-Murillo, Villegas and Kuhlmann. “VoIP Regulation in Latin America.” Paper presented at the 35th Research Conference on Communication, Information and Internet Policy (TPRC 2007). 28-30 September 2007. Arlington, Virginia, USA. available at: http://www.web.si.umich.edu/tprc/papers/2007/777/VoIP_LatAm_TPRC2007.pdf.
- ⁴ VoIP regulation due early 2007.” ITU Regulatory Newslog. January 4, 2007. Available at: <http://www.itu.int/ituweblogs/treg/VoIP+Regulation+Due+Early+2007.aspx>.
- ⁵ http://www.antiguasunonline.com/index.php?option=com_content&view=article&id=237625:C&W_govt-set-to-clash-over-VoIP&catid=57:local&Itemid=54.
- ⁶ Barbados Free Press. “Barbados VoIP Policy Is Nothing More Than Another Monopoly, Unless.”. September 2007. See: <http://barbadosfreepress.wordpress.com/2007/09/06/barbados-voip-policy-is-nothing-more-than-another-monopoly/>.
- ⁷ America Móvil. 2008. Annual Report 2007.
- ⁸ See the Partnership on Measuring ICT for Development. Revisions and additions to the core list of ICT indicators, at: http://www.itu.int/ITU-D/ict/partnership/material/CoreICTIndicators_e_rev2.pdf. The two indicators are HH 3 and HH10.
- ⁹ The government intends to award three mobile licenses in 2010. See “Digicel Targets Mobile Telecom License in Costa Rica.” *Inside Costa Rica*. June 17, 2009. Available at: <http://insidecostarica.com/dailynews/2009/june/17/cr07.htm>.
- ¹⁰ See Grupo Televisa, “At a glance.” Available at: <http://www.esmas.com/televisainversionistas/eng/about/glance/>.
- ¹¹ Globo TV International. “Brazilian Distributor reaches 80% of Latin America.” *Press Release*. May 19, 2009. Available at: <http://www.globotvinternational.com/newsDet.asp?newsId=50>.
- ¹² See Liberty Global, “Key Facts – Chile”, at <http://www.lgi.com/chile.html>.
- ¹³ “Grupo Clarín gana batalla contra IPTV en Argentina.” *TV Telco Latam*. October 8, 2007. Available at: <http://www.nextvlatam.com/Nota.aspx?IdContenido=25>.
- ¹⁴ “Telmex launches triple play offer under a single brand.” *TeleGeography’s CommsUpdate*. February 27, 2008. http://www.telegeography.com/cu/article.php?article_id=21938.
- ¹⁵ “Millicom Completes Acquisition of Amnet.” *Press Release*. October 1, 2008. <http://files.shareholder.com/downloads/MICC/644314039x0x237916/4014B3DF-8E81-4F4E-919E-4710FF0F6E0B/081001%20Completion%20of%20Amnet%20FINAL.pdf>.
- ¹⁶ DSLReports.com. “Shaw Launches 100Mbps Broadband”. February 2005. See: <http://www.dslreports.com/shownews/Shaw-Launches-100Mbps-Broadband-100712>.
- ¹⁷ See Verizon’s FiOS Internet offer, at: <http://www22.verizon.com/Residential/FiOSInternet/Plans/Plans.htm>.
- ¹⁸ FTTH Council. “Fiber to the Home Continues its Global March - Number of Countries with Significant FTTH Market Penetration Now at 20 as More European Countries Come on Line.” *Press Release*. February 12, 2009. Available at: <http://www.ftthcouncil.org/en/newsroom/2009/02/12/fiber-to-the-home-continues-its-global-march-number-of-countries-with-significan>.
- ¹⁹ Federal Communications Commission. *A National Broadband Plan for Our Future: Notice of Inquiry*. April 8, 2009. Available at: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-31A1.pdf.
- ²⁰ WiMax.com. The WiMAX Guide. April 2009.
- ²¹ “Telecommunications Perspectives.” *Business News Americas*. May 2 - May 9 2009. Available at: http://www.bnamericas.com/interviews/telecommunications/Dick_Abanto_Movimax.

- ²² Clearwire Reports Fourth Quarter and Full Year 2008 Results.” *News Release*. March 5, 2009. <http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1263228&highlight=>.
- ²³ The United States government defines high-speed mobile wireless lines as “mobile service subscribers whose wireless device is capable of operating on a high-speed mobile wireless network.” See: Federal Communications Commission. 2009. *High-Speed Services for Internet Access: Status as of December 31, 2007*. Available at: <http://www.fcc.gov/wcb/iatd/comp.html>.
- ²⁴ M:Metrics. “iPhone Hype Holds Up.” *Press Release*. March 18, 2008. Available from: <http://www.marketwire.com/press-release/MMetrics-833439.html>.
- ²⁵ 3G Americas. “2008 Third Consecutive Year with More than 100 Million New Mobile Connections for GSM-HSPA in Western Hemisphere.” *Press Release*. March 5, 2009. <http://www.3gamericas.org/index.cfm?fuseaction=pressreleasedisplay&pressreleaseid=2159>.
- ²⁶ See CDMA Development Group, “Quick Market Statistics”, available at: http://www.cdg.org/technology/cdma_technology/cdma_stats.asp.

Chapter 2.

Internet access and applications

2.1 Public/Community Internet access

Available data suggest the use of public Internet centres is quite high in Latin America. This is not surprising given the relatively low level of ICTs in households (see Chapter 1), explained at least in part by the high cost of computers and Internet access relative to incomes in the region. For example, the main reason cited for not having a home computer or home Internet access in Mexico in 2007 was a lack of financial resources (Chart 2.1).

In countries where data are available, Internet cafés tend to be the predominant places where the Internet is used like, for example, in Brazil, Paraguay and Peru (Chart 2.2).

Public Internet access centres, including commercial Internet cafes and government sponsored community centres, have spread to meet some of the demand for Internet access. Data on the number of public facilities alone are insufficient to determine if Internet access is widely available nationwide and to make cross-country comparisons. Public Internet facilities also vary widely in their functionality, available bandwidth, number of computers, etc. It is important to use internationally agreed definitions to improve comparability and to monitor the dispersion of Internet cafes, particularly in rural areas.

The ITU has done pioneering work in this area and the *Partnership on Measuring ICT for Development* has identified indicator A10 as a core indicator: Percentage of localities with public Internet access centres (PIACs) by number of inhabitants (rural/

In some countries in the region, Internet cafés are the predominant places where the Internet is used

Barriers to ICTs in households, Mexico, 2007

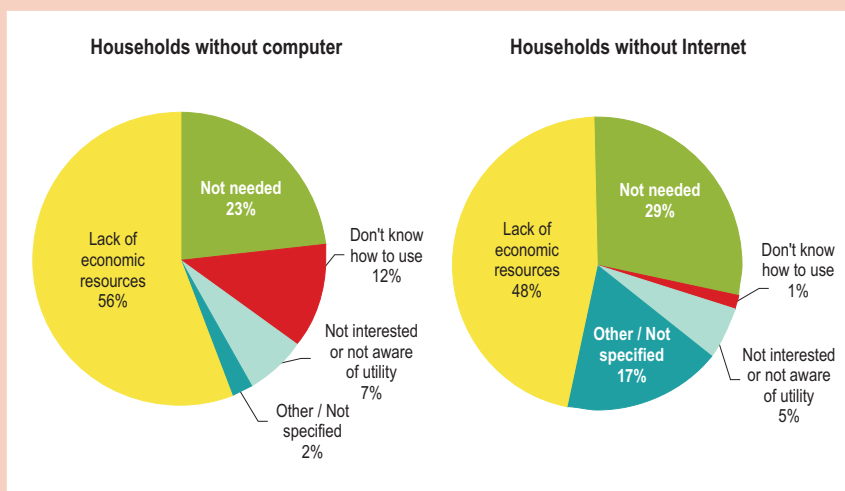


Chart 2.1

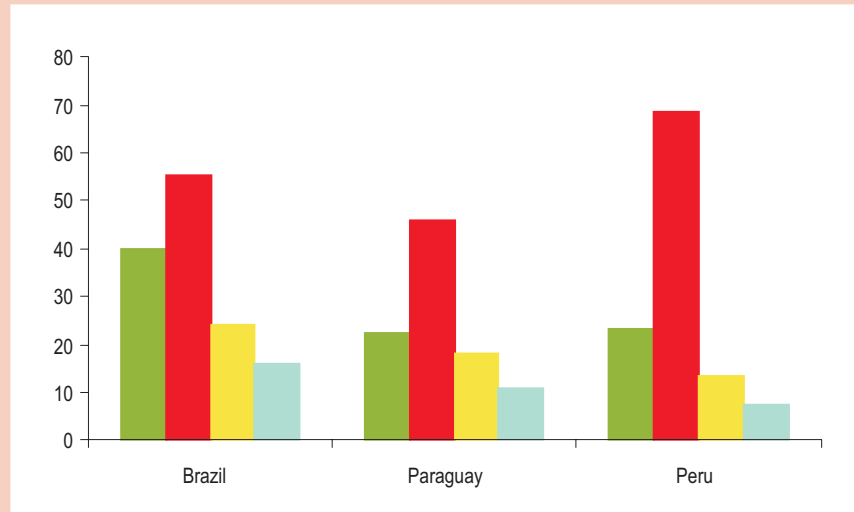
Source: INEGI.

Chart 2.2

Proportion of individuals using the Internet by location, selected South American countries, 2007/08

■ At home
 ■ Internet café
 ■ At work
 ■ At school

Note: Data for Brazil and Paraguay refer to 2007 and for Peru to 2008. Multiple responses.
Source: ITU adapted from national statistical offices.



urban).¹ The ITU also recommends that countries collect household survey data on the 'location of individual use of the Internet' (indicator HH8 on the *Partnership on Measuring ICT for Development's* core list of indicators) including 'community Internet access facilities' and 'commercial Internet access facilities'. These two indicators are complementary, the first providing geographic information on the availability of Internet access by locations (villages), and the second providing information on individuals' use. The second indicator is collected through household surveys and can be cross-tabulated with individual characteristics such as age, income level, and educational background.

A number of countries in the region have plans for expanding Internet access to rural areas. For example, the e-Mexico project installs Digital Community Centres (DCCs) in rural localities; by the end of 2007 there were 8'790 DCCs in 2'521 localities.² In Colombia, the Ministry of Communications has connected more than 15'000 public institutions to the Internet through the Compartel program.³ This includes almost 13'000 schools providing Internet access for over half of primary and secondary school students in the country.

In the Caribbean, widespread tourism has contributed to public Internet access, particularly through Wi-Fi hotspots; and the local population can also make use of these hotspots. Barbados reported 26 cyber cafes and 16 Wi-Fi hotspots in 2007.⁴ Government-sponsored facilities are also helping to spread Internet access. In the Dominican Republic, over 70 per cent of Community Access Centres provide Internet access serving some 218'000 users per week.⁵ In Trinidad and Tobago, public Internet access is available through a number of outlets, including private Internet cafés and libraries. Also, all of the some 30'000 tertiary students in the country have potential access to the Internet through colleges and universities and most primary and secondary schools have Internet access, albeit dial-up. Some 17 Internet cafes were surveyed throughout the country

serving around 2'000 users a week. The country's 24 public libraries are among the most popular public venues, providing access to some 17'000 users a month.⁶

The spread of public Internet facilities is to be commended as universal access programs contribute to increased availability of ICTs. However, greater home access needs to be encouraged since it has a number of advantages. In particular, it enhances the availability and use of the Internet as users do not need to go out to a public facility. This may also encourage more women to go online since in many countries women tend to spend more time at home and have less access to the Internet at work. It is also important for homes with children to expose them at an early age to ICTs and to help with their schoolwork. One study found that "...students who are established computer users tend to perform better in key school subjects..."⁷ Identifying the exact need for each country is critical and policy makers should balance both *universal access* through public facilities and *universal service* through greater home access. Steps to encourage universal ICT service include lowering the cost of home access, for example through facilitating easy repayment terms for PCs, and promoting more competition in the broadband market to lower prices.

Efforts are also needed to raise awareness and increase training. Policy makers and the public need to understand what they can do with the Internet and especially broadband access. In the case of Mexico, responses about the lack of home PCs and Internet access such as "*not needed*", "*not interested or do not know utility*" and "*do not know how to use*" combined accounted for 42 per cent for PC and 36 per cent for the Internet. Over 60 per cent of Internet users in Mexico have post-secondary education.⁸ The link between education and ICT usage is confirmed by other data from the region. In Peru, 77 per cent of those with a university education access the Internet compared to just 11 per cent of those with a primary education.⁹ Similarly, in Brazil, 78 per cent of those with a university degree use the Internet, compared to just 29 per cent of those with a primary education.¹⁰ Furthermore the main reason non-users do not utilize the Internet in Brazil is "Lack of computer / Internet skills", with over half of non-users citing this factor.

2.2 Mobile Internet

Some analysts feel that an over-emphasis on promoting Internet access from computer-based public facilities may be misguided given the prevalence of mobile phones: "*Our results reveal that the poor simply perceive no benefit in using the internet, with the exception of a small percentage of youth who consider it useful for school purposes and for keeping in touch with friends. This represents a red flag for policymakers who promote universal access policies and who frequently focus on internet/PC shared-access programs. For the poor, the mobile phone has become a much more important and familiar platform than the internet.*"¹³

It is difficult to measure mobile Internet access and use throughout the region due to lack of data, or when data are available, confusion about exactly what they mean. Nevertheless, evidence points to an increase in the use of mobile phones for Internet access throughout the Americas. This trend is likely to continue as more high-speed 3G mobile networks become available, including with flat rate

In the Dominican Republic, Community Access Centres provide Internet access to 218'000 users per week

Household Internet access exposes children at an early age to ICTs and helps with their schoolwork

Box 2.1

Minimal gender divide

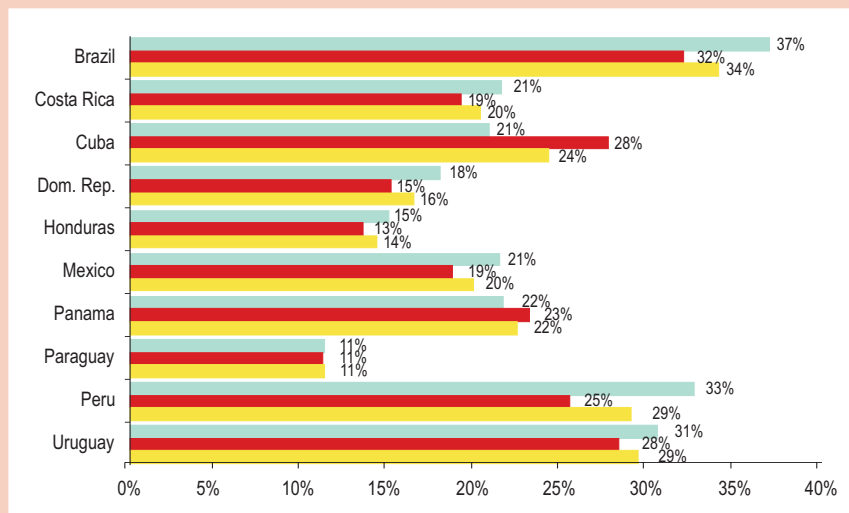
As in other parts of the world, there are significant differences in Internet use in Latin America and the Caribbean depending on location (urban or rural), education, age and income. However, evidence from countries where gender-disaggregated data are available shows that there are very small differences in the share of Internet users between men and women (Box Chart 2.1).

Cultural and historical patterns have influenced the role of women in the region who generally have a high level of equality compared to other developing regions. Argentina and Chile both have female presidents and Argentina has a higher share of women parliamentary members than the United States.¹¹ The region also stands out in educational equality and in fact, girls outnumber boys in school enrollment in a number of countries in the region and “If anything, gender disparity in schools favors girls over boys.”¹²

Box Chart 2.1

Proportion of Internet users by gender, various years

■ Male
 ■ Female
 ■ Overall



Note: The year of the data ranges from 2005-2007.
Source: ITU adapted from ECLAC/OSILAC and national statistical offices.

charges for 3G services, and as 3G-capable handsets become more widespread and less expensive. The sophistication of handsets impacts the type of use that is made of them (Table 2.1). For example, 85 per cent of Apple iPhone owners access news and information compared to only 13 per cent of all US mobile subscribers. The iPhone was available in twenty Latin American and Caribbean markets by May 2009.¹⁴

One indication of the use of mobile phones for non-voice services is the growth of text messaging. Though it does not constitute a form of Internet access, SMS can serve as a substitute for e-mail and is typically the first step to the use of more sophisticated mobile applications. In some countries, SMS use has been increasing rapidly, while it has stagnated in others. Customer attitudes, pricing (in particular relative to voice calls), and the ease of availability of traditional e-mail all impact the use of text messaging and explain the large observed cross-country differences in text messaging, ranging from 135 per user per month in Venezuela to just six

The use of mobile phones for Internet access is increasing throughout the Americas

Mobile Internet use, United States, January 2008

Activity	iPhone	Smartphone*	Market
Any news or info via browser	84.8%	58.2%	13.1%
Accessed web search	58.6%	37.0%	6.1%
Watched mobile TV and/or video	30.9%	14.2%	4.6%
Watched on-demand video or TV programming	20.9%	7.0%	1.4%
Accessed Social Networking Site or Blog	49.7%	19.4%	4.2%
Listened to music on mobile phone	74.1%	27.9%	6.7%

Table 2.1

Note: *Smartphones include devices running Windows, Symbian, RIM or Apple operating systems.
Source: M:Metrics, Inc.

in Chile (Chart 2.3).

Harmonized data on the use of mobile phones for Internet access are not available for the region. Although the available national data are limited and often not comparable between countries, they give some indication of mobile Internet trends. In Colombia, almost ten per cent of mobile subscriptions were also mobile Internet subscriptions, with mobile Internet traffic growing almost 500 per cent between the first and third quarter of 2008.¹⁵ Furthermore, Colombia's 3.6 million mobile Internet subscriptions outnumbered fixed Internet subscribers (two million). In Brazil, although 40 per cent of mobile subscriptions had phones with Internet capability in 2007, only five per cent used it.¹⁶ More popular activities included sending text messages (half of phone users), sending pictures and images (15 per cent of phone users) and music or video downloads (11 per cent).

2.3 Applications

The following two sections outline Internet access and use in government and business. They highlight the importance of a sound underlying ICT infrastructure to develop and enable the use of government and business applications. While there are a growing number of applications delivered over the Internet, including in the area of e-health and social networking, official data are most readily available in the areas of e-government and e-business.

E-government

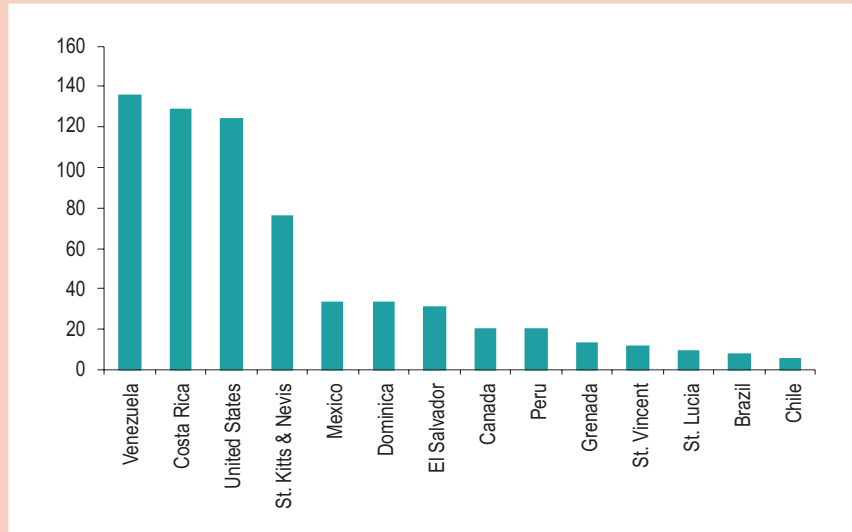
The availability of government information and services over the Internet is fairly advanced in the Americas compared to other regions. The Americas region ranked second after Europe in the 2008 United Nations e-Government Readiness index (Chart 2.4).¹⁷

The North American countries in the region are among the global top ten, with

There are large cross-country differences in text messaging, ranging from 135 per user per month in Venezuela to just six in Chile

Chart 2.3

Number of text messages (SMS) per user per month, latest available year

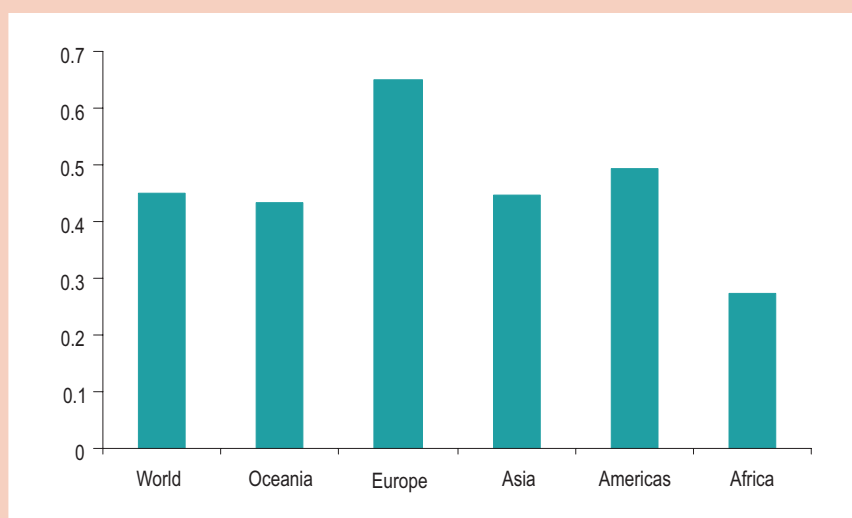


Source: ITU World Telecommunication/ICT Indicators database.

the United States ranked fourth and Canada seventh. According to the UN, the United States federal government is a model for e-government and “*the USA.gov web portal remains one of the most comprehensive and effective government websites in existence.*” Regarding Canada, the UN states “*The Canadian web portal is still a leader, especially given the fact that all information and services provided at the site are equally available in both English and French.*” Although no Latin American and the Caribbean countries are among the top 35 – which mainly consists of developed economies – several are in the next 35.

Chart 2.4

E-Government Readiness Index by region, 2008



Source: UN (2008).

However, the e-Government Readiness Index includes items not directly related to e-government, such as telecommunication infrastructure and education, which means a country's rank may be higher than its actual e-government performance would imply. For example, Barbados ranks top in the Caribbean on the overall e-Government Readiness Index but on the basis of the UN's *Web Measure Index* – which is one of the three sub-indices of the overall e-Government Readiness Index¹⁸ and measures the availability and functionality of government information and services on the Internet – the Dominican Republic, Trinidad and Tobago and Jamaica ranked above Barbados. Overall, the Americas ranks second on the Web Measure Index after Europe (Chart 2.5).

The United States and Canada lead the Web Measure Index in the Americas, followed by Mexico (Chart 2.6). According to the UN, the Mexican national government web site (<http://www.gob.mx>) is strong in e-participation presence and offers online consultation between the government and citizens. The site also provides online bidding for public contracts and payment by credit

The Americas region ranked second after Europe in the 2008 United Nations e-Government Readiness index

Web Measure Index by region, 2008

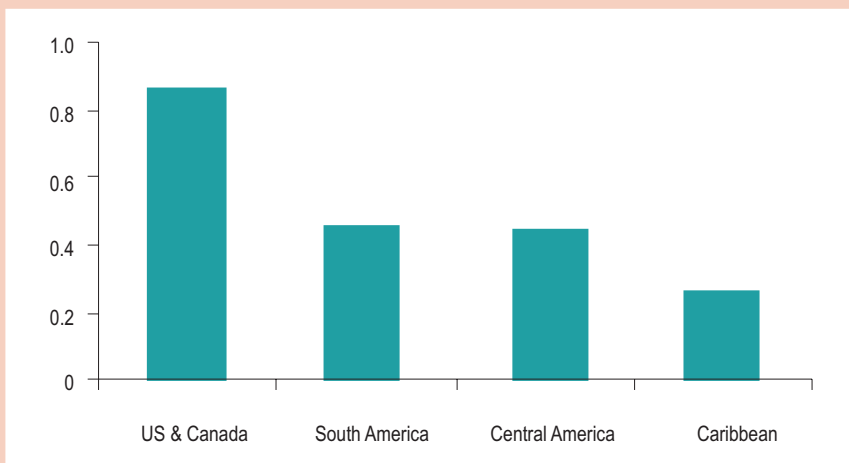
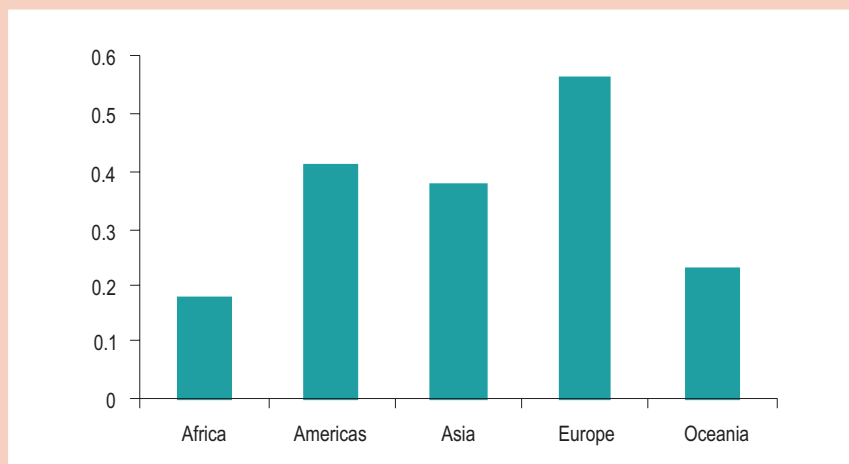
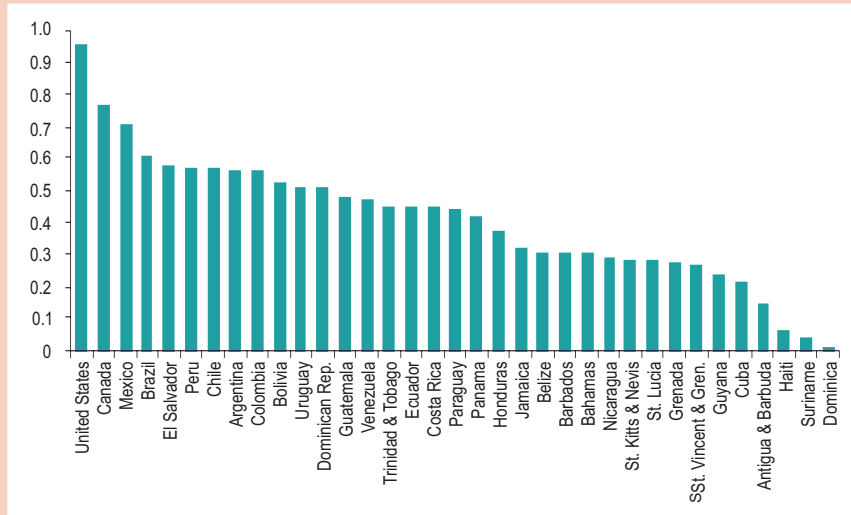


Chart 2.5

Source: Adapted from UN.

Chart 2.6

Web Measure Index, Americas, 2008



Source: Adapted from UN.

The Mexican national government web site offers online consultation between the government and citizens

card. Brazil is the highest ranking South American nation, with its House of Representatives web site cited by the UN for particular merit (Box 2.2). The Dominican Republic has the highest score in the Caribbean, ranking in the top third of the Web Measure Index. However, its relatively undeveloped infrastructure compared to other Caribbean countries lowers its overall e-Government Readiness score.

While e-government presence is comparatively well-developed in the Americas, there are sharp differences in citizens' use among countries. For example, in Brazil and Canada, over one quarter of Internet users access government services on-line. The corresponding figure is five per cent or lower in Mexico, Panama and Peru. Demand for e-government services does not completely match e-government presence. While it is true that Canada and Brazil rank second and fourth respectively in the UN Web Measure Index, Mexico ranks third and Peru fifth although these countries have a significantly smaller proportion of e-government use.

E-business and e-commerce

Box 2.2

Brazil – House of Representatives e-Participation

The Brazilian House of Representatives website (<http://www2.camara.gov.br/popular>) allows citizens to talk to their representatives and to participate in debates directly through the Internet. The government of Brazil also provides an e-participation platform that permits Members of Parliament and citizens to communicate through chat rooms, discussion forums and the service “Fale com Deputado” or “Talk to the MP”. This form of e-participation has enhanced the interaction between citizens and Members of Parliament. In a country as vast as Brazil and with a geographically dispersed population online participation has provided citizens with a greater voice in the creation of policies and laws.

Source: UNPAN (2008).

Proportion of Internet users using the Internet to interact with government, various years, Americas

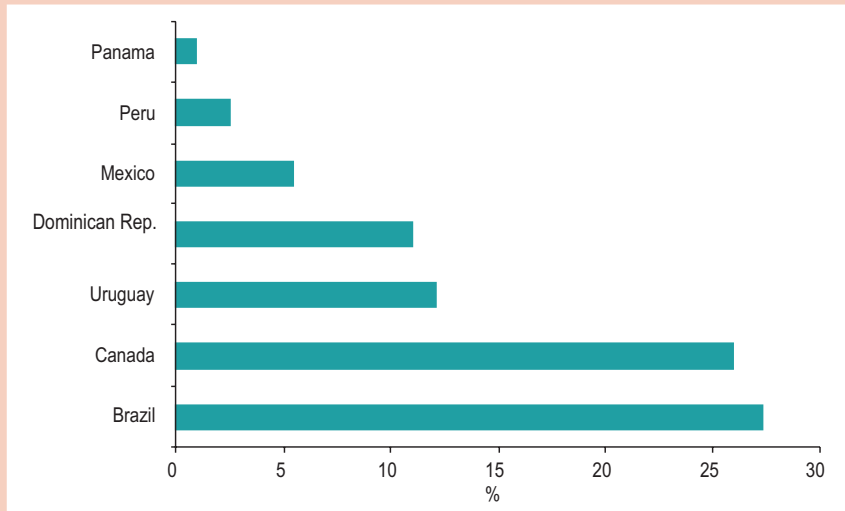


Chart 2.7

Note: Data for Brazil and Dominican Republic refer to 2005, data for Mexico, Panama and Uruguay to 2006 and for Canada and Peru to 2007.
Source: ITU adapted from OSILAC, Statistics Canada and INE (Peru).

Although data on business use of ICTs are not as available as administrative or household statistics, coverage is improving. Table 2.2 shows selected core indicators for countries with available data. Nonetheless, the data must be treated with caution as they tend to be several years old and developments in the area of ICT evolve quickly. In the countries with data, the use of computers is high among businesses with more than ten employees; over 50 per cent in all countries and almost 100 per cent in Argentina. The proportion of enterprises with a web site varies widely. Over half of Argentinean and Canadian enterprises have a web site compared to less than half in Brazil, Colombia, Cuba and Uruguay. Likewise, the use of the Internet to buy and sell products and services differs between countries. One inhibiting factor for the development of websites and e-commerce is the type of Internet connection. An always-on broadband access is essential to successfully exploit business use of the Internet. Only in Canada do most businesses use a fixed broadband connection.

The available data suggest that there is huge scope for improvement to bring more businesses on-line, in particular by providing broadband connections and raising awareness about the advantage of buying and selling online.

There are hardly any data on the value of e-commerce in the region. One reason is that most national surveys do not ask businesses about the value of electronic transactions carried out over the Internet. Therefore, this information is not included in the *Partnership on Measuring ICT for Development's* core list of indicators. However, the region's two developed economies do publish official e-commerce data. In the United States, e-commerce retail sales were US\$ 31 billion in the fourth quarter of 2008, accounting for 3.4 per cent of total retail sales.¹⁹ In Canada, e-commerce sales were C\$ 62.7 billion in 2007, up 26 per cent from 2006 and just under two per cent of total sales.²⁰

In Latin America and the Caribbean, there is huge scope for improvement to bring more businesses on-line, in particular by providing broadband connections

Table 2.2

Core indicators on use of ICT by businesses, selected economies

	Reference year	Proportion of enterprises					
		Using computers	Using Internet	With a website	Receiving orders over the Internet	Placing orders over the Internet	Accessing the Internet by fixed broadband
		B1	B3	B5	B7	B8	B9.d
Argentina	2006	99.9	94.9	70.7	41.9	45.8	–
Brazil	2007	94.3	91.2	43.7	41.6	58.5	63.7
Canada	2007	–	94.9	69.7	13.1	65.4	94.3
Colombia	2006	89.3	85.6	40.5	36.4	34.2	66.7
Cuba	2007	94.3	70.3	27.3	2.1	2.6	0.7
Panama	2006	79.1	68.3	–	26.7	28.6	–
Uruguay	2005	67.5	54.3	19	19.3	18.7	42.9

Note: Except for Canada, enterprises with 10 or more employees.

Source: UNCTAD Information Economy database and Statistics Canada.

In the region's other economies, some indication of e-commerce – at least consumer-to-business – can be inferred from demand side statistics in household and business ICT surveys. For countries where data are available, the percentage of Internet users who bought products or services over the Internet ranges from 16 per cent in Brazil to four per cent in Uruguay (Chart 2.8).

There is scope for e-commerce to grow in the region's developing countries, in particular as more people get on-line, the use of credit cards expands, the necessary laws and security provisions are implemented, more local businesses become e-enabled, and logistics systems for delivering products improve. More information on this subject can be found in UNCTAD's Information Economy Reports ²¹.

The percentage of individuals who bought products or services over the Internet ranges from 16 per cent in Brazil to four per cent in Uruguay

Proportion of Internet users who bought goods or services over the Internet, 2006/07

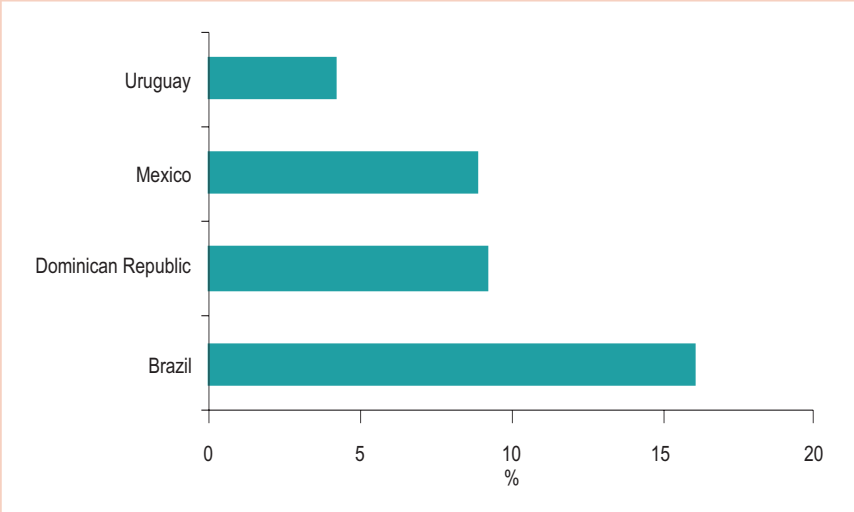


Chart 2.8

Source: ITU adapted from national statistical offices.

Endnotes

- ¹ Data should be collected broken down by the location of the PIAC and by the size of the localities. This was done, for example, in Peru and data show that in 2004, although only one per cent of localities have a public Internet facility, over half the population resides in localities with a public Internet facility. See: OSIPTEL, *El Acceso Comunitario a las TICs*, 2004.
- ² Secretaría de Comunicaciones y Transportes (2008). *Anuario Estadístico 2007*. Available at: <http://dgp.sct.gob.mx/index.php?id=550>.
- ³ Comisión de Regulación de Telecomunicaciones. *Informe Trimestral de Conectividad No. 14*. Marzo 2009. Available at: http://www.crt.gov.co/index.php?option=com_content&view=article&id=52%3Apromocion-de-tics-y-acceso-a-la-sociedad-de-informacion&catid=36%3Apromocion-de-tics-y-acceso-al-futuro&Itemid=62&lang=es.
- ⁴ See Telecoms Unit “ICT Statistics for Barbados” Available at: <http://www.telecoms.gov.bb/ICTStatisticsforBarbados/tabid/102/Default.aspx>.
- ⁵ Oficina Nacional de Estadística. “Indicadores de Centros de Acceso Comunitario (CAC) por iniciativa, según concepto, 2007.” Available at: <http://osicrd.one.gob.do/index.php?module=articles&func=view&catid=54&ptid=11&aid=5>.
- ⁶ Bhesem Ramlal and Patrick K. Watson. 2007. *The Digital Divide in Trinidad & Tobago 2007*. Available at: http://www.tatt.org.tt/ddocs/Digital_Divide_Report.pdf.
- ⁷ Organization for Economic Cooperation and Development. “Regular computer users perform better in key school subjects, OECD study shows.” *Press Release*. January 24, 2006. Available at: http://www.oecd.org/document/17/0,2340,en_2649_201185_35992849_1_1_1_1,00.html.
- ⁸ See: Instituto Nacional de Estadística y Geografía. “Usuarios de Internet por nivel de escolaridad, 2001 a 2008.” Available at: <http://www.inegi.org.mx/est/contenidos/espanol/rutinas/ept.asp?t=inf215&s=est&c=5566>.
- ⁹ Instituto Nacional de Estadística e Informática. March 2008. “Las Tecnologías de Información y Comunicación en los Hogares Octubre - Diciembre 2007.” Available at: <http://www1.inei.gob.pe/web/BoletinFlotante.asp?file=7311.pdf>.
- ¹⁰ Comitê Gestor da Internet no Brasil. 2008. *Survey on the use of Information and Communication Technologies in Brazil*. Available at: <http://www.cgi.br/publicacoes/index.htm>.
- ¹¹ UNDP. 2007. *Human Development Report 2007/2008*. Available at: <http://hdr.undp.org/en/reports/global/hdr2007-2008/>.
- ¹² See “Gender Achievements and Prospects in Education” on the UNICEF web site at: <http://www.ungei.org/gap/reportLatin.php>.
- ¹³ Hernán Galperin and Judith Mariscal. 2007. *Poverty and Mobile Telephony in Latin America and the Caribbean*. Available at: http://www.dirsi.net/files/regional/REGIONAL_FINAL_english.pdf.
- ¹⁴ See Apple, “iPhone around the world”, at <http://www.apple.com/iphone/countries/>.
- ¹⁵ Comisión de Regulación de Telecomunicaciones. *Informe Trimestral de Conectividad No. 13*. November 2008. Available at: http://www.crt.gov.co/index.php?option=com_content&view=article&id=52%3Apromocion-de-tics-y-acceso-a-la-sociedad-de-informacion&catid=36%3Apromocion-de-tics-y-acceso-al-futuro&Itemid=62&lang=es.
- ¹⁶ Comitê Gestor da Internet no Brasil. 2008. *Survey on the use of Information and Communication Technologies in Brazil*. Available at: <http://www.cgi.br/publicacoes/index.htm>.
- ¹⁷ UN Division for Public Administration and Development Management. 2008. *United Nations e-Government Survey 2008: From e-Government to Connected Governance*. Available at: <http://www.unpan.org/egovernment.asp>.
- ¹⁸ The UN E-government Readiness index is composed of 3 sub-indices: the telecommunication (connectivity) infrastructure index, the human capital index, and the web measure index. The third is based on quantitative analysis of countries’ web presence and features, assessed by the National Portal or official government homepage, as well as the online presence of five ministries. See: Division for Public Administration and Development Management. “Aide Memoire.” Available at: <http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN031458.pdf>.
- ¹⁹ U.S. Census Bureau. “Estimated Quarterly U.S. Retail Sales (Adjusted1): Total and E-commerce” Available from: <http://www.census.gov/mrts/www/data/html/09Q1table3.html>.

²⁰ Statistics Canada. "Electronic commerce and technology." *The Daily*. April 24, 2008. Available from: <http://www.statcan.gc.ca/daily-quotidien/080424/dq080424a-eng.htm>.

²¹ UNCTAD. 2008. *Information Economy Report 2007-2008*. Available at: <http://www.unctad.org/Templates/WebFlyer.asp?intItemID=4462&lang=1>.

Chapter 3.

Benchmarking ICT developments in the Americas

3.1 Regional analysis of the ICT Development Index (IDI)

The ITU presented the ICT Development Index (IDI) in March 2009¹ in response to the calls for benchmarking information society developments made at the international level during the World Summit on the Information Society (WSIS).² The IDI is a useful tool to benchmark and assess information society developments, and to monitor the digital divide. The IDI is a composite index made up of eleven different indicators, grouped into three sub-indices. The sub-indices measure ICT infrastructure and access (sub-index access³), ICT use and intensity of use (sub-index use⁴), and the capacity to use ICTs effectively (sub-index skills⁵).

The results of the IDI in the Americas⁶ for two benchmarking years, 2002 and 2007, ranked by the 2007 values are shown in Table 3.1 (for tables on the three sub-indices see Annex 2). All countries improved their IDI score in the five-year period, in line with the general world trend of growing ICT access and usage, even though there are some significant cross-country differences in IDI scores and improvements in the Americas region.

The regional 2007 IDI ranking is topped by the United States and Canada, over two points ahead of Argentina, ranked third, and their score reaching almost five times that of Haiti, the only Least Developed Country (LDC) in the Americas, reflecting the large differences in ICT development between the region's countries.

The relationship between the IDI and GNI per capita (expressed in US\$) in the Americas is shown in Chart 3.1. The logarithmic model presented in the chart provides a good fit. Indeed, the relation between GNI per capita and IDI in the Americas (R square value of 0.85) is strong and comparable to the world (R square value of 0.88) or, for example, to Asia and the Pacific (R square value of 0.93).⁷

The differences in IDI value – and therefore ICT development – between the United States and Canada, and the rest of the countries in the region reflect substantial differences in income levels. As a result, the United States and Canada face different types of ICT-related challenges than the other countries in the region, and comparisons are most usefully made between countries with similar income levels. Jamaica and Argentina, compared to countries with similar income levels in the region, have achieved relatively higher IDI values.

Mexico, Trinidad & Tobago, and Venezuela have lower-than-expected ICT levels considering their per capita incomes. The economies of Venezuela and Trinidad & Tobago are resource-driven, which tends to overstate income on a per capita basis.

The relation between GNI per capita and IDI levels in the Americas is strong and comparable to the world

Compared to countries with similar income levels, Jamaica and Argentina have achieved relatively higher IDI values

Table 3.1

ICT Development Index (IDI), 2002 and 2007, Americas

Country	Rank 2007	IDI 2007	Rank 2002	IDI 2002	Rank change 2002-2007	IDI change 2002-2007
United States	1	6.44	2	5.25	1	1.19
Canada	2	6.34	1	5.33	-1	1.00
Argentina	3	4.12	3	3.06	0	1.06
Chile	4	4.00	4	2.97	0	1.03
Uruguay	5	3.88	5	2.90	0	0.97
Jamaica	6	3.78	6	2.79	0	0.99
Trinidad & Tobago	7	3.61	9	2.50	2	1.10
Brazil	8	3.48	7	2.55	-1	0.93
Panama	9	3.46	10	2.42	1	1.04
Costa Rica	10	3.41	8	2.54	-2	0.86
Venezuela	11	3.34	12	2.18	1	1.16
Colombia	12	3.25	14	2.13	2	1.11
Peru	13	3.11	13	2.15	0	0.96
Mexico	14	3.09	11	2.38	-3	0.71
Ecuador	15	2.75	17	1.97	2	0.78
Dominican Rep.	16	2.65	18	1.97	2	0.68
Cuba	17	2.53	19	1.94	2	0.59
Paraguay	18	2.52	16	2.02	-2	0.50
Bolivia	19	2.45	15	2.03	-4	0.42
El Salvador	20	2.43	20	1.74	0	0.69
Honduras	21	2.28	23	1.31	2	0.97
Guatemala	22	2.28	21	1.60	-1	0.68
Nicaragua	23	2.03	22	1.37	-1	0.66
Haiti	24	1.27	24	1.05	0	0.21

Source: ITU.

Brazil, Canada, Jamaica and the United States have experienced a higher increase in the sub-index use than in the sub-index access

Given the level of income of these two countries, they have great potential for further growth of ICT-led development. However, Mexico being the third largest country in terms of population in the Americas, it also faces additional challenges to improve the penetration of ICT services and make their benefits more widely available.

Average changes for the five-year period in each of the three IDI sub-indices are shown in Table 3.2. The sub-index access shows the greatest average increase, with more moderate progress in the other two sub-indices. This is because the index is based on a three-stage sequential model⁸: countries with low levels of ICT development will progress towards an information society by improving first ICT access, and then ICT use. The higher the level of skills is, the easier it will be for countries to adopt and use ICTs. In the Americas, Brazil, Canada, Jamaica and the United States have experienced a higher increase in the sub-index use than in the sub-index access in the period from 2002 to 2007.⁹ Most other countries in the region are in the first stage of ICT development, and therefore the highest average increase is achieved

IDI and GNI per capita, 2007

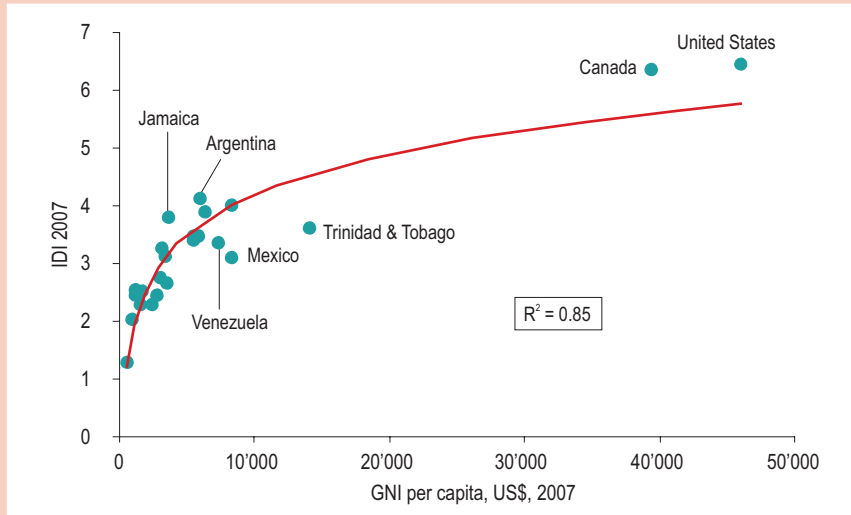


Chart 3.1

● Observed
— Logarithmic

Source: ITU.

in the sub-index access (nearly twice as much as that in the sub-index use). On the other hand, improvements in education and literacy are less dynamic, and therefore value changes in the sub-index skills tend to be lower than in the other sub-indices.

Compared to the world, the region has experienced on average a similar increase in the sub-index access, while that of the sub-index use has been lower. Lower progress in the sub-index use is partly due to the unavailability of mobile broadband in many countries in the region, and low penetration in those countries where it is available. Only the US, Trinidad & Tobago, Venezuela, Canada and Brazil have mobile broadband penetration rates that lie above the developing countries' average. (Chart 3.2). On the other hand, the increase in Internet usage in the region (from 28 per cent in 2002 to 43 per cent in 2007) has been above that of the world for the same period (from 11 per cent to 21 per cent) and has been the main source of growth in the sub-index use,

IDI changes 2002-2007

	Americas			World	
	Average value 2002	Average value 2007	Change in value 2002-2007	Average value 2007	Change in value 2002-2007
IDI	2.42	3.27	0.85	3.40	0.92
Sub-index access	2.40	3.64	1.24	3.91	1.23
Sub-index use	0.46	1.12	0.66	1.43	0.89
Sub-index skills	6.38	6.82	0.44	6.31	0.37

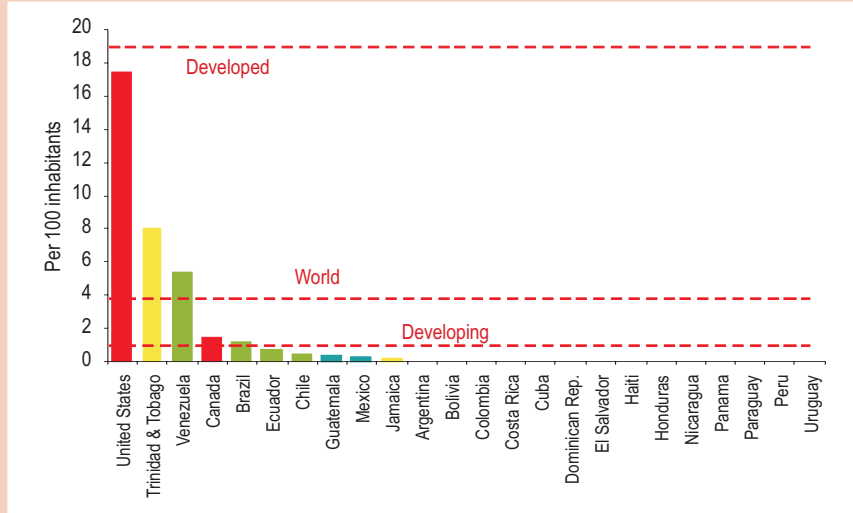
Table 3.2

Source: ITU.

Chart 3.2

Mobile broadband penetration in the Americas, 2007

- US & Canada
- Caribbean
- South America
- Central America



Source: ITU World Telecommunication/ICT Indicators database.

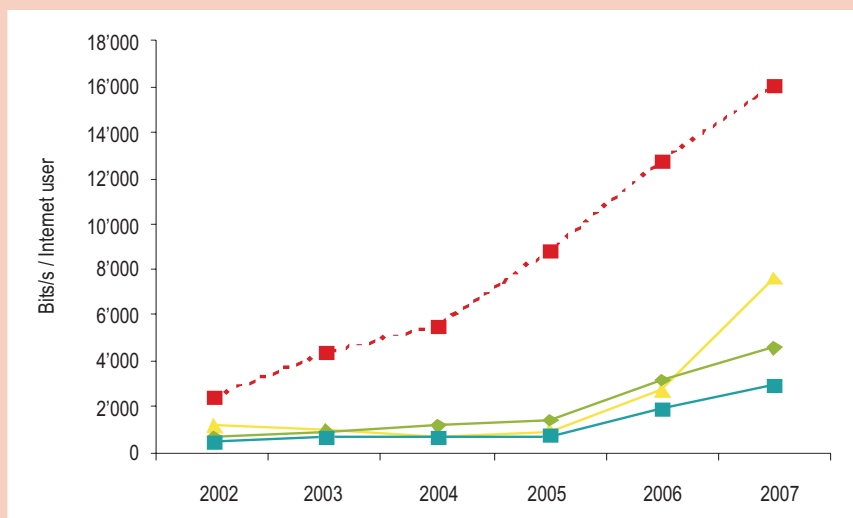
especially in the Caribbean (from six per cent to 17 per cent Internet user penetration) and in South America (from nine per cent to 29 per cent Internet user penetration).

Americas' progress in the **sub-index access** was mainly due to a significant increase in mobile cellular subscriptions per 100 inhabitants (from 30 in 2002 to 73 in 2007). Additionally, International Internet bandwidth in the region also improved (from 501 Gbps to 4'576 Gbps), and, as a result, international Internet bandwidth per Internet user increased in the Americas, although major differences persisted between the United States and Canada and the other countries (Chart 3.3).

Chart 3.3

International Internet bandwidth per Internet user in the Americas, 2007

- US & Canada
- Caribbean
- South America
- Central America



Source: ITU World Telecommunication/ICT Indicators database.

On average, the increase in the **sub-index skills** was higher in the region compared to the world, which is a remarkable achievement for a region that in 2002 was already above the world's average in all three skills indicators. This progress was based on improvements in both secondary and tertiary enrolment rates.

The following section takes a closer look at the IDI ranking in the Americas, and highlights some selected economies in the region:¹⁰

- **The United States** tops the regional ranking, ahead of Canada which was ranked first in 2002. The country has experienced the highest gain in IDI value in the region (1.19 points). It has greatly improved in the area of intensity of use (increase of 1.95 points in the sub-index use), reflecting growth in broadband. The United States is the only country in the Americas that has achieved a mobile broadband penetration above ten per cent (17 per cent in 2007). Moreover, the country had the highest gain of the region in fixed broadband penetration (from seven to 24 per cent), and also a significant gain in Internet usage, which led to a penetration of 73 Internet users per 100 inhabitants in 2007, the second highest after Canada. Despite its leading position in the Americas, the country still has room for improvement to reach the ICT levels of the top ten economies in the world, especially in terms of mobile cellular penetration.¹¹
- **Canada** ranks second in the regional IDI 2007, down one place from 2002. Both Canada and the United States have reached relatively high levels of ICT usage and are in the world's top twenty IDI ranking. By 2007, Canada and the United States had the highest Internet penetration rate (73 per 100 inhabitants). Canada had the highest fixed broadband penetration (28 per cent) in the Americas. The country also stood out for having the highest sub-index access value in the region, due to the large proportion of households with a computer (79 per cent), households with Internet access at home (72 per cent), and fixed line penetration (55 per cent). On the other hand, in 2007 mobile cellular penetration was relatively low (62 per cent), and mobile broadband was just beginning, with 1.5 subscriptions per 100 inhabitants.
- **Argentina** ranks third in the regional IDI 2007, the same as in 2002. The country had a high gain in the sub-index access, only surpassed by that of Trinidad & Tobago. Argentina improved impressively in mobile cellular penetration (from 17 to 102 per cent), becoming the first Latin American country to exceed 100 per cent. It also made significant progress in the proportion of households with Internet access at home, reaching 28 per cent in 2007 (third highest after Canada and the United States). However, the country has still ample room for improvement in the sub-index use: in 2007, mobile broadband was not available in the country, and, although some progress was made in fixed broadband penetration, it stood at seven per cent in 2007.
- **Jamaica** remained in the 6th place in the regional IDI 2007, unchanged from 2002. The country experienced a high gain in the sub-index use, only surpassed in the region by that of the United States and Canada. This improvement was mainly due to the highest increase in the region in Internet usage (from 23 to 55 per cent). Mobile cellular penetration also increased significantly, from 48 to

The increase in the sub-index skills was higher in the region compared to the world due to improvements in secondary and tertiary enrolment rates

In Jamaica, Internet usage penetration increased from 23 to 55 per cent, the highest increase in the region

99 per cent. However, in 2007 mobile broadband was almost inexistant, fixed broadband penetration stood at three per cent, and between 2002 to 2007 fixed line penetration had decreased from 17 to 13 per cent.

Trinidad & Tobago has the highest mobile cellular penetration amongst the countries included in the regional IDI

- **Trinidad & Tobago** advanced two places in the regional IDI, reaching the 7th position in 2007. The country experienced the highest gain in the sub-index access in the Americas. ICT access growth was driven by an outstanding increase in mobile cellular penetration (from 20 to 113 per cent), which led the country to reach the highest mobile cellular penetration amongst the countries included in the IDI in the region. The proportion of households with a computer also increased significantly (from 17 to 44 per cent), although the proportion of households with Internet access remained much lower (18 per cent in 2007). In line with these results, mobile broadband in Trinidad & Tobago reached a relatively high penetration (eight per cent in 2007, only surpassed in the region by the United States), while fixed broadband penetration remained low (three per cent in 2007). On the other hand, in 2007 the country had the lowest sub-index skills value of all American economies with similar income levels¹², with only 12 per cent tertiary enrolment rate.
- **Brazil** lost one position in the regional IDI, ranking 8th in 2007. The country experienced moderate growth in all three sub-indices. The main sources of growth were mobile cellular penetration (from 19 to 63 per cent) and Internet usage (from nine to 35 per cent). Mobile broadband became available in 2007, yet penetration remained nearly nil (0.1 per cent in 2007). Concerning the sub-index skills, although some progress was made in tertiary enrolment, it remained rather low compared to other South American countries with similar income levels (less than 30 per cent in Brazil compared to, for example, over 60 per cent in Argentina).
- **Venezuela** ranks 11th in the regional IDI 2007, up one place from 2002. The country had the second highest IDI gain in the Americas, only surpassed by the United States. Growth was driven by significant progress in both the sub-index access and the sub-index skills. ICT access improved through higher mobile cellular penetration (from 26 to 86 per cent) and fixed line penetration (from 11 to 18 per cent). While fixed line penetration is still low, the change is significant taking into account that most countries in the region have experienced very little progress in fixed line penetration. Improvements in the sub-index skills were due to progress in secondary and particularly tertiary enrolment (from 38 to 58 per cent). On the other hand, the sub-index use grew slowly, and in 2007 Venezuela's value was below the average of the region.
- **Colombia** advanced two places to rank 12 in the regional 2007 IDI. Progress was mainly on the sub-index access, although significant advances were made also in the sub-index skills. Mobile cellular penetration improved from 11 to 74 per cent, and the proportion of households with a computer increased from 10 to 27 per cent. In the sub-index skills, both secondary enrolment rate (from 71 to 85 per cent) and tertiary enrolment rate (from 24 to 32 per cent) improved, although tertiary enrolment continues to remain below the regional average (36 per cent).

Venezuela had the second highest IDI gain in the Americas, due to progress in the sub-indices access and skills

- **Mexico** dropped three places to rank 14 in the regional IDI 2007. The country improved mobile cellular penetration (from 25 to 62 per cent) and, to a lesser extent, Internet usage (from 13 to 22 per cent) and fixed broadband penetration (from nearly zero to seven per cent). Notwithstanding these advances, the country still remained below the penetration of the Americas in these indicators. Moreover, in 2007 mobile broadband penetration was very low in the country (below 0.3 per cent). In the sub-index skills, Mexico increased its secondary enrolment rate to 87 per cent in 2007 and remained above the average of the region. On the other hand, in 2007 tertiary enrolment rate was below 30 per cent, far from the values of other countries with similar income levels, such as Chile (47 per cent), Venezuela (58 per cent) or Argentina (62 per cent).
- **Honduras** moved up two positions to reach the 21st place in the regional 2007 IDI. Particularly, the country improved the enrolment rate in secondary schools (from 32 to 61 per cent), but it also made important improvements in mobile cellular penetration (from five to 59) and international Internet bandwidth (from 17 to 1730 Mbps).

3.2 Regional analysis of the ICT Price Basket

The ITU presented the ICT Price Basket in March 2009¹³ in order to raise awareness of the impact of ICT prices on ICT usage and to allow policy makers to evaluate the cost of ICT services in their country and benchmark them against those of other countries.

The ICT Price Basket is made up of three sub-baskets, which measure the prices of fixed telephone, mobile cellular and fixed broadband Internet services. Each sub-basket is presented in US\$¹⁴, in PPP\$¹⁵ and as a percentage of monthly GNI per capita. The three sub-baskets are combined into a single ICT Price Basket value, which determines the overall rank.

The **ICT Price Basket** is the value computed as the sum of the price of each sub-basket (in US\$) as a percentage of a country's monthly GNI per capita (World Bank, US\$, Atlas Method), divided by three (Chart 3.4). For this exercise, the cost of each sub-basket as a percentage of the monthly GNI per capita is limited to a maximum value of 100, so that the final ICT Price Basket value may vary between a theoretical 'zero' (tariffs represent zero per cent of average monthly GNI per capita, and all three services are for free), and 100 (the price of all three sub-baskets is equal to or exceeds the monthly GNI per capita). Based on the ICT Price Basket value, countries are ranked. This section analyses the results of the 2008 ICT Price Basket in the Americas, which includes a total of 30 countries.¹⁶

Overall results of the ICT Price Basket

On average, the 2008 ICT Price Basket value in the Americas corresponds to 7.5 per cent of the countries' average GNI per capita. However, it varies from 0.6 per cent in North America to 7.7 per cent in Central America, 8.4 per cent in South America, and 9.5 per cent in the Caribbean.¹⁷ The average cost of the ICT Price Basket in North American countries is the lowest among all regions in the world. Indeed, ICT prices

Compared to the world average (15%), the 2008 ICT Price Basket in the Americas is significantly less expensive (7.5%)

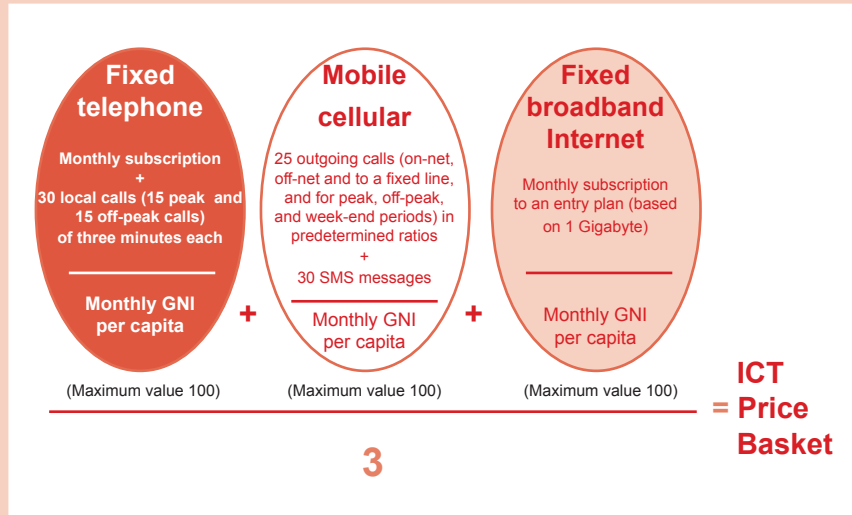
Chart 3.4

Note: In countries where no mobile prepaid offers are available, the monthly fixed cost (minus the free minutes included, if applicable) of a postpaid subscription is added to the basket.

For monthly fixed broadband Internet plans that limit the amount of data transferred by including caps below 1 Gigabyte, the cost for additional bytes is added.

Source: ITU.

ICT Price Basket methodology



in the United States (0.4) and Canada (0.7) represent a significantly lower percentage of GNI per capita than those of the developed world (1.6 per cent). The ICT Price Basket values of Central America (7.7 per cent), South America (8.4 per cent) and the Caribbean (6.1 per cent) lie significantly below the developing world average of 20 per cent, indicating that prices are relatively lower in the Americas than in other regions.

Compared to the world average of 15 per cent, the 2008 ICT Price Basket is significantly less expensive in the Americas.

The distribution of the ICT Price Basket according to geographical groupings is shown in Chart 3.5. More than half of the countries in the Americas have an ICT Price Basket that corresponds to less than six per cent of their GNI per capita. Only six countries have ICT Price Baskets above ten per cent.

Compared to other regions, such as Asia and the Pacific, or Africa,¹⁸ the ICT Price Basket in the Americas has lower value differences between countries. As further analysed below, this is partly explained by moderate fixed broadband prices in the Americas, which in other regions are the main cause for high ICT Price Basket values. Indeed, in the Americas, only Cuba has a fixed broadband sub-basket that represents more than 100 per cent of its monthly GNI per capita,¹⁹ and most countries have fixed broadband prices that correspond to less than ten per cent of their GNI per capita.

Full results of the ICT Price Basket in the Americas are shown in Table 3.3.²⁰ The ranking is topped by the United States, followed by Canada and Trinidad & Tobago, the three countries in the region with the highest income levels. The cost of the ICT Price Basket varies from less than one per cent in the United States and Canada to over 45 per cent in Cuba. Only Guyana, Bolivia, Nicaragua and Cuba have an ICT Price Basket above the world average. Nevertheless, the comparison with the world

More than half of the countries in the Americas have an ICT Price Basket that corresponds to less than six per cent of their GNI per capita

ICT Price Basket values by geographical region in the Americas, 2008

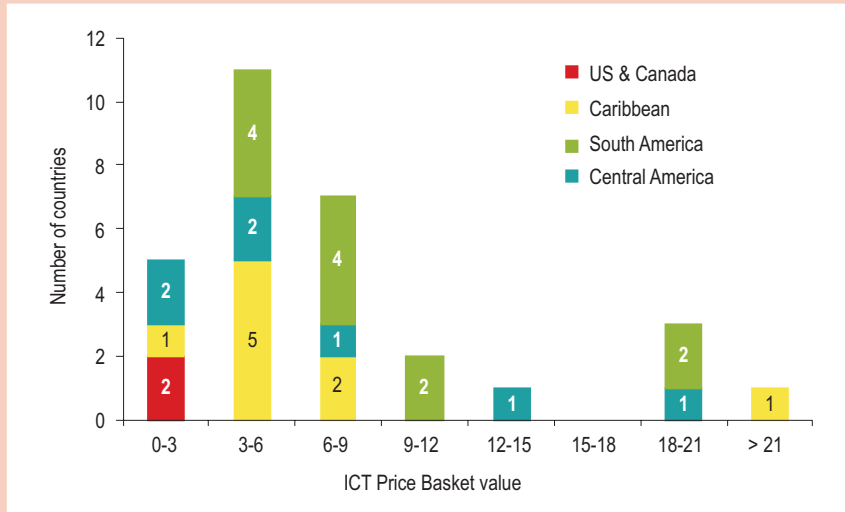


Chart 3.5

Note: The ICT Price Basket value is the sum of the price of each sub-basket (fixed, mobile cellular, fixed broadband, in US\$) as a percentage of a country's monthly GNI per capita (World Bank, US\$, Atlas Method), divided by 3. In this chart, there are a total of five countries (two from North America, one from the Caribbean and two from Central America) in which the ICT Price Basket represents 0-3 per cent of their GNI per capita.
Source: ITU.

average needs to be interpreted with caution, as it is highly influenced by high fixed broadband prices in several African and Asian countries. On the other hand, the average ICT Price Basket in developed countries is 1.6 per cent, which is less than in all of the countries included in the Americas (except for the United States, Canada and Trinidad & Tobago). This suggests that although prices in the Americas are on average lower than in some other regions, there is still room for improvement for prices to drop to the levels of the world's most advanced countries.

Fixed telephone sub-basket

The fixed telephone sub-basket represents the cost of local fixed residential telephone service. It includes the fee of the monthly subscription, plus the cost of 30 local calls to the same (fixed) network (15 peak and 15 off-peak calls) of three minutes each.²¹

The price of the monthly fixed telephone basket in the Americas varies from US\$ 1.1 in Ecuador to US\$ 33 in Canada. However, Canada's high prices in US\$ are compensated for by a high GNI per capita, which makes services rather affordable (one per cent of GNI per capita). Ecuador (PPP\$ 2.5), Suriname (PPP\$ 4.6), and Guyana (PPP\$ 5.4) have the lowest fixed telephone prices of the region, and are among the world's top ten economies with the least costly fixed telephone sub-basket (in US\$ and PPP\$). On the other hand, Bolivia has the most expensive fixed telephone sub-basket of the region (PPP\$ 65).

As a percentage of GNI per capita, fixed telephone prices vary in the Americas from 0.4 per cent in Ecuador to 22 per cent in Bolivia. Thus, Ecuador has the lowest fixed telephone prices in the region, even in terms of its GNI per capita. This is partly explained by the fact that, according to social and economical criteria, tariffs are set by the Government. Guyana (2.4 per cent of monthly GNI per capita) also stands out in

Ecuador, Suriname and Guyana have the lowest fixed telephone prices of the region, partly explained by the fact that tariffs are set by the Government

Table 3.3

ICT Price Basket 2008, Americas

Rank	Economy	ICT Price Basket Value**	Sub-baskets			GNI per capita*, USD
			Fixed (% of GNI per capita*)	Mobile (% of GNI per capita*)	Broadband (% of GNI per capita*)	
1	United States	0.4	0.4	0.4	0.4	46'040
2	Canada	0.7	1.0	0.6	0.6	39'420
3	Trinidad & Tobago	1.1	1.7	0.7	1.1	14'100
4	Costa Rica	1.9	1.0	1.0	3.7	5'560
5	Panama	2.1	2.0	1.1	3.3	5'510
6	Uruguay	3.2	2.5	2.6	4.6	6'380
7	Venezuela	3.4	1.2	4.1	5.1	7'320
8	Mexico	3.6	3.2	2.2	5.3	8'340
9	Argentina	3.7	0.9	2.5	7.6	6'050
10	Barbados	3.9	2.7	1.6	7.3	8'080
11	Grenada	4.1	3.0	1.9	7.5	4'670
12	Chile	4.5	3.9	2.0	7.6	8'350
13	Jamaica	5.1	3.5	2.3	9.7	3'710
14	El Salvador	5.5	4.4	4.4	7.6	2'850
15	St. Lucia	5.7	2.5	2.6	12.0	5'530
16	Dominican Rep.	5.8	4.9	3.1	9.5	3'550
17	Ecuador	6.5	0.4	3.5	15.5	3'080
18	Dominica	6.6	3.1	3.1	13.5	4'250
19	Colombia	6.6	2.8	3.5	13.4	3'250
20	Peru	6.9	5.4	2.8	12.7	3'450
21	Brazil	7.4	4.9	7.5	9.6	5'910
22	St. Vincent and the G.	7.4	3.1	3.4	15.7	4'210
23	Guatemala	7.7	4.3	2.2	16.7	2'440
24	Suriname	9.0	0.7	2.3	24.1	4'730
25	Paraguay	11.5	5.2	4.1	25.1	1'670
26	Belize	13.2	6.6	4.7	28.3	3'800
27	Guyana	18.3	2.4	6.9	45.7	1'300
28	Bolivia	19.7	21.6	5.6	31.9	1'260
29	Nicaragua	19.9	6.2	16.9	36.7	980
30	Cuba	45.6	13.5	23.3	1671.8	1'170
	WORLD	15.1	7.3	7.6	218.9	11'189

Note: *The GNI per capita is based on the World Bank's Atlas Method.
 ** The ICT Price Basket Value is the sum of the three sub-baskets as a percentage of GNI per capita, divided by three.
 Source: ITU.

the regional top ten list of less costly fixed telephone prices, as it is also a lower-middle-income country (Chart 3.6). In the Americas, only Cuba and Bolivia have a fixed telephone sub-basket (as a percentage of monthly GNI per capita) above the world average.

Mobile cellular sub-basket

The mobile cellular sub-basket corresponds to the price of a standard (low-user) basket of mobile monthly usage based on the OECD/Teligen methodology.²² It includes 25 outgoing calls per month (on-net, off-net and to a fixed line), in predetermined ratios of minutes, plus 30 text messages (i.e., Short Message Service, SMS).²³

Top ten economies with the least costly fixed telephone sub-basket in the Americas, 2008

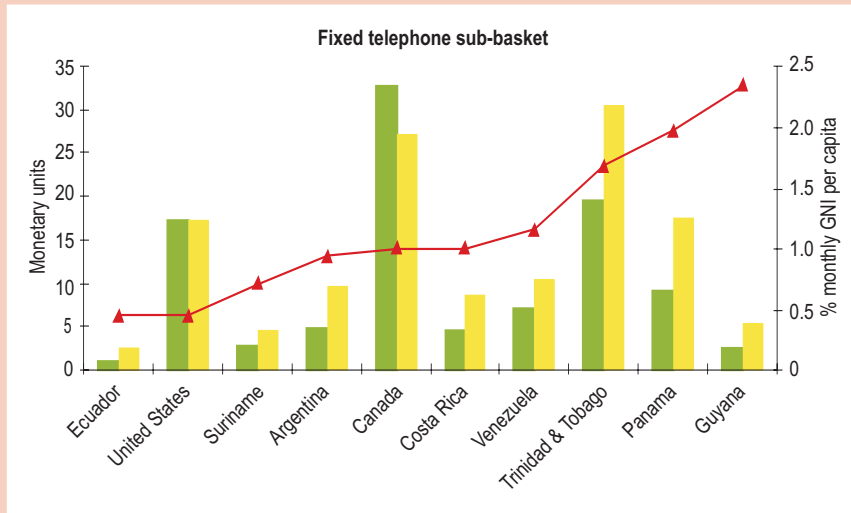


Chart 3.6

■ US\$
■ PPP \$
▲ % monthly GNI per capita

Source: ITU.

Mobile cellular prices in the Americas vary from US\$ five in Costa Rica, Guatemala, and Panama to US\$ 37 in Brazil. In PPP terms, Guatemala and Costa Rica have the lowest prices (PPP\$ 8), while Brazil has the highest ones (PPP\$ 44). Unlike the fixed telephone sub-basket, the countries with the least costly PPP prices in the Americas are not among the world's top ten.

The ten countries with the least costly mobile cellular prices in terms of GNI per capita are shown in Chart 3.7. The ranking is topped by the United States (0.4 per cent), and includes all the region's high-income countries (i.e. Canada, Trinidad & Tobago, and Barbados). Nicaragua and Cuba are the only countries in the Americas with a mobile cellular sub-basket more expensive than the world's average (in terms of GNI per capita).

Fixed broadband Internet sub-basket

The fixed broadband Internet sub-basket is calculated based on the price of the monthly subscription to an entry level fixed broadband plan, at a minimum of 256 kbit/s.²⁴

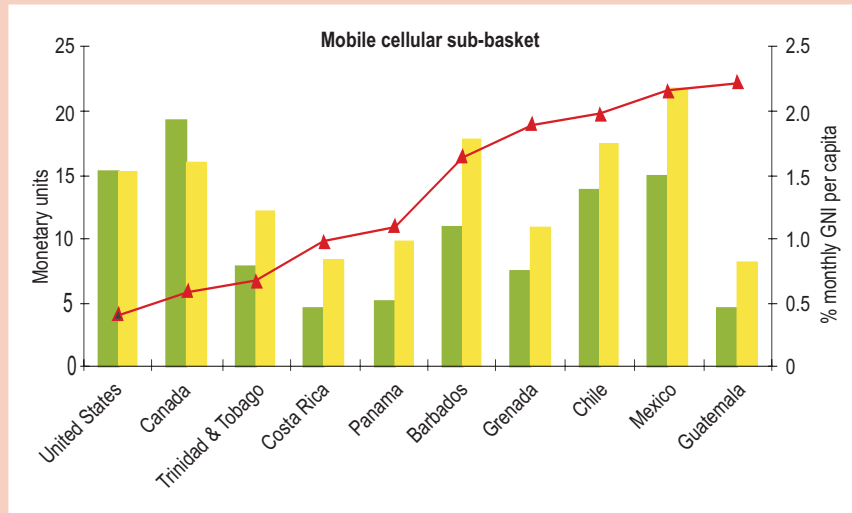
As in other regions of the world, the fixed broadband Internet sub-basket in the Americas is the most expensive of the three sub-baskets. It also displays the highest differences between countries in the region, although the value difference for the Americas is not as pronounced as it is in other regions. Prices range from US\$ 13 in Trinidad & Tobago to US\$ 95 in Suriname. Cuba is an exceptional case because fixed broadband is only available in the island to businesses in selected locations, and at a very high price (US\$ 1'630/month).

As in other regions of the world, the fixed broadband Internet sub-basket in the Americas is the most expensive and displays the highest differences between countries

Chart 3.7

Top ten economies with the least costly mobile cellular sub-basket in the Americas, 2008

■ US\$
 ■ PPP \$
 ▲ % monthly GNI per capita



Source: ITU.

In PPP terms, the United States has the cheapest prices (PPP\$ 15), while Suriname has the most expensive ones (PPP\$ 153). Moreover, the United States, Canada, and Trinidad & Tobago are among the world's top ten countries with the least costly fixed broadband Internet sub-basket in PPP terms.

The ten countries in the region with the least expensive fixed broadband prices, in relative terms, are shown in Chart 3.8. The list is topped by the United States (0.4 per cent) and Canada (0.6 per cent), which are also the two countries with the least costly fixed broadband Internet sub-basket worldwide. Fixed broadband prices are closely linked to income levels, and high(er) income countries tend to have the relatively cheapest broadband prices. Indeed, the Americas top ten does not include any lower-middle-income country, and displays the greatest difference between the first three countries (the ones with the highest income), and the rest. On the other hand, in the Americas, only Cuba has a fixed broadband sub-basket (as a percentage of GNI per capita) above the world's average.

Top ten economies with the least costly fixed broadband Internet sub-basket in the Americas, 2008

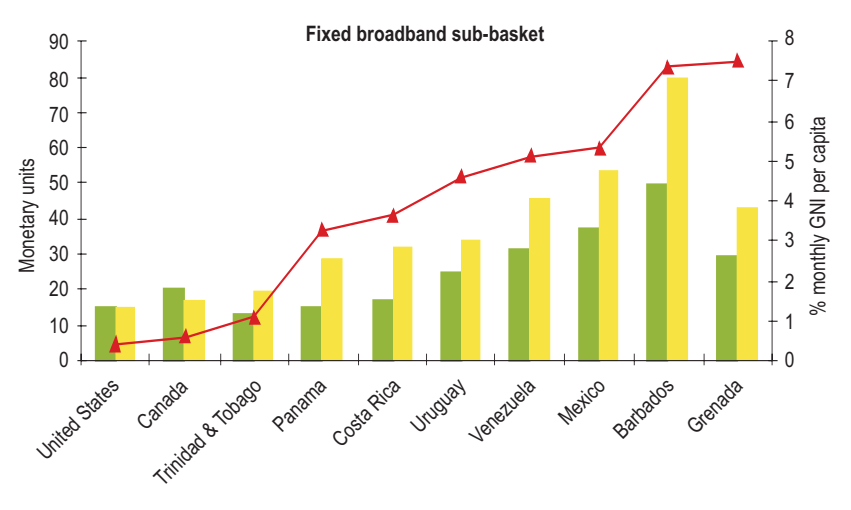


Chart 3.8

■ US\$
■ PPP \$
▲ % monthly GNI per capita

Source: ITU.

Endnotes

- ¹ See ITU (2009a).
- ² For more information on the WSIS and its outcome documents, see <http://www.itu.int/wsis/index.html>.
- ³ The sub-index access includes the following indicators: fixed telephone lines per 100 inhabitants, mobile cellular telephone subscriptions per 100 inhabitants, international Internet bandwidth (bits/s) per Internet user, proportion of households with a computer, and proportion of households with Internet access at home.
- ⁴ The sub-index use includes the following indicators: Internet users per 100 inhabitants, fixed broadband Internet subscribers per 100 inhabitants, and mobile broadband subscribers per 100 inhabitants.
- ⁵ The sub-index skills includes the following indicators: adult literacy rate, secondary gross enrolment ratio, and tertiary gross enrolment ratio.
- ⁶ The following countries were not included in the regional IDI because of lack of data: Antigua & Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Suriname.
- ⁷ The R square value of a logarithmic regression provides a measure of how well the trendline approximates the real data points. It varies from 0 to 1, being 1 the value obtained by a perfect fit of the data points. For a more detailed analysis of the link between income and IDI in the world, see ITU (2009a). For an analysis of the same variables in Asia and the Pacific, see ITU (2009b).
- ⁸ See Chapter 3 ITU (2009a) for more details on the conceptual framework of the IDI.
- ⁹ The same is true for Cuba and Haiti but in the case of Cuba and Haiti, the higher increase in the sub-index use than in the sub-index access is due to stagnation in the sub-index access, rather than high growth in the sub-index use. These countries still have ample room for improvement of ICT access, which will be necessary in order to reach higher ICT use values.
- ¹⁰ References to rankings made in this section apply to rankings of economies within the region. It is to be noted that these rankings may differ from the world IDI ranking, which includes 154 economies (see ITU, 2009a).
- ¹¹ The United States has a 2007 IDI value of 6.44 and ranks 17th in the world IDI ranking, lower, for example, than the United Kingdom (10th, 2007 IDI value of 6.78), or the Republic of Korea (1st, 2007 IDI value of 7.50). In 2007, the United States had a mobile cellular penetration of 83.5 per cent, compared to, for example, more than 100 per cent in all Northern European countries except Latvia.
- ¹² Those countries classified by the World Bank Income Groups as high and upper-middle-income (i.e. with a 2007 GNI per capita above US\$ 3706). In the Americas, this includes the following countries: United States, Canada, Argentina, Chile, Uruguay, Jamaica, Brazil, Panama, Costa Rica, Venezuela, Mexico, and Cuba.
- ¹³ See ITU (2009a) for more details.
- ¹⁴ The average United Nations operational rate of exchange from January 2008 to September 2008 was used (the month when prices were gathered).
- ¹⁵ Current international dollars (PPP \$) are calculated using Purchasing Power Parity (PPP) conversion factors instead of regular exchange rates. The use of PPP exchange factors helps screening price and exchange rate distortions, thus providing a measure of the cost of a given service taking into account the purchasing power equivalences between countries. PPP data used in the ICT Price Basket were provided by the World Bank. For more information on PPP methodology and data, see <http://go.worldbank.org/UI22NH9ME0> and the World Bank (2008).
- ¹⁶ The following economies included in the ITU World Telecommunication / ICT Indicators database were not included in the ICT Price Basket because of lack of data: Antigua & Barbuda, Bahamas, Haiti, St. Kitts and Nevis, and Honduras.

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- ¹⁷ The average value of the ICT Price Basket in the Caribbean is relatively high due to the prices in Cuba, which correspond to 45.6 per cent of the country's GNI per capita. Excluding Cuba, the average value of the ICT Price Basket in the Caribbean drops to 5.0 per cent. The high ICT Price Basket value of Cuba is due to high fixed broadband prices, which is only available to businesses on the island, and to a relatively low GNI per capita (US\$ 1'170, compared to an average US\$ 6'013 in the other Caribbean countries included in the regional 2008 ICT Price Basket).
- ¹⁸ See ITU (2009b) and ITU (2009c) for more details.
- ¹⁹ In Cuba, fixed broadband Internet is only available to businesses.
- ²⁰ Brazil's ICT Price Basket 2008 has been updated from the one published in ITU (2009a). The update affects Brazil's fixed telephone sub-basket, which now takes into account the fact that by law the basic monthly subscription fee for a fixed telephone plan must include at least 200 minutes of free local call.
- ²¹ See ITU (2009a), Annex 2, for more details.
- ²² OECD (2002). OECD Mobile Basket Revisions. (DSTI/ICCP/TISP (2002)9.) Available at: <http://www.oecd.org/dataoecd/56/26/41049548.pdf>.
- ²³ See ITU (2009a), Annex 2, for more details.
- ²⁴ Broadband is considered any dedicated connection to the Internet at speeds equal to, or greater than, 256kbit/s, in one or both directions. Where several offers were available, preference was given to a 256 kbit/s connection. The tariff represents the cheapest broadband entry plan (although special offers – limited in time or to specific geographic areas – were not taken into consideration) but does not necessarily represent the fastest or most cost-effective connection since often the price for a higher-speed plan is relatively cheaper (in terms of the caps). See ITU (2009a), Annex 2, for more details.

Chapter 4.

Conclusions

This section highlights key findings and draws conclusions, with a view to providing recommendations that policy makers could implement to enhance development of the information society in the Americas region and increase access to ICTs. Policy recommendations are primarily addressed to countries with relatively low levels of ICT access and use and less to the highly developed countries, such as the United States and Canada.

The Americas region has been making steady ICT progress, although the number of fixed telephone lines has stagnated as a result of the popularity of mobile and the trend to Voice over Broadband services. Mobile telephony has grown rapidly and is on track to exceed 100 per cent penetration in most countries in the region in the next few years. Some developing countries in the region, including Argentina, Guatemala, and Trinidad and Tobago have not only exceeded the 100 per cent penetration mark but are also ahead of Canada and the United States, the region's most developed economies. Internet use has grown steadily, thanks in part to a proliferation of public access facilities. However, there are a number of areas that merit greater attention, particularly broadband penetration and household access, which is low in the region's developing nations. There are also important gaps between urban and rural areas. Of particular importance is the need to spread training and skills to enhance the awareness of the benefits of ICTs and the ability of people to use them effectively.

A number of regulatory obstacles are currently inhibiting the development of the region's telecommunication services sector, including barriers to convergence. For example, in some countries VoIP is restricted and in others, the regulatory status is unclear. Though the mobile sector has grown impressively, in some countries a number of barriers inhibit competition, the development of new services and greater usage. This includes the persistence of non-cost based termination rates, the lack of mobile number portability and spectrum allocation difficulties. Some of these regulatory challenges might be facilitated by greater inter-regional cooperation and harmonization through the identification of best practice and forward looking models that countries can adapt to their circumstances.

The region has been among the leaders in developing web presence of the public administration. The success of e-government applications needs to be broadened to other sectors such as business, education and health. The region has a clear advantage in the development of online content since English, Spanish, Portuguese and French are all languages that are widely spoken in the region and represented on the Internet globally. This allows application developers and users to leverage on content developed in the Americas, as well as on content available from other regions.

Areas that merit greater attention are broadband penetration and household access, which is low in the region's developing countries

The success of e-government applications needs to be broadened to other sectors such as business, education and health

Summing up, Latin America and the Caribbean has a number of advantages compared to other developing regions. Levels of literacy are relatively high as is the degree of urbanization (lowering the cost of network development). The region can also leverage on similar linguistic and cultural traits. Policy makers need adopt the best policies for promoting ICT development in their countries. If this can be achieved, the region as a whole has significant potential to maximize the benefits of information and communication technology.

The following recommendations may help achieve this goal and increase ICT access and use in the region:

- **Convergence.** The technical ability to provide voice, Internet access and television over different networks – fixed telephone, cable television, mobile cellular – has existed for a number of years. However, the legal ability to do so has not always caught up. Restrictions on the provision of voice using VoIP or television using IPTV inhibits network investment, results in lower broadband penetration, weakens competition and delays the transition to next generation networks. While most countries in the region have liberalized VoIP, they have been slower to accept IPTV. If countries make their laws and institutions convergence-ready, operators have incentives to upgrade networks and users can avail themselves of integrated triple-play services.
- **Regulatory harmonization.** Despite the overall trend towards greater liberalization of ICT markets in the Americas, there are still variations in laws and regulations among countries of the region. Greater regulatory harmonization can help increase investment in the region. The Eastern Caribbean Telecommunication Authority (ECTEL) is a good example of what can be done. ECTEL is the world's first two-tier system of national regulatory agencies combined with a regional regulator. In other words, while each country has its own regulator, major decisions are approved at the regional level by ECTEL such as a recent regulation on interconnection rates.¹ It offers a good model for a harmonized approach, sharing resources and “*ceding sovereignty in the interest of the overall good.*”²
- **Spectrum liberalization.** The Americas has lagged other regions in allocating the spectrum identified for IMT-2000, 2.1 GHz. So far only Brazil, Canada and the United States have awarded spectrum in that band. Although operators have gotten around this by using their existing spectrum to provide 3G service, more spectrum is needed to meet the anticipated growth in mobile broadband services. There are already positive examples in the region with El Salvador and Guatemala heralded for progressive spectrum policies which allow trading. In Guatemala, spectrum owners are granted titles with a term of 15 years during which the spectrum can be leased, sold, subdivided or consolidated. Both El Salvador and Guatemala have allocated more spectrum than average for the region, enhancing competition.³
- **Mobile competition.** Although almost all of the countries in the region have introduced competition in the mobile sector, structural barriers remain. This is true of any industry where barriers to entry are high. Regulators therefore need to remain engaged and adopt appropriate laws and regulations regarding number

Countries need to make their laws and institutions convergence-ready

ECTEL is a good model for greater regulatory harmonization at the regional level

portability, termination rates and virtual network operators. Mobile telephony could also be better incorporated into achieving universal access goals, as has been done in Brazil, where recent spectrum awards require operators to provide specific levels of 3G coverage by certain dates.

- **Application development.** The region is progressing with infrastructure deployment, increasing bandwidth and a growing number of users. In some cases, socially and economically relevant applications have not always followed suit. E-government is one area where the region is doing well. It needs to leverage that experience by encouraging greater business use as well as socially relevant applications in health, education and agriculture. Disaster prevention, particularly important for the region's coastal areas, which are subject to numerous storms, is another area where the use of ICTs can be improved.⁴ In general, countries in the region can leverage on the fact that their languages are widely spoken across the world and that content is available.
- **Training.** The continual technological evolution of ICTs, convergence, spectrum allocation and many other complex issues require clear understanding and the ability to apply objective and forward looking laws and regulations. It is critical that governments allocate adequate resources for training and education for those responsible for overseeing ICT policies. Regional and international organizations can assist through partnerships throughout the region to offer relevant workshops and seminars and provide participation assistance for needy countries.

Countries in the region can leverage on the fact that their languages are widely spoken across the world and that content is available

Endnotes

- 1 ECTEL. “Decision on Interconnection Rates From the 19th Council of Ministers Meeting.” March 31, 2009.
- 2 [http://www.forumsec.org.fj/UserFiles/File/FEMH.08 - Case Study Eastern Caribbean Telecommunications Authority.pdf](http://www.forumsec.org.fj/UserFiles/File/FEMH.08_-_Case_Study_Eastern_Caribbean_Telecommunications_Authority.pdf)
- 3 “The empirical evidence gleaned across the four estimated equations is consistent with the hypothesis that spectrum reforms in Guatemala and El Salvador have resulted both in expanded deployment of radio spectrum and in less concentrated markets... Given that Guatemala and El Salvador have succeeded in having much more bandwidth deployed by operators than in the average Latin American regime (approximately 139 MHz to 90 MHz), competition has been enabled.” Hazlett, Thomas W., Ibarguen, Giancarlo and Leighton, Wayne A., “Property Rights to Radio Spectrum in Guatemala and El Salvador: An Experiment in Liberalization” (March 10, 2006). *George Mason Law & Economics Research Paper* No. 06-07 Available at SSRN: <http://ssrn.com/abstract=889409>.
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Annex 1. List of countries in the Americas

Central	US & Canada
Belize	Canada
Costa Rica	United States
El Salvador	
Guatemala	
Honduras	
Mexico	
Nicaragua	
Panama	
South	Caribbean
Argentina	Antigua & Barbuda
Bolivia	Bahamas
Brazil	Barbados
Chile	Cuba
Colombia	Dominica
Ecuador	Dominican Republic
Guyana	Grenada
Paraguay	Haiti
Peru	Jamaica
Suriname	St. Kitts and Nevis
Uruguay	St. Lucia
Venezuela	St. Vincent and the Grenadines
	Trinidad & Tobago

Note: The Americas in this report refers to the countries served by the ITU Regional Office in Brasilia. Countries are grouped based on the United Nations Statistics Division's composition of regions.

Annex 2. IDI sub-indices (access, use, skills) for countries in the Americas

IDI access sub-index (2002 and 2007)

Country	Rank 2007	Access 2007	Rank 2002	Access 2002	Rank change 2002-2007	Access change 2002-2007
Canada	1	7.43	1	6.34	0	1.09
United States	2	7.20	2	6.21	0	0.99
Argentina	3	5.02	5	2.99	2	2.04
Trinidad & Tobago	4	4.96	7	2.88	3	2.08
Chile	5	4.62	3	3.02	-2	1.61
Uruguay	6	4.37	6	2.95	0	1.41
Jamaica	7	4.17	4	3.01	-3	1.16
Panama	8	4.15	11	2.31	3	1.84
Costa Rica	9	3.75	8	2.67	-1	1.07
Brazil	10	3.64	9	2.58	-1	1.06
Colombia	11	3.60	12	2.06	1	1.53
Venezuela	12	3.45	13	1.96	1	1.49
Ecuador	13	3.31	14	1.96	1	1.35
Mexico	14	3.29	10	2.33	-4	0.96
Peru	15	3.04	19	1.52	4	1.52
Guatemala	16	2.95	16	1.83	0	1.12
Honduras	17	2.88	23	1.11	6	1.77
El Salvador	18	2.84	17	1.59	-1	1.25
Paraguay	19	2.83	15	1.89	-4	0.95
Dominican Rep.	20	2.61	18	1.56	-2	1.05
Nicaragua	21	2.37	24	0.96	3	1.41
Bolivia	22	2.21	20	1.45	-2	0.76
Haiti	23	1.38	22	1.23	-1	0.15
Cuba	24	1.30	21	1.28	-3	0.01

Note: Based on ITU (2009a).

IDI use sub-index (2002 and 2007)

Country	Rank 2007	Use 2007	Rank 2002	Use 2002	Rank change 2002-2007	Use change 2002-2007
United States	1	4.32	2	2.37	1	1.95
Canada	2	4.01	1	2.67	-1	1.34
Jamaica	3	2.04	3	0.78	0	1.25
Chile	4	1.48	4	0.70	0	0.78
Brazil	5	1.41	10	0.33	5	1.08
Costa Rica	6	1.28	5	0.66	-1	0.62
Uruguay	7	1.24	8	0.37	1	0.87
Argentina	8	1.23	7	0.38	-1	0.84
Venezuela	9	1.04	14	0.18	5	0.86
Peru	10	1.02	11	0.31	1	0.72
Colombia	11	1.02	15	0.16	4	0.86
Mexico	12	0.99	6	0.45	-6	0.54
Panama	13	0.98	12	0.31	-1	0.68
Trinidad & Tobago	14	0.95	9	0.36	-5	0.59
Dominican Rep.	15	0.66	13	0.24	-2	0.42
Ecuador	16	0.60	17	0.14	1	0.45
Guatemala	17	0.48	18	0.11	1	0.37
El Salvador	18	0.44	16	0.15	-2	0.29
Cuba	19	0.39	23	0.05	4	0.34
Bolivia	20	0.37	19	0.11	-1	0.26
Haiti	21	0.35	24	0.03	3	0.31
Paraguay	22	0.34	22	0.06	0	0.28
Honduras	23	0.20	20	0.08	-3	0.12
Nicaragua	24	0.14	21	0.06	-3	0.08

Note: Based on ITU (2009a).

IDI skills sub-index (2002 and 2007)

Country	Rank 2007	Skills 2007	Rank 2002	Skills 2002	Rank change 2002-2007	Skills change 2002-2007
Cuba	1	9.26	7	7.03	6	2.23
United States	2	9.13	1	9.07	-1	0.06
Canada	3	8.81	2	8.63	-1	0.18
Uruguay	4	8.17	4	7.87	0	0.31
Argentina	5	8.12	3	8.57	-2	-0.45
Chile	6	7.81	5	7.41	-1	0.40
Venezuela	7	7.72	11	6.62	4	1.10
Peru	8	7.42	6	7.08	-2	0.34
Brazil	9	7.28	9	6.92	0	0.36
Bolivia	10	7.07	8	7.03	-2	0.04
Panama	11	7.02	10	6.84	-1	0.17
Colombia	12	7.00	16	6.22	4	0.78
Costa Rica	13	6.97	18	6.03	5	0.93
Mexico	14	6.90	13	6.35	-1	0.55
Dominican Rep.	15	6.70	14	6.24	-1	0.47
Jamaica	16	6.48	12	6.36	-4	0.12
Paraguay	17	6.26	15	6.22	-2	0.04
Trinidad & Tobago	18	6.22	17	6.04	-1	0.18
Ecuador	19	5.95	19	5.64	0	0.31
El Salvador	20	5.59	20	5.19	0	0.39
Honduras	21	5.25	22	4.18	1	1.07
Nicaragua	22	5.12	21	4.81	-1	0.31
Guatemala	23	4.55	23	4.11	0	0.44
Haiti	24	2.90	24	2.74	0	0.15

Note: Based on ITU (2009a).

Annex 3. Statistical tables

Introduction

Data generally refer to the end of the calendar year indicated in the table *List of economies*.

The following signs and symbols are used in the document:

*	Estimate or refers to years other than those specified
000s	Thousands (e.g, 1'000)
M	Millions (e.g, 1'000'000)
B	Billions (e.g, 1'000'000'000)
US\$	United States dollars. See the <i>Technical notes</i> for how US\$ figures are obtained.
%	Per cent
-	Zero or a quantity less than half the unit shown.
...	Data not available
CAGR	Compound Annual Growth Rate. See the <i>Technical notes</i> for how this is computed.

The absence of any sign or symbol indicates that data are in units.

List of economies

Full designation	Designation in document	Fiscal year
Antigua and Barbuda	Antigua & Barbuda	Beginning 01.04
Argentine Republic	Argentina	Ending 30.09
Bahamas (Commonwealth of the)	Bahamas	Ending 31.12
Barbados	Barbados	Beginning 01.04
Belize	Belize	Beginning 01.04
Bolivia (Republic of)	Bolivia	Ending 31.12
Brazil (Federative Republic of)	Brazil	Ending 31.12
Canada	Canada	Ending 31.12
Chile	Chile	Ending 31.12
Colombia (Republic of)	Colombia	Ending 31.12
Costa Rica	Costa Rica	Ending 31.12
Cuba	Cuba	Ending 31.12
Dominica (Commonwealth of)	Dominica	Beginning 01.04
Dominican Republic	Dominican Rep.	Ending 31.12
Ecuador	Ecuador	Ending 31.12
El Salvador (Republic of)	El Salvador	Ending 31.12
Grenada	Grenada	Ending 31.12
Guatemala (Republic of)	Guatemala	Ending 31.12
Guyana	Guyana	Ending 31.12
Haiti (Republic of)	Haiti	Ending 31.12
Honduras (Republic of)	Honduras	Ending 31.12
Jamaica	Jamaica	Beginning 01.04
Mexico	Mexico	Ending 31.12
Nicaragua	Nicaragua	Ending 31.12
Panama (Republic of)	Panama	Ending 31.12
Paraguay (Republic of)	Paraguay	Ending 31.12
Peru	Peru	Ending 31.12
Saint Kitts and Nevis	St. Kitts and Nevis	Beginning 01.04
Saint Lucia	St. Lucia	Beginning 01.04
Saint Vincent and the Grenadines	St. Vincent and the G.	Beginning 01.04
Suriname (Republic of)	Suriname	Ending 31.12
Trinidad and Tobago	Trinidad & Tobago	Beginning 01.04
United States of America	United States	Ending 31.12
Uruguay (Eastern Republic of)	Uruguay	Ending 31.12
Venezuela (Republic of)	Venezuela	Ending 31.12

1. Main (fixed) telephone lines

		Main (fixed) telephone lines			Main (fixed) telephone lines per 100 inhabitants		
		(000s)		CAGR			CAGR
		2003	2008	2003-2008	2003	2008	2003-2008
1	Antigua & Barbuda	38.0	38.0	-	47.7	45.9	-0.8
2	Argentina	8'603.9	9'631.1	2.3	22.6	24.1	1.3
3	Bahamas	131.9	132.9 *	0.2	41.9	39.6 *	-1.1
4	Barbados	134.0	132.3 *	-0.2	50.0	44.9 *	-2.1
5	Belize	33.3	31.1	-1.3	12.9	10.6	-3.8
6	Bolivia	610.3	678.2 *	2.1	6.9	7.0 *	0.3
7	Brazil	39'205.0	41'141.4	1.0	21.6	21.2	-0.4
8	Canada	20'612.0	18'241.0 *	-2.4	65.2	55.0 *	-3.3
9	Chile	3'252.1	3'526.4	1.6	20.4	21.0	0.6
10	Colombia	7'848.3	6'820.2	-2.8	17.7	14.6	-3.8
11	Costa Rica	1'159.2	1'437.7	4.4	27.8	31.7	2.7
12	Cuba	724.3	1'103.6	8.8	6.5	9.8	8.7
13	Dominica	22.5	15.9 *	-6.7	28.7	22.8 *	-4.5
14	Dominican Rep.	908.8	985.7	1.6	10.5	10.0	-1.1
15	Ecuador	1'530.7	1'910.0	4.5	11.9	14.2	3.5
16	El Salvador	752.6	1'077.2	7.4	11.3	15.5	6.5
17	Grenada	32.6	28.6	-2.6	32.0	27.1	-3.3
18	Guatemala	944.1	1'449.4	9.0	7.9	10.6	6.1
19	Guyana	92.3	135.9 *	8.0	12.3	18.5 *	8.4
20	Haiti	140.0	108.3 *	-5.0	1.7	1.1 *	-8.0
21	Honduras	334.4	825.8	19.8	4.9	11.4	18.6
22	Jamaica	458.7	316.6	-7.1	17.5	11.6	-7.8
23	Mexico	16'330.1	20'538.6	4.7	15.7	19.1	4.0
24	Nicaragua	205.0	312.1 *	8.8	3.9	5.5 *	7.2
25	Panama	381.4	495.8	5.4	12.2	14.6	3.6
26	Paraguay	280.8	363.0	5.3	4.8	5.8	4.0
27	Peru	1'839.2	2'878.2	9.4	6.8	10.2	8.5
28	St. Kitts and Nevis	23.4 *	20.5 *	-2.7	56.2 *	44.3 *	-4.6
29	St. Lucia	51.1 *	40.9	-4.3	32.3 *	24.5	-5.4
30	St. Vincent and the G.	21.2	22.8	1.5	18.0	18.8	0.9
31	Suriname	79.8	82.4 *	0.6	18.0	17.9 *	-0.1
32	Trinidad & Tobago	318.9	307.3 *	-0.7	24.6	23.0 *	-1.4
33	United States	182'933.3	158'436.8 *	-2.8	62.5	51.3 *	-3.9
34	Uruguay	938.2	959.3	0.4	27.5	28.6	0.8
35	Venezuela	2'956.2	6'303.5	16.4	11.5	22.4	14.4
	Americas	293'927.4	280'528.4	-0.9	33.9	30.6	-2.0

Note: For data comparability and coverage, see the technical notes.

* Figures are estimates or refer to years other than those specified.

Source: ITU World Telecommunication/ICT Indicators Database.

2. Mobile cellular subscriptions

	Mobile cellular subscriptions			Mobile cellular subscriptions per 100 inhabitants			
	(000s)		CAGR (%)			CAGR (%)	
	2003	2008	2003-2008	2003	2008	2003-2008	
1	Antigua & Barbuda	46.1	136.6	24.3	57.9	165.0	23.3
2	Argentina	7'842.2	46'508.8	42.8	20.6	116.5	41.4
3	Bahamas	122.2	358.1	24.0	38.9	106.8	22.4
4	Barbados	140.0	313.6 *	17.5	52.2	106.4 *	15.3
5	Belize	60.4	160.0	21.5	23.3	54.5	18.5
6	Bolivia	1'278.8	4'830.0	30.4	14.5	49.8	28.0
7	Brazil	46'373.3	150'641.4	26.6	25.6	77.6	24.9
8	Canada	13'291.0	21'455.2	10.1	42.0	64.7	9.0
9	Chile	7'268.3	14'796.6	15.3	45.6	88.1	14.1
10	Colombia	6'186.2	41'364.8	46.2	14.0	88.5	44.6
11	Costa Rica	778.3	1'886.6	19.4	18.6	41.6	17.4
12	Cuba	35.4	331.7	56.5	0.3	2.9	56.4
13	Dominica	23.8	89.5 *	30.4	30.4	128.6 *	33.5
14	Dominican Rep.	2'091.9	7'210.5	28.1	24.2	72.8	24.6
15	Ecuador	2'398.2	11'595.1	37.1	18.7	86.0	35.7
16	El Salvador	1'149.8	6'950.7	43.3	17.3	100.0	42.0
17	Grenada	42.3	60.0	7.3	41.5	56.9	6.5
18	Guatemala	2'034.8	14'948.6	49.0	17.0	109.2	45.1
19	Guyana	138.0	328.0 *	18.9	18.4	44.6 *	19.3
20	Haiti	320.0	3'200.0	58.5	3.9	32.8	53.4
21	Honduras	379.4	6'210.7	74.9	5.5	85.7	73.2
22	Jamaica	1'576.4	2'723.3	11.6	60.0	99.8	10.7
23	Mexico	30'097.7	75'303.5	20.1	28.8	69.9	19.3
24	Nicaragua	466.7	3'038.9	45.5	8.9	53.5	43.3
25	Panama	692.4	3'804.7	40.6	22.2	111.9	38.2
26	Paraguay	1'770.3	5'790.8	26.7	30.1	92.8	25.2
27	Peru	2'930.3	20'951.8	48.2	10.8	74.2	47.1
28	St. Kitts and Nevis	7.5 *	74.1 *	58.1	18.0 *	160.7 *	54.9
29	St. Lucia	53.7 *	169.6	25.9	33.9 *	101.7	24.6
30	St. Vincent and the G.	62.9	130.1	15.6	53.4	107.5	15.0
31	Suriname	168.5	350.0 *	15.7	38.0	76.0 *	14.9
32	Trinidad & Tobago	336.4	1'509.8 *	35.0	25.9	112.8 *	34.2
33	United States	160'637.0	270'500.0	11.0	54.9	87.6	9.8
34	Uruguay	497.5	3'507.8	47.8	14.6	104.7	48.4
35	Venezuela	7'015.1	27'083.8	31.0	27.2	96.3	28.8
Americas		298'312.7	748'314.7	24.3	29.1	81.8	16.9

Note: For data comparability and coverage, see the technical notes.

* Figures are estimates or refer to years other than those specified.

Source: ITU World Telecommunication/ICT Indicators Database.

2. Mobile cellular subscriptions (continuation)

		Mobile cellular subscriptions			Mobile broadband subscriptions		
		Prepaid subscriptions (%)	Population coverage (%)	As % of total telephone subscribers	(000s)		Per 100 inhabitants
					2008	2008	
		2008	2007	2008	2003	2008	2008
1	Antigua & Barbuda	75.7	100.0	78.2	-	-	-
2	Argentina	89.6	94.1	82.8	-	745.8	1.9
3	Bahamas	90.7	100.0	73.8*	-	26.7	8.0
4	Barbados	53.3 *	99.9 *	60.5*	-	-	-
5	Belize	97.7	...	83.7	-	6.3	2.2
6	Bolivia	95.5 *	45.9	82.8*	-	9.1	0.1
7	Brazil	81.5	90.6	78.5	-	2'818.3	1.5
8	Canada	20.9	98.0 *	52.6*	-	1'517.4	4.6
9	Chile	72.7	100.0	80.8	-	228.4	1.4
10	Colombia	86.3	83.0	85.8	-	3'926.2	8.4
11	Costa Rica	-	87.0 *	56.8	-	-	-
12	Cuba	91.5	77.2 *	23.1	-	-	-
13	Dominica	92.9 *	...	66.6*	-	-	-
14	Dominican Rep.	86.7	90.0 *	88.0	-	61.3	0.6
15	Ecuador	87.1	84.0	85.9	-	15.6	0.1
16	El Salvador	90.5	95.0 *	86.6	-	48.5	0.7
17	Grenada	86.0	...	67.7	-	-	-
18	Guatemala	94.7	76.0 *	91.2	-	90.2	0.7
19	Guyana	96.8 *	95.0	71.9*	-	-	-
20	Haiti	100.0 *	...	95.8*	-	-	-
21	Honduras	96.1	89.9 *	88.3	-	50.5	0.7
22	Jamaica	96.9	95.0 *	89.6	-	25.3	0.9
23	Mexico	91.8	99.9	78.6	-	325.9	0.3
24	Nicaragua	94.8	70.0	88.1*	-	23.5	0.4
25	Panama	93.0	81.2	88.5	-	-	-
26	Paraguay	80.0	...	94.1	-	19.7	0.3
27	Peru	89.0	92.0	87.9	-	-	-
28	St. Kitts and Nevis	...	...	28.6*	-	-	-
29	St. Lucia	88.4	80.0 *	80.6	-	-	-
30	St. Vincent and the G.	96.9	100.0	85.1	-	-	-
31	Suriname	92.4 *	...	79.7*	-	-	-
32	Trinidad & Tobago	90.8 *	100.0	83.1*	-	184.6	13.8
33	United States	17.0 *	99.8 *	62.4*	10.22	81'899.7	26.5
34	Uruguay	76.8	100.0	78.5	-	46.9	1.4
35	Venezuela	94.3	90.0	81.1	-	233.1	0.8
	Americas	59.8	94.1	72.4	10.22	92'302.9	10.1

Note: For data comparability and coverage, see the technical notes.

* Figures are estimates or refer to years other than those specified.

Source: ITU World Telecommunication/ICT Indicators Database.

3. Internet users

	Internet users			Internet users per 100 inhabitants		
	(000s)		CAGR (%)			CAGR (%)
	2003	2008	2003-2008	2003	2008	2003-2008
1 Antigua & Barbuda	14.0	65.0	35.9	17.6	78.5	34.9
2 Argentina	4'530.0	11'212.2	19.9	11.9	28.1	18.7
3 Bahamas	84.0	142.0	11.1	26.7	42.4	9.7
4 Barbados	100.0	160.0 *	9.9	37.3	54.3 *	7.8
5 Belize	...	60.0 *	...	...	20.4 *	...
6 Bolivia	310.0	1'000.0 *	26.4	3.5	10.3 *	24.1
7 Brazil	23'976.7	67'510.4 *	23.0	13.2	34.8 *	21.3
8 Canada	20'247.3	23'999.5 *	3.5	64.0	72.4 *	2.5
9 Chile	3'239.8	5'456.5	11.0	20.3	32.5	9.8
10 Colombia	3'084.2	17'117.0	40.9	7.0	36.6	39.3
11 Costa Rica	850.0	1'500.0 *	12.0	20.4	33.1 *	10.2
12 Cuba	585.0	1'450.0	19.9	5.2	12.9	19.8
13 Dominica	16.0	22.0 *	6.6	20.4	31.6 *	9.1
14 Dominican Rep.	730.8	2'562.6	28.5	8.5	25.9	25.1
15 Ecuador	569.7	1'309.6	18.1	4.4	9.7	17.0
16 El Salvador	550.0	975.0 *	12.1	8.3	14.0 *	11.1
17 Grenada	19.0	27.0 *	7.3	18.6	25.6 *	6.5
18 Guatemala	550.0	1'320.0 *	19.1	4.6	9.6 *	16.0
19 Guyana	140.0	150.0 *	1.4	18.7	20.4 *	1.7
20 Haiti	150.0	1'000.0 *	46.1	1.8	10.3 *	41.5
21 Honduras	185.5	658.5	28.8	2.7	9.1	27.6
22 Jamaica	800.0	1'540.0	14.0	30.5	56.4	13.1
23 Mexico	15'375.3	23'260.3	8.6	14.7	21.6	7.9
24 Nicaragua	100.0	600.0 *	43.1	1.9	10.6 *	41.0
25 Panama	311.6	778.8 *	20.1	10.0	22.9 *	18.1
26 Paraguay	120.0	600.0 *	38.0	2.0	9.6 *	36.3
27 Peru	2'850.0	7'128.3 *	20.1	10.5	25.3 *	19.2
28 St. Kitts and Nevis	11.0	35.0 *	26.0	26.4	75.9 *	23.5
29 St. Lucia	34.0	100.0	24.1	21.5	60.0	22.8
30 St. Vincent and the G.	7.0	66.0	56.6	5.9	54.5	55.8
31 Suriname	23.0	50.0 *	16.8	5.2	10.9 *	15.9
32 Trinidad & Tobago	153.0	220.0	7.5	11.8	16.4	6.9
33 United States	183'195.7	220'000.0	3.7	62.6	71.2	2.6
34 Uruguay	530.0	1'340.0	20.4	15.5	40.0	20.8
35 Venezuela	1'934.8	7'167.4	29.9	7.5	25.5	27.7
Americas	265'377.4	400'583.1	8.6	30.7	43.7	7.3

Note: For data comparability and coverage, see the technical notes.

* Figures are estimates or refer to years other than those specified.

Source: ITU World Telecommunication/ICT Indicators Database.

4. International Internet bandwidth

		International Internet bandwidth					
		Mbps		CAGR (%)	Bits/s per Internet user		CAGR (%)
		2003	2008	2003-2008	2003	2008	2003-2008
1	Antigua & Barbuda	290.0	3'250.0	83.0	20'714	50'000	24.6
2	Argentina	7'358.0	91'633.0 *	87.9	1'624	8'173 *	49.8
3	Bahamas	90.0	510.0	54.3	1'071	3'592	35.3
4	Barbados	...	519.0 *	...	...	3'244 *	...
5	Belize	46.0	490.0	80.7	...	8'167	...
6	Bolivia	175.5	398.0 *	22.7	566	398 *	-8.4
7	Brazil	18'511.0	199'500.0 *	81.2	772	2'955 *	39.9
8	Canada	172'529.0	533'983.0 *	32.6	8'521	22'250 *	27.1
9	Chile	6'103.0	67'813.0 *	82.6	1'884	12'428 *	60.3
10	Colombia	3'818.0	100'523.0	126.5	1'238	5'873	47.6
11	Costa Rica	1'020.0	3'875.0	39.6	1'200	2'583	21.1
12	Cuba	87.0	302.0	36.5	149	208	8.8
13	Dominica	17.0	...	...	1'063	...	...
14	Dominican Rep.	51.8	14'000.0	305.5	71	5'463	196.3
15	Ecuador	483.0	11'664.0	121.7	848	8'907	80.0
16	El Salvador	82.0	200.0	25.0	149	205	8.3
17	Grenada	...	...	...	...	...	...
18	Guatemala	700.0	2'490.0 *	37.3	1'273	1'886 *	10.3
19	Guyana	28.0	...	...	200	...	...
20	Haiti	82.0	...	...	547	...	...
21	Honduras	22.0	1'731.0 *	197.8	119	2'629 *	117.0
22	Jamaica	2'000.0	2'000.0 *	-	2'500	1'299 *	-15.1
23	Mexico	9'088.0	30'275.0	35.1	591	1'302	22
24	Nicaragua	6.0	806.0 *	240.4	60	1'343 *	117.5
25	Panama	621.5	53'374.0 *	204.4	1'995	68'532 *	142.1
26	Paraguay	100.0	1'119.0	82.9	833	1'865	22.3
27	Peru	1'840.0	75'428.0	153.0	646	10'581	101.2
28	St. Kitts and Nevis	2.0	...	...	180	...	...
29	St. Lucia	...	...	...	...	...	...
30	St. Vincent and the G.	3.0	30'000.0	900.0	429	454'545	470.7
31	Suriname	45.0	...	...	1'957	...	...
32	Trinidad & Tobago	96.0	900.0 *	75.0	627	4'091 *	59.8
33	United States	708'599.0	3'401'410.0 *	48.0	3'868	15'461 *	41.4
34	Uruguay	436.2	3'003.0 *	62.0	823	2'241 *	28.5
35	Venezuela	747.0	17'253.0 *	119.2	386	2'407 *	58.0
Americas		935'077.0	4'648'449.0	37.8	3'526	11'642	27.0

Note: For data comparability and coverage, see the technical notes.

* Figures are estimates or refer to years other than those specified.

Source: ITU World Telecommunication/ICT Indicators Database.

5. Fixed broadband Internet subscribers

	Fixed broadband Internet subscribers			Fixed broadband Internet subscribers per 100 inhabitants		
	(000s)		CAGR (%)			CAGR (%)
	2003	2008	2003-2008	2003	2008	2003-2008
1 Antigua & Barbuda	-	12.6	...	...	15.2	...
2 Argentina	258.8	3'185.3	65.2	0.7	8.0	63.6
3 Bahamas	10.9	34.0	25.5	3.5	10.2	23.9
4 Barbados	27.3	...	...	10.2	...	...
5 Belize	0.9	7.7	52.3	0.4	2.6	48.5
6 Bolivia	5.7	34.0 *	42.7	0.1	0.4 *	40.1
7 Brazil	966.3	10'098.0	59.9	0.5	5.2	57.7
8 Canada	4'513.0	9'633.3	16.4	14.3	29.0	15.3
9 Chile	352.2	1'426.4	32.3	2.2	8.5	30.9
10 Colombia	64.4	1'902.8	96.8	0.1	4.1	94.6
11 Costa Rica	14.9	176.1	63.9	0.4	3.9	61.2
12 Cuba	-	1.9 *	...	...	-	...
13 Dominica	2.7	...	...	3.4	...	...
14 Dominican Rep.	15.0	226.0	72.0	0.2	2.3	67.4
15 Ecuador	6.9	35.2	38.4	0.1	0.3	37.1
16 El Salvador	19.6	123.5	44.5	0.3	1.8	43.2
17 Grenada	0.6	10.1	76.8	0.6	9.6	75.6
18 Guatemala	-	...	...	...	...	...
19 Guyana	-	...	...	...	...	...
20 Haiti	-	...	...	...	...	...
21 Honduras	-	...	...	...	...	...
22 Jamaica	9.0	97.7	61.1	0.3	3.6	59.9
23 Mexico	428.4	7'604.6	77.8	0.4	7.1	76.6
24 Nicaragua	4.4	...	...	0.1	...	...
25 Panama	15.0	157.5	60.0	0.5	4.6	57.2
26 Paraguay	0.5	93.7	184.8	-	1.5	...
27 Peru	93.9	725.6	50.5	0.3	2.6	49.4
28 St. Kitts and Nevis	...	...	...	...	...	...
29 St. Lucia	...	14.0	...	...	8.4	...
30 St. Vincent and the G.	1.1	9.4	52.2	1.0	7.7	51.4
31 Suriname	0.2	...	...	-	...	...
32 Trinidad & Tobago	0.9	35.5 *	109.3	0.1	2.7 *	108.0
33 United States	27'744.3	79'014.1	23.3	9.5	25.6	22.0
34 Uruguay	-	287.7	...	...	8.6	...
35 Venezuela	117.0	1'096.5	56.4	0.5	3.9	53.8
Americas	34'674.1	116'043.2	27.4	4.0	13.2	26.0

Note: For data comparability and coverage, see the technical notes.

* Figures are estimates or refer to years other than those specified.

Source: ITU World Telecommunication/ICT Indicators Database.

6. Households with access to computers and the Internet

	Proportion of households with computer			Proportion of households with Internet		
	2002	2007	CAGR (%)	2002	2007	CAGR (%)
1 Antigua & Barbuda	...	...	...	...	...	...
2 Argentina	27.0	36.4 *	6.2	14.0	27.5 *	14.5
3 Bahamas	...	...	...	...	...	...
4 Barbados	...	...	...	...	...	...
5 Belize	...	...	...	...	...	...
6 Bolivia	7.1 *	18.0 *	20.5	1.8	5.9	26.9
7 Brazil	14.2	20.8 *	8.0	10.3	15.4 *	8.4
8 Canada	64.0	79.1 *	4.3	54.5	72.1 *	5.8
9 Chile	20.5	36.4	12.2	11.0	22.1	15.0
10 Colombia	10.0	27.4 *	22.3	5.6	8.0 *	7.4
11 Costa Rica	20.0	31.6 *	9.6	7.3	11.8	10.2
12 Cuba	0.5 *	2.3	35.7	-	1.8	...
13 Dominica	...	...	...	...	...	...
14 Dominican Rep.	5.5	12.5	18.1	2.8	5.7	15.2
15 Ecuador	17.5 *	18.0	0.6	2.0 *	6.8	27.4
16 El Salvador	5.2 *	8.6 *	10.7	2.3 *	3.6 *	9.4
17 Grenada	...	...	...	...	...	...
18 Guatemala	5.9 *	13.6 *	18.3	0.6	1.8	25.2
19 Guyana	...	...	...	...	...	...
20 Haiti	0.3 *	4.0 *	68.7	-	1.8 *	...
21 Honduras	4.2	10.1 *	19.4	-	3.3	...
22 Jamaica	13.0	17.2 *	5.8	7.7	12.7 *	10.6
23 Mexico	15.2	22.1	7.8	7.5	12.0	9.9
24 Nicaragua	2.2	7.8 *	28.8	0.6 *	3.6 *	43.4
25 Panama	9.8 *	16.9	11.4	5.8 *	8.9 *	9.0
26 Paraguay	5.4	10.4 *	14.1	1.7	4.0 *	18.5
27 Peru	4.3	13.8 *	26.3	0.8 *	5.6	47.6
28 St. Kitts and Nevis	...	...	...	...	...	...
29 St. Lucia	...	...	...	...	...	...
30 St. Vincent and the G.	...	...	...	...	...	...
31 Suriname	...	...	...	...	...	...
32 Trinidad & Tobago	17.0	43.6	20.7	15.5 *	18.0 *	3.1
33 United States	59.0	70.2 *	3.5	52.0	61.7	3.5
34 Uruguay	17.6	27.0 *	8.9	13.6	13.5 *	-0.1
35 Venezuela	5.1	11.9 *	18.4	2.0	3.0 *	8.6
Americas	35.5	44.7	4.7	29.8	36.3	4.0

Note: For data comparability and coverage, see the technical notes.

* Figures are estimates or refer to years other than those specified.

Source: ITU World Telecommunication/ICT Indicators Database.

Technical Notes

General methodology

The compound annual growth rate (CAGR) is computed by the formula:

$$[(P_v / P_0)^{(1/n)}] - 1$$

where P_v = Present value
 P_0 = Beginning value
 n = Number of periods

The result is multiplied by 100 to obtain a percentage.

Regional aggregates are either *totals* or weighted *averages* depending on the indicator. For example, for main (fixed) telephone lines, the total number of *main (fixed) telephone lines* is shown, while for *main (fixed) lines per 100 inhabitants* the weighted average is shown. Growth rates generally refer to countries for which data are available for both years.

1. Main (fixed) telephone lines

Main (fixed) telephone lines refer to telephone lines connecting a customer's equipment (e.g., telephone set, facsimile machine) to the Public Switched Telephone Network (PSTN) and which have a dedicated port on a telephone exchange. Note that for most countries, main (fixed) lines also include public payphones. Many countries also include ISDN channels in main (fixed) lines (see below ISDN and ADSL). *Main (fixed) telephone lines per 100 inhabitants* is calculated by dividing the number of main (fixed) lines by the population and multiplying by 100.

2. Mobile cellular subscriptions

Mobile cellular subscriptions refers to users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology that provides access to the PSTN. *Per 100 inhabitants* is obtained by dividing the number of mobile cellular subscriptions by the population and multiplying by 100. *Prepaid subscriptions* refers to the percentage of mobile cellular subscriptions using prepaid cards. *Population coverage* measures the percentage of inhabitants that are within range of a mobile cellular signal whether or not they are subscribers. This is calculated by dividing the number of inhabitants within range of a mobile cellular signal by the total population and multiplying by 100. *Mobile broadband subscriptions* refers to the number of subscriptions to mobile cellular networks with access to data communications (e.g. the Internet) at broadband speeds (greater than or equal to 256 kbit/s in one or both directions) such as WCDMA, HSDPA, CDMA2000 1xEV-DO, CDMA 2000 1xEV-DV etc. *Per 100 inhabitants* is obtained by dividing the number of mobile broadband subscriptions by the population and multiplying by 100.

3. Internet users

Internet users is based on nationally reported data. In some cases, surveys have been carried out that give a more precise figure for the number of Internet users. However, surveys differ across countries in the age and frequency of use they cover. The reported figure for Internet users – which may refer to only users above a certain age – is divided by the total population and multiplied by 100 to obtain *Internet users per 100 inhabitants*. Countries that do not have surveys generally base their estimates on derivations from reported Internet Service Provider subscriber counts, calculated by multiplying the number of subscribers by a multiplier.

4. International Internet bandwidth

International Internet bandwidth refers to the amount of international Internet bandwidth measured in Mega Bits Per Second (Mbps). Data for Internet bandwidth originate from ITU's annual questionnaire supplemented with data from TeleGeography. *Bits/s per Internet user* is calculated by dividing the international Internet bandwidth (in bits/s) by the number of Internet users.

5. Fixed broadband Internet subscribers

Fixed broadband Internet subscribers refers to subscribers who pay for high-speed access to the public Internet (a TCP/IP connection) at speeds equal to, or greater than, 256 kbps in one or both directions. It includes the sum of DSL, cable modem and other fixed broadband subscribers. *Fixed broadband Internet subscribers per 100 inhabitants* is calculated by dividing the number of fixed broadband Internet subscribers by the population of the country and by multiplying by 100.

6. Households with access to computers and the Internet

This table shows the latest available data for households with access to computers and the Internet. Data are collected from National Statistical Offices and usually originate from national (household and individual) surveys.

For a more detailed description of the indicators, including definitions and methodological notes, please consult the *Core ICT Indicators* publication, available for free on the ITU ICT Statistics website (http://www.itu.int/ITU-D/ict/partnership/material/CoreICTIndicators_e_rev2.pdf).



Printed in Switzerland
Geneva, 2009