
**LATIN AMERICA FACES MANY OBSTACLES IN
RESPONDING TO THE INFORMATION REVOLUTION:
SOME NATIONS WILL RISE TO THE CHALLENGE,
OTHERS WILL NOT**

**TODAY MOST LATIN AMERICAN NATIONS ARE
“ALSO-RANS” IN THE INFORMATION REVOLUTION,
AS THEY ARE IN THE GLOBAL ECONOMY**

Latin America's prospects in the information revolution are closely linked to its performance in the emerging global economy. Its major difficulties are the same in both cases:¹

- The intrusive role of many Latin American governments in their economies and the often dominating roles of large incumbent, and sometimes protected, local firms
- The sometimes volatile nature of Latin America's financial connections to the richer countries of the world, especially the United States²
- The need to train and retain skilled people in Latin America.

In recent years, even decades, Latin America has had problems in all these areas. As a result:

- Latin America is something of an “also-ran” in the global economy, with an average GDP per capita only 31 percent of the Organisation for Economic Cooperation and Development (OECD) average in 1999 and a GDP per capita annual growth rate roughly one-third of the OECD average over the 1975–1999 period.³ In the increasingly important area of high-tech exports,

Latin America lags well behind North America, Europe, and Asia.⁴

- The Internet and other aspects of the information revolution have come late to Latin America. In 2000, Latin America had roughly 15 million Internet users, compared with 160 million in North America, 105 million in Europe, and 90 million in the Asia-Pacific region; only Africa (3.1 million) and the Middle East (2.4 million) had fewer users.⁵ Latin America had only 30 Internet users per 1,000 people that year, compared with more than 700 users per 1,000 people in North America and more than 500 users per 1,000 in Europe.⁶ The situation is similar for Internet hosts, where Latin America had 5.6 per 1,000 people in 2000, compared with more than 170 per 1,000 in North America; telephone landlines, where Latin America had 130 per 1,000 people in 2000 compared with more than 650 per 1,000 in North America; and cell phones, where Latin America had 80 per 1,000 people in 2000 compared with nearly 300 per 1,000 in North America.^{7,8} Finally, Latin America's intercontinental Internet links totaled less than 3 Gbps in 2000, compared with more than 83 Gbps for North America, about 60 Gbps for Europe, and about 20 Gbps for Asia.⁹
- E-commerce is in its early stages in Latin America. In 2001, only an estimated 2 percent of Latin American business was transacted electronically (compared with 6 percent in North America). Latin America had 4 percent of the global e-commerce market in 2001, compared with 63 percent for North America, 17 percent for Europe, and 15 percent for Asia.¹⁰

Today, it is clear that Latin America is an also-ran in the information revolution.

LATIN AMERICAN NATIONS CAN BE DIVIDED INTO "LEADERS," "SUCCESSFUL OUTLIERS," AND THE REST

Insofar as the information revolution is concerned, Latin American nations can be divided today into "leaders," "successful outliers," and the rest.

Argentina, Brazil, Chile, Mexico, and Uruguay Have Been Latin America's Leaders in the Information Revolution in Recent Years

In recent years, Argentina, Brazil, Chile, Mexico, and Uruguay have led Latin America in most measures of IT penetration and usage and in IT-related business and financial developments. Argentina has many young entrepreneurs who are computer proficient,¹¹ opened up all areas of its telecommunications market to an unlimited number of licensees in November 2000, and, prior to its recent financial difficulties, appeared to be developing indigenous venture capital.¹² Brazil leads the rest of Latin America in electronic banking¹³ and in e-commerce in general;¹⁴ has led in attracting foreign venture capital; appears to be leading, although still in the early stages, in developing indigenous venture capital; and has developed a number of university-related IT business incubator programs.¹⁵

Chile has the most competitive telecommunications market in Latin America, followed by Uruguay, Brazil, and Argentina.¹⁶ Chile has taken the lead in protecting IT-related intellectual property rights and has a secondary school *Enlaces* (links) program that will eventually introduce more IT-interested students into the already successful higher education system.¹⁷ Uruguay has a growing indigenous software industry, exploiting its educated workforce.¹⁸

Mexico is a somewhat special case in Latin America because of its connections to the United States. It has developed two IT-related “clusters”—one at the Monterrey Technical Institute, which has 27 branch campuses and an innovative virtual learning program, and one at “Silicon Valle,” where IT startups are beginning to thrive.¹⁹

Mexico also has one important “pull” factor that is unique. The just-in-time inventory needs of the *maquiladoras* on its northern border—processing operations, mostly in consumer electronics, whose inputs can be imported duty free provided all the products are exported—provide a powerful incentive to use IT.²⁰

These five nations have in recent years provided IT-related leadership examples to the rest of Latin America. Of these nations, Mexico and Chile continue to do well today, whereas Argentina, Uruguay, and Brazil have recently suffered financial difficulties—in Argentina's

case, grave difficulties—that put future economic development in jeopardy.²¹

A Few Latin American Nations Are “Successful Outliers” Regarding the Information Revolution

Several of the mostly small island states in the Caribbean—including the Cayman Islands, the Bahamas, St. Barts, Aruba, the British Virgin Islands, and the U.S. Virgin Islands—are “successful outliers” compared with the rest of Latin America insofar as the information revolution is concerned. They have per capita incomes among the highest in Latin America and are much further along in IT penetration and use. These outliers share several preconditions: their governments are founded on trust and transparency; and they have a well-established rule of law, high literacy rates, economic cultures in which business can prosper, populations fluent in English, and, perhaps most important, political stability.²²

In Central America, Costa Rica is an IT outlier. Intel has based an assembly plant there, which has had a major impact on Costa Rican employment and growth. In attracting Intel, Costa Rica had advantages similar to the Caribbean islands: a good rule of law; a population that mostly has a “working” knowledge of English;²³ a program to wire every school in the country, so that much of the younger population will soon become computer and Internet savvy; and a sizable number of trained engineers available to work in the Intel plant or in supporting industries. Moreover, Costa Rica has a business school, INCAE, founded with help from the Harvard Business School. Costa Rica has, in effect, created an IT *maquiladora*.²⁴

Even though they are doing well themselves in the information revolution, because they are small and removed geographically from the mainstream of Latin America, Costa Rica and these Caribbean nations do not provide leadership examples to the rest of Latin America; they are information revolution outliers, not leaders.

The Rest of the Latin American Nations Are Following Along Behind—Sometimes Way Behind

The rest of the Latin American nations lag behind these leaders and successful outliers, often way behind. These other nations have lower numbers of Internet users and Internet hosts (relative to their populations), sometimes far lower, and limited international Internet bandwidth.²⁵ The situation is particularly dire for the nations on the Andean ridge (e.g., Bolivia, Ecuador, Peru), those torn by internal guerrilla conflicts (e.g., Colombia), and impoverished island nations of the Caribbean (e.g., Haiti).

LATIN AMERICA FACES MANY OBSTACLES IN EXPLOITING OPPORTUNITIES OFFERED BY THE INFORMATION REVOLUTION

These obstacles include the following:²⁶

- A government role in the economy that today appears to be more of an impediment than an advantage in many Latin American nations.²⁷
- Privileged positions for large, old-economy firms that often impede the development of markets by new IT-related firms.
- A financial system in many Latin American nations that is not conducive to IT-related startups.²⁸
- Difficulties in paying for e-commerce purchases (due to lack of credit cards in many Latin American nations) and delivering purchased goods (due to lack of trusted delivery infrastructures).²⁹
- Shortages of skilled people required to produce, operate, and use IT in many Latin American nations, and to perform knowledge work in general, because of deficiencies in the educational systems³⁰ and “brain drain” losses, primarily to North America.³¹
- As a result of these brain-drain losses, competition from Miami-based companies for the Spanish language–content Internet market.³²

- A pronounced digital divide, even in the leading Latin American nations, due partially to income disparities and to deficient electric and telecommunications infrastructures in rural areas.³³
- A propensity for frequent financial crises, associated with instabilities in international capital flows into and out of Latin America.^{34,35}

All in all, the business and social climate in Latin America is much less hospitable to the information revolution than in North America or Europe, or in many parts of Asia.

WHAT DOES THE FUTURE HOLD FOR LATIN AMERICA? PROBABLY MORE OF THE SAME

Although the numbers of Internet end users and host computers are growing faster in Latin America than the world averages, the gap between this region and the world's IT leaders is, in the view of experts, not likely to close.³⁶

However, in the leading Latin American nations, the Internet appears poised to accelerate economic development but at the price of greater income disparities.³⁷ Mexico and Chile should continue to do well in the information revolution; so may many of the currently successful outliers (e.g., Costa Rica and some of the Caribbean nations)—assuming that all these nations avoid financial crises.³⁸

Argentina has been devastated, not only economically but also socially, by its current financial crisis. It could be many years before it recovers. Until then, progress in the information revolution (or in other areas of economic development) is unlikely.³⁹

Brazil and Uruguay are also undergoing financial difficulties today, albeit mild compared with those that in Argentina. How these difficulties are resolved will have much to do with determining how these two nations fare over the next few years insofar as the information revolution is concerned.⁴⁰

The rest of the Latin American nations will most likely continue to follow on behind, as they are doing today—some of them well behind.

In all these nations, the presence or absence of individuals in key public- and private-sector positions who network together to push the information revolution forward—termed “information revolutionaries” by one expert—will be an important shaper of a country’s IT future.⁴¹

NOTES

¹The chapter draws heavily on the views expressed during RAND’s November 2000 conference on the information revolution in Latin America. (See Treverton and Mizell, 2001.)

²In the past decade, Latin America’s connections to capital from outside the region has been quite problematic because Latin America has been at the mercy of external financial developments, leading to financial crises in Mexico in 1994–1995; in Argentina beginning in the late 1990s, continuing today, and spreading to Uruguay; and, most recently, in Brazil. (See *The Economist*, 2002d, for a recent assessment of this situation.)

³In 1999, the OECD nations had an average GDP per capita of \$22,000, while the value for Latin America and the Caribbean was \$6,880. Over the 1975–1999 period, the GDP per capita annual growth rate was 2.0 percent in the OECD nations and only 0.6 percent in Latin America. (See UNDP, 2001, p. 181.)

⁴In 1998–1999, only three Latin American nations were in the top 30 leading exporters of high-tech products: Mexico (11th, \$38 billion), Brazil (27th, \$4 billion), and Costa Rica (30th, \$3 billion). Mexico was well behind the high-tech export leader that year—the United States, with \$206 billion. (See UNDP, 2001, p. 42.)

⁵See Treverton and Mizell (2001), p. 7.

⁶See Treverton and Mizell (2001), p. xiii.

⁷See UNDP (2001), pp. 60–63.

⁸These average numbers mask large variations across Latin America. For example, Bolivia and Ecuador both had 0.3 Internet hosts per 1,000 people in 2000, and Uruguay had 19.6; Paraguay had 55 telephone landlines per 1,000 people in 1999, and Uruguay had 271; and Ecuador had 31 cell phones per 1,000 people in 1999, and Venezuela had 143. (See UNDP, 2001, pp. 60–63.)

⁹See Treverton and Mizell (2001), p. 10.

¹⁰See Oakes (2002).

¹¹Many of these young Argentinean entrepreneurs are of immigrant origin, although not first generation. (See Treverton and Mizell, 2001, p. 45.)

¹²See Treverton and Mizell (2001), pp. 28–29.

¹³See Lipschultz (2001).

¹⁴See Treverton and Mizell (2001), p. 35.

¹⁵See Treverton and Mizell (2001), pp. xix, 22, 28, 44.

¹⁶See Treverton and Mizell (2001), p. 28.

¹⁷In 1992, Catholic University in Chile began a project to develop and evaluate an elementary school network called *Enlaces*. The project aimed to enhance efficiency, quality, and equity in education and to “integrate the children into the culture.” By the end of 2000, 100 percent of Chilean middle and high schools and 50 percent of grammar schools had Internet-connected labs. *Enlaces* is comprehensive in that it covers curriculum development and teacher training and collaboration as well as hardware and software. It was intended from the beginning to cover the entire nation, and, as such, different universities are responsible for different regions of the nation. (See Treverton and Mizell, 2001, pp. 12–13.)

¹⁸See Treverton and Mizell (2001), p. 29.

¹⁹See Treverton and Mizell (2001). The 125 firms in Silicon *Valle* are all foreign owned—four-fifths American and the rest Asian.

²⁰Foreign direct investment in Mexico, much of it focused on these *maquiladoras*, has grown from \$4 billion to \$13 billion annually since NAFTA, the North American Free Trade Agreement, came into effect in 1995. (See Treverton and Mizell, 2001, p. xviii.)

²¹We return to these financial difficulties later in this chapter.

²²It should be noted, however, that these countries’ IT advances were driven by the needs of their commerce—tourism and banking (including in some cases, unfortunately, money laundering)—not the other way around. The existing electronic infrastructure associated with these industries made it easier for them to incorporate new information technologies. (See Treverton and Mizell, 2001, p. 30.)

²³To attract Intel, Costa Rica took the politically risky step of committing to teach English in its primary schools. (See Treverton and Mizell 2001, p. 31.)

²⁴See Treverton and Mizell (2001), p. 31.

²⁵ See UNDP (2001), pp. 60–63, and Treverton and Mizell (2001), pp. 5–14, for quantitative Internet-related data on all the Latin American nations.

²⁶These are discussed in more detail in Treverton and Mizell (2001).

²⁷See Treverton and Mizell (2001), pp. xix–xx, 33–37, for further discussion of this issue.

²⁸Many of the IT-related startups currently conducting business in Latin America were organized and financed outside of the region. Others serve the region from external locations (e.g., Miami). (See Treverton and Mizell, 2001, p. xvii.)

²⁹For these reasons, business-to-business e-commerce may have a more promising future than business-to-consumer e-commerce in many Latin America nations today. (See Treverton and Mizell, 2001.)

³⁰Education is a primary obstacle to exploiting IT-related opportunities in many Latin American nations. Dropout rates are high, repeat rates in primary school are very high, teaching materials are outdated, and the worst teachers are in the primary schools. At the university level, teachers are ill paid, and so moonlighting and part-time teaching are the norm. Unions and bureaucracy create barriers to innovation, and the upper classes send their children to private schools. (See Treverton and Mizell, 2001, pp. xix, 40–42, 45–47.)

³¹In much of northern South America, in particular, skilled people who can leave do leave, most often for the United States. They are pushed out by violence, by the lack of opportunities, and by populist politics that discourage innovation and individual enrichment. In the process, Miami is becoming a kind of economic and cultural “capital” of Latin America. (See Treverton and Mizell, 2001, p. xix.)

³²Given the large market for Spanish-language Internet content, not only in Latin America but also throughout the entire Spanish-speaking world—only 2 percent of Web content is now in Spanish, whereas more than 6 percent of the world’s population is Spanish speaking—there is a major business opportunity for Spanish-language Internet-content entrepreneurs. Because of this brain-drain process, however, Latin America has to compete with Miami for this business. In this competition, Miami-based companies will have advantages in infrastructure and financing, as well as many talented emigrants from Latin America to draw on. (See Treverton and Mizell, 2001, p. xix.)

³³Treverton and Mizell (2001) give data regarding the digital divide in Mexico and elsewhere in Latin America.

³⁴The Latin American nations need external investment capital to prosper and grow. But instabilities in these external investment flows have in the past decade caused many problems. (See *The Economist*, 2002d, for a recent assessment of this situation.)

³⁵Argentina is the latest casualty of one of these crises, with unemployment now at 20 percent, more than half of the population living below the official poverty line, the life savings of the Argentine middle class destroyed, hunger and malnutrition emerging in the rural interior, and per capita income declining from \$8,909 in 1999 (double that of Mexico and three times that of Poland) to \$2,500 in 2002 (roughly on a par with Jamaica and Belarus). (See Faiola, 2002, for a recent update on the situation in Argentina.)

³⁶This was the assessment of the experts participating in RAND’s November 2000 conference on the information revolution in Latin America. (See Treverton and Mizell, 2001.)

³⁷Latin America did not close economic and social gaps during the industrial revolution. It was the assessment of the experts participating in RAND’s November 2000 conference on the information revolution in Latin America that the region is unlikely to do so during the information revolution as well. (See Treverton and Mizell, pp. 15, 42.)

³⁸Chile could do particularly well if the current negotiations between it and the United States result in a free trade agreement between these two nations.

³⁹Faiola (2002) describes the depths of the current financial and social crisis in Argentina.

⁴⁰*The Economist* (2002d) discusses the current financial situation in Brazil and Uruguay.

⁴¹Ernest Wilson introduced the “information revolutionaries” concept at RAND’s November 2000 conference on the information revolution in Latin America. (See Treverton and Mizell, 2001, pp. 23–25.) A more detailed presentation of the theory underlying this concept and its application in specific nations is contained in Wilson (2003).