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The Internet and The Information Revolution in Mexico

"E-commerce is to the Information Revolution what the railroad was to the Industrial Revolution — a totally new, totally unprecedented, totally unexpected development...In the new mental geography created by the railroad, humanity mastered distance. In the mental geography of e-commerce, distance has been eliminated."

Peter F. Drucker — "[Beyond the Information Revolution](#)" in [The Atlantic Monthly](#) (October 1999)

What is this site about?

This site represents the output for a class project conducted by Stanford University undergraduate and postgraduate students. The course — a joint class offered by the Latin American Studies and Computer Science Departments, is called "[The Information Revolution in Latin](#)



[America: Obstacles and](#)

[Opportunities through the Internet](#)". Our class has split into 9 teams

investigating current situation and future trends in the adoption and usage of internet technologies in different Latin American countries. The class objective is to produce output that:

"draws from multiple disciplines to analyze the opportunities and obstacles the Information Revolution presents for newly developing countries in Latin America."

Our team is focused on understanding internet opportunities and obstacles in Mexico.

Our site is split into seven sections:

1. the **Overview** (this page) giving the high level guide to this site and [who we are](#);
2. the **Introduction**, acting as a starting point for discussion of [the Mexican environment](#) in particular and [the Information Revolution](#) in general;
3. the **Background Research**, detailing many of the key factors that influence the course of the Information Revolution in Mexico;
 - [Communications](#)
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- [Education](#)
 - [Nature and Access of Opportunity](#)
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 - [Private Sector](#)
 - [Government Policies](#)
4. the **Analysis** section, where we evaluate the progress of the Information Revolution in Mexico, and look at two case studies in a little more detail: the [Ministry of Public Education](#) and [Infotel](#).
 5. our **Conclusions** where we summarize our take-away findings from our work - the [positive points](#) for Mexico and [potential pitfalls](#), as well as our [concluding remarks](#);
 6. The **E-commerce** section, where we analyze the factors at play in successfully bringing e-commerce into Mexico ; and
 7. a **Resources** section where we suggest [useful links](#) which we have discovered in the course of our work, provide a forum for [posting feedback](#), and supply a [contact](#) for website details.

The Team:

[Will Budreau](#) — Stanford University — [Symbolic Systems](#) Department — Undergraduate

[Lisa Marino](#) — Stanford University — [Latin American Studies Department](#) — Post Graduate

[Simon Morris](#) — Stanford University — [Graduate School of Business](#) — MBA Student

[Bernardo Naranjo](#) — Stanford University — [School of Education](#) — Post Graduate

Last revised 12/06/99

[contact webmaster](#)

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GENERAL INFORMATION



Official Name: Estados Unidos Mexicanos

Territory: 1'972,547 square kilometers

Population: 93.7 million (1995, [see table](#) for state by state population)

Capital: Mexico City

Currency: Mexican Peso (US\$1 = MX\$9.75 in October 1999)

GNP: US\$414,986.4 million dollars.

GNP per capita: US\$4,400

[Political organization](#), [History](#) and [Festivities](#)

Political Organization:

- [Government](#)
- [Parties](#)

The **government** is divided into executive, legislative and judicial branches. The executive branch is headed by a President democratically elected every six years without the possibility of reelection. The legislative branch is divided into a Camara de Diputados (with 500 representatives, 300 of them directly elected, while 200 are assigned to each political party according to the number of votes obtained) and the Camara de Senadores (with 128 senators, 4 for each one of the 31 states and 4 for the Federal District). Please visit www.camaradediputados.gob.mx and www.senado.gob.mx for more information. Judicial system has been recently restructured to ensure the autonomy of its members (www.scjn.gob.mx/default.asp).

There are multiple **political parties** covering all the political spectrum. The governing party (Partido Revolucionario Institucional, PRI) has not lost any presidential election since its creation in 1929 (www.pri.org.mx). The Partido Acción Nacional (born in 1939) has been identified with the right wing: it won its first state election until this decade (www.pan.org.mx). Currently, the PAN controls important states such as Jalisco and Nuevo León. The Partido de la Revolución Democrática is a coalition of left wing organizations originated after the presidential election of 1988 (www.cen-prd.org.mx). The "moral" leader of the party was elected mayor of Mexico City in 1997 and the PRD also controls states like Tlaxcala and Zacatecas. Other minor political parties include the Partido Verde Ecologista de México, the

Partido del Trabajo, The Partido Auténtico de la Revolución Mexicana and some other newer organizations.

History:



José Clemente Orozco: "La Reforma"

A good overview of Mexican history in English is provided in the [webpage](#) of the Office of the President of Mexico.

The most important **civic festivities** are:

- September 16th (Independence Day)
- November 20th (Revolution Day)
- May 5th (Battle vs France),
- March 21st (Benito Juárez's anniversary)

The most representative **religious festivities** are:

- December 25th (Christmas)
- December 12th (Nuestra Señora de Guadalupe's day)
- November 2nd (Día de los Muertos)
- Semana Santa (March - April)

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Population per Gender and State

	NATIONAL	Aguascalientes	Baja California	Baja California Sur	Campeche	Coahuila	Colima	Chiapas	Chihuahua	Distrito Federal	Durango	Guanajuato	Guerrero	Hidalgo	Jalisco	Estado de Mexico	Michoacán	Morelos	Nayarit	Nuevo León	Oaxaca	Puebla	Querétaro	Quintana Roo	San Luis Potosi	Sinaloa	Sonora	Tabasco	Tamaulipas	Tlaxcala	Veracruz	Yucatán	Zacatecas
Total Population	95,675,535	937,445	2,285,834	412,169	686,790	2,232,818	500,883	3,797,565	2,960,367	8,572,535	1,463,657	4,563,067	3,044,792	2,206,918	6,270,358	12,754,305	3,943,626	1,554,486	935,928	3,742,950	3,372,993	4,810,592	1,348,633	802,517	2,277,137	2,519,318	2,190,297	1,868,413	2,613,319	1,013,863	6,955,559	1,653,785	1,382,616
Male	46,698,045	457,127	1,152,291	209,829	346,646	1,099,925	247,040	1,894,494	1,470,770	4,144,613	716,453	2,181,928	1,482,698	1,073,115	3,035,918	6,211,649	1,830,632	747,076	465,987	1,876,372	1,653,973	2,348,489	650,889	411,213	1,078,756	1,250,905	1,090,598	931,037	1,285,714	501,140	3,371,466	812,014	667,288
Female	48,977,490	480,318	1,133,543	202,340	340,144	1,132,893	253,843	1,903,071	1,489,597	4,427,922	747,204	2,381,139	1,562,094	1,133,803	3,234,440	6,542,656	2,112,994	807,410	469,941	1,866,578	1,719,020	2,462,103	697,744	391,304	1,198,381	1,268,413	1,099,699	937,376	1,327,605	512,723	3,584,093	841,771	715,328

The Information Revolution

the US leads the way

[Drivers of the Internet demonstrated in the US](#)

[Latin America has these drivers position](#)

[The six "C"s of the internet revolution](#)

[Which of the six "C"s has Latin America achieved](#)

The Information Revolution has its deepest roots in the development of the first computers as long ago as the 1940s. However, the recent explosion onto the scene of the internet, the "hyper-growth" of the internet user base, the enormous impact the internet is having on existing companies and organizations, as well as the incredibly prolific genesis of new internet companies and organizations — all this is leaving observers breathless and often quite confused. The assertion that the internet will *change everything* is increasingly a bland truism — what is far more interesting becomes the questions about "how is the internet changing things?", "by how much?", and "how fast?".

The emergence of the internet in the US has involved the convergence of a large number of different drivers or enablers. These can be summarized in at least six sections:

● the development of new technologies

The emergence of the necessary hardware included low cost high power personal computers, as well as network technology (routers, high-speed modems, fiber-optics). Key software innovations included the emergence of browser technology (a graphical user interface to the internet), the use of Hyper Text Markup Language (HTML) to describe the appearance of content online, and the development "object orientation" including the emergence of Java as a language to operate independent of the operating system, and without the need for an overarching grand application to be running. These hardware and software technologies have made possible the development of the internet into a self-sustaining entity.

● the emergence of technical standards

Widely accepted technical standards emerged included HTTP for communications, HTML (and more recently XML) for labeling content online in a way that can be understood consistently from anywhere in the world. The existence of these standards has laid the foundations for the single unified global medium that the internet strives to offer.

● the development of new business models

The internet has been characterized by the appropriation of various offline business models into an online analog (for example the common subscription fee-for-service offered by many ISPs, similar to the cable TV model), as well as the emergence of completely new business models (e.g. where an online intermediary makes a dynamic market for goods that are otherwise difficult to buy or sell economically, taking a cut of the proceeds — this example is essentially the eBay model).

- **explosive growth in user demand**

The pattern of usage has moved from an early low-level government (specifically defense) focus for (what would become) the internet; moving quickly into the educational sphere, with rapid adoption by US and foreign university students and faculty.

In the mid 1990s, the value this powerful low-cost global communications medium was largely opened up by a combination of the availability of a much simpler graphical browser (Mosaic, and soon Netscape Navigator) and the very aggressive marketing performed by early ISPs (in particular AOL's campaign to "carpet bomb the United States with free CDs containing introductory offers for its services).

The explosive nature of the growth in users (like the phone — the more people who have a phone, the more pressure there is on the laggards to get hooked up) is both a result of other drivers, but also a driver itself of future investment and growth in new internet technologies and services.

- **access to financial capital and start-up expertise**

The intense internet activity and tremendous success of areas such as Silicon Valley (along with other clones like Silicon Alley in New York, and Silicon Barrio in Miami) have created both huge concentrations of capital (increasingly supplied to VCs through major US institutional investors) as well as centers of excellence in the development and implementation of commercial internet ideas. The equity boom that has resulted is fuelling a virtuous circle where more and more talent and capital get attracted to these areas, resulting in the development and implementation of new ideas at an incredibly rapid rate, and the shrinking of timescales where what used to take years now takes months, and sometimes only weeks.

- **the establishment of a critical mass of physical infrastructure**

The success of major start-up infrastructure players (such as Cisco) and the subsequent embracing of internet infrastructure by almost every major telecommunications and enabling hardware provider has powered the development of internet infrastructure in the US at lightening speed.

The point for Latin America is that many of these drivers are now aligned for the region:

- **the development of new technologies**

These are all now available (although the price may be a barrier).

- **the emergence of technical standards**

The critical standards are in place.

- **the development of new business models**

The major new business models have been devised, tried and tested.

- **explosive growth in user demand**

Demand for the internet in Latin America is high (at least in affluent social elites).

- **access to financial capital and start-up expertise**

This is potentially a constraint in Latin America, although the signs are increasingly that the talent based mainly in the US, and (in particular) the capital, will ultimately look for opportunities for maximum impact. With the rapid saturation of the market in the US, investors and entrepreneurs are starting to look further afield.

- **the establishment of a critical mass of physical infrastructure**

This is the chief constraint in Latin America. The lack of installed infrastructure both retard the development of internet usage across the whole region, but also will likely shape the way in which users interact differently to the observed experience so far in the US.

The development of the internet as a commercial medium will likely follow a broad pattern first seen in the US — the 6 C's of the internet revolution:

1. Computers

In this wave the computing infrastructure is developed, including the technology, the basic technical standards and the rollout of the core base of infrastructure (including the network itself, servers and routers, and the end-user devices).

Although the technology is in constant rapid development and upgrade, this arrival of the computers wave helps to bridge the chasm of simple technophobia and ignorance in large parts of the population.

2. Connection

This is where access to the network infrastructure becomes either affordable or economically viable for end users. For the first time the connection to the internet comes economically within the reach of large numbers of users. This is predicated on the passing of the first wave, but accelerated by the deployment of new business models backed up with financial venture investment.

3. **Content and content enablement**

This wave sees the rapid development of large amounts of digitalized content. This is initially provided by public institutions, companies as well as private individuals. The "enablement" of this content includes the organization of online content through online services such as search engines, directories, and later portals and destination sites.

4. **Commerce**

This is where companies begin to transact over the internet — the internet becomes a new customer channel for them to sell goods and services to their customers. This also leads to the development of the first back-end transaction completion and fulfilment capabilities.

5. **Community and intermediation**

In the fifth wave, users and internet companies and organizations have fully grasped the real-time two-way nature of communications over the internet — that is they start to fully exploit its potential for fully interactive services. While this wave happens much earlier for consumers than it does (e.g.) for businesses, the basic concepts are the same. The upshot is the establishment of online intermediaries to mediate and manage complex interactions and transactions.

6. **Consolidation**

This is the point at which major internet companies start to consolidate into multifaceted media and technology empires. This has already started happening in some parts of the US internet (the emergence of CMGI and Yahoo/GeoCities/Broadcast.com groups are two examples).

These waves are depicted in the [this diagram](#)

Where does Latin America now stand in terms of these six steps?

Latin America is experiencing the connection wave now, and the user population is growing very rapidly

Estimates as to the current and projected size of the online user population in Latin America vary significantly. These variations occur as a result of inconsistent estimation methodologies as well as great uncertainty over how fast Latin Americans will embrace the internet.

However, as the diagram below outlines, a variety of estimates seem to indicate that the regional user base will probably break through the 20 million mark sometime in 2002, and that overall growth for the next half decade is likely to be somewhere between 25% and 35% every year.

The fastest growing user group is business users — evidence that Latin American businesses may

be embracing the internet much sooner than US businesses did

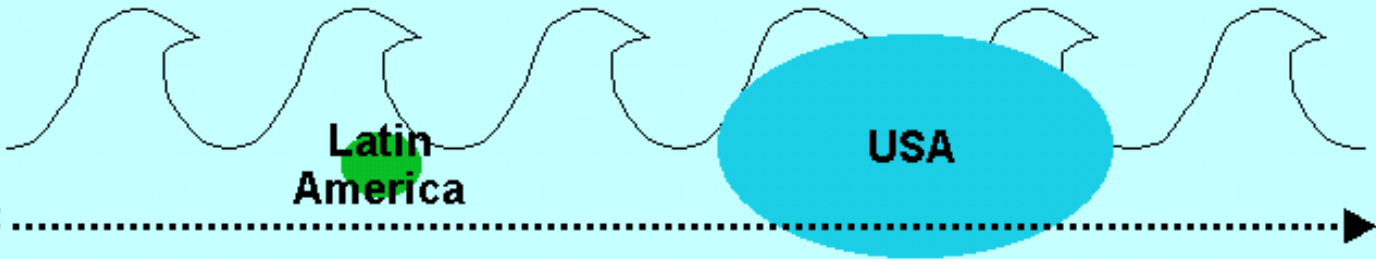
New Latin American company websites are growing at an incredible rate of over 60% each year (see graph). This fact, along with statistics demonstrating that Latin American business users are the fastest growing user segment indicate that Latin American business people have a basic understanding and acceptance of the internet phenomenon — most likely as a result of experience and reports from elsewhere in the world.

The commercial side of the Latin American internet is rapidly taking off

The growth in e-commerce in the region, combined with a rapidly growing internet advertising market indicate the speed at which the commercial side of the internet is being exploited in the region. This is further demonstrated by the first two (phenomenally successful) Initial Public Offerings (IPOs) of stock from internet companies exclusively focused on Latin America — Starmedia (www.starmedia.com) went public in May 1999, followed by Terra Networks (www.terra.com) in November 1999. Both offer major portal sites for Latin American consumers with business models combining a customer appeal based on content and community with revenue from commerce and online advertising.

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The 6 C's of the internet revolution:



Wave:	COMPUTERS	CONNECTION	CONTENT & INTERCONNECTION	COMMERCE ¹	COMMUNITY & INTERMEDIATION ¹	CONSOLIDATION
Principal Activities:	<ul style="list-style-type: none"> Hardware Software 	<ul style="list-style-type: none"> N/W & connection infrastructure Internet service provision 	<ul style="list-style-type: none"> Content digitalisation Website design Content aggregation Navigation & search 	<ul style="list-style-type: none"> Online promotion Online buying and selling Internet advertising 	<ul style="list-style-type: none"> User interaction Build "destination sites" around types of users or products Specialized services 	<ul style="list-style-type: none"> Internet companies become branded global "inter-media businesses"
E.g.:	<ul style="list-style-type: none"> IBM Intel Microsoft 	<ul style="list-style-type: none"> Telcos Netscape Cisco AOL ISPs 	<ul style="list-style-type: none"> Yahoo! StarMedia Terra Networks Dow Jones MSNBC C/NET 	<ul style="list-style-type: none"> Amazon.com DELL Schwab high traffic internet sites (advertising) 	<ul style="list-style-type: none"> eBay iVillage priceline.com E*Trade Vertical Net Chemdex 	<ul style="list-style-type: none"> ????
Key Success Factors:	<ul style="list-style-type: none"> Develop high-performance low cost technology 	<ul style="list-style-type: none"> Large investment in "hard" infrastructure Customer service 	<ul style="list-style-type: none"> Develop and index large amount of content Build traffic 	<ul style="list-style-type: none"> Identify types of product which sell well over the net Develop new "internet assets" that can be sold (e.g. "eyeballs") 	<ul style="list-style-type: none"> Identify <i>natural communities</i> around types of user or product Mediate value-added services for these communities 	<ul style="list-style-type: none"> Critical mass Global brand Customer loyalty

1. NB: in the "Commerce" wave, companies use the internet to sell assets they own, (books, computers, traffic on their site); in the "Community and Intermediation" wave, intermediaries emerge to act as brokers, aggregators and service providers to both buyers and sellers.

INFRASTRUCTURE FOR COMMUNICATIONS



- [Roads](#)
- [Telephone lines](#)
- [Internet users](#)

The country has a network of 96,360 kilometers of **paved roads** running all over the country (find a road network map in the [Secretaría de Comunicaciones y Transportes website](#)).

There are about 10.4 million **telephone lines** (compared to 5.3 millions in 1990). The number of cities, towns and communities served reached 31,695 in 1997 (compared to 7,270 in 1990). On average, in August 1999 there were 107 lines per thousand habitants. It is important to notice that over 98 per cent of the phone lines operate already with digital technology. (www.cofetel.gob.mx/html/5_est/celulares/usumincel.html)

In 1998 there were an estimate 1.3 million **internet users** ([see growth table](#)). The internet infrastructure include two international connections. (see map at www.cofetel.gob.mx/html/5_est/Graf_internet/rtnbackbone.htm)

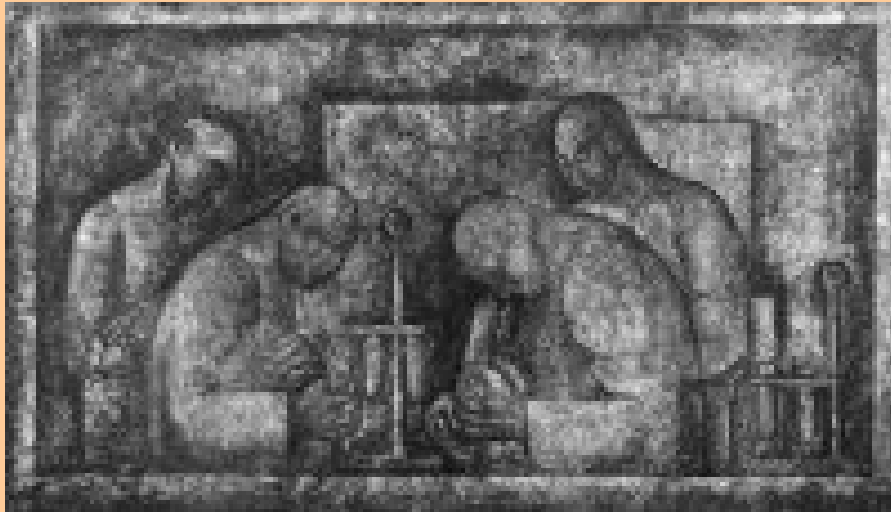
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Internet Users per Sector

	1995	1996	1997	1998
Home	10	29	141	298
Government	3	5	14	31
Education	33	69	142	238
Business	48	84	299	740
Total	94	187	596	1307
Annual growth	n.a.	98.9%	218.7%	119.3%

Source: Comisión Federal de Telecomunicaciones

LABOR MARKETS



Diego Rivera: "Investigadores"
Main building of the Secretaría de Educación Pública

Let us consider four indicators to understand the structure of the labor markets in Mexico. The first three indicators, along with some of the information present in the education section, are suggested in the Key Indicators of the Labor Market proposed by the International Labour Organization ([ILO](#)):

- Labor force in Mexico is changing rapidly and the schooling level of the [population with economic activity](#) is growing. Over 26 million people in Mexico have at least the basic education (9 years of schooling). Also please refer to the [education](#) section of this webpage.
- Salaries in Mexico are very sensitive in terms of specialization and level of skills; in general, variations are higher than in developed countries. [Average wages per industry, level \(blue collar, white collar and executives\) and other labor costs](#) such as benefits are included in this section.
- Another important variable for salaries and labor skills are specific location of firms. There are different amounts of people with different level of skills and average salaries in every [level of skills and average salaries in every state](#).
- Cheaper labor does not mean lower productivity. The [overall productivity](#) of Mexico is higher than major manufacturers.

Population with economic activity per schooling level

The level of education of people shows an important growth in Mexico. If we analyze the age structure of the population and their schooling levels, it is clear that younger generations have much higher expectancy of schooling (see the educational profile). It is remarkable that between 1991 and 1997, there was a very important increase (5.5 million people more) in the number of people with at least basic education (K-9) to reach 26.2 millions. Additionally, the number of people with college increased 50 per cent in that period to reach 4.5 millions in 1997 and the semi professional people just doubled. These are good news from the standpoint of the "trainability" of the labor force –that increases as level of schooling does- and from the perspective of potential audiences for the Internet. See this growth in the [table provided](#).

Average wages per industry and other labor costs (benefits)

At the low end of the labor market, salaries differ in a very important way depending on the **kind of industry** and the region. Salaries in the manufacturing industry are on average twice as much as those in commercial activities and 150 per cent above those in the construction ([see table](#)).

Salaries are also very sensitive regarding the **level of skill** of the people. An example of these variations is the following table of average hourly wages (in US dollars) for industrial parks in the central state of Guanajuato, considering days with 8 working hours and including taxes and fringe benefits:

Unskilled labor	from \$3.72 to \$7.44
Semiskilled labor	from \$5.58 to \$10.23
Skilled labor	from \$7.44 to \$13.02

Among white collar workers and executives in the same state, average monthly salaries in US dollars, not including fringe benefits, are:

Bilingual Secretary	\$242.00 to \$381.00
Accountant	\$288.00 to \$558.00
Production Technician	\$390.00 to \$707.00
Production Engineer	\$827.00 to \$1,302.00
Production Manager	\$1,162.00 to \$2,046.00
Plant Manager	\$3,255.00 to \$4,837.00

A good overview of this issue can be consulted in the appropriate section of the webpage of the government of the state of [Guanajuato](#) (look for the english version of the page and then go to "investing in Guanajuato").

Some rules concerning **benefits** are:

- Overtime is paid as follows: 1 to 9 hours, twice the hourly wage rate, 10 hours or more, triple the hourly wage rate.
- Vacations: after one year, workers are entitled to six days of paid vacation, with an increase of two to twelve days for each additional year of work. After the fourth year this increases by two days for each five years worked. Workers are paid an additional 25% of normal daily wages as a vacation premium.
- Worker's income is based on agreements regulated by the Federal Labor Law. Wages are reviewed every year.
- Severance compensation is: 3 monthly wages plus 20 days per year of work with the company.
- Mandatory social (fringe) benefits include contribution to IMSS, INFONAVIT, SAR, as well as vacations premiums (paid vacations plus 25% daily wage per vacation day) and Christmas bonuses ("aguinaldo", a mandatory payment of 15 days wages and up to 30 discretionary). On average, the cost of these benefits accounts for 29% to 34% of salaries paid.

(Source: State of Guanajuato webpage)

For an example of additional benefits paid (taking Guadalajara city as example) [see the poll](#) made by the state government of Jalisco

Population with economic activity and average wages per state

Of course the amount of trained people and salaries vary depending on the specific state the business is located. For example, salaries in Mexico City (Distrito Federal, where the average salary is \$152 pesos a day) are, on average, 42 per cent higher than the national average (\$107 pesos a day). On the other hand, salaries in states such as Guanajuato, Sinaloa and Yucatán (all of them below \$80 pesos a day) are 30 per cent lower than the national average. In [this table](#) you will find the population by gender, economically active and non active, as well as the average salaries per state (in pesos and dollars) and an index to compare them.

Information regarding the specific availability of technicians and professionals in information technology related fields can be found in the tables for graduates in computer related fields from [technical schools](#), [junior colleges](#) and [colleges](#) provided in the [education](#) section.

Overall productivity

According to information provided by the state government of Jalisco, the productivity in Mexico (measured by the number of workers to obtain the same output) is higher than the one observed in Brazil and South Korea, but below Taiwan's.

http://www.jalisco.gob.mx/srias/seproe/mexico/general/p_product.html

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PEA* and Workforce per Schooling Level 91-97

Formal Education	1991		1993		1995		1996		1997	
	PEA	POP. Over 12	PEA	POP. Over 12	PEA	POP. Over 12	PEA	POP. Over 12	PEA	POP. Over 12
TOTAL	31,229,048	58,317,249	33,651,812	61,000,194	35,558,484	63,982,096	36,580,746	66,037,955	38,344,658	67,702,002
Without instruction	3,614,390	7,634,058	3,873,023	8,069,285	3,849,508	7,787,087	3,339,739	7,012,862	3,466,680	6,961,851
1-3 Years of school	4,902,880	8,951,595	4,916,624	8,956,471	4,607,754	8,400,600	4,597,457	8,337,776	4,783,526	8,462,357
4-5 Years of School	2,479,274	5,605,807	2,721,421	6,014,661	2,817,034	6,023,993	2,573,352	5,712,250	2,552,581	5,755,327
6 Years of school	6,619,375	12,636,771	7,398,347	13,469,979	7,602,526	13,891,625	7,907,745	14,617,223	7,953,701	14,631,529
7-8 Years of school	1,721,643	4,724,948	2,031,114	4,993,822	2,026,724	5,330,968	1,983,905	5,316,216	2,252,990	5,649,131
9 Years of school (Basic Ed)	4,008,293	6,634,824	4,276,816	6,735,449	5,206,758	8,231,607	5,591,682	9,026,599	6,107,276	9,386,232
Specific training	2,483,659	3,942,147	2,619,476	4,024,596	2,690,923	4,236,402	2,621,570	4,214,527	2,907,585	4,422,591
High school	2,082,187	3,663,729	2,228,017	3,903,309	2,649,229	4,615,856	3,067,242	5,307,724	3,206,658	5,614,248
Semi professional	278,918	373,184	346,514	457,465	530,598	692,898	492,040	680,163	554,346	771,732
Higher education	3,035,315	4,138,265	3,230,748	4,354,532	3,566,818	4,738,378	4,401,521	5,804,578	4,549,128	6,031,158
Not specified	3,114	11,921	9,712	20,625	10,612	32,682	4,493	8,037	10,187	15,846

Basic education or more 11,888,372 18,752,149 12,701,571 19,475,351 14,644,326 22,515,141 16,174,055 25,033,591 17,324,993 26,225,961

PEA: Population with Economic Activity

* Legal working age in Mexico is 16 years.

Source: *Secretaría del Trabajo y Previsión Social*

MEXICO

Average Wages per Industry 1994 - 1999

YEAR	MINIMUM DAILY WAGE	MANUFACTURING INDUSTRY	MAQUILADORAS	CONSTRUCTION	COMMERCIAL
1994	13.97	101.01	54.14	42.07	54.33
1995	16.42	118.85	68.40	50.14	63.35
1996	20.39	144.14	86.97	54.12	77.31
1997	24.30	173.22	106.17	63.18	94.95
1998	28.30	205.11	127.92	74.63	111.52
1999	31.91	230.01	148.97	85.64	126.16

Source: Secretaría del Trabajo y Previsión Social

PEA* and Average Wages per State 1999

	NATIONAL	Aguascalientes	Baja California	Baja California Sur	Campeche	Coahuila	Colima	Chiapas	Chihuahua	Distrito Federal	Durango	Guanajuato	Guerrero	Hidalgo	Jalisco	Estado de México	Michoacán	Morelos	Nayarit	Nuevo León	Oaxaca	Puebla	Querétaro	Quintana Roo	San Luis Potosí	Sinaloa	Sonora	Tabasco	Tamaulipas	Tlaxcala	Veracruz	Yucatán	Zacatecas
Average daily wage index (Nat'l = 100)	100.00	81.86	100.22	95.47	99.04	85.85	84.24	71.08	87.82	142.21	63.59	73.33	79.30	80.83	90.71	107.10	80.92	94.71	68.52	106.17	73.29	88.79	104.50	82.51	84.44	73.87	80.57	82.65	93.70	81.76	84.63	70.31	63.96
Average daily wage (dollars) (1 x 9.75)	10.98	8.99	11.01	10.49	10.88	9.43	9.25	7.81	9.65	15.62	6.99	8.06	8.71	8.88	9.96	11.76	8.89	10.40	7.53	11.66	8.05	9.75	11.48	9.06	9.28	8.11	8.85	9.08	10.29	8.98	9.30	7.72	7.03
Average daily wage (pesos)	107.10	87.67	107.34	102.25	106.07	91.95	90.22	76.13	94.06	152.31	68.11	78.54	84.93	86.57	97.15	114.70	86.67	101.43	73.38	113.71	78.49	95.09	111.92	88.37	90.44	79.12	86.29	88.52	100.35	87.57	90.64	75.30	68.50
PEA Male	26,176,026	235,653	642,722	120,556	186,445	621,160	139,460	1,092,759	806,655	2,395,552	394,804	1,143,873	818,225	603,848	1,791,381	3,458,841	992,311	425,609	271,217	1,104,424	902,449	1,243,263	334,290	234,813	552,656	706,081	631,712	539,366	730,515	274,806	1,979,176	455,668	345,736
PEA Female	13,331,037	119,357	325,931	57,827	71,962	329,540	77,376	455,500	363,163	1,454,091	177,284	555,773	429,166	325,988	1,030,541	1,817,488	521,428	233,063	145,154	545,225	445,825	601,250	165,645	93,350	251,517	368,065	341,325	194,093	385,660	130,202	899,956	243,358	174,934
Population economically active (PEA)	39,507,063	355,010	968,653	178,383	258,407	950,700	216,836	1,548,259	1,169,818	3,849,643	572,088	1,699,646	1,247,391	929,836	2,821,922	5,276,329	1,513,739	658,672	416,371	1,649,649	1,348,274	1,844,513	499,935	328,163	804,173	1,074,146	973,037	733,459	1,116,175	405,008	2,879,132	699,026	520,670
Population economically inactive	29,870,996	305,553	695,936	127,736	227,139	676,205	149,492	958,817	983,112	2,884,582	463,002	1,524,096	843,041	630,179	1,754,078	4,043,282	1,266,482	502,720	260,035	1,209,117	1,028,547	1,578,150	445,718	239,499	800,141	766,211	658,705	596,435	819,781	328,160	2,132,183	518,357	454,505
Population 12 years old and over	69,378,059	660,563	1,664,589	306,119	485,546	1,626,905	366,328	2,507,076	2,152,930	6,734,225	1,035,090	3,223,742	2,090,432	1,560,015	4,576,000	9,319,611	2,780,221	1,161,392	676,406	2,858,766	2,376,821	3,422,663	945,653	567,662	1,604,314	1,840,357	1,631,742	1,329,894	1,935,956	733,168	5,011,315	1,217,383	975,175

PEA: Population with economic activity

Source: Secretaría de Trabajo y Previsión Social

EDUCATION



Diego Rivera: "Construcción de un Nuevo Mundo: la Maestra"
Main building of the Secretaría de Educación Pública

- [Literacy](#)
- [Average years of schooling](#)
- [Information technology in the educational sector](#)
 - [Basic computer literacy](#)
 - [Adult training](#)
 - [Technical training](#) ([graduates](#) per state per school)
 - [Higher education](#) ([graduates](#) [junior college](#) or [college](#) per state per school)

Trends in Mexican education are stimulating. Educational policies in the last 20 years have focused in the proliferation of schools, and that is now reflected in the literacy rates and average schooling of younger population.

In order to assess what are the opportunities for information technology in the next years, we need to focus in the potential users of that information (or potential markets in case of ebusiness), and in the skills of the labor force that will be supporting and making those projects real. In this section we include literacy rates, schooling levels and complete information of the ways each educational level is dealing with the challenge, including the number of graduates per level per state (see the appropriate link in each level).

New generations have higher **literacy** rates. Literacy reaches 90.3 of population over 15 years old. However, the literacy rate in the generation of people below 30 years old is around 96 per cent, while the population 65 years old and over has a literacy rate of 64 per cent.

The **average years of schooling** was 7.2 in 1998. However, according to the Secretaría de Educación Pública, the generation of kids who are now 5 years old will have an average schooling of 13 years. Of course previous generations have much lower schooling average and the overall average will not reach that number in the next years, but the point is that younger generations are increasing dramatically their schooling levels. If we consider that people who use the internet have at least basic education both to use it and to become a potential consumer, the growth of this potential market in Mexico is impressive. In 1997, 26'225,961 Mexicans had

completed their basic education, and 1.3 million students are doing it every year.

For further information on general education visit the statistical section of the [Ministry of Public Education's webpage](#)

The information technology in the educational sector

The efforts to leap-frog the gap in information technology are recent in Mexico. In higher levels of education, there was a relatively quick response and many public and private colleges and universities have an important number of information technology programs all over the country. At the basic education level, however, currently a vast majority of public schools do not have computer labs for students and teachers lack of appropriate training in computer-related matters. Here we present some of the educational possibilities for human resource training at different levels.

[Basic computer literacy](#)

[Adult training](#)

[Technical training](#)

[Higher education](#)

Basic computer literacy

Two important efforts have been developed to increase the literacy in computer-related areas in the population. The first one is directed to teachers of basic education schools. The Secretaría de Educación Pública has created over 300 "centros de maestros" (centers for teachers) in all states where they have access to all sort of resources to prepare classes, specialize and, of course, have access to computers. According to some officials in SEP, most centers will soon have at least one computer connected to Internet for the use of the teachers. For more information, go to www.sep.gob.mx/centros_para_maestros.html.

A second effort goes directly to students. The Instituto Latinoamericano de Comunicación Educativa (ILCE) –with the financial support of SEP- has installed over 30,000 receiver sets (TVs plus antenna) in all public junior high schools of the country and in different strategic places -Centros de Maestros included- and broadcasts a number of educational programs through satellite. Every weekday at 7am there is a half-an-hour program designed by SEP to provide the elements of computer use to all students. The program, SEPa Informática, includes information on the use of basic software applications as well as internet. Some other programs are broadcasted at different times of the day with more specific programs, such as Excel or Word. All this programs are also broadcasted through a Televisa channel with more limited, but still important coverage nationwide. You can visit imagina.ilce.edu.mx.

The ILCE is also performing a pilot program in primary and junior high schools to provide computers, a telephone line and Internet access for students. In each school, two teachers are trained to become tutors for the rest of teachers and of course for the students. According to the ILCE, the project will reach 500 schools by the end of 1999. The whole description of the project is in redescolar.ilce.edu.mx.

Adult training

The Ministry of Public Education has 198 schools all over the country intended to provide short term training programs, almost all of them offering training in computer operation. This programs do not require but basic literacy skills to be admitted and courses can be given to specific groups under request. The location and specific programs in every Centro de Capacitación Tecnológica Industrial (Cecati, as they are called) can be found at www.sep.gob.mx/ubicacion_de_los_planteles.html

Technical training

Technical training is provided in several high schools, where in addition to a diploma to pursue higher education, students can obtain a diploma certifying a strong emphasis in a specific area as well. 2.84 million students are enrolled in high schools in Mexico, and 42 per cent of them are in this "double track" system.

Different institutions offer this kind of diplomas (graduates are called "profesionales técnicos"). The older institution is the Dirección General de Educación Tecnológica Industrial (DGETI) that operates 428 schools. Most of them have programs related to information technology. Additionally, most states have systems similar to DGETI's, called Centros de Estudios Científicos y Tecnológicos (CECyT). There are 234 of these schools.

Another system that has an orientation to technical education is the Colegio Nacional de Educación Profesional Técnica (Conalep). A centralized institution until 1998, the 439 schools of this system –with 242 thousand students- now operate under every state's authority. Like in the case of DGETI, most schools have information technology oriented programs.

The certified [graduates](#) of technical programs in every state can be found in [this table](#). It is important to notice that the information concerning exclusively information technology related programs is not available, so these numbers include the schools with programs in most areas, except for teacher training, health and other areas that clearly do not meet the characteristics we are looking for. You can also browse for specific schools.

Higher education

Today, about 1.9 million students are enrolled in colleges all over the country, and this number is growing at a rate of 7 per cent a year. Out of them, 488.6 thousand are enrolled in technology-related programs: this number represents 45 per cent more than those enrolled 10 years ago (see [growth graph](#)). It is important to point out that only a fraction of these students are specializing in computer related areas. There are different kinds of schools, public and private, and we provide information about some of them. Here you can find information on [junior colleges](#) (2 year programs), [institutos tecnológicos](#), [public universities](#), [private institutions](#) and [graduates](#) per state per school from those with four year programs (for graduates of junior colleges see the corresponding [table](#)).

The growth in the number of [graduates](#) from technology related programs in four years colleges is impressive: in the last decade there have been more graduates in these areas (189,070) than in the previous 45 years (182,743). An important note is that these numbers are clearly underestimated since they report *only* "certified" engineers. The certification is a requirement of the government to enforce laws for professional activity in areas such as medicine, law, accountability or civil engineering. Other graduates can have a professional activity –electrical or mechanical engineers, designers or sociologists, for example- without been officially certified (in this cases, the diploma from the university is enough). Please browse for specific states and schools.

The **universidades tecnológicas** are junior colleges –two year college programs- created in 1992 and that have shown an important growth in these years. Their programs are closely linked to local economic activities, and the number of graduates in each one of them can be seen in [this table](#), along with those from similar programs in other institutions. Browse for specific states and schools in their [webpage](#).

The **institutos tecnológicos** are public technological schools with BA (licenciatura), BS (ingeniería) degrees in

areas related to the industry, as well as specialities, masters and doctoral degrees. Most schools have programs on computer science (look for "ISC" initials in the list of schools), information technology (look for "LI") Information concerning the degrees, programs and location of 79 of these schools all over the country can be found at www.sep.gob.mx/dgit/index.html. In addition to these schools, states are responsible for 62 public technological schools also called Institutos Tecnológicos that also have academic programs related to IT areas.

All **public universities** (at least one in every state) have programs related to information technology. A complete list of these institutions (usually called "Universidades Autónomas", except for the Universidad Autónoma de Guadalajara, that is private) can be found in www.sep.gob.mx/sector_educativo_nacionales_inter.html.

A very important source of graduates are **private institutions**. One of them, the Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM, but better known as the "Tec de Monterrey") has 27 campi in the country and provides undergraduate as well as graduate programs with a strong emphasis in technological areas (www.itesm.mx). Other important private institutions with this kind of programs are the Universidad Iberoamericana with 6 campi (www.uia.mx), the Universidad Autónoma de Guadalajara, the Instituto Tecnológico Autónomo de México and the Universidad La Salle, to name a very few of them. Find some others in every state at www.sep.gob.mx/sector_educativo_nacionales_inter.html.

[Back to the Overview](#)

TECHNICAL SECONDARY EDUCATION GRADUATES

	1945-1989	1990-1998	TOTAL
NATIONAL	143,766	309,318	453,084
Aguascalientes Baja California Baja California Sur Campeche Coahuila Colima Chiapas Chihuahua Distrito Federal Durango Guanajuato Guerrero Hidalgo Jalisco Estado de México Michoacán Morelos Nayarit Nuevo León Oaxaca Puebla Querétaro Quintana Roo San Luis Potosí Sinaloa Sonora Tabasco Tamaulipas Tlaxcala Veracruz Yucatán Zacatecas			
AGUASCALIENTES			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO AUTONOMO DE CIENCIAS Y TECNOLOGIA	46	4	50
INSTITUTO TECNOLOGICO DE AGUASCALIENTES (I.T.R.)	24	20	44
C.B.T.A. NO. 61 (C.E.T.A. NO. 61) (CALVILLO)	44	6	50
ESCUELA PREPARATORIA NORMAL Y DE COMERCIO	108	8	116
UNIVERSIDAD AUTONOMA DE AGUASCALIENTES	691	597	1288
C.B.T.I.S. NO. 39 (C.E.C.Y.T. NO. 199)	4	129	133
C.B.T.A. NO. 30 (C.E.T.A. NO. 30)	24	11	35
C.B.T.A. NO. 40 (C.E.T.A. NO. 40)	4	1	5
C.E.T.I.S. NO. 80	0	5	5
C.B.T.A. NO. 103 (C.E.T.A. NO. 103)	0	5	5
C.B.T.I.S. NO. 195	0	124	124
C.E.T.I.S. NO. 155	0	40	40
C.B.T.I.S. NO. 168	0	228	228
COLEGIO TECNOLOGICO ALEXANDER HAMILTON, A.C.	0	6	6
TOTAL	945	1184	2129
BAJA CALIFORNIA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA	1214	1093	2307
CTRO. DE ENSEÑANZA TECNICA Y SUPERIOR DE MEXICALI	13	1	14
INSTITUTO TECNOLOGICO DE TIJUANA (I.T.R.)	17	5	22
CTRO. DE ESTUDIOS TECNICOS Y COMERCIALES INGLES	0	1	1
UNIVERSIDAD ESTATAL DE ESTUDIOS PEDAGOGICOS	191	29	220
C.B.T.I.S. NO. 21 (C.E.C.Y.T. NO. 82)	53	342	395
C.B.T.I.S. NO. 41 (C.E.C.Y.T. NO. 201)	140	219	359
C.B.T.I.S. NO. 116 (C.E.C.Y.T. NO. 406)	18	27	45
C.B.T.A. NO. 41 (C.E.T.A. NO. 41)	2	11	13
CTRO. DE ESTUDIOS UNIVERSITARIOS XOCHICALCO	1	29	30
INSTITUTO DE ENSEÑANZA TECNICA, A.C.	43	7	50
CTRO. DE CAPACITACION Y DE ESTUDIOS PEDAGOGICOS DEL ESTADO DE B.C.	0	14	14
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 11 ENSENADA B.C.	9	40	49

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.I.S. NO. 146	0	25	25
C.B.T.I.S. NO. 140	1	116	117
C.E.T.I.S. NO. 25	0	48	48
C.E.T.I.S. NO. 58	7	44	51
C.E.T.I.S. NO. 75	10	279	289
C.E.T.I.S. NO. 74	0	71	71
C.B.T.A. NO. 146	0	2	2
C.E.T.I.S. NO. 18	0	470	470
C.B.T.I.S. NO. 155	0	135	135
UNIVERSIDAD IBEROAMERICANA PLANTEL [NOROESTE]	0	21	21
C.E.T.I.S. NO. 156	0	28	28
C.B.T.I.S. NO. 237	0	26	26
TOTAL	1719	3083	4802
BAJA CALIFORNIA SUR			
INSTITUTION			
	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE LA PAZ, B.C.S. (I.T.R.)	1	39	40
C.B.T.I.S. NO. 62 (C.E.C.Y.T. NO. 232)	108	421	529
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 30 SAN CARLOS B.C.S.	0	29	29
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 4 LA PAZ B.C.S.	3	27	30
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 21 GUERRERO NEGRO, B.C.S.	44	12	56
C.B.T.A. NO. 27 (C.E.T.A. NO. 27) V. INSURGENTES	1	1	2
C.B.T.I.S. NO. 69	0	52	52
C.E.T.I.S. NO. 81	0	97	97
C.B.T.I.S. NO. 230	0	87	87
ESCUELA SOR JUANA INES DE LA CRUZ B.C.S.	0	133	133
TOTAL	157	898	1055
CAMPECHE			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE CAMPECHE	259	302	561
UNIVERSIDAD AUTONOMA DEL CARMEN	529	337	866
INSTITUTO CAMPECHANO	1516	415	1931
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 29 CD. DEL CARMEN CAMPECHE CAMP.	0	1	1
C.B.T.A. NO. 15 (C.E.T.A. NO. 15)	3	1	4
C.B.T.A. NO. 62 (C.E.T.A. NO. 62)	0	1	1
C.E.T.I.S. NO. 20	1	40	41
C.B.T.I.S. NO. 9 (C.E.C.Y.T. NO. 22 AHORA NO. 9)	8	203	211
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 2 CAMPECHE CAMP.	26	50	76
C.E.T.I.S. NO. 82	0	9	9
C.B.T.I.S. NO. 126	1	26	27
C.B.T.A. NO. 169	0	1	1
INSTITUTO COMERCIAL BANCARIO APOLINAR, A. C.	0	60	60
TOTAL	2343	1446	3789
COAHUILA			
INSTITUTION			
	1945-1989	1990-98	TOTAL

TECHNICAL SECONDARY EDUCATION GRADUATES

UNIVERSIDAD AUTONOMA DE COAHUILA	1902	163	2065
INSTITUTO TECNOLOGICO DE SALTILLO (I.T.R.)	22	81	103
INSTITUTO TECNOLOGICO DE LA LAGUNA, TORREON COAH. (I.T.R.)	7	9	16
CTRO. UNIVERSITARIO DEL NORTE (PIEDRAS NEGRAS)	334	149	483
COLEGIO ROBERTS	59	0	59
FACULTADES UNIVERSITARIAS DE SALTILLO, A.C.	88	0	88
C.E.T.I.S. NO. 46 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 46) [CD. FRONTERA, COAH.]	29	267	296
ESCUELA TECNICA INDUSTRIAL DE TORREON	2	1	3
C.B.T.A. NO. 21 (C.E.T.A. NO. 21)	4	0	4
C.B.T.A. NO. 22 (C.E.T.A. NO. 22) (CUATRO CIENEGAS)	5	2	7
C.B.T.I.S. NO. 36 (C.E.C.Y.T. NO. 179)	26	174	200
C.E.T.I.S. NO. 59	3	290	293
C.E.T.I.S. NO. 60	0	70	70
C.B.T.I.S. NO. 54 (C.E.C.Y.T. NO. 219)	12	119	131
C.E.T.I.S. NO. 83	0	26	26
C.B.T.I.S. NO. 34 (C.E.C.Y.T. NO. 173)	10	210	220
C.B.T.I.S. NO. 127	1	220	221
C.B.T.I.S. NO. 20 (C.E.C.Y.T. NO. 81)	31	62	93
C.B.T.I.S. NO. 97	5	342	347
I.T.A. NO. 10	2	3	5
C.E.T.I.S. NO. 24	8	691	699
C.B.T.I.S. NO. 196	0	729	729
C.E.T.I.S. NO. 48	0	103	103
C.B.T.A. NO. 1 (C.E.T.A. NO. 1)	26	23	49
C.B.T.I.S. NO. 156	0	43	43
CTRO. DE ESTUDIOS SUPERIORES DE SALTILLO	2	0	2
C.B.T.I.S. NO. 235	0	137	137
C.B.T.I.S. NO. 239	0	26	26
INSTITUTO COAHUILENSE SALTILLO, COAH.	0	1	1
INSTITUTO UNIVERSITARIO METROPOLITANO MONCLOVA COAHUILA	0	90	90
CTRO. PANAMERICANO DE ESTUDIOS PROFESIONALES JUSTO SIERRA	0	0	0
COLEGIO ANTON MAKARENKO DE LA LAGUNA, A.C.	0	7	7
TOTAL	2578	4038	6616
COLIMA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE COLIMA	1142	190	1332
INSTITUTO VASCO DE QUIROGA	194	111	305
C.B.T.I.S. NO. 19 (C.E.C.Y.T. NO. 80)	0	276	276
C.E.T.I.S. NO. 84	0	69	69
C.B.T.I.S. NO. 157	38	134	172
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 12 MANZANILLO COL.	3	37	40
C.B.T.A. NO. 148	1	2	3
C.E.T.I.S. NO. 157	0	25	25
INSTITUTO "LIC. BENITO JUAREZ"	0	2	2
TOTAL	1378	846	2224

TECHNICAL SECONDARY EDUCATION GRADUATES

CHIAPAS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE CHIAPAS	13	1	14
INSTITUTO DE CIENCIAS Y ARTES DE CHIAPAS	1827	602	2429
INSTITUTO CHIAPAS [TAPACHULA]	32	43	75
INSTITUTO TECNOLOGICO DE TUXTLA, GTZ. (I.T.R.)	0	36	36
DEPARTAMENTO TECNICO Y DE ACTUALIZACION PROFESIONAL	427	66	493
CTRO. DE ESTUDIOS SUPERIORES DE SAN CRISTOBAL	29	9	38
CTRO. ESCOLAR SUPERIOR JOSE MARIA MORELOS Y PAVON	33	4	37
INSTITUTO EDUCATIVO ROSARIO CASTELLANOS	122	162	284
COLEGIO MEXICO DE TUXTLA	4	196	200
C.B.T.I.S. NO. 28	0	2	2
C.B.T.A. NO. 43 (C.E.T.A. NO. 43)	4	5	9
C.B.T.A. NO. 44 (C.E.T.A. NO. 44) (YAJALON)	2	13	15
C.B.T.A. NO. 60 (C.E.T.A. NO. 60)	1	22	23
C.B.T.I.S. NO. 88	0	20	20
C.B.T.A. NO. 24 (C.E.T.A. NO. 24)	0	1	1
C.B.T.A. NO. 46 (C.E.T.A. NO. 46) DE (VENUSTIANO CARRANZA)	22	2	24
C.B.T.A. NO. 42 (C.E.T.A. NO. 42)	0	27	27
C.B.T.A. NO. 45 (C.E.T.A. NO. 45)	9	8	17
C.E.T.I.S. NO. 85	0	17	17
CTRO. DE ESTUDIOS 5 DE OCTUBRE	2	90	92
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO.24 DE PUERTO MADERO CHIAPAS	1	1	2
C.B.T.I.S. NO. 144	0	46	46
C.E.T.I.S. NO. 158	0	105	105
C.B.T.I.S. NO. 170	0	188	188
INSTITUTO JUSTO SIERRA	16	11	27
INSTITUTO DE ESTUDIOS SUPERIORES DE CHIAPAS	0	3	3
C.B.T.I.S. NO. 92	0	200	200
C.B.T.A. NO. 23	4	2	6
C.B.T.A. NO. 91	43	12	55
C.B.T.I.S. NO. 108 (C.E.C.Y.T. NO. 305)	3	95	98
INSTITUTO TECNOLOGICO DE TAPACHULA (I.T.R.)	1	1	2
C.E.T.I.S. NO. 138	0	89	89
C.B.T.I.S. NO. 169	0	14	14
C.E.T.I.S. NO. 136	0	2	2
C.E.T.I.S. NO. 137	0	29	29
C.B.T.I.S. NO. 114	0	1	1
C.B.T.I.S. NO. 233	0	87	87
INSTITUTO COMERCIAL LEUZAGUI	0	14	14
C.B.T.I.S. NO. 243	0	67	67
TOTAL	2595	2293	4888
CHIHUAHUA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE CHIHUAHUA	1124	887	2011
ESCUELA SUPERIOR DE AGRICULTURA HERMANOS ESCOBAR	721	8	729
INSTITUTO TECNOLOGICO DE CHIHUAHUA (I.T.R.)	4	1	5

TECHNICAL SECONDARY EDUCATION GRADUATES

INSTITUTO TECNOLOGICO DE CD. JUAREZ (I.T.R.)	1	0	1
INSTITUTO TECNICO DE CONTABILIDAD MERCADOTECNIA Y ADMINISTRACION	5	1	6
UNIVERSIDAD AUTONOMA DE CIUDAD JUAREZ, CHIH.	238	409	647
COLEGIO PALMORE	4	0	4
ESCUELA DE TOPOGRAFIA Y DIBUJO	69	48	117
C.B.T.A. NO. 2 (C.E.T.A. NO. 2)	30	48	78
C.B.T.I.S. NO. 117 (C.E.C.Y.T. NO. 413)	6	80	86
C.B.T.A. NO. 90 (C.E.T.A. NO. 90)	25	6	31
INSTITUTO TECNOLOGICO DE PARRAL (I.T.R.)	15	47	62
C.B.T.I.S. NO. 143	3	63	66
C.B.T.I.S. NO. 114	0	178	178
C.B.T.I.S. NO. 122	0	482	482
C.B.T.I.S. NO. 128	0	5	5
C.B.T.I.S. NO. 138	0	71	71
C.E.T.I.S. NO. 61	0	184	184
C.E.T.I.S. NO. 86	0	168	168
C.E.T.I.S. NO. 87	0	263	263
C.E.T.I.S. NO. 159 SAN FRANCISCO DEL ORO	0	177	177
C.E.T.I.S. NO. 98	0	87	87
C.B.T.I.S. NO. 158	0	129	129
C.B.T.A. NO. 170	0	2	2
C.E.T.I.S. NO. 93	0	163	163
C.B.T.I.S. NO. 197	0	63	63
C.B.T.I.S. NO. 228	0	51	51
TOTAL	2245	3621	5866
* DISTRITO FEDERAL			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD NACIONAL AUTONOMA DE MEXICO	16335	6799	23134
INSTITUTO POLITECNICO NACIONAL	6535	5596	12131
UNIVERSIDAD FEMENINA DE MEXICO, S.C.	1118	204	1322
UNIVERSIDAD MOTOLINIA, A.C.	35	1	36
SECRETARIA DE LA DEFENSA NACIONAL ESCUELA MILITAR DE TRANSMISIONES	289	0	289
CTRO. NACIONAL DE ENSEÑANZA TECNICA INDUSTRIAL	459	6	465
ESCUELA MARGARITA DE ESCOCIA	91	2	93
INSTITUTO MIGUEL ANGEL	1348	2	1350
ESCUELA REINA MARIA	278	4	282
COLEGIO LATINOAMERICANO DE MEXICO	33	6	39
INSTITUTO JUAN ESCUTIA	2	2	4
COLEGIO LA FLORIDA	888	10	898
COLEGIO MAYORAZGO	673	3	676
ESCUELA IGNACIO M. ALTAMIRANO	9442	134	9576
INSTITUTO FEMENINO MEXICANO	557	1	558
ESCUELA NACIONAL DE MAESTROS DE CAPACITACION PARA EL TRABAJO INDUSTRIAL	3060	602	3662
ESCUELA MANUEL ACOSTA	5321	162	5483
INSTITUTO DE CAPACITACION PROFESIONAL JUSTO SIERRA	23	0	23

TECHNICAL SECONDARY EDUCATION GRADUATES

ESCUELA NACIONAL MIGUEL LERDO DE TEJADA	4	0	4
SECRETARIA DE COMUNICACIONES Y TRANSPORTES	24	21	45
ESCUELA DE AVIACION MEXICO	0	2	2
CTRO. DE ESTUDIOS TURISTICOS, A.C.	1	15	16
CTRO. SUPERIOR DE ESTUDIOS TURISTICOS	3	1	4
ESCUELA PANAMERICANA DE HOTELERIA, A.C.	69	313	382
CTRO. DE ESTUDIOS TECNOLOGICOS INTERNACIONAL DE TURISMO	30	114	144
CTRO. DE ESTUDIOS SOCIALES Y ECONOMICOS DE MEXICO	3	65	68
COLEGIO NACIONAL DE EDUCACION PROFESIONAL TECNICA *	13020	157766	170786
CTRO. ESCOLAR NEWTON	0	146	146
CTRO. DE ESTUDIOS TECNICOS EN HOTELERIA	0	22	22
INSTITUTO COMERCIAL MANUEL GUTIERREZ NAJERA	0	31	31
ESCUELA ESTEFANIA CASTAÑEDA	0	165	165
ESCUELA MILITAR DE AVIACION	112	54	166
UNIVERSIDAD INSURGENTES PLANTEL VIADUCTO	5	103	108
INSTITUTO XOCHICALCO	0	89	89
ESCUELA JOSE ROSAS MORENO	0	251	251
INSTITUTO DE COMPUTACION Y MECANIZACION DE MEXICO	0	54	54
INSTITUTO TECNOLOGICO ROOSEVELT	0	452	452
INSTITUTO DE ESTUDIOS SUPERIORES DE TURISMO	0	22	22
CTRO. ESCOLAR YAOCALLI	0	69	69
ESCUELA TECNICA RAFAEL DONDE DE MEXICO, D.F.	0	7	7
INSTITUTO ALBERTO SANTOS DUMONT	0	34	34
INSTITUTO MARILLAC	1410	442	1852
CENTRO DE ASESORIA PROFESIONAL INTENSIVA	0	6	6
COLEGIO MODERNO ALARID	0	2	2
INSTITUTO PANAMERICANO DE AERONAUTICA Y DESARROLLO	0	8	8
INSTITUTO MODERNO DE ESTUDIOS CONTABLES Y COMERCIALES	0	15	15
S.C.Y.T. CENTRO INTERNACIONAL DE ADIESTRAMIENTO DE AVIACION CIVIL	349	5	354
ESCUELA TECNICA DE TURISMO	1	0	1
COLEGIO FRANCO AMERICANO	0	6	6
UNIVERSIDAD PANAMERICANA	14	6	20
C.E.T.I.S. NO. 152	0	2	2
CTRO. DE ESTUDIOS TECNOLOGICOS Y COMERCIALES LATINOAMERICANO DE MEXICO	15	99	114
CTRO. LATINOAMERICANO DE ESTUDIOS UNIVERSITARIOS	35	55	90
CTRO. DE ESTUDIOS DE LA COMUNICACION SOCIAL	13	284	297
INSTITUTO DE MERCADOTECNIA Y PUBLICIDAD	6	282	288
C.E.T.I.S. NO. 3 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 8)	1107	1455	2562
C.E.T.I.S. NO. 13 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 4)	97	311	408
C.E.T.I.S. NO. 32 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 32)	56	259	315
C.E.T.I.S. NO. 8 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 1)	97	160	257
C.E.T.I.S. NO. 30 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 30)	1	161	162
C.E.T.I.S. NO. 33 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 33)	31	42	73
C.E.T.I.S. NO. 31 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 31) [D,F.]	11	167	178
C.E.T.I.S. NO. 76 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 76)	9	1474	1483
C.E.T.I.S. NO. 39	23	73	96
C.E.T.I.S. NO. 29	27	161	188
C.E.T.I.S. NO. 9 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 5)	335	1451	1786

TECHNICAL SECONDARY EDUCATION GRADUATES

C.E.T.I.S. NO. 11 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 9)	14	226	240
C.E.T.I.S. NO. 56 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 56)	14	498	512
C.E.T.I.S. NO. 10 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 6)	783	1591	2374
C.E.T.I.S. NO. 52	7	207	214
C.E.T.I.S. NO. 53	0	34	34
C.E.T.I.S. NO. 54	52	525	577
C.E.T.I.S. NO. 55	2	26	28
C.E.T.I.S. NO. 6 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 107)	61	264	325
C.E.T.I.S. NO. 49	4	123	127
C.E.T.I.S. NO. 50	16	491	507
C.E.T.I.S. NO. 1 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 54)	185	415	600
C.E.T.I.S. NO. 51	749	2193	2942
TECNOLOGICO UNIVERSITARIO DE MEXICO	90	2	92
C.E.T.I.S. NO. 2 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 55)	180	365	545
C.E.T.I.S. NO. 4 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 92)	81	100	181
C.E.T.I.S. NO. 7 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 2)	55	458	513
C.E.T.I.S. NO. 57	12	551	563
INSTITUTO ESPERANZA	0	44	44
CTRO. DE EDUCACION PREPARATORIA MEXICO, D. F.	0	1	1
INSTITUTO BONAMPAK	0	49	49
ESCUELA ZEFERINO AGUIRRE	0	4	4
COLEGIO AMAUTA	0	11	11
ESCUELA BRUSELAS	0	20	20
UNIVERSIDAD INSURGENTES PLANTEL SUR	0	0	0
ESCUELA NACIONAL PARA CIEGOS LIC. IGNACIO TRIGUEROS	0	2	2
CTRO. DE ESTUDIOS DE COMPUTO CAFETALES	0	11	11
ESCUELA MARTIN LUTHER KING	0	2	2
ESCUELA TECNICA PROFESIONAL DE MEDICINA ALTERNATIVA	0	0	0
C.E.T.I.S. NO. 154	0	376	376
C.E.T.I.S. NO. 153	0	104	104
UNIVERSIDAD DEL EJERCITO Y FUERZA AEREA	132	1800	1932
C.E.T.I.S. NO. 42	0	67	67
CTRO. DE ESTUDIOS EN TURISMO MIRAVALLE	0	8	8
ESCUELA MEXICANA DE TURISMO	0	26	26
INSTITUTO CESAR RITZ	0	44	44
CTRO. DE ESTUDIOS COMERCIALES Y ADMINISTRATIVOS	0	8	8
INSTITUTO CARLOS LINDBERGH	0	13	13
ESCUELA CULTURAL MAYA	0	19	19
TECNOLOGICO FEMENINO DE ORIENTE	0	38	38
CTRO. DE FORMACION Y ESTUDIOS TECNICOS INDUSTRIALES	0	12	12
ESCUELA MUNDIAL DE TURISMO	0	9	9
COLEGIO DE PILOTOS AVIADORES DE MEXICO, A. C.	0	6	6
CTRO. DE ESTUDIOS TECNICOS INTERNACIONAL DE TURISMO	0	17	17
ESCUELA PEDRO HENRIQUEZ UREÑA	0	1	1
COLEGIO TURISTICO DE LAS AMERICAS	0	16	16
TOTAL	65832	191033	256865
* These graduates come from the 439 Conalep schools all over the country			

TECHNICAL SECONDARY EDUCATION GRADUATES

DURANGO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD JUAREZ DEL ESTADO DE DURANGO	1178	185	1363
INSTITUTO TECNOLOGICO DE DURANGO (I.T.R.)	5	3	8
ESCUELA J. GUADALUPE AGUILERA	2092	22	2114
C.B.T.I.S. NO. 4 (C.E.C.Y.T. NO. 145)	10	227	237
C.B.T.A. NO. 28 (C.E.T.A. NO. 28)	0	1	1
I.T.A. NO. 1	7	39	46
C.B.T.I.S. NO. 89 (C.E.C.Y.T. NO. 281)	5	8	13
C.B.T.I.S. NO. 42	0	8	8
C.B.T.A. NO. 47 (C.E.T.A. NO. 47)	3	35	38
C.E.T.I.S. NO. 47	1	29	30
C.B.T.I.S. NO. 58 (C.E.C.Y.T. NO. 221)	16	41	57
ESCUELA GENERAL LAZARO CARDENAS DEL RIO	1590	107	1697
C.B.T.I.S. NO. 112 (C.E.C.Y.T. NO. 377)	3	55	58
C.B.T.A. NO. 149	0	2	2
C.B.T.A. NO. 101 (C.E.T.A. NO. 101) [EJIDO 6 DE OCTUBRE]	3	0	3
C.B.T.A. NO. 63 (C.E.T.A. NO. 63)	1	0	1
C.B.T.I.S. NO. 96	0	43	43
C.B.T.I.S. NO. 109	0	43	43
C.B.T.I.S. NO. 110	0	62	62
C.E.T.I.S. NO. 88	0	317	317
C.B.T.I.S. NO. 115	0	5	5
C.E.T.I.S. NO. 148	0	73	73
C.B.T.I.S. NO. 130	0	192	192
C.B.T.I.S. NO. 159	0	106	106
TOTAL	4914	1603	6517
GUANAJUATO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE GUANAJUATO	1369	1060	2429
INSTITUTO TECNOLOGICO DE CELAYA (I.T.R.)	56	57	113
INSTITUTO CELAYENSE	3	0	3
INSTITUTO AMERICANO	10	147	157
INSTITUTO AMERICA [LEON]	304	81	385
C.B.T.I.S. NO. 225	0	44	44
ESCUELA PARTICULAR INCORPORADA 1972 AÑO DE JUAREZ	131	53	184
CTRO. DE ENSEÑANZA CONSTANCIA Y PROGRESO A.C. COLEGIO MEXICO	35	183	218
INSTITUTO TEPEYAC [LEON]	126	122	248
INSTITUTO SUPERIOR DE EDUCACION TECNOLOGICA AGROPECUARIA	843	219	1062
INSTITUTO TECNOLOGICO DE LEON (I.T.R.)	1	5	6
C.B.T.A. NO. 105 (C.E.T.A. NO. 105)	1	3	4
C.B.T.I.S. NO. 173	13	178	191
C.E.T.I.S. NO. 160	0	85	85
C.E.T.I.S. NO. 115	0	288	288
C.B.T.A. NO. 174	0	6	6
C.B.T.A. NO. 175	0	15	15

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.I.S. NO. 171	0	158	158
C.B.T.I.S. NO. 172	0	174	174
C.E.T.I.S. NO. 150	0	203	203
C.B.T.A. NO. 113 (C.E.T.A. NO. 113)	1	132	133
C.B.T.I.S. NO. 174	0	20	20
C.B.T.I.S. NO. 60 (C.E.C.Y.T. NO. 230)	18	173	191
C.B.T.I.S. NO. 75 (C.E.C.Y.T. NO. 263)	4	157	161
C.B.T.I.S. NO. 65 (C.E.C.Y.T. NO. 235)	112	331	443
C.B.T.A. NO. 34 (C.E.T.A. NO. 34)	10	0	10
C.E.T.I.S. NO. 21 (CTRO. DE ESTUDIOS TECNOLOGICOS NO.21) [LEON]	68	410	478
C.E.T.I.S. NO. 139	11	101	112
C.E.T.I.S. NO. 62 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 62)	3	652	655
C.B.T.I.S. NO. 139	18	126	144
C.B.T.I.S. NO. 148	21	281	302
C.E.T.I.S. NO. 89	0	233	233
C.B.T.I.S. NO. 147	0	233	233
C.E.T.I.S. NO. 77	42	88	130
C.E.T.I.S. NO. 149	0	219	219
C.B.T.I.S. NO. 198	0	281	281
C.B.T.I.S. NO. 217	0	10	10
LICEO CERVANTINO	0	169	169
CTRO. DE ESTUDIOS DE BACHILLERATOS TECNOLOGICOS	0	14	14
C.B.T.I.S. NO. 238	0	119	119
INSTITUTO ARTURO ROSENBLUETH STEARNS	0	0	0
C.B.T.I.S. NO. 255	0	88	88
INSTITUTO GENERAL FELIPE ANGELES	0	3	3
COLEGIO LA SALLE DE LA MONTAÑA	0	10	10
TOTAL	3200	6931	10131
GUERRERO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE GUERRERO	3235	5431	8666
C.B.T.I.S. NO. 56 (C.E.C.Y.T. NO. 222)	4	682	686
C.B.T.A. NO. 18 (C.E.T.A. NO. 18)	12	9	21
C.B.T.I.S. NO. 82 (C.E.C.Y.T. NO. 275)	17	135	152
C.B.T.I.S. NO. 57 (C.E.C.Y.T. NO. 226)	2	238	240
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 18 ACAPULCO GRO.	8	35	43
C.B.T.I.S. NO. 14 (C.E.C.Y.T. NO. 37)	17	279	296
INSTITUTO TECNOLOGICO DE ACAPULCO (I.T.R.)	4	13	17
C.B.T.A. NO. 65 (C.E.T.A. NO. 65) (ARCELIA)	7	4	11
C.B.T.A. NO. 66 (C.E.T.A. NO. 66)	13	22	35
C.B.T.A. NO. 102 (C.E.T.A. NO. 102)	7	5	12
CTRO. DE ESTUDIOS JUAN ESCUTIA	22	18	40
C.E.T.I.S. NO. 41	15	469	484
C.B.T.I.S. NO. 87	0	6	6
C.B.T.F. NO. 5	0	2	2
C.B.T.I.S. NO. 134	0	760	760
C.E.T.I.S. NO. 45	0	160	160

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.A. NO. 176 DE [APAXTLA CASTREJON]	6	25	31
C.E.T.I.S. NO. 90	0	578	578
C.B.T.A. NO. 125	0	2	2
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 27 PUERTO VICENTE GUERRERO	2	20	22
C.E.T.I.S. NO. 135 [CHILPANCINGO]	0	292	292
C.B.T.A. NO. 178	0	5	5
C.B.T.A. NO. 151	0	1	1
C.B.T.A. NO. 177	0	8	8
C.B.T.A. NO. 191	0	1	1
C.B.T.I.S. NO. 176	0	24	24
C.E.T.I.S. NO. 117	0	33	33
C.E.T.I.S. NO. 116	0	145	145
ESCUELA PAZ VALLEJO MURIANA	0	119	119
C.B.T.I.S. NO. 175	0	55	55
C.B.T.I.S. NO. 216	0	30	30
C.B.T.I.S. NO. 178	0	7	7
INSTITUTO COMERCIAL TIXTLA	0	38	38
CTRO. DE CAPACITACION COMERCIAL CEC	0	2	2
C.B.T.I.S. NO. 177	0	34	34
TOTAL	3371	9687	13058
HIDALGO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE HIDALGO	876	793	1669
INSTITUTO TECNOLOGICO DE PACHUCA (I.T.R.)	5	6	11
ESCUELA VASCO DE QUIROGA	0	141	141
INSTITUTO CIENTIFICO Y LITERARIO DE HIDALGO (ESCUELA NO REG. EN INST.)	15	0	15
ESCUELA PALAS ATENEA CUAUTEPEC, HGO.	0	19	19
INSTITUTO TIOZIHUATL PARTICULAR INCORPORADA [HUEJUTLA, HGO.]	0	150	150
BACHILLERATO TECNOLOGICO "VICTORY" (CTRO. DE EST. COMERCIALES)	5	50	55
ESCUELA CRUZ AZUL	0	218	218
ACADEMIA COMERCIAL EUTIMIO ARREOLA	86	89	175
CTRO. DE ESTUDIOS COMERCIALES HIDALGO	343	355	698
C.E.T.I.S. NO. 140	3	34	37
C.B.T.A. NO. 152 DE [APAN HIDALGO]	2	5	7
C.B.T.A. NO. 179	0	11	11
C.B.T.I.S. NO. 8 (C.E.C.Y.T. NO. 15)	136	403	539
C.B.T.A. NO. 126	4	17	21
C.B.T.I.S. NO. 59 (C.E.C.Y.T. NO. 229)	63	415	478
C.B.T.I.S. NO. 83	2	123	125
C.B.T.I.S. NO. 5 (C.E.C.Y.T. NO. 147)	60	681	741
C.B.T.A. NO. 67 (C.E.T.A. NO. 67)	22	28	50
C.E.T.I.S. NO. 26 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 26)	55	798	853
C.B.T.I.S. NO. 179	2	168	170
C.B.T.A. NO. 6	9	90	99
C.B.T.A. NO. 5	10	27	37
C.E.T.I.S. NO. 91	16	679	695
C.B.T.I.S. NO. 199	0	389	389

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.I.S. NO. 200	0	246	246
C.B.T.I.S. NO. 218	0	115	115
C.B.T.I.S. NO. 222	0	417	417
CTRO. DE ESTUDIOS TECNOLOGICOS EN AGUAS CONTINENTALES NO. 2 TEZONTEPEC HGO.	0	10	10
ESCUELA TOMAS GARRIGUE MASARYK CD. SAHAGUN, HGO.	0	88	88
ESCUELA REFUGIO ESTEVES MIXQUIAHUALA, HGO.	0	1	1
COLEGIO DE EST. CIENT. Y TEC. DEL EDO. DE HIDALGO (PLANT. IXMIQUILPAN)	0	2	2
COLEGIO DE EST. CIENT. Y TEC. DEL EDO. DE HIDALGO (PLANT. HUICHAPAN)	0	3	3
COLEGIO DE EST. CIENT. Y TEC. DEL EDO. DE HIDALGO (PLANTEL HUAUTLA)	0	0	0
INSTITUTO TECNOLOGICO CANADIENSE	0	1	1
INSTITUTO MOYOCOYANI	0	29	29
COLEGIO INTERNACIONAL	0	19	19
INSTITUTO COMERCIAL SAHAGUN	0	6	6
TOTAL	1714	6626	8340
JALISCO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE GUADALAJARA	4956	4527	9483
UNIVERSIDAD AUTONOMA DE GUADALAJARA	327	41	368
INSTITUTO TECNOLOGICO DE CD. GUZMAN (I.T.R.)	4	11	15
CTRO. REGIONAL DE ENSEÑANZA TECNICA INDUSTRIAL	15	91	106
INSTITUTO PARTICULAR AMERICANO	23	0	23
CTRO. DE ESTUDIOS EN TURISMO GUADALAJARA LAMAR	1	0	1
CTRO. DE ESTUDIOS CIENTIFICOS Y TECNOLOGICOS DEL (VALLE DE ATEMAJAC)	0	219	219
INSTITUTO COLUMBIA	0	4	4
CTRO. DE ESTUDIOS TECNOLOGICOS DE LA UNIVERSIDAD AUTONOMA DE GUADALAJARA	0	131	131
CTRO. INTERNACIONAL DE ESTUDIOS DE TURISMO DE GUADALAJARA	0	35	35
UNIVERSIDAD FEMENINA DE GUADALAJARA	181	338	519
C.E.T.I.S. NO. 14	91	350	441
C.E.T.I.S. NO. 73 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 73)	1	234	235
C.B.T.I.S. NO. 63	16	12	28
C.B.T.A. NO. 127	0	2	2
C.B.T.I.S. NO. 10 (C.E.C.Y.T. NO. 25)	54	469	523
CTRO. DE ESTUDIOS TECNOLOGICOS IND. Y DE SERVICIOS NO. 14 ANTES NO. 361 (ZAPOPAN)	171	43	214
C.B.T.A. NO. 32 (C.E.T.A. NO. 32) (YAHUALICA)	30	30	60
C.B.T.I.S. NO. 61 (C.E.C.Y.T. NO. 61)	25	2	27
C.B.T.A. NO. 31 (C.E.T.A. NO. 31)	10	3	13
C.B.T.I.S. NO. 49 (C.E.C.Y.T. NO. 209)	2	121	123
C.B.T.I.S. NO. 68 (C.E.C.Y.T. NO. 241)	6	57	63
C.B.T.A. NO. 19 (C.E.T.A. NO. 19) (SAYULA)	7	5	12
C.B.T.I.S. NO. 70 (C.E.C.Y.T. NO. 243)	22	36	58
CTRO. DE ESTUDIOS TECNOLOGICOS EN AGUAS CONTINENTALES NO. 1 JOCOTEPEC JAL.	0	2	2
CENTRO DE ESTUDIOS TECNICOS VERACRUZ, A.C.	28	301	329
C.B.T.I.S. NO. 38 (C.E.C.Y.T. NO. 269)	202	864	1066
C.E.T.I.S. NO. 63	0	53	53
C.E.T.I.S. NO. 161	0	116	116
C.E.T.I.S. NO. 162	0	12	12
C.B.T.I.S. NO. 226	0	51	51

TECHNICAL SECONDARY EDUCATION GRADUATES

CTRO. DE ESTUDIOS TECNICOS DE LA INDUSTRIA DEL VESTIDO	0	37	37
CTRO. FORMATIVO DE ARTES Y OFICIOS	0	52	52
INSTITUTO LANSPIAC (JALISCO)	0	1	1
ESCUELA IGNACIA RIECHY GUADALAJARA JALISCO	0	27	27
COLEGIO TECNICO DECROLY	0	137	137
C.B.T.I.S. NO. 246 ZAPOPAN JAL.	0	25	25
C.B.T.I.S. NO. 201	0	1	1
C.B.T.I.S. NO. 247	0	16	16
C.B.T.I.S. NO. 245	0	1	1
C.B.T.I.S. NO. 262	0	0	0
CTRO. DE ESTUDIOS TECNOLOGICOS DE LAS AMERICAS	0	19	19
C.B.T.I.S. NO. 244	0	20	20
BACHILLERATO TECNOLOGICO JALISCO	0	0	0
TOTAL	6172	8496	14668
ESTADO DE MÉXICO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DEL ESTADO DE MEXICO	1169	678	1847
UNIVERSIDAD AGRICOLA AUTONOMA [CHAPINGO]	49	0	49
LICEO DE CIENCIAS Y HUMANIDADES	14	4	18
CTRO. DE CAPACITACION PARA MUJERES INDIGENAS CARMEN SERDAN	12	0	12
CTRO. DE ESTUDIOS LOMAS, S.C.	59	151	210
COLEGIO DE LA COMUNIDAD DE (CD. NEZAHUALCOYOTL)	4	5	9
INSTITUTO TECNOLOGICO DE TLALNEPANTLA (I.T.R.)	4	13	17
CTRO. UNIVERSITARIO DEL ESTADO DE MEXICO, A.C	21	28	49
C.B.T.I.S. NO. 29	3	164	167
C.B.T.A. NO. 35 (C.E.T.A. NO. 35) (CHALCO)	57	19	76
INSTITUTO TECNOLOGICO DE TOLUCA (I.T.R.)	1	9	10
C.B.T.I.S. NO. 50 (C.E.C.Y.T. NO. 210)	13	46	59
C.B.T.I.S. NO. 133	0	24	24
C.B.T.I.S. NO. 6 (C.E.C.Y.T. NO. 148)	131	232	363
C.B.T.A. NO. 96 (C.E.T.A. NO. 96)	6	18	24
C.E.T.I.S. NO. 36	4	130	134
C.E.T.I.S. NO. 23 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 23) [LERMA]	11	159	170
UNIVERSIDAD FEMENINA DEL EDO. DE MEX. [TOLUCA]	16	0	16
C.E.T.I.S. NO. 37	19	215	234
C.E.T.I.S. NO. 97	0	407	407
INSTITUTO TECNOLOGICO DEL EDO. DE MEX.	0	78	78
INSTITUTO TECNICO DE TURISMO	2	61	63
C.E.T.I.S. NO. 94	0	80	80
C.E.T.I.S. NO. 95	0	27	27
C.E.T.I.S. NO. 96	0	40	40
C.E.T.I.S. NO. 65	6	16	22
C.E.T.I.S. NO. 92	1	24	25
C.E.T.I.S. NO. 35	0	18	18
C.E.T.I.S. NO. 64	5	363	368
C.B.T.A. NO. 128	4	2	6
CTRO. DE ESTUDIOS TECNOLOGICOS DEL ANGEL, S.C.	2	13	15

TECHNICAL SECONDARY EDUCATION GRADUATES

CTRO. DE ESTUDIOS LA SALLE (ECATEPEC)	0	3	3
C.E.T.I.S. NO. 141	13	145	158
C.B.T.I.S. NO. 160 [CUAUTITLAN]	0	251	251
C.E.T.I.S. NO. 118 [ZUMPANGO]	0	84	84
C.E.T.I.S. NO. 119	4	294	298
C.B.T.A. NO. 150	1	5	6
C.B.T.A. NO. 180	0	5	5
ESCUELA MECANICA DIESEL Y VEHICULOS AUTOMOTORES DE TOLUCA	0	5	5
C.B.T.I.S. NO. 202	0	66	66
C.B.T.I.S. NO. 50 CALMECAC	1	25	26
INSTITUTO THOMAS COOK DE TLANEPANTLA, EDO. DE MEX.	0	15	15
C.B.T.I.S. NO. 180	0	10	10
CTRO. DE ESTUDIOS TECNOLOGICOS FRANCO AMERICANO DEL (EDO. DE MEX.)	0	2	2
CTRO. TECNOLOGICO EN TURISMO, A.C.	0	8	8
C.B.T.I.S. NO. 23 "DR. LEOPOLDO RIO DE LA LOZA"	0	12	12
COLEGIO ZURICH S.C.	0	1	1
COLEGIO HOUSTON	0	86	86
INSTITUTO MONTREAL DE ESTUDIOS TECNICOS NAUCALPAN, EDO. DE MEXICO	0	6	6
ESCUELA SUPERIOR DE COMERCIO NO. 2 GABRIEL V. ALCOCER	0	4	4
C.B.T.I.S. NO. 38 "ING. JUAN CELADA SALMON"	0	5	5
TECNOLOGICO PARA VEHICULOS A GASOLINA Y DIESEL, S. C.	0	1	1
C.B.T.I.S. NO. 227	0	137	137
CTRO. DE ESTUDIOS NO. 8 CALMECAC	0	6	6
C.B.T.I.S. NO. 40 DR. ALFONSO LEON DE GARAY	0	1	1
C.E.T.I.S. NO. 165	0	6	6
C.B.T.I.S. NO. 203	0	21	21
ESCUELA PARTICULAR JUANA DE ASBAJE	0	3	3
C.B.T.I.S. NO. 31 "ATANACIO CHAVEZ ROSAS"	0	4	4
CTRO. DE ESTUDIOS TECNICOS DE BACHILLERATO PROFESIONAL, S.C.	0	49	49
INSTITUTO CULTURAL TECNOLOGICO CUINCACALLI	0	3	3
INSTITUTO MODELO	0	18	18
C.B.T.I.S. NO. 15 "DR. JORGE JIMENEZ CANTU"	0	1	1
C.B.T.I.S. NO. 41 MA. LUISA MARINA DE SUAREZ	0	1	1
C.B.T.I.S. NO. 22 "DR. DONATO ALARCON SEGOVIA"	0	3	3
C.B.T.I.S. NO. 43 "ISAAC NEWTON"	0	2	2
INSTITUTO ANA FREUD	0	3	3
UNIVERSIDAD TERRANOVA TOLUCA, ESTADO DE MEXICO	0	2	2
ESCUELA DOMINGO FAUSTINO SARMIENTO ECATEPEC DE MORELOS, EDO. DE MEXICO	0	46	46
C.B.T.I.S. NO. 24 "JUSTO SIERRA"	0	1	1
C.B.T.I.S. NO. 161	38	366	404
C.B.T.I.S. NO. 27 "DR. CARLOS SOSA MOSS"	0	1	1
INSTITUTO TECNICO PROFESIONAL DE TOLUCA, S.C.	0	2	2
C.B.T.I.S. NO. 16 PROF. LUIS CAMARENA GONZALEZ	0	0	0
INSTITUTO DE MERCADOTECNIA Y PUBLICIDAD (NAUCALPAN)	0	9	9
CTRO. DE BACHILLERATO TECNOLOGICO DE SERVICIOS JUAREZ	0	0	0
ESCUELA QUETZALCOATL	0	2	2
CTRO. UNIVERSITARIO DE ORIENTE	0	1	1
CTRO. DE ESTUDIOS TECNOLOGICOS Y DE ESPECIALIZACION CONTINUA RAVEL	0	3	3
ESCUELA EULALIA SANDOVAL	0	10	10

TECHNICAL SECONDARY EDUCATION GRADUATES

COLEGIO MEXIQUENSE DE EDUCACION TECNICA, A.C.	0	1	1
ESCUELA NARCISO BASSOLS	0	3	3
INSTITUTO COMERCIAL Y BACHILLERATO	0	7	7
C.B.T.I.S. NO. 54 ANGEL MARIA GARIBAY KINTANA	0	2	2
TOTAL	1670	4771	6441
MICHOACAN			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD MICHOACANA DE SAN NICOLAS DE HIDALGO	2398	2038	4436
INSTITUTO TECNOLOGICO DE MORELIA (I.T.R)	2	53	55
COLEGIO MOTOLINIA, A.C.	527	1	528
UNIVERSIDAD VASCO DE QUIROGA, A.C.	0	1	1
ESCUELA MICHOACANA DE TURISMO	0	81	81
I.T.A. NO. 7	0	13	13
CTRO. DE ESTUDIOS TECNOLOGICOS ANTONIO PLANCARTE	47	504	551
C.B.T.I.S. NO. 18 (C.E.C.Y.T. NO. 50)	3	64	67
C.B.T.I.S. NO. 12 (C.E.C.Y.T. NO. 29 AHORA NO. 12)	102	80	182
C.B.T.A. NO. 33 (C.E.T.A. NO. 33)	19	5	24
C.B.T.A. NO. 7 (C.E.T.A. NO. 7)	3	160	163
C.B.T.I.S. NO. 84 (C.E.C.Y.T. NO. 277)	42	107	149
C.B.T.I.S. NO. 94	14	52	66
C.E.T.I.S. NO. 27 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 27)	67	281	348
C.E.T.I.S. NO. 28	8	266	274
C.B.T.A. NO. 68 (C.E.T.A. NO. 68) (CHILCHOTA)	6	2	8
C.B.T.A. NO. 89 (C.E.T.A. NO. 89) [TERETAN]	7	49	56
C.B.T.A. NO. 70 (C.E.T.A. NO. 70) (TEPALCATEPEC)	14	1	15
C.B.T.A. NO. 69 (C.E.T.A. NO. 69) (CHUPIO)	17	1	18
C.B.T.A. NO. 49	0	10	10
C.B.T.I.S. NO. 52 (C.E.C.Y.T. NO. 212)	12	353	365
C.B.T.F. NO. 6 [CD. HIDALGO, MICH.]	39	109	148
C.B.T.I.S. NO. 149	4	503	507
C.E.T.I.S. NO. 34	1	194	195
C.B.T.A. NO. 114 (C.E.T.A. NO. 114)	13	6	19
C.B.T.A. NO. 140	0	2	2
C.E.T.I.S. NO. 121	21	163	184
C.E.T.I.S. NO. 120	5	476	481
C.B.T.A. NO. 181 DE [MARAVATIO, MICH.]	2	15	17
C.B.T.I.S. NO. 182 [ZINAPECUARO]	0	62	62
C.B.T.I.S. NO. 162	0	118	118
C.B.T.I.S. NO. 204	0	80	80
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 16 LAZARO CARDENAS MICHOACAN	0	27	27
C.B.T.A. NO. 153	0	11	11
CTRO. DE ESTUDIOS TECNOLOGICOS JUAN DE SAN MIGUEL	0	310	310
CTRO. DE ESTUDIOS TECNOLOGICOS MIGUEL HIDALGO	0	181	181
CTRO. DE ESTUDIOS TECNOLOGICOS LUMENA	0	189	189
CTRO. DE ESTUDIOS TECNOLOGICOS ANAHUAC	0	125	125
INSTITUTO MORELIA	0	45	45
ESCUELA PATTYE F. SOUTHERLAND	0	151	151

TECHNICAL SECONDARY EDUCATION GRADUATES

CTRO. DE ESTUDIOS TECNOLOGICOS PROGRESO	0	32	32
CTRO. DE ESTUDIOS TECNOLOGICOS JOSE MARIA MORELOS	0	20	20
CTRO. DE ESTUDIOS TECNOLOGICOS MANUEL PEREZ CORONADO	0	10	10
C.B.T.I.S. NO. 181	0	4	4
TOTAL	3373	6955	10328
MORELOS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DEL ESTADO DE MORELOS	3196	1591	4787
ESCUELA DE TURISMO JUAN DE DIOS BATIZ	11	68	79
UNIVERSIDAD FRAY LUCA PACCIOLI	0	69	69
INSTITUTO PAPE CARPENTIER	1	0	1
C.B.T.A. EL PEÑON NO. 193	0	2	2
UNIVERSIDAD FEMENINA DE CUERNAVACA	90	25	115
INSTITUTO TECNOLOGICO DE ZACATEPEC (I.T.R.)	12	22	34
ESCUELA MILITARIZADA CRISTOBAL COLON	258	42	300
I.T.A. NO. 9	2	2	4
CTRO. DE ESTUDIOS TECNICOS Y COMERCIALES DR. RIO DE LA LOZA	136	382	518
INSTITUTO JUANA DE ARCO	0	108	108
C.B.T.A. NO. 71 (C.E.T.A. NO. 71) (TLALNEPANTLA)	18	10	28
C.B.T.A. NO. 8 (C.E.T.A. NO. 8)	23	100	123
C.B.T.A. NO. 39 (C.E.T.A. NO. 39)	3	11	14
C.E.T.I.S. NO. 12 (CTRO. DE ESTUDIOS TECNOLOGICOS NO.140) [JIUTEPEC, MOR.]	33	422	455
C.E.T.I.S. NO. 44 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 44)	6	337	343
C.B.T.I.S. NO. 194	0	590	590
C.E.T.I.S. NO. 43	2	774	776
C.B.T.I.S. NO. 76	56	1030	1086
C.E.T.I.S. NO. 122	16	1056	1072
C.B.T.A. NO. 190	1	8	9
CTRO. DE ESTUDIOS COMERCIALES MINERVA	2	168	170
INSTITUTO LEOPOLDO DE PORTILLO CARDENAS	0	9	9
C.B.T.A. NO. 155	0	7	7
C.E.T.I.S. NO. 99	22	462	484
C.B.T.I.S. NO. 136	52	511	563
C.B.T.A. NO. 129	2	2	4
C.B.T.A. NO. 154	4	21	25
C.B.T.I.S. NO. 166	0	338	338
C.B.T.I.S. NO. 223	0	91	91
INSTITUTO DE ESTUDIOS JOJUTLA MORELOS	0	5	5
CTRO. INTERNACIONAL DE ESTUDIOS DE TURISMO DE MORELOS	0	106	106
ESCUELA CHARLES RICHEL	0	97	97
CTRO. DE ESTUDIOS TECNICOS Y ADMINISTRATIVOS	0	48	48
ESCUELA TECNICA AUTOMOTRIZ DE CUAUTLA BENJAMIN FRANKLIN	0	31	31
ESCUELA FEMENINA DE MONTEFALCO	0	12	12
INSTITUTO DE ARTES Y CIENCIAS APLICADAS CUERNAVACA, MOR.	0	5	5
CTRO. DE DESARROLLO EDUCATIVO Y CULTURAL DE MORELOS	0	12	12
C.B.T.I.S. NO. 232	0	28	28
ESCUELA LIBERTAD	0	13	13

TECHNICAL SECONDARY EDUCATION GRADUATES

TOTAL	3946	8615	12561
NAYARIT			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE NAYARIT	1356	1238	2594
INSTITUTO DE ESTUDIOS TECNOLOGICOS Y SUPERIORES MATATIPAC, A.C.	0	67	67
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 26 SAN BLAS NAY.	0	8	8
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 6 LA HUANACAXTLE NAY.	14	52	66
C.B.T.I.S. NO. 100 (C.E.C.Y.T. NO. 340) [NAYARIT]	9	171	180
C.E.T.I.S. NO. 100	0	116	116
C.B.T.I.S. NO. 27 (C.E.C.Y.T. NO. 157)	37	234	271
INSTITUTO TECNOLOGICO DE TEPIC (I.T.R.)	7	88	95
INSTITUTO TECNOLOGICO Y DE ESTUDIOS SUPERIORES DE TEPIC	378	225	603
C.B.T.A. NO. 108	0	0	0
C.B.T.A. NO. 72 (C.E.T.A. NO. 72) ROSA MORADA	3	0	3
INSTITUTO LAS AMERICAS DE NAYARIT, S. C.	0	9	9
TOTAL	1804	2208	4012
NUEVO LEÓN			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE NUEVO LEON	3120	1557	4677
UNIVERSIDAD DE MONTERREY	2	67	69
CTRO. DE ESTUDIOS SUPERIORES DE DISEÑO DE MONTERREY, S. C.	30	205	235
CTRO. DE ESTUDIOS UNIVERSITARIOS DE (MONTERREY)	2167	1699	3866
C.B.T.I.S. NO. 74 (C.E.C.Y.T. NO. 262)	115	196	311
INSTITUTO UNIVERSITARIO METROPOLITANO	37	241	278
C.B.T.I.S. NO. 22	4	58	62
C.B.T.I.S. NO. 53	0	17	17
C.E.T.I.S. NO. 66	28	21	49
C.B.T.A. NO. 73	1	0	1
C.B.T.A. NO. 74	0	2	2
C.B.T.I.S. NO. 99	1	138	139
C.E.T.I.S. NO. 101	0	278	278
C.E.T.I.S. NO. 163	0	124	124
INSTITUTO GUADALUPE DE ESTUDIOS SUPERIORES, S.C. UNIDAD MONTEMORELOS	0	0	0
UNIVERSIDAD DE MONTEMORELOS	1	13	14
C.B.T.A. NO. 59 (C.E.T.A. NO. 59) (GALEANA)	5	3	8
C.B.T.A. NO. 58 (C.E.T.A. NO. 58) (GALEANA)	1	0	1
C.B.T.A. NO. 48 (C.E.T.A. NO. 48) (EL POTOSI)	2	0	2
C.B.T.A. NO. 50 (C.E.T.A. NO. 50)	0	4	4
C.B.T.I.S. NO. 258	0	78	78
TOTAL	5514	4701	10215
OAXACA			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA BENITO JUAREZ DE OAXACA	1187	1052	2239

TECHNICAL SECONDARY EDUCATION GRADUATES

INSTITUTO TECNOLOGICO DE OAXACA (I.T.R.)	11	0	11
INSTITUTO TECNOLOGICO DE PINOTEPA NACIONAL (I.T.A. NO. 13 [PINOTEPA NAL., OAX.])	4	0	4
BACHILLERATO TECNOLOGICO CRUZ AZUL	0	183	183
CTRO. DE ESTUDIOS TECNICOS Y COMERCIALES EULOGIO GULLOW OAXACA OAX.	0	11	11
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 5 SALINAS CRUZ OAX.	12	13	25
C.E.T.I.S. NO. 123	0	25	25
C.B.T.I.S. NO. 90 (C.E.C.Y.T. NO. 285)	6	13	19
INSTITUTO TECNICO LATINO, A.C.	154	88	242
C.B.T.I.S. NO. 31 (C.E.C.Y.T. NO. 168)	2	20	22
C.B.T.I.S. NO. 26 (C.E.C.Y.T. NO. 137)	22	80	102
C.B.T.I.S. NO. 25	0	33	33
C.B.T.I.S. NO. 2	3	20	23
C.B.T.A. NO. 77 (C.E.T.A. NO. 77)	3	9	12
C.B.T.A. NO. 16 (C.E.T.A. NO. 16) (SAN BARTOLO TUXTEPEC)	3	1	4
C.B.T.I.S. NO. 107	0	1	1
C.B.T.A. NO. 37	0	7	7
C.B.T.A. NO. 76	0	26	26
C.B.T.F. NO. 3	0	3	3
C.B.T.A. NO. 10 (C.E.T.A. NO. 10)	3	4	7
C.B.T.A. NO. 51 (C.E.T.A. NO. 51)	11	16	27
C.B.T.A. NO. 78 (C.E.T.A. NO. 78) [ZAACHILA]	8	9	17
C.B.T.I.S. NO. 91 (C.E.C.Y.T. NO. 291)	14	26	40
C.B.T.I.S. NO. 123	0	88	88
C.B.T.A. NO. 92	3	1	4
C.B.T.I.S. NO. 150	0	33	33
C.B.T.A. NO. 75 (C.E.T.A. NO. 75) [ACATLAN DE PEREZ]	16	2	18
C.E.T.I.S. NO. 102	8	45	53
INSTITUTO TECNOLOGICO DE TUXTEPEC (I.T.R.)	0	1	1
UNIVERSIDAD REGIONAL DEL SURESTE	92	108	200
COLEGIO MOTOLINIA	5	0	5
INSTITUTO TECNOLOGICO DEL ISTMO (I.T.R)	0	1	1
C.B.T.A. NO. 9	9	4	13
C.B.T.A. NO. 131	2	1	3
C.E.T.I.S. NO. 103	0	4	4
C.E.T.I.S. NO. 38	2	168	170
C.B.T.A. NO. 158	0	3	3
C.B.T.A. NO. 192	0	2	2
C.E.T.I.S. NO. 124	1	27	28
C.B.T.I.S. NO. 183	0	19	19
INSTITUTO LIBRE DE COMERCIO Y ADMINISTRACION	0	15	15
CENTRO DE ESTUDIOS UNIVERSITARIOS Y TECNOLOGICOS	0	7	7
C.B.T.I.S. NO. 205	0	0	0
COLEGIO DE EST. CIENT. Y TEC. DEL EDO. DE OAXACA (PLANTEL TUTUTEPEC)	0	0	0
C.B.T.I.S. NO. 240	0	45	45
C.B.T.I.S. NO. 259	0	2	2
C.B.T.I.S. NO. 248	0	1	1
TOTAL	1581	2217	3798

TECHNICAL SECONDARY EDUCATION GRADUATES

PUEBLA			
INSTITUTION	1945-1989	1990-98	TOTAL
BENEMERITA UNIVERSIDAD AUTONOMA DE PUEBLA	2239	2246	4485
UNIVERSIDAD POPULAR AUTONOMA DE PUEBLA	313	472	785
UNIVERSIDAD FEMENINA DE PUEBLA	5	0	5
LICEO TECNICO ITALIANO DE PUEBLA	4	29	33
INSTITUTO MEXICANO MADERO	12	1	13
TEHUITZINGO	3	0	3
ESCUELA CIVIL DE AVIACION 5 DE MAYO	55	0	55
ESCUELA DE TURISMO ROBERTO CAÑEDO MARTINEZ	0	310	310
INSTITUTO TECNOLOGICO DE PUEBLA (I.T.R.)	1	4	5
C.B.T.I.S. NO. 16 (C.E.C.Y.T. NO. 46)	2	11	13
C.E.T.I.S. NO. 17	2	125	127
C.E.T.I.S. NO. 67	9	416	425
ESCUELA RUDOLPH DIESEL	0	340	340
C.B.T.I.S. NO. 86 (C.E.C.Y.T. NO. 302)	31	129	160
C.B.T.I.S. NO. 44 (C.E.C.Y.T. NO. 204)	11	67	78
C.B.T.A. NO. 79	0	6	6
C.E.T.I.S. NO. 104	0	199	199
C.B.T.A. NO. 168	0	4	4
INSTITUTO TECNOLOGICO DE TEHUACAN (I.T.R.)	9	15	24
C.B.T.A. NO. 184	0	21	21
C.B.T.A. NO. 185	0	10	10
C.B.T.I.S. NO. 184	0	26	26
C.E.T.I.S. NO. 151	0	79	79
INSTITUTO BRITANICO DE LA CD. DE PUEBLA, A.C.	0	74	74
C.B.T.I.S. NO. 67	0	73	73
C.B.T.I.S. NO. 229	0	59	59
INSTITUTO TECNICO PANAMERICANO	0	3	3
INSTITUTO EUROCENTURY	0	42	42
INSTITUTO TECNOLOGICO ROOSEVELT	0	1	1
C.B.T.I.S. NO. 260	0	1	1
C.B.T.I.S. NO. 254	0	0	0
C.B.T.I.S. NO. 241	0	2	2
C.B.T.I.S. NO. 242	0	1	1
CENTRO EDUCATIVO DE PUEBLA	0	1	1
COLEGIO MEXICANO	0	0	0
INSTITUTO WILLIAM SHAKESPEARE DE TEXMELUCAN, A.C.	0	0	0
TOTAL	2696	4767	7463
QUERETARO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE QUERETARO	814	362	1176
INSTITUTO TECNOLOGICO DE QUERETARO (I.T.R.)	5	4	9
INSTITUTO 5 DE MAYO	7	137	144
ESCUELA CLARA BARTON	0	102	102
C.B.T.A. NO. 115	1	3	4
C.B.T.I.S. NO. 118	5	54	59

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.I.S. NO. 145	0	65	65
C.E.T.I.S. NO. 105	7	113	120
C.E.T.I.S. NO. 16	0	90	90
C.E.T.I.S. NO. 142	0	75	75
ESCUELA TECNICA COMERCIAL VASCO DE QUIROGA	0	112	112
INSTITUTO SOCIAL COMERCIAL EN CONTADURIA ADMINISTRATIVA	0	9	9
ESCUELA CINCO DE MAYO	0	1	1
COL. DE EST. CIENTIFICOS Y TEC. DEL EDO. DE QRO. PLAN. 82 HUIMILPAN	0	5	5
COL. DE EST. CIENTIFICOS Y TEC. DEL EDO. DE QRO. PLAN. 83 PEDRO ESCOBEDO	0	14	14
COL. DE EST. CIENTIFICOS Y TEC. DEL EDO. DE QRO. PLAN. 84 PINAL DE AMOLES	0	6	6
COL. DE EST. CIENTIFICOS Y TEC. DEL EDO. DE QRO. PLAN. 85 PEÑAMILLER	0	10	10
TOTAL	839	1162	2001
QUINTANA ROO			
INSTITUTION			
	1945-1989	1990-98	TOTAL
C.B.T.I.S. NO. 28 (C.E.C.Y.T. NO. 159)	4	34	38
C.B.T.I.S. NO. 72 (C.E.C.Y.T. NO. 245)	7	12	19
C.B.T.A. NO. 186	0	2	2
C.B.T.A. NO. 11	5	10	15
INSTITUTO TECNOLOGICO DE CHETUMAL (I.T.R.)	0	1	1
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 23 CHETUMAL Q. ROO	0	16	16
C.B.T.A. NO. 80	0	0	0
C.B.T.I.S. NO. 111	0	7	7
C.B.T.I.S. NO. 214	0	51	51
C.B.T.I.S. NO. 253	0	24	24
TOTAL	16	157	173
SAN LUIS POTOSI			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE SAN LUIS POTOSI	1131	43	1174
ESCUELA PARTICULAR GABRIELA MISTRAL	379	47	426
ESCUELA TECNICA ATENEA	82	68	150
INSTITUTO TECNOLOGICO DE SAN LUIS POTOSI (I.T.R.)	0	2	2
C.E.T.I.S. NO. 125	22	748	770
C.E.T.I.S. NO. 126	0	111	111
C.B.T.I.S. NO. 46 (C.E.C.Y.T. NO. 206)	23	381	404
C.B.T.A. NO. 52 (C.E.T.A. NO. 52)	30	18	48
C.B.T.I.S. NO. 131	59	640	699
ESCUELA DE BACHILLERATO EN CIENCIAS SOCIALES GALILEO GALILEI	41	7	48
CTRO. DE ESTUDIOS EN DECORACION CIENCIA Y ARTE	50	0	50
C.B.T.I.S. NO. 87	0	122	122
C.B.T.A. NO. 120	3	3	6
C.B.T.A. NO. 141	2	0	2
C.B.T.A. NO. 121	2	2	4
C.B.T.I.S. NO. 121	1	362	363
C.B.T.I.S. NO. 151	0	211	211
C.E.T.I.S. NO. 106	1	219	220

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.A. NO. 123	7	4	11
C.B.T.A. NO. 143	0	6	6
C.B.T.A. NO. 142	0	6	6
C.B.T.A. NO. 119	0	1	1
C.B.T.A. NO. 187 DE [ACOSTA, S.L.P.]	2	7	9
C.B.T.I.S. NO. 185	2	362	364
C.B.T.I.S. NO. 186	0	91	91
C.B.T.A. NO. 159	0	4	4
C.B.T.A. NO. 160	0	3	3
C.B.T.I.S. NO. 187	0	62	62
INSTITUTO TECNICO HERMAN HOLLERIT	0	59	59
INSTITUTO CARLOS GOMEZ	0	29	29
INSTITUTO JUVENTUD	0	17	17
ESCUELA GABRIELA MISTRAL, A. C.	0	18	18
INSTITUTO TECNOLOGICO METROPOLITANO SAN LUIS POTOSI	0	26	26
ESCUELA CARTAGO	0	0	0
LICEO RIOVERDE	0	176	176
COL. DE EST. CIEN. Y TECNO. DEL EDO. DE SAN LUIS POTOSI (PL. SLP I)	0	0	0
COL. DE EST. CIEN. Y TECNO. DEL EDO. DE SAN LUIS POTOSI (PL. SLP II)	0	0	0
COL. DE EST. CIEN. Y TECNO. DEL EDO. DE SAN LUIS POTOSI (PL. SLP III)	0	0	0
TOTAL	1837	3855	5692
SINALOA			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE SINALOA	4033	3685	7718
INSTITUTO TECNOLOGICO DE CULIACAN (I.T.R.)	7	8	15
CTRO. DE ESTUDIOS TECNOLOGICOS DEL PACIFICO [UNIVERSIDAD DEL PACIFICO, A.C	0	1	1
CTRO. DE ESTUDIOS SUPERIORES	0	5	5
SECRETARIA DE MARINA ESCUELA NAVAL MILITAR [MAZATLAN]	158	2	160
C.B.T.A. NO. 25 (C.E.T.A. NO. 25)	1	292	293
C.B.T.I.S. NO. 51 (C.E.C.Y.T. NO. 211)	32	89	121
C.B.T.I.S. NO. 45 (C.E.C.Y.T. NO. 205)	36	63	99
C.B.T.I.S. NO. 43	45	36	81
CTRO. DE ESTUDIOS SUPERIORES DE GUAMUCHIL, A.C. (SIN.)	13	53	66
ESCUELA NAUTICA MERCANTE DE MAZATLAN CAP. DE ALT. ANTONIO GOMEZ M.	115	88	203
INSTITUTO DEL NOROESTE	129	117	246
CTRO. DE ESTUDIOS TECNOLOGICOS DE TRABAJO SOR JUANA INES DE LA CRUZ	38	2	40
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 23 TEACAPAN SIN.	1	40	41
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 8 MAZATLAN SIN.	6	25	31
C.B.T.A. NO. 133	1	1	2
C.B.T.A. NO. 81	0	89	89
C.B.T.I.S. NO. 152	0	22	22
C.E.T.I.S. NO. 107	0	28	28
C.E.T.I.S. NO. 108	16	84	100
C.E.T.I.S. NO. 68	0	180	180
C.B.T.A. NO. 116	0	11	11
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 13 TOPOLOBAMPO SIN.	3	16	19
C.E.T.I.S. NO. 127	11	21	32

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.I.S. NO. 43	0	17	17
C.B.T.I.S. NO. 224	0	23	23
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 28 ALTATA SIN.	0	6	6
CTRO. TECNOLOGICO DE MAZATLAN	0	9	9
TOTAL	4645	5013	9658
SONORA			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE SONORA	489	310	799
INSTITUTO TECNOLOGICO DE SONORA	350	214	564
C.B.T.I.S. NO. 81 (C.E.C.Y.T. NO. 274)	16	32	48
COLEGIO DE SONORA	0	1	1
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 3 GUAYMAS SON.	9	24	33
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 14 PUERTO PENASCO SON.	0	6	6
C.B.T.A. NO. 38 (C.E.T.A. NO. 38) (CAJEME, SON.)	0	9	9
C.B.T.A. NO. 161	0	27	27
C.B.T.I.S. NO. 129	5	29	34
C.B.T.I.S. NO. 40 (C.E.C.Y.T. NO. 200)	23	503	526
C.E.T.I.S. NO. 128	0	253	253
C.B.T.I.S. NO. 106	9	223	232
C.B.T.I.S. NO. 64 (C.E.C.Y.T. NO. 234)	14	187	201
C.B.T.I.S. NO. 11 (C.E.C.Y.T. NO. 26)	45	132	177
C.B.T.I.S. NO. 37 (C.E.C.Y.T. NO. 220)	14	124	138
C.B.T.I.S. NO. 63 (C.E.C.Y.T. NO. 233)	41	107	148
INSTITUTO TECNOLOGICO DE NOGALES, SON. (I.T.R.)	6	2	8
INSTITUTO TECNOLOGICO DE HERMOSILLO, SON. (I.T.R.)	0	1	1
C.B.T.I.S. NO. 33 (C.E.C.Y.T. NO. 172)	18	192	210
C.B.T.A. NO. 53 (C.E.T.A. NO. 53)	5	9	14
C.B.T.I.S. NO. 188	0	95	95
C.B.T.A. NO. 97	1	13	14
C.B.T.A. NO. 26	0	1	1
C.B.T.I.S. NO. 132	0	391	391
C.E.T.I.S. NO. 69	0	52	52
C.B.T.A. NO. 132	0	41	41
C.B.T.I.S. NO. 206	0	127	127
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 22 YAVAROS SON.	0	4	4
C.B.T.I.S. NO. 207	0	36	36
COLEGIO CENTRAL PROFESOR ANTONIO GAMEZ, S. C.	0	2	2
ESCUELA PITIC	0	5	5
INSTITUTO SUPERIOR DE COMERCIO	0	0	0
C.B.T.A. NO. 197	0	0	0
TOTAL	1045	3152	4197
TABASCO			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD JUAREZ AUTONOMA DE TABASCO	472	652	1124
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 19 FRONTERA TAB.	5	16	21

TECHNICAL SECONDARY EDUCATION GRADUATES

INSTITUTO TECNOLOGICO DE VILLAHERMOSA, TAB. (I.T.R.)	17	0	17
CENTRO BACHILLERATO TECNOLOGICO PARAISO	0	0	0
C.B.T.I.S. NO. 32 (C.E.C.Y.T. NO. 169)	47	124	171
C.B.T.A. NO. 54 (C.E.T.A. NO. 54)	1	1	2
C.E.T.I.S. NO. 40	2	75	77
C.B.T.A. NO. 94 (C.E.T.A. NO. 94) [JALPA DE MENDEZ, TAB.]	6	20	26
C.B.T.I.S. NO. 93 (C.E.C.Y.T. NO. 326)	1	147	148
C.B.T.A. NO. 93	0	20	20
C.B.T.A. NO. 82	0	1	1
C.E.T.I.S. NO. 70	0	58	58
C.B.T.A. NO. 144	1	6	7
C.B.T.I.S. NO. 163	0	26	26
CTRO. DE ESTUDIOS PROFESOR CARLOS FERNANDEZ LOPEZ	0	14	14
COLEGIO MONTECRISTO, S.C.	0	4	4
C.B.T.I.S. NO. 167	0	11	11
C.B.T.I.S. NO. 249	0	0	0
CTRO. DE ESTUDIOS TECNICOS MOCTEZUMA	0	12	12
ESCUELA MELANIE KLEIN	0	37	37
INSTITUTO DE DIFUSION TECNICA 6	0	1	1
CTRO. DE ESTUDIOS TECNOLOGICOS ATENAS	0	2	2
COLEGIO DE EST. C. Y TECNO. DEL EDO. DE TAB. P. AQUILES SERDAN	0	0	0
COLEGIO DE EST. C. Y TECNO. DEL EDO. DE TAB. P. TAPIJULAPA	0	0	0
COLEGIO DE EST. C. Y TECNO. DEL EDO. DE TAB. P. TEQUILA	0	0	0
COLEGIO DE EST. C. Y TECNO. DEL EDO. DE TAB. P. COMALCALCO	0	0	0
COLEGIO DE EST. C. Y TECNO. DEL EDO. DE TAB. P. VILLA IGNACIO ALLENDE	0	0	0
COLEGIO DE EST. C. Y TECNO. DEL EDO. DE TAB. P. IGNACIO GUTIERREZ G.	0	0	0
TOTAL	552	1227	1779
TAMAULIPAS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE TAMAULIPAS	4921	2245	7166
INSTITUTO TECNOLOGICO DE CD. MADERO, TAMS. (I.T.R.)	94	128	222
INSTITUTO TECNOLOGICO DE NUEVO LAREDO, TAMPS. (I.T.R.)	1	0	1
INSTITUTO TECNOLOGICO DE MATAMOROS, TAMS. (I.T.R.)	1	3	4
UNIVERSIDAD REGIONAL MIGUEL HIDALGO	274	254	528
INSTITUTO DE CIENCIAS Y ESTUDIOS SUPERIORES DE TAMAULIPAS, A.C.	358	548	906
INSTITUTO DE CIENCIAS Y TECNOLOGIA DE TAMPICO	130	0	130
DIRECCION GENERAL DE LA MARINA MERCANTE	9	0	9
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 9 CD. MADERO TAM.	6	28	34
CTRO. DE ESTUDIOS TECNOLOGICOS SALVADOR DIAZ MIRON	119	24	143
I.T.A. NO. 4	2	0	2
UNIVERSIDAD VALLE DEL BRAVO	4	18	22
C.B.T.I.S. NO. 15 (C.E.C.Y.T. NO. 40)	24	757	781
C.E.T.I.S. NO. 22 (CTRO. DE ESTUDIOS TECNOLOGICOS NO. 22) [TAMPICO]	43	456	499
C.B.T.A. NO. 98 (C.E.T.A. NO. 98) L. CARDENAS	2	0	2
C.B.T.I.S. NO. 7 (C.E.C.Y.T. NO. 149)	62	179	241
C.B.T.I.S. NO. 73 (C.E.C.Y.T. NO. 246)	95	80	175
C.B.T.A. NO. 12 (C.E.T.A. NO. 12)	4	15	19

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.I.S. NO. 24 (C.E.C.Y.T. NO. 104)	201	298	499
ESCUELA NAUTICA MERCANTE DE [TAMPICO]	154	129	283
UNIVERSIDAD DEL NORESTE	254	95	349
UNIVERSIDAD MIGUEL ANGEL	21	0	21
ESCUELA NORMAL EXPERIMENTAL LIC. EMILIO PORTES GIL	18	32	50
C.B.T.I.S. NO. 98 [XICOTENCATL, TAMPS.]	2	46	48
C.B.T.I.S. NO. 105 (C.E.C.Y.T. NO. 349)	9	86	95
C.B.T.I.S. NO. 103 (C.E.C.Y.T. NO. 347)	18	69	87
C.B.T.A. NO. 117 [TAMAULIPAS]	1	3	4
C.B.T.I.S. NO. 119 (C.E.C.Y.T. NO. 418)	24	272	296
CTRO. DE ESTUDIOS PROFESIONALES DE LAZARO CARDENAS	4	2	6
C.B.T.A. NO. 56	3	15	18
UNIVERSIDAD MEXICO AMERICANA DEL NORTE	12	23	35
INSTITUTO DE COMPUTACION DEL NOROESTE, S.C.	0	3	3
C.B.T.A. NO. 139 FRANCISCO VILLA	2	11	13
CTRO. DE ESTUDIOS TECNOLOGICOS IBEROAMERICANO DE (CD. MANTE, TAMPS.)	24	64	88
UNIVERSIDAD DE MATAMOROS	2	9	11
C.B.T.I.S. NO. 220	0	80	80
C.B.T.A. NO. 55	0	4	4
C.B.T.A. NO. 83	0	11	11
C.B.T.I.S. NO. 125	0	137	137
C.B.T.I.S. NO. 135	0	223	223
C.E.T.I.S. NO. 71	6	56	62
C.E.T.I.S. NO. 78	0	16	16
C.E.T.I.S. NO. 109	0	39	39
C.B.T.I.S. NO. 137	0	37	37
C.E.T.I.S. NO. 130	1	136	137
C.E.T.I.S. NO. 131	0	44	44
C.E.T.I.S. NO. 129	0	28	28
C.B.T.I.S. NO. 219	0	35	35
C.B.T.I.S. NO. 209	0	98	98
C.B.T.I.S. NO. 210	0	5	5
C.B.T.I.S. NO. 208	0	69	69
UNIVERSIDAD PANAMERICANA DE NUEVO LAREDO	1	58	59
C.B.T.I.S. NO. 164	0	29	29
C.B.T.I.S. NO. 189	0	157	157
C.B.T.I.S. NO. 236	0	93	93
C.B.T.I.S. NO. 234	0	3	3
INSTITUTO LICEO FRANCO AMERICANO	0	3	3
INSTITUTO TAMAULIPECO DE CAPACITACION PARA EL EMPLEO, PL. CD. VICTORIA	0	18	18
INSTITUTO TAMAULIPECO DE CAPACITACION PARA EL EMPLEO, PL. REYNOSA	0	0	0
INSTITUTO TAMAULIPECO DE CAPACITACION PARA EL EMPLEO, PL. MATAMOROS	0	1	1
INSTITUTO UNIVERSITARIO METROPOLITANO, S.C.	0	4	4
TOTAL	6906	7276	14182
TLAXCALA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE TLAXCALA	1076	674	1750

TECHNICAL SECONDARY EDUCATION GRADUATES

INSTITUTO DE ESTUDIOS SUPERIORES DE TLAXCALA	265	6	271
C.B.T.I.S. NO. 61 (C.E.C.Y.T. NO. 231)	15	142	157
C.B.T.I.S. NO. 3 (C.E.C.Y.T. NO. 144)	12	79	91
C.B.T.A. NO. 134	3	0	3
INSTITUTO TECNOLOGICO DE APIZACO, TLAX. (I.T.R.)	3	5	8
C.B.T.A. NO. 162	2	2	4
C.E.T.I.S. NO. 132	0	68	68
C.B.T.I.S. NO. 212	0	251	251
C.B.T.I.S. NO. 154	2	209	211
C.B.T.I.S. NO. 153	0	187	187
C.B.T.I.S. NO. 211	0	14	14
COLEGIO JOSE MARIA LAFRAGUA, A.C.	0	10	10
COLEGIO DE ESTUDIOS CIENTIFICOS Y TECNOLOGICOS DEL EDO. DE TLAXCALA	0	21	21
TOTAL	1378	1668	3046
VERACRUZ			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD VERACRUZANA	3104	2753	5857
INSTITUTO TECNOLOGICO DE ORIZABA, VER. (I.T.R.)	30	23	53
INSTITUTO TECNOLOGICO DE VERACRUZ (I.T.R.)	5	1	6
ESCUELA NAVAL MILITAR ANTON LIZARDO (SECRETARIA DE MARINA)	221	43	264
ESCUELA DE AVIACION NAVAL	3	0	3
ESCUELA NAUTICA MERCANTE FERNANDO SILICEO	828	107	935
INSTITUTO TECNOLOGICO Y DE ESTUDIOS SUPERIORES "RENE DESCARTES"	0	54	54
INSTITUTO SALVADOR DIAZ MIRON	26	142	168
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 1 ALVARADO VER.	4	83	87
ESCUELA CAMPESINA DE LAS HUASTECAS	2	0	2
CTRO. DE ESTUDIOS TECNICOS MEXICO	159	171	330
CTRO. DE ESTUDIOS TECNOLOGICOS VASCO DE QUIROGA	25	58	83
INSTITUTO ISAAC PTIMAN	0	93	93
CTRO. DE ESTUDIOS TECNOLOGICOS DE ACTIVIDADES SUBACUATICAS EN [VERACRUZ]	0	10	10
C.B.T.I.S. NO. 165	0	54	54
C.B.T.A. NO. 85 (C.E.T.A. NO. 85)	11	6	17
UNIVERSIDAD FEMENINA DE VERACRUZ LLAVE	108	9	117
C.B.T.I.S. NO. 47	1	5	6
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 7 VERACRUZ VER.	96	121	217
INSTITUTO TECNOLOGICO DEL MAR NO. 1 BOCA DEL RIO VER.	17	7	24
C.B.T.I.S. NO. 191	0	79	79
C.B.T.A. NO. 36 (C.E.T.A. NO. 36)	11	7	18
C.B.T.I.S. NO. 13 (C.E.C.Y.T. NO. 36)	119	597	716
C.B.T.I.S. NO. 77 (C.E.C.Y.T. NO. 265)	27	144	171
I.T.A. NO. 18	0	1	1
INSTITUTO TECNOLOGICO DE MINATITLAN, VER. (I.T.R.)	6	0	6
CTRO. DE ESTUDIOS TECNOLOGICOS INDUSTRIAL Y DE SERVICIOS NO. 15	4	1	5
C.B.T.A. NO. 86 (C.E.T.A. NO. 86)	5	34	39
C.B.T.I.S. NO. 55 (C.E.C.Y.T. NO. 221)	2	83	85
C.B.T.I.S. NO. 78 (C.E.C.Y.T. NO. 270)	27	458	485
C.B.T.I.S. NO. 71 (C.E.C.Y.T. NO. 244)	4	40	44

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.A. NO. 57 (C.E.T.A. NO. 57)	39	6	45
C.B.T.I.S. NO. 48 (C.E.C.Y.T. NO. 208)	7	50	57
C.B.T.I.S. NO. 102 (C.E.C.Y.T. NO. 102)	9	13	22
C.B.T.I.S. NO. 101 (C.E.C.Y.T. NO. 341)	2	0	2
C.B.T.I.S. NO. 30 (C.E.C.Y.T. NO. 162)	40	50	90
C.B.T.I.S. NO. 85 (C.E.C.Y.T. NO. 293)	6	22	28
C.B.T.I.S. NO. 35 (C.E.C.Y.T. NO. 174)	23	68	91
C.B.T.A. NO. 17	1	12	13
C.B.T.I.S. NO. 79 (C.E.C.Y.T. NO. 271)	84	265	349
C.E.T.I.S. NO. 143	0	24	24
C.B.T.A. NO. 99	27	6	33
C.B.T.A. NO. 84	0	1	1
C.E.T.I.S. NO. 111	22	78	100
C.B.T.A. NO. 111	4	0	4
C.E.T.I.S. NO. 47	0	0	0
C.E.T.I.S. NO. 72	1	45	46
C.E.T.I.S. NO. 15	2	70	72
C.B.T.I.S. NO. 207	2	0	2
C.B.T.I.S. NO. 66	3	66	69
C.B.T.I.S. NO. 67	2	101	103
C.B.T.I.S. NO. 70	0	1	1
C.B.T.I.S. NO. 113	1	174	175
C.B.T.I.S. NO. 124	5	23	28
C.B.T.I.S. NO. 142	0	157	157
C.E.T.I.S. NO. 110	0	22	22
C.E.T.I.S. NO. 79	1	21	22
C.E.T.I.S. NO. 133	15	53	68
C.B.T.A. NO. 135	0	10	10
C.B.T.A. NO. 136	0	8	8
C.B.T.A. NO. 163 [LA CHACA, VERACRUZ]	11	8	19
C.B.T.A. NO. 145	0	24	24
C.B.T.A. NO. 164	0	8	8
C.E.T.I.S. NO. 146	0	11	11
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 15 COATZACOALCOS VER.	0	17	17
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 20 TUXPAN VER.	0	54	54
C.E.T.I.S. NO. 134	0	30	30
INSTITUTO JOSE CARDEL	0	98	98
ESCUELA LEONA VICARIO	0	39	39
INSTITUTO TECNICO DE TURISMO CITLALTEPETL	0	59	59
C.B.T.I.S. NO. 192	0	10	10
C.B.T.I.S. NO. 213	0	5	5
C.B.T.I.S. NO. 250	0	1	1
C.E.T.I.S. NO. 145	0	19	19
C.B.T.I.S. NO. 190	0	6	6
CTRO. DE ESTUDIOS TECNOLOGICOS DE TURISMO Y HOTELERIA MIGUEL ALEMAN VALDEZ	0	10	10
C.B.T.I.S. NO. 17	0	3	3
C.E.T.I.S. NO. 144	0	2	2
CENTRO DE BACHILLERATO TECNICO COMERCIAL HIDALGO	0	12	12
INSTITUTO MEXICO DE CARDEL	0	0	0

TECHNICAL SECONDARY EDUCATION GRADUATES

C.B.T.I.S. NO. 251	0	2	2
TOTAL	5152	6948	12100
YUCATAN			
INSTITUTION			
	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE MERIDA (I.T.R.)	12	33	45
UNIVERSIDAD AUTONOMA DE YUCATAN	954	155	1109
CENTRO DE ESTUDIOS DE LAS AMERICAS, A.C.	0	6	6
ESCUELA DE TURISMO PERTENECIENTE A LA A.C. DENOM. SN. AGUSTIN, A.C.	0	1	1
C.B.T.A. NO. 13 (C.E.T.A. NO. 13)	33	7	40
C.B.T.I.S. NO. 80 (C.E.C.Y.T. NO. 273)	50	486	536
C.B.T.A. NO. 14 (C.E.T.A. NO. 14) (TIZIMIN)	10	2	12
I.T.A. NO. 2	1	4	5
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 17 YUCALPETEN YUC.	1	8	9
C.B.T.I.S. NO. 95	1	52	53
C.B.T.A. NO. 87	0	2	2
C.B.T.A. NO. 100	0	0	0
C.B.T.I.S. NO. 120	0	38	38
C.E.T.I.S. NO. 19	0	48	48
C.E.T.I.S. NO. 112	0	66	66
C.B.T.A. NO. 165	0	1	1
C.B.T.I.S. NO. 193	0	10	10
CENTRO EDUCATIVO SAN RAFAEL, A. C.	0	33	33
INSTITUTO TECNICO RODOLFO DIESEL MERIDA, YUC.	0	6	6
INSTITUTO DE CIENCIAS HUMANAS	0	33	33
ESCUELA MANUEL ACEVEDO RUIZ DEL HOYO	0	1	1
TOTAL	1062	992	2054
ZACATECAS			
INSTITUTION			
	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE ZACATECAS	502	270	772
C.B.T.I.S. NO. 1 (C.E.C.Y.T. NO. 138)	14	202	216
C.B.T.A. NO. 20 (C.E.T.A. NO. 20) (RIO GRANDE, ZAC.)	8	39	47
C.B.T.I.S. NO. 23 (C.E.C.Y.T. NO. 85)	2	118	120
C.B.T.I.S. NO. 104 (C.E.C.Y.T. NO. 348)	24	49	73
C.B.T.A. NO. 88	0	18	18
C.B.T.I.S. NO. 141	0	122	122
C.E.T.I.S. NO. 113	6	250	256
C.E.T.I.S. NO. 114	0	398	398
C.B.T.A. NO. 137	0	2	2
C.B.T.A. NO. 167	0	3	3
C.E.T.I.S. NO. 147	0	95	95
C.B.T.I.S. NO. 215	0	98	98
C.B.T.I.S. NO. 221	0	42	42
TOTAL	556	1706	2262

TECHNICAL SECONDARY EDUCATION GRADUATES

EXTRANJEROS			
INSTITUTION	1945-1989	1990-98	TOTAL
PROFESIONISTAS MEXICANOS CON ESTUDIOS EN EL EXTRANJERO	23	27	50
PROFESIONISTAS EXTRANJEROS CON ESTUDIOS EN EL EXTRANJERO	8	5	13
ESCUELA DE AVIACION (CONF. ACUERDO 001) E/S/R	0	111	111
TOTAL	31	143	174
* These graduates in the Distrito Federal come from the 439 Conalep schools all over the country			

JUNIOR COLLEGE TECHNICAL PROGRAMS

	1945-1989	1990-1998	TOTAL
NATIONAL	1,503	4,950	6,453
Aguascalientes Coahuila Colima Distrito Federal Guanajuato Hidalgo Jalisco Estado de México Morelos Nuevo León Puebla Querétaro Tabasco Tamaulipas Veracruz			
AGUASCALIENTES			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD TECNOLOGICA DE AGUASCALIENTES	0	860	860
TOTAL	0	860	860
COAHUILA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DEL NORESTE	0	1	1
UNIVERSIDAD TECNOLOGICA DE COAHUILA	0	55	55
TOTAL	0	56	56
COLIMA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE COLIMA	1142	190	1332
ESCUELA PARTICULAR PARA SRTAS. DEL ESTADO	4	0	4
INSTITUTO VASCO DE QUIROGA	194	111	305
C.B.T.I.S. NO. 19 (C.E.C.Y.T. NO. 80)	0	276	276
C.E.T.I.S. NO. 84	0	69	69
C.B.T.I.S. NO. 157	38	134	172
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 12 MANZANILLO COL.	3	37	40
C.B.T.A. NO. 148	1	2	3
C.E.T.I.S. NO. 157	0	25	25
INSTITUTO "LIC. BENITO JUAREZ"	0	2	2
TOTAL	1382	846	2228
DISTRITO FEDERAL			
INSTITUTION	1945-1989	1990-98	TOTAL
CTRO. DE ESTUDIOS SUPERIORES DE SAN ANGEL	0	4	4
TOTAL	0	4	4
GUANAJUATO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD TECNOLOGICA DEL NORTE DE GUANAJUATO	0	223	223
UNIVERSIDAD TECNOLOGICA DE LEON	0	161	161
TOTAL	0	384	384
HIDALGO			
INSTITUTION	1945-1989	1990-98	TOTAL

JUNIOR COLLEGE TECHNICAL PROGRAMS

UNIVERSIDAD TECNOLOGICA DE LA HUASTECA HIDALGUENSE	0	0	0
UNIVERSIDAD TECNOLOGICA DEL VALLE DEL MEZQUITAL	0	0	0
UNIVERSIDAD TECNOLOGICA DE TULA TEPEJI HGO.	0	523	523
UNIVERSIDAD TECNOLOGICA DE TULANCINGO	0	0	0
TOTAL	0	523	523
JALISCO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE GUADALAJARA	0	498	498
TOTAL	0	498	498
ESTADO DE MÉXICO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD TECNOLOGICA DE NEZAHUALCOYOTL	0	869	869
UNIVERSIDAD TECNOLOGICA FIDEL VELAZQUEZ (NICOLAS ROMERO)	0	0	0
TOTAL	0	869	869
MORELOS			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE CUAUTLA (I.T.R.)	0	46	46
TOTAL	0	46	46
NUEVO LEÓN			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE LINARES(ANTES I.T.A. NO. 12 [LINARES] I.T.R)	2	3	5
TOTAL	2	3	5
PUEBLA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD TECNOLOGICA DE PUEBLA	0	85	85
TOTAL	0	85	85
QUERETARO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD TECNOLOGICA DE QUERETARO	0	5	5
TOTAL	0	5	5
TABASCO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD TECNOLOGICA DE TABASCO	0	28	28
TAMAULIPAS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE TAMAULIPAS	119	742	861
TOTAL	119	742	861
VERACRUZ			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DEL MAR NO. 1 BOCA DEL RIO VER.	0	1	1
TOTAL	0	1	1

Source: Secretaría de Educación Pública

COLLEGE GRADUATES IN TECHNICAL AREAS*

	1945-1989	1990-1998	TOTAL
NATIONAL	182,743	189,070	371,813
Aguascalientes Baja California Baja California Sur Campeche Coahuila Colima Chiapas Chihuahua Distrito Federal Durango Guanajuato Guerrero Hidalgo Jalisco Estado de México Michoacán Morelos Nayarit Nuevo León Oaxaca Puebla Querétaro Quintana Roo San Luis Potosí Sinaloa Sonora Tabasco Tamaulipas Tlaxcala Veracruz Yucatán Zacatecas			
AGUASCALIENTES			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE AGUASCALIENTES (I.T.R.)	283	1013	1296
UNIVERSIDAD AUTONOMA DE AGUASCALIENTES	237	864	1101
I.T.A. NO. 20	200	179	379
UNIVERSIDAD BONATERRA	0	30	30
TOTAL	720	2086	2806
BAJA CALIFORNIA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA	572	919	1491
CTRO. DE ENSEÑANZA TECNICA Y SUPERIOR DE MEXICALI	372	450	822
INSTITUTO TECNOLOGICO DE TIJUANA (I.T.R.)	186	885	1071
INSTITUTO TECNOLOGICO DE MEXICALI (I.T.R.)	41	309	350
UNIVERSIDAD IBEROAMERICANA PLANTEL [NOROESTE]	0	14	14
TOTAL	1171	2577	3748
BAJA CALIFORNIA SUR			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE LA PAZ, B.C.S. (I.T.R.)	52	293	345
UNIVERSIDAD AUTONOMA DE BAJA CALIFORNIA SUR	17	95	112
TOTAL	69	388	457
CAMPECHE			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE CAMPECHE	117	266	383
UNIVERSIDAD AUTONOMA DEL CARMEN	4	126	130
INSTITUTO TECNOLOGICO DEL MAR NO. 4 CAMPECHE, CAMP.	0	18	18
INSTITUTO TECNOLOGICO DE DE CAMPECHE (I.T.R.)	6	95	101
I.T.A. NO. 5 [EJIDO DE CHINA * MUNICIPIO CAMPECHE]	64	238	302
TOTAL	191	743	934
COAHUILA			
INSTITUTION	1945-1989	1990-98	TOTAL

COLLEGE GRADUATES IN TECHNICAL AREAS

UNIVERSIDAD AUTONOMA DE COAHUILA	1551	2990	4541
ESCUELA DE INGENIERIA MECANICA Y ELECTRICA	2	1	3
I.T.E.S.M. CAMPUS LA LAGUNA	224	259	483
INSTITUTO TECNOLOGICO DE SALTILLO (I.T.R.)	418	996	1414
INSTITUTO TECNOLOGICO DE LA LAGUNA, TORREON COAH. (I.T.R.)	1207	1898	3105
INSTITUTO DE ESTUDIOS PROFESIONALES DE SALTILLO, COAH., A.C.	3	2	5
UNIVERSIDAD AUTONOMA DE LA LAGUNA	0	135	135
INSTITUTO UNIVERSITARIO VALLE DE SANTIAGO	0	0	0
FACULTADES UNIVERSITARIAS DE SALTILLO, A.C.	3	0	3
UNIVERSIDAD AUTONOMA AGRARIA ANTONIO NARRO	940	1057	1997
UNIVERSIDAD AUTONOMA DEL NORESTE	86	506	592
I.T.A. NO. 10	400	231	631
INSTITUTO TECNOLOGICO DE PIEDRAS NEGRAS (I.T.R.)	16	141	157
UNIVERSIDAD IBEROAMERICANA PLANTEL [LAGUNA]	0	91	91
CTRO. DE ESTUDIOS UNIVERSITARIOS CD. ACUÑA COAHUILA	0	1	1
ESCUELA SUPERIOR DE AGRICULTURA Y VETERINARIA (SAN BUENAVENTURA)	0	6	6
INSTITUTO TECNOLOGICO DE ESTUDIOS SUPERIORES DE LA REGION CARBONIFERA	0	39	39
CTRO. TECNOLOGICO Y DE EDUCACION SUPERIOR SIERRA MADRE	0	0	0
TOTAL	4850	8353	13203
COLIMA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE COLIMA	175	662	837
INSTITUTO TECNOLOGICO DE COLIMA (I.T.R.)	29	223	252
UNIVERSIDAD AUTONOMA DEL PACIFICO	0	5	5
TOTAL	204	890	1094
CHIAPAS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE CHIAPAS	177	388	565
INSTITUTO DE CIENCIAS Y ARTES DE CHIAPAS	0	24	24
INSTITUTO TECNOLOGICO DE TUXTLA, GTZ. (I.T.R.)	24	602	626
INSTITUTO TECNOLOGICO DE COMITAN (I.T.A. NO. 31 DE COMITAN, CHIS.)	6	154	160
INSTITUTO DE ESTUDIOS SUPERIORES DE CHIAPAS	0	5	5
INSTITUTO TECNOLOGICO DE TAPACHULA (I.T.R.)	53	236	289
CTRO. REGIONAL DE ENSEÑANZA TECNICA INDUSTRIAL CENETI (SOCONUSCO CHIAPAS)	0	1	1
UNIVERSIDAD VALLE DEL GRIJALVA	0	1	1
UNIVERSIDAD DE CIENCIAS Y ARTES DEL ESTADO DE CHIAPAS	0	2	2
TOTAL	260	1413	1673
CHIHUAHUA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE CHIHUAHUA	1503	1855	3358
ESCUELA SUPERIOR DE AGRICULTURA HERMANOS ESCOBAR	113	126	239
INSTITUTO TECNOLOGICO DE CHIHUAHUA (I.T.R.)	811	2112	2923
INSTITUTO TECNOLOGICO DE CD. JUAREZ (I.T.R.)	169	781	950
UNIVERSIDAD AUTONOMA DE CIUDAD JUAREZ, CHIH.	134	171	305
I.T.E.S.M. CAMPUS CHIHUAHUA	0	23	23
INSTITUTO TECNOLOGICO DE PARRAL (I.T.R.)	20	472	492

COLLEGE GRADUATES IN TECHNICAL AREAS

I.T.A. NO. 24	58	147	205
INSTITUTO TECNOLOGICO DE CIUDAD DELICIAS CHIH. (I.T.R.)	0	143	143
INSTITUTO TECNOLOGICO DE CHIHUAHUA II (I.T.R.)	5	186	191
INSTITUTO TECNOLOGICO DE CIUDAD CUAUHTEMOC (I.T.R.)	0	122	122
UNIVERSIDAD REGIONAL DEL NORTE	0	3	3
INSTITUTO TECNOLOGICO SUPERIOR DE NUEVO CASAS GRANDES	0	2	2
INSTITUTO TECNOLOGICO DE CD. JIMENEZ (I.T.R.)	0	6	6
TOTAL	2813	6149	8962
DISTRITO FEDERAL			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD NACIONAL AUTONOMA DE MEXICO	27101	12922	40023
INSTITUTO POLITECNICO NACIONAL	46530	24254	70784
UNIVERSIDAD IBEROAMERICANA	2947	2292	5239
UNIVERSIDAD LA SALLE	1297	1921	3218
UNIVERSIDAD DEL VALLE DE MEXICO	103	587	690
UNIVERSIDAD AUTONOMA METROPOLITANA	3912	5209	9121
UNIVERSIDAD TECNOLOGICA DE MEXICO	0	102	102
I.T.E.S.M. CAMPUS CIUDAD DE MEXICO	0	1	1
INSTITUTO TECNOLOGICO AUTONOMO DE MEXICO	49	283	332
ESCUELA DE INGENIERIA MUNICIPAL	768	151	919
UNIVERSIDAD ISEC (INSTITUTO SUPERIOR DE ESTUDIOS COMERCIALES)	0	10	10
SECRETARIA DE LA DEFENSA NACIONAL ESCUELA MILITAR DE INGENIEROS	448	28	476
SECRETARIA DE LA DEFENSA NACIONAL ESCUELA MILITAR DE TRANSMISIONES	211	26	237
CTRO. NACIONAL DE ENSEÑANZA TECNICA INDUSTRIAL	495	0	495
UNIVERSIDAD DEL TEPEYAC	0	15	15
SECRETARIA DE LA DEFENSA NACIONAL COLEGIO MILITAR	519	2	521
INSTITUTO DE CAPACITACION PROFESIONAL JUSTO SIERRA	7	0	7
SECRETARIA DE COMUNICACIONES Y TRANSPORTES	2	2	4
INSTITUTO TECNOLOGICO DE LA CONSTRUCCION	0	86	86
SECRETARIA DE AGRICULTURA Y GANADERIA ESCUELA NACIONAL FORESTAL	64	0	64
CTRO. DE DESARROLLO PROFESIONAL PARA LA EDUCACION AGROPECUARIA	207	16	223
UNIVERSIDAD ANAHUAC DEL SUR	3	144	147
UNIVERSIDAD SIMON BOLIVAR	2	73	75
FACULTAD DE QUIMICA BERZELIUS	3	0	3
UNIVERSIDAD PANAMERICANA	51	461	512
UNIVERSIDAD DEL EJERCITO Y FUERZA AEREA	120	500	620
INSTITUTO SUPERIOR DE ARQUITECTURA	29	65	94
FUNDACION ARTURO ROSENBLUETH PARA EL AVANCE DE LA CIENCIA	0	11	11
TOTAL	84868	49161	134029
DURANGO			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE DURANGO (I.T.R.)	1297	1768	3065
I.T.F. NO. 1	126	143	269
I.T.A. NO. 1	561	603	1164
INSTITUTO SUPERIOR DE CIENCIA Y TECNOLOGIA, A.C.	105	78	183
TOTAL	2089	2592	4681
GUANAJUATO			

COLLEGE GRADUATES IN TECHNICAL AREAS

INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE GUANAJUATO	1943	1278	3221
INSTITUTO TECNOLOGICO DE CELAYA (I.T.R.)	740	1749	2489
I.T.E.S.M. CAMPUS LEON	65	198	263
UNIVERSIDAD QUETZALCOATL	1	7	8
UNIVERSIDAD IBEROAMERICANA PLANTEL [LEON, GTO.]	0	135	135
UNIVERSIDAD DEL BAJIO [LEON]	0	86	86
INSTITUTO SUPERIOR DE EDUCACION TECNOLOGICA AGROPECUARIA	0	105	105
INSTITUTO TECNOLOGICO DE LEON (I.T.R.)	47	533	580
UNIVERSIDAD DE CELAYA	0	14	14
INSTITUTO DE ESTUDIOS SUPERIORES DEL CENTRO	0	1	1
TOTAL	2796	4106	6902
GUERRERO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE GUERRERO	204	577	781
INSTITUTO TECNOLOGICO DE ACAPULCO (I.T.R.)	32	665	697
INSTITUTO SUPERIOR AGROPECUARIO AUTONOMO DEL ESTADO	60	184	244
I.T.A. NO. 25	107	215	322
INSTITUTO DE CAPACITACION DEL MAGISTERIO	5	1	6
INSTITUTO TECNOLOGICO DE COSTA GRANDE, GRO. (I.T.R.)	0	7	7
INSTITUTO TECNOLOGICO DE CHILPANCINGO (I.T.R.)	0	61	61
INSTITUTO TECNOLOGICO DE IGUALA (I.T.R.)	0	6	6
INSTITUTO TECNOLOGICO SUPERIOR DE LA COSTA CHICA	0	1	1
TOTAL	408	1717	2125
HIDALGO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE HIDALGO	243	915	1158
INSTITUTO TECNOLOGICO DE PACHUCA (I.T.R.)	207	1149	1356
I.T.A. NO. 6 [HUEJUTLA]	174	358	532
TOTAL	624	2422	3046
JALISCO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE GUADALAJARA	5791	5597	11388
UNIVERSIDAD AUTONOMA DE GUADALAJARA	925	2537	3462
INSTITUTO TECNOLOGICO Y DE ESTUDIOS SUPERIORES DE OCCIDENTE	545	1280	1825
UNIVERSIDAD DEL VALLE DE ATEMAJAC [PLANTEL GUADALAJARA JAL.]	6	189	195
INSTITUTO TECNOLOGICO DE CD. GUZMAN (I.T.R.)	83	469	552
CTRO. REGIONAL DE ENSEÑANZA TECNICA INDUSTRIAL	10	92	102
ESCUELA LIBRE DE INGENIEROS	37	0	37
UNIVERSIDAD PANAMERICANA DE GUADALAJARA	0	136	136
INSTITUTO TECNOLOGICO DE OCOTLAN (I.T.R.)	0	9	9
I.T.A. NO. 26	35	156	191
UNIVERSIDAD DEL VALLE DE ATEMAJAC (PLANTEL LAGOS)	0	1	1
TOTAL	7432	10466	17898
ESTADO DE MÉXICO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DEL ESTADO DE MEXICO	328	600	928

COLLEGE GRADUATES IN TECHNICAL AREAS

UNIVERSIDAD AGRICOLA AUTONOMA [CHAPINGO]	3049	4034	7083
I.T.E.S.M. CAMPUS ESTADO DE MEXICO [ATIZAPAN DE ZARAGOZA]	687	1825	2512
INSTITUTO TECNOLOGICO DE TLALNEPANTLA (I.T.R.)	225	583	808
UNIVERSIDAD NUEVO MUNDO	9	34	43
UNIVERSIDAD ANAHUAC	484	546	1030
INSTITUTO TECNOLOGICO DE TOLUCA (I.T.R.)	36	377	413
TECNOLOGICO DE ESTUDIOS SUPERIORES DE ECATEPEC	0	127	127
CTRO. UNIVERSITARIO ISIDRO FABELA	0	2	2
UNIVERSIDAD DE CUAUTITLAN IZCALLI, PLANTEL LAGO DE LOS LIRIOS	0	3	3
TOTAL	4818	8131	12949
MICHOACAN			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD MICHOACANA DE SAN NICOLAS DE HIDALGO	2264	3389	5653
INSTITUTO TECNOLOGICO DE MORELIA (I.T.R)	297	915	1212
I.T.A. NO. 7	687	918	1605
INSTITUTO TECNOLOGICO DE JIQUILPAN (I.T.R.)	13	121	134
INSTITUTO TECNOLOGICO DE LAZARO CARDENAS, MICH. (I.T.R.)	0	30	30
INSTITUTO TECNOLOGICO DE LA PIEDAD (I.T.R.)	0	29	29
INSTITUTO TECNOLOGICO DE ZITACUARO (I.T.R.)	0	0	0
UNIVERSIDAD DEL VALLE DE ATEMAJAC (PLANTEL LA PIEDAD)	0	1	1
INSTITUTO TECNOLOGICO DE ESTUDIOS SUPERIORES DE ZAMORA	0	0	0
UNIVERSIDAD LATINA DE AMERICA	0	2	2
INSTITUTO TECNOLOGICO SUPERIOR DE APATZINGAN	0	0	0
CENTRO UNIVERSITARIO DEL VALLE DE ZACAPU	0	3	3
TOTAL	3261	5408	8669
MORELOS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DEL ESTADO DE MORELOS	172	543	715
INSTITUTO TECNOLOGICO DE ZACATEPEC (I.T.R.)	155	654	809
I.T.A. NO. 9	157	260	417
I.T.E.S.M. CAMPUS MORELOS	53	114	167
UNIVERSIDAD DEL SOL, S. C.	0	12	12
TOTAL	537	1583	2120
NAYARIT			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE NAYARIT	147	522	669
INSTITUTO TECNOLOGICO DE TEPIC (I.T.R.)	128	649	777
I.T.A. NO. 27	15	103	118
TOTAL	290	1274	1564
NUEVO LEÓN			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE NUEVO LEON	14532	9195	23727
INSTITUTO TECNOLOGICO Y DE ESTUDIOS SUPERIORES DE MONTERREY	11835	12998	24833
UNIVERSIDAD DE MONTERREY	444	479	923
UNIVERSIDAD REGIOMONTANA	1137	909	2046
CTRO. UNIVERSITARIO MEXICO-VALLE	0	1	1
CTRO. DE ESTUDIOS UNIVERSITARIOS DE (MONTERREY)	1206	445	1651

COLLEGE GRADUATES IN TECHNICAL AREAS

UNIVERSITARIO DE AMERICA CENTRO DE EDUCACION SUPERIOR PARTICULAR	0	11	11
INSTITUTO TECNOLOGICO DE LINARES(ANTES I.T.A. NO. 12 [LINARES] I.T.R.)	59	147	206
UNIVERSIDAD MEXICANA DEL NORESTE	69	126	195
UNIVERSIDAD DE MONTEMORELOS	0	13	13
INSTITUTO TECNOLOGICO DE NUEVO LEON (I.T.R.)	8	192	200
UNIVERSIDAD DEL NORTE	76	288	364
CTRO. DE IDIOMAS EXTRANJEROS Y DE ENSEÑANZA SUPERIOR UNIVERSIDAD INTER	0	1	1
UNIVERSIDAD HISPANO AMERICANA	0	12	12
TOTAL	29366	24817	54183
OAXACA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA BENITO JUAREZ DE OAXACA	2	0	2
INSTITUTO TECNOLOGICO DE OAXACA (I.T.R.)	628	972	1600
INSTITUTO TECNOLOGICO DE PINOTEPA NACIONAL (I.T.A. NO. 13 [PINOTEPA NAL., OAX.])	17	28	45
I.T.A. NO. 3 [TUXTEPEC]	346	209	555
INSTITUTO TECNOLOGICO DE COMITANCILLO (I.T.A. NO. 8)	155	130	285
INSTITUTO TECNOLOGICO DE TUXTEPEC (I.T.R.)	48	310	358
UNIVERSIDAD REGIONAL DEL SURESTE	5	0	5
INSTITUTO TECNOLOGICO DEL ISTMO (I.T.R)	154	484	638
I.T.A. NO. 23 [NAZARENO XOXOCOTLAN]	9	188	197
I.T.A. NO. 13 DE [SAN JOSE ESTANCIA GRANDE, OAX.]	11	37	48
INSTITUTO TECNOLOGICO DE TLAXIACO (I.T.R.)	0	7	7
UNIVERSIDAD TECNOLOGICA DE LA MIXTECA	0	6	6
TOTAL	1375	2371	3746
PUEBLA			
INSTITUTION	1945-1989	1990-98	TOTAL
BENEMERITA UNIVERSIDAD AUTONOMA DE PUEBLA	2389	3023	5412
UNIVERSIDAD POPULAR AUTONOMA DE PUEBLA	270	639	909
INSTITUTO TECNOLOGICO DE PUEBLA (I.T.R.)	263	827	1090
FUNDACION UNIVERSIDAD DE LAS AMERICAS PUEBLA	662	1648	2310
UNIVERSIDAD DE LA SIERRA, A.C.	0	37	37
UNIVERSIDAD CUAUHTEMOC	8	88	96
UNIVERSIDAD XICOTEPETL, A.C.	0	3	3
INSTITUTO TECNOLOGICO DE TEHUACAN (I.T.R.)	27	295	322
I.T.A. NO. 32	5	46	51
UNIVERSIDAD IBEROAMERICANA PLANTEL GOLFO CENTRO	0	89	89
UNIVERSIDAD INTERAMERICANA, A. C.	0	14	14
CTRO. DE DESARROLLO PROFESIONAL DIVISION UNIVERSITARIA, A.C.	0	15	15
UNIVERSIDAD REALISTICA DE MEXICO	0	4	4
INSTITUTO UNIVERSITARIO PUEBLA	0	0	0
INSTITUTO TECNOLOGICO SUPERIOR DE LA SIERRA NORTE DE PUEBLA	0	0	0
TOTAL	3624	6728	10352
QUERETARO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE QUERETARO	678	444	1122
INSTITUTO TECNOLOGICO DE QUERETARO (I.T.R.)	866	1443	2309

COLLEGE GRADUATES IN TECHNICAL AREAS

I.T.E.S.M. CAMPUS QUERETARO	660	918	1578
INSTITUTO TECNOLOGICO DE SAN JUAN DEL RIO, QRO. (I.T.R.)	0	59	59
TOTAL	2204	2864	5068
QUINTANA ROO			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE CANCUN, Q. ROO (I.T.R.)	0	15	15
INSTITUTO TECNOLOGICO DE CHETUMAL (I.T.R.)	34	111	145
I.T.A. NO. 16 [CHETUMAL]	85	173	258
UNIVERSIDAD DE QUINTANA ROO	0	0	0
TOTAL	119	299	418
SAN LUIS POTOSI			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE SAN LUIS POTOSI	4014	2121	6135
UNIVERSIDAD DEL CENTRO DE MEXICO PARTICULAR	0	32	32
INSTITUTO TECNOLOGICO DE MATEHUALA (I.T.R.)	0	25	25
INSTITUTO TECNOLOGICO DE SAN LUIS POTOSI (I.T.R.)	126	1438	1564
I.T.E.S.M. CAMPUS SAN LUIS POTOSI	18	115	133
CTRO. REGIONAL DE EDUCACION NORMAL CEDRAL	0	1	1
INSTITUTO TECNOLOGICO DE CD. VALLES [I.T.A NO 22 DE CD. VALLES I.T.R.]	135	244	379
I.T.A. NO. 30	2	27	29
TOTAL	4295	4003	8298
SINALOA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE SINALOA	2477	2792	5269
INSTITUTO TECNOLOGICO DE CULIACAN (I.T.R.)	416	1001	1417
UNIVERSIDAD DE OCCIDENTE	18	88	106
SECRETARIA DE MARINA ESCUELA NAVAL MILITAR [MAZATLAN]	115	1	116
UNIVERSIDAD DE MAZATLAN	0	12	12
INSTITUTO TECNOLOGICO DE LOS MOCHIS, SIN. (I.T.R.)	66	283	349
ESCUELA NAUTICA MERCANTE DE MAZATLAN CAP. DE ALT. ANTONIO GOMEZ M.	91	26	117
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 8 MAZATLAN SIN.	0	7	7
I.T.E.S.M. CAMPUS SINALOA	1	70	71
INSTITUTO TECNOLOGICO DEL MAR NO. 2 MAZATLAN SIN.	0	217	217
TOTAL	3184	4497	7681
SONORA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD DE SONORA	987	1315	2302
INSTITUTO TECNOLOGICO DE SONORA	517	827	1344
I.T.E.S.M. CAMPUS SONORA	869	601	1470
CTRO. DE ESTUDIOS SUPERIORES DE SONORA	0	41	41
INSTITUTO TECNOLOGICO DEL MAR NO. 3 GUAYMAS. SON.	0	97	97
INSTITUTO TECNOLOGICO DE HUATABAMPO, SON. (I.T.R.)	0	60	60
INSTITUTO TECNOLOGICO DE NOGALES, SON. (I.T.R.)	34	323	357
INSTITUTO TECNOLOGICO DE HERMOSILLO, SON. (I.T.R.)	28	789	817
I.T.A. NO. 21	201	251	452
UNIVERSIDAD DEL NOROESTE	0	12	12
INSTITUTO TECNOLOGICO SUPERIOR DE CANANEA	0	0	0

COLLEGE GRADUATES IN TECHNICAL AREAS

UNIVERSIDAD LA SALLE NOROESTE	0	4	4
INSTITUTO TECNOLOGICO DE AGUA PRIETA (I.T.R.)	0	1	1
TOTAL	2636	4321	6957
TABASCO			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD JUAREZ AUTONOMA DE TABASCO	363	1402	1765
COLEGIO SUPERIOR DE AGRICULTURA TROPICAL (CARDENAS)	74	90	164
INSTITUTO TECNOLOGICO DE VILLAHERMOSA, TAB. (I.T.R.)	107	824	931
COLEGIO SUPERIOR DE AGRICULTURA TROPICAL	4	26	30
I.T.A. NO. 28	21	171	192
TOTAL	569	2513	3082
TAMAULIPAS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE TAMAULIPAS	3863	2719	6582
INSTITUTO TECNOLOGICO DE CD. MADERO, TAMS. (I.T.R.)	3288	3565	6853
INSTITUTO TECNOLOGICO DE NUEVO LAREDO, TAMPS. (I.T.R.)	281	1066	1347
INSTITUTO TECNOLOGICO DE MATAMOROS, TAMS. (I.T.R.)	115	447	562
CTRO. UNIVERSITARIO DEL NORESTE	4	4	8
INSTITUTO MANTENSE DE ESTUDIOS PROFESIONALES	4	2	6
INSTITUTO DE CIENCIAS Y ESTUDIOS SUPERIORES DE TAMAULIPAS, A.C.	2	31	33
I.T.E.S.M. CAMPUS TAMPICO	17	82	99
INSTITUTO DE CIENCIAS Y TECNOLOGIA DE TAMPICO	104	0	104
I.T.A. NO. 4	251	210	461
UNIVERSIDAD VALLE DEL BRAVO	233	561	794
ESCUELA NAUTICA MERCANTE DE [TAMPICO]	102	30	132
INSTITUTO TECNOLOGICO DE CIUDAD VICTORIA (I.T.R.)	220	916	1136
INSTITUTO DE ESTUDIOS SUPERIORES DE TAMAULIPAS, A.C.	47	338	385
UNIVERSIDAD DEL NORESTE	0	1	1
UNIVERSIDAD MEXICO AMERICANA DEL NORTE	18	132	150
INSTITUTO DE COMPUTACION DEL NORESTE EN MATAMOROS, A.C.	0	78	78
INSTITUTO DE COMPUTACION DEL NOROESTE, S.C.	0	112	112
UNIVERSIDAD DE MATAMOROS	1	8	9
INSTITUTO TECNOLOGICO DE REYNOSA, TAMPS. (I.T.R.)	0	91	91
UNIVERSIDAD PANAMERICANA DE NUEVO LAREDO	0	2	2
UNIVERSIDAD DEL ATLANTICO	0	21	21
TOTAL	8550	10416	18966
TLAXCALA			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE TLAXCALA	15	107	122
I.T.A. NO. 29 DE [XOCOYUCAN, TLAX.]	100	723	823
INSTITUTO TECNOLOGICO DE APIZACO, TLAX. (I.T.R.)	59	253	312
TOTAL	174	1083	1257
VERACRUZ			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD VERACRUZANA	2014	3778	5792
INSTITUTO TECNOLOGICO DE ORIZABA, VER. (I.T.R.)	613	1693	2306
INSTITUTO TECNOLOGICO DE VERACRUZ (I.T.R.)	1027	1798	2825

COLLEGE GRADUATES IN TECHNICAL AREAS

ESCUELA NAVAL MILITAR ANTON LIZARDO (SECRETARIA DE MARINA)	1217	1654	2871
UNIVERSIDAD VILLA RICA DE VERACRUZ	0	4	4
ESCUELA NAUTICA MERCANTE FERNANDO SILICEO	344	35	379
INSTITUTO TECNOLOGICO DE CERRO AZUL, VER. (I.T.R.)	1	203	204
UNIVERSIDAD CRISTOBAL COLON	0	55	55
CTRO. DE ESTUDIOS TECNOLOGICOS DEL MAR NO. 7 VERACRUZ VER.	10	3	13
INSTITUTO TECNOLOGICO DEL MAR NO. 1 BOCA DEL RIO VER.	155	318	473
I.T.A. NO. 18	271	376	647
INSTITUTO TECNOLOGICO DE MINATITLAN, VER. (I.T.R.)	174	1096	1270
INSTITUTO TECNOLOGICO DE PESCA	2	0	2
UNIVERSIDAD DEL VALLE DE ORIZABA ANTES(INST. DE EST. SUP. VALLE DE ORIZABA)	0	11	11
INSTITUTO DE ESTUDIOS SUPERIORES DE POZA RICA	0	3	3
TOTAL	5828	11027	16855
YUCATAN			
INSTITUTION	1945-1989	1990-98	TOTAL
INSTITUTO TECNOLOGICO DE MERIDA (I.T.R.)	669	1565	2234
UNIVERSIDAD AUTONOMA DE YUCATAN	1050	576	1626
I.T.A. NO. 2	165	525	690
I.T.A. NO. 19 [TIZIMIN]	53	178	231
TOTAL	1937	2844	4781
ZACATECAS			
INSTITUTION	1945-1989	1990-98	TOTAL
UNIVERSIDAD AUTONOMA DE ZACATECAS	1445	1474	2919
UNIVERSIDAD AUTONOMA DE FRESNILLO	0	20	20
INSTITUTO TECNOLOGICO DE ZACATECAS (I.T.R.)	36	319	355
I.T.E.S.M. CAMPUS ZACATECAS	0	15	15
TOTAL	1481	1828	3309
EXTRANJEROS			
INSTITUTION	1945-1989	1990-98	TOTAL
PROFESIONISTAS MEXICANOS CON ESTUDIOS EN EL EXTRANJERO	84	67	151
PROFESIONISTAS EXTRANJEROS CON ESTUDIOS EN EL EXTRANJERO	13	27	40
TOTAL	97	94	191
* Includes only those graduates who are registered in SEP			
Source: Secretaría de Educación Pública			

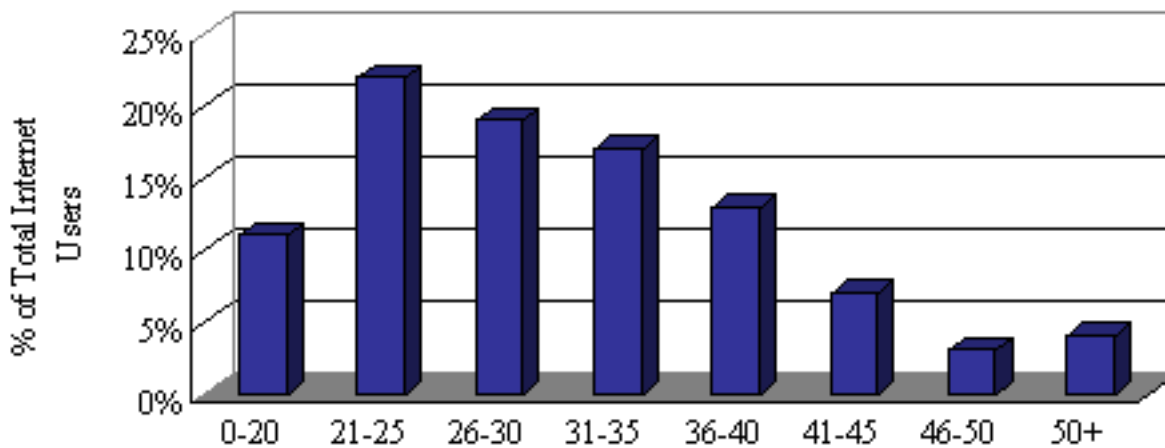
Mexican Higher Education Enrollments in Technical Areas (thousands)

ObjetoGráfico
Chart 1

Nature Of Internet Access

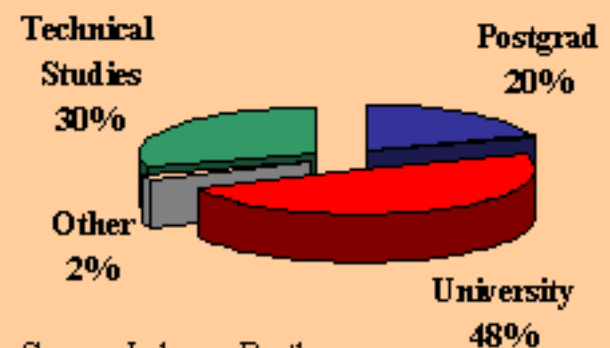
Internet user demographics in Mexico are no different than other Latin American countries. For example, the typical user is a university graduate between that ages of 21 and 40. Further, the concentration of income in the upper classes and the relatively low per capita wages for the remainder of the population put the average Mexican at a disadvantage in terms of Internet access. The distribution of income in Mexico and Latin America is a major issue leading to the slow adoption of the Internet to date and these same issues pose a threat to future Internet and ecommerce development.

Internet Age Demographics



Source: Lehman Brothers

Education Demographics



Source: Lehman Brothers

Comparing Mexican demographics to those of other LAC countries shows why Mexico has lagged its regional counterparts when many would expect it to be leading Internet development, given its proximity to the US and US impact on Mexican business. Mexico has the second largest population in Latin America and other than Brazil it is the only country who could capitalize on the economy of scale benefits of ecommerce for the domestic market, however, it only has 50 retail sites, according to BCG. Other LAC countries have to go after the pan regional business model to achieve these benefits, which means penetrating foreign markets.

(Pop in Millions)	1999	2010
Argentina	36.6	41.5
Brazil	168.5	192.2
Chile	15.0	17.0
Colombia	41.6	49.7
Mexico	97.4	112.9
Peru	25.2	30.0
Venezuela	23.7	28.7
Total	408.0	472.0

Source: Latin American Market Planning Report

The distribution of income is another factor that has and will continue to hamper the growth of the Internet in Latin America. Mexico has a smaller percentage of its population in the A class and a disproportionate percentage of the population in the D class relative to other LAC nations. Further the population of A class (1.6%) had 71% of the purchasing power in 1998 while the B, C and D classes earned 19%, 8% and 2%, respectively. Couple the income inequalities with the high price of access discussed above and the main population of Mexico is priced out of the market at this point. In the case of Mexico almost 90% of the population can not afford an Internet connection.

Population by Socioeconomic Class

	A	B	C	D
Argentina	1.5%	8.4%	35.6%	54.5%
Brazil	2.5%	16.0%	29.0%	52.5%
Chile	2.0%	6.3%	41.9%	49.8%
Colombia	2.3%	7.8%	37.0%	52.9%
Mexico	1.6%	10.9%	22.3%	65.2%
Peru	2.6%	8.2%	32.8%	56.4%
Venezuela	1.0%	4.2%	20.0%	74.8%

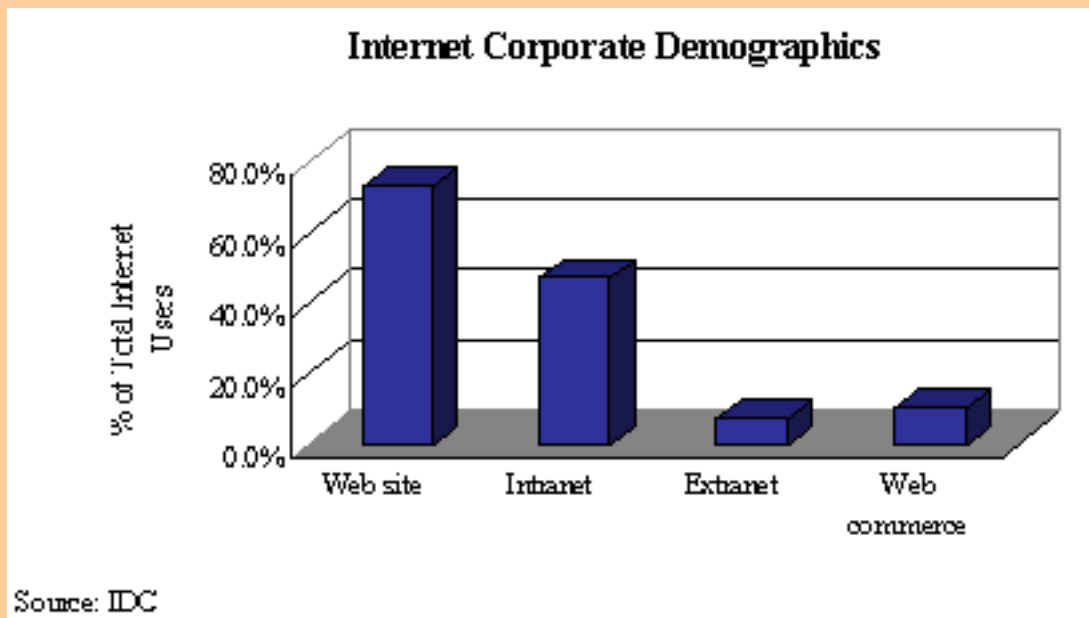
Source: Latin American Market Planning Report

1998 National Purchasing Power by Socioeconomic Class by household

(US \$s)	A	B	C	D
Argentina	196,652	60,433	18,627	15,063
Brazil	111,348	20,611	8,662	2,106
Chile	142,794	49,649	14,281	3,277
Colombia	105,006	42,962	8,975	1,845
Mexico	169,680	45,286	18,359	4,252
Peru	86,086	38,579	9,419	1,345
Venezuela	156,623	61,825	21,948	2,342

Source: Latin American Market Planning Report

Although the expense the expense of the Internet makes access prohibitive. Many of those who could not normally afford the service are exposed to the Internet through work or school. In terms of the work place, IDC completed a study in 1997 where it concluded that 73% of larger Mexican corporations had a web site and 100% intended to have one by the end of this year. Further, many of these countries also provided employees access to an intranet site and 10% of such companies planned to offer some sort of ecommerce solution. Though this survey only captures major Mexican corporations, it does shed light on the trend that more and more employees are able to access the Internet through work and that companies are adopting a more technology oriented infrastructure. For example, the overall IT services market in Latin America grew by a healthy 14.8% between 1997-1998 to reach U.S. \$8.45 billion and IDC estimates, this market will grow to over \$13.9 billion by 2002. The most significant area of growth is in systems integration which is expected to grow from US\$1.3 billion in 1998 to US\$2.6 billion in 2002.



Though access has been growing rapidly in the work place, Internet proliferation is still at low levels within corporate Mexico, particularly when considering small and medium sized businesses. Further, those companies that have adopted an web and Internet based technology are frequently manufacturing intensive, which means that only those that work in the corporate headquarters have access to the

Internet. These also happen to be the same wealthy and highly educated people that have already been exposed to technology.

Besides improving access in the workplace, schools are a major source of exposure to the Internet.

Primary Schools

The ILCE is also performing a pilot program in primary and junior high schools to provide computers, a telephone line and Internet access for students. In each school, two teachers are trained to become tutors for the rest of teachers and of course for the students. According to the ILCE, the project will reach 500 schools by the end of 1999. The whole description of the project is in redescolar.ilce.edu.mx.

Secondary Schools

Technical training is provided in several high schools, where in addition to a diploma to pursue higher education, students can obtain a diploma certifying a strong emphasis in a specific area as well. 2.84 million students are enrolled in high schools in Mexico, and 42 per cent of them are in this "double track" system.

Different institutions offer this kind of diploma (graduates are called "profesionales técnicos"). The oldest institution is the Dirección General de Educación Tecnológica Industrial (DGETI) operates 428 schools. Most of the schools have programs related to information technology. Additionally, most states have systems similar to DGETI's, called Centros de Estudios Científicos y Tecnológicos (CECyT). There are 234 of these schools.

Universities

People with access to universities is an important source of access to the Internet in Mexico. The number of people with college degrees increased 50 per cent between 1991 and 1997, to reach 4.5 million. Today, about 1.9 million students are enrolled in colleges all over the country, and this number is growing at a rate of 7 per cent a year. Out of them, 488.6 thousand are enrolled in technology-related programs: this number represents 45 per cent more than those enrolled 10 years ago (see [growth graph](#)). It is important to point out that only a fraction of these students are specializing in computer related areas.

However, the growth in the number of [graduates](#) from technology related programs in four year colleges is impressive: in the last decade there have been more graduates in these areas (189,070) than in the previous 45 years (182,743). An important note is that these numbers are clearly underestimated since they report *only* "certified" engineers.

Technical Schools/Training Centers

Another system that has an orientation to technical education is the Colegio Nacional de Educación Profesional Técnica (Conalep). A centralized institution until 1998, the 439 schools of this system —with 242 thousand students- now operate under every state's authority. Like in the case of DGETI, most schools have information technology oriented programs.

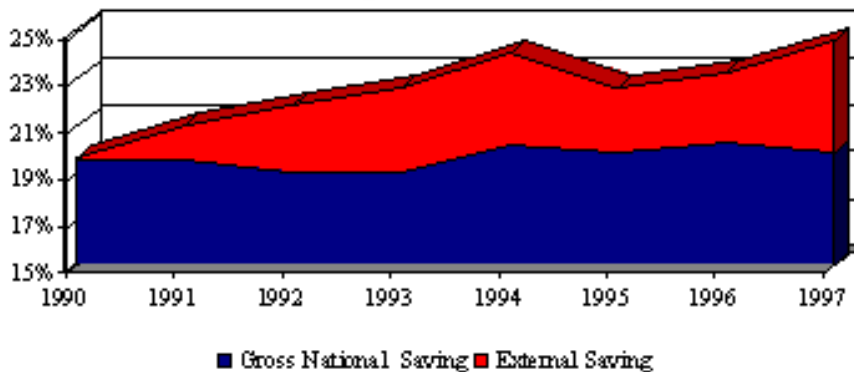
The Ministry of Public Education also has 198 schools all over the country intended to provide short term training programs, almost all of them offering training in computer operation. This programs do not require but basic literacy skills to be admitted and courses can be given to specific groups under request.

The location and specific programs in every Centro de Capacitación Tecnológica Industrial (Cecati, as they are called) can be found at http://www.sep.gob.mx/ubicacion_de_los_planteles.html

Domestic Sources of Capital: Few local investors to provide funding for entrepreneurs.

At present, there are very few sources of local capital willing to bet on entrepreneurs in the early adopter phase of Internet development in Mexico mainly because these investors do not understand the investment model for Internet companies, the technology or the valuations. Further, because of Mexico's institutional investor base is very immature and there is lack of capital markets instruments available to the private sector, few if any of these dollars finance start up companies. What pension funds do exist, for example, are generally very conservative in terms investment vehicles and in many cases are legally constrained from taking direct positions in private companies. Further, the return requirements for institutional investors tend to promote a homogenous asset base. Capital market instruments are also completely inaccessible for Mexican start-ups as the market for IPOs has about dried up because of the economic difficulties and the equities market lacks the infrastructure to develop a U.S. type IPO model for technology and Internet opportunities. The situation is likely to continue in the near future because savings rates are low as a result of continued trade deficits and the pension system continues to be underdeveloped, which further reduce the sources of institutional capital.

LAC Saving and Investment Ratios: Gross National Saving + External Saving = Gross Investment (% of GDP)



Source: ECLA

	<u>Trade Surplus (Deficit)</u>			<u>Current Account Surplus (Deficit)</u>		
	1996	1997	1998	1996	1997	1998
LAC	7,959	31,650	50,405	36,659	63,669	83,905
Argentina	873	5,581	7,200	3,787	9,454	12,200
Brazil	47,586	19,569	15,750	24,347	33,484	32,450
Chile	1,448	1,11	3,505	3,744	4,058	5,163
Mexico	6,841	408	8,200	2,380	7,449	15,503

However, Mexico is beginning to see the emergence of private equity funds that pool resources from local investors, however, much of this capital funds later stage companies outside of the telecommunications sector. At this point the majority of dollars spent on either the Internet infrastructure or Internet businesses comes from large Mexican corporations in the telecom and media space, such as Telmex, Avantel or TV Azteca (Todito.com).

Foreign Private Equity

Since the beginning of 1999 the Internet in Latin America has become a hotbed for international investing, which has drawn a significant amount of attention to the ecommerce opportunities in the region. Internet companies based both locally and outside of the region focusing on Latin America are getting financing at aggressive valuations as early investors want to capitalize on this potential. New businesses are springing up in everything from Internet portals, to on-line trading, to virtual malls over the Web with Latin America as the target market for these ideas.

Private equity funds in the U.S. that focus on Latin America are leading the way with such high profile investments as StarMedia, El Sitio, and Patagon.com in an attempt to realize the types of returns their U.S. private equity counterparts have in North American Internet investments. As recently as this past July, Explorador Capital, a Latin American private equity investor, launched a \$15 million fund specifically focusing on Internet investments in Latin America, the first of its kind. Potential strategic partners for these companies are also beginning to pay attention to the region. These partners are evaluating investments in and acquisitions of solid Internet businesses. For example Telefonica de España invested in Ole!, a Spanish language portal, AOL Latin America has exchanged equity stakes with and Big Entertainment, a developer of a movie web site, Sony Entertainment has invested in Yupi.com, Thomson Financial Services acquired Porvenir and Euromoney purchased an 80% stake in Internet Securities. StarMedia has also moved aggressively into the acquisition mode by acquiring Cade?, Zeek!, Servicios Interactivos and Latin Red in an attempt to begin to offer more local content in each of the countries in which it operates.

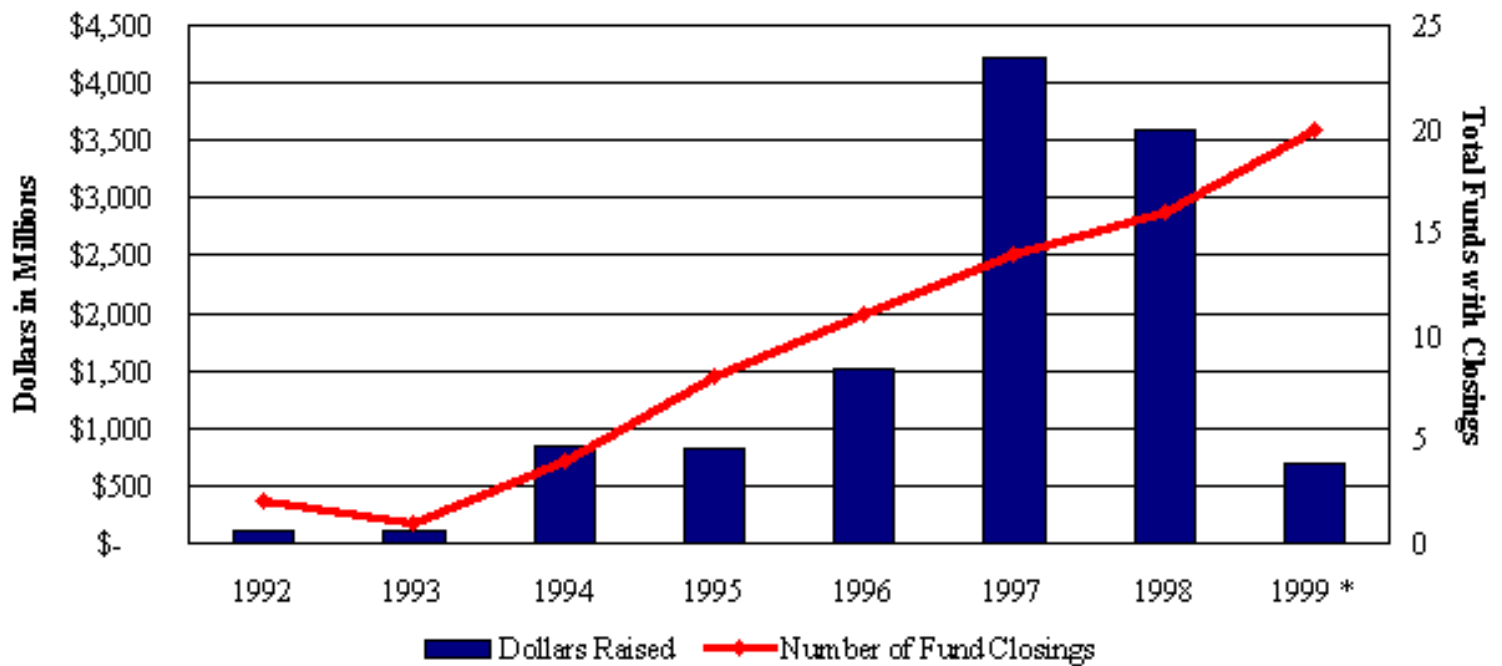
Internet Acquisitions and Investments (\$ in Millions)

Date	Target	Acquirer/Investor	Investment	Valuation	Revenue Multiple
Nov-99	Laborum.com	Explorador Capital	1.2	NA	NA
Sep-99	BookNet Ltda	Warburg Pincus	14.0	46.7	NA
Sep-99	UOL	GP Investimentos Morgan Stanley Lazard Frere Blackstone Group Providence Equity Partners, Inc CSFB Garantia Private Equity Funds DB Capital Partners Latin America Hambrecht & Quist Latin West Asset Management Reuters Group, Plc	100.0	800.0	NA
Sep-99	ZipNet	Unibanco	10.0	100.0	NA
Sep-99	Todosport.com	Explorador Capital	NA	NA	NA
Sep-99	Netcom Br Ltda	GP Investimentos	0.3	0.5	NA
Aug-99	Yupi.com	Internet Store Corp of America	NA	NA	NA
Aug-99	Brujula.cl	Explorador Capital	NA	NA	NA
Aug-99	Big Entertainment	AOL Latin America	NA	NA	NA
Aug-99	Impsat	El Sitio	NA	NA	NA
Jul-99	Latin Red	StarMedia	NA	NA	NA
Jul-99	Viajo.com	Chase Capital Partners	NA	NA	NA
Jul-99	OneScope.com	Explorador Capital	NA	NA	NA
Jun-99	Servicios Interactivos, Ltda.	Star Media	NA	NA	NA
Jun-99	Rede Brasil Sul(Zaz)	Telefonica de España	NA	NA	NA
Jun-99	El Sitio International Corporation	Ibero-America Media Partners GCC Investments Bear Stearns & Co.	44.0	120.0	15.2x
May-99	Yupi.com	IFX Corp Enterprise Technology Partners	13.0	32.5	NA
May-99	Ciudad Futura	Yupi.com	NA	NA	NA
May-99	StarMedia	Not Disclosed	39.4	487.6	73.7x
May-99	Whiss Net, S.L.	StarMedia	17.0	17.0	NA
Apr-99	KD Sistemas de Informatacao, Ltda	StarMedia	12.3	12.3	NA
Apr-99	Patagon.com	Patron Partners Chase Capital Partners	8.0	NA	NA
Mar-99	Ole!	Telefonica de España			
Mar-99	Achei Internet Promocion Limitada	StarMedia	0.8	0.8	NA
	Tecnonautica	Compañía de Telefonos de Chile	0.5	0.8	NA
Jan-99	Internet Securities	Euromoney	43.0	53.8	5.5x
Jan-99	Parvenir	Thomson Financial Group	NA	NA	NA
Dec-98	ChilNet	Incorp Enterprises	0.5	1.0	NA
Aug-98	StarMedia	Chase Capital Partners Warburg Pincus GE Capital Corp Patron Partners	80.0	203.6	177.8x
Feb-98	StarMedia	Chase Capital Partners	12.0	38.6	83.9x
Jul-97	StarMedia	Undisclosed	3.7	8.9	44.4x
Jun-97	El Sitio International Corporation	Sociedad Latinoamericana de Inversiones TowerPlus International Corp	NA	NA	NA

Key Trends in Private Equity and Latin America

- Total US funds directed at Latin America have grown substantially.
- Since 1996 over \$9 billion in private equity has been directed at the region and funds have raised over \$9.2 billion with over \$800 million going to Mexico.
- 1998 was a record year in terms of the number of funds raising capital that are focused on Latin America. 16 funds raised a total of \$3.6 billion.

Total Dollars Raised and Number of Latin American Funds with Closings



Source: *Latin American Private Equity Analyst*

* 1999 is 6 months ended June

However there is a disconnect between entrepreneurs and sources of U.S. financing

- Besides a shortage of local investment capital, technology and Internet opportunities in Latin America have not attracted the attention of foreign financial or strategic investors until very recently.
- These new ventures and sources of foreign funding have difficulty finding each other.
- Many Internet start-ups in Latin America do not understand how to package themselves to attract foreign capital.
- Few entrepreneurs have formal business plans
- Many do not understand the financial forecasting process
- Many do not realize the importance building out an infrastructure and management team had on the investment decision process.
- Most of these firms do not know where to obtain this type of advice
- Those that do obtain venture capital advice hired consultants who understood the U.S. financing model and who helped them prepare solid business plans and management for the marketing process.
- Many of the companies receiving financing are based in the U.S. (Silicon Barrio in Miami) and have Latin America as their target market

This section attempts to make sense of the role of the private sector in Internet development in Mexico and much of Latin America. Essentially, this portion is a compilation of many other points made throughout this site. At this time there are five main ways in which Mexico's private sector can spur Internet development.

Internet Infrastructure

The telcos in Mexico are responsible for the buildout of the Internet infrastructure. Telmex has already realized the value in promoting the Internet and its position in profiting from Internet development in Mexico, which is why it began offering computers on credit to those who sign up for Internet service.

Mexico has over 240 ISPs all working to profit from Internet development. These ISPs are attempting to differentiate themselves through high speed access services, web hosting services and virtual private network services. This bundling of telecommunications services to create an end-to-end networking platform will create exploitable niches for those able to offer a full range of services.

Ecommerce Development

The development of local content will give reasons for consumers get connected to the Web and will help spur development. Internet start ups (either B2b or B2C), large retailers and companies who can take advantage of B2B solutions will help create the content and the pull through demand effect to bring people online. Foreign firms have a role to play also, they bring ecommerce experience, particularly in the B2B space to Mexico, and many foreign companies have developed content through pan regional web sites. Further content develop, most of which will be ecommerce oriented to capitalize on profit making Internet opportunities, is key to continued Internet user growth.

Sources of Capital

Domestic Investors. At present, there are very few sources of local capital willing to bet on entrepreneurs in the early adopter phase of Internet development in Mexico mainly because these investors do not understand the investment model for Internet companies, the technology or the valuations. Commercial banks do not have the ability to invest in risky ventures such as this due to lending regulations, which attempt to build stability into the financial structure of Mexico and avoid further economic crises. Couple the conservative lending policies with the recent emerging markets economic crisis and the credit crunch becomes even more pronounced. Further, because of Mexico's institutional investor base is very immature and there is lack of capital markets instruments available to the private sector, few if any of these dollars finance start up companies. What pension funds do exist, for example, are generally very conservative in terms investment vehicles and in many cases are legally constrained from taking direct positions in private companies. Capital market instruments are also completely inaccessible for Mexican start-ups as the market for IPOs has about dried up because of the economic difficulties and the equities market lacks the infrastructure to develop a U.S. type IPO model for technology and Internet opportunities. The situation is likely to continue in the near future because savings rates are low as a result of continued trade deficits and the pension system continues to be underdeveloped, which further reduce the sources of institutional capital

At this point the majority of dollars spent on either the Internet infrastructure or Internet businesses comes from large Mexican corporations in the telecom and media space, such as Telmex, Avantel or TV Azteca (Todito.com).

Foreign investors. Since the beginning of 1999 the Internet in Latin America has become a hotbed for international investing, which has drawn a significant amount of attention to the ecommerce opportunities in the region. Internet companies based both locally and outside of the region focusing on Latin America are getting financing at aggressive valuations as early investors want to capitalize on this potential. Private equity funds in the U.S. that focus on Latin America are leading the way with such high profile investments as StarMedia, El Sitio, and Patagon.com in an attempt to realize the types of returns their U.S. private equity counterparts have in North American Internet investments. Potential strategic partners (foreign corporations) for these companies are also beginning to pay attention to the region. For example Telefonica de España invested in Ole!, a Spanish language portal, AOL Latin America has exchanged equity stakes with and Big Entertainment, a developer of a movie web site, Sony Entertainment has invested in Yupi.com, Thomson Financial Services acquired Porvenir and Euromoney purchased an 80% stake in Internet Securities. StarMedia has also moved aggressively into the acquisition mode by acquiring Cade?, Zeek!, Servicios Interactivos and Latin Red in an attempt to begin to offer more local content in each of the countries in which it operates.

Education

Systems integrators and service providers. All of these players are working hard to keep E-commerce in the media in an effort to promote awareness and educate both businesses and consumers about the benefits of the Internet and Web commerce. As a result, service providers and integrators need to work on changing the culture of their customers with regards to IT and customer service. Additionally, because many of these executives are not IT savvy, they view the start up costs for an E-commerce site to be very prohibitive. Teaching executives to look past the initial start up fees, which can run anywhere from \$10,000 for the most simple equipment plus the cost of establishing a dedicated line to a service provider and the cost of the monthly web hosting service is the most difficult part of the process at this point. Few companies feel using the Web as a new distribution channel is worth the effort. Finally, Telmex, with its computer credit program is helping to get the Internet into the consumer sector to create even more demand for content by *businesses*.

Corporations. In terms of the work place, IDC completed a study in 1997 where it concluded that 73% of larger Mexican corporations had a web site and 100% intended to have one by the end of this year. Further, many of these countries also provided employees access to an intranet site and 10% of such companies planned to offer some sort of ecommerce solution. Though this survey only captures major Mexican corporations, it does shed light on the trend that more and more employees are able to access the Internet through work and that companies are adopting a more technology oriented infrastructure. For example, the overall IT services market in Latin America grew by a healthy 14.8% between 1997-1998 to reach U.S. \$8.45 billion and IDC estimates, this market will grow to over \$13.9 billion by 2002. The most significant area of growth is in systems integration which is expected to grow from US\$1.3 billion in 1998 to US\$2.6 billion in 2002.

Though access has been growing rapidly in the work place, Internet proliferation is still at low levels within corporate Mexico, particularly when considering small and medium sized businesses. Further,

those companies that have adopted an web and Internet based technology are frequently manufacturing intensive, which means that only those that work in the corporate headquarters have access to the Internet. These also happen to be the same wealthy and highly educated people that have already been exposed to technology.

Influencing government policies:

ABM (an association of private banks) is has proposed language that addresses the electronic transactions to make sure that the government incorporates their business concerns with any legislation

Telmex and other service providers work closely with COFETEL to make telecom services in Mexico more competitive thus lowering pricing. They can also effect many other policies set by COFETEL all with Internet impact

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Regulations Effecting the Mexican Internet Market

In terms of governmental leadership in E-commerce, there has been very little. Many analysts attribute this to the government's preoccupation with Y2K and preparing its own systems infrastructure for the millenium. Additionally, many Internet and E-commerce issues are international in nature and the Mexican government has adopted a wait and see attitude with regard to establishing rules which address international jurisdiction, taxation, and consumer protection issues as well as defining which acts constitute a binding contract between two parties. Finally, establishing regulations for technology and the Internet can be very overwhelming projects for policy makers not well versed in the industry. Couple the huge task with the fact that the Internet proliferation in Mexico is in its infancy and it is easy to see why the government has not been aggressive about setting policies

At this point, there are few regulations that impact the Internet in Mexico or Latin America in general, however, there is important potential activity going on in four key areas. First, the Mexican government is expected to pass an ecommerce law before the end of 1999. Second, COFETEL, the Mexican telecommunications regulator, has taken a hands-off approach to the Internet. However, there are hints that the government will intervene if Telmex, the leading Mexican telecommunications service provider and ISP, establishes a dominant market position similar to the ones its has in the local, long distance, interconnection and transport services markets. Should Telmex continue to dominate the Internet, COFETEL may step in to prevent anti-competitive practices. Third, COFETEL has also chosen to limit the annual rate increases Telmex is allowed. This means that local access charges, the most expensive component of Internet pricing in Latin America will continue to fall. Finally, NAFTA has a large impact on Mexican Internet regulation, arguably the most important because as a treaty, it supercedes domestic law, and these laws are highly influenced by the U.S.

I. Mexico to Approve Ecommerce Law in 1999

Electronic transactions in Mexico started with the implementation of NAFTA, which encouraged Mexican businesses to increase domestic and international efficiency and competitiveness. However, because of the high prices for the installation and development of electronic systems, the adoption of these practices is in the early stages for small and medium sized Mexican companies. Currently, the online payment of transactions among businesses is not allowed. Invoices and signatures need to be paper based according to Treasury Ministry regulations. As a result, the EDI system is only being used for coordination between the purchasing operations of a company and its suppliers in non-payment B2B transactions and customs clearing. At this time a little over 3,000 companies are carrying out their non-payment transactions through Electronic Data Interchange (EDI), which is the only approved medium for conducting electronic transactions. In July 1999 pilot testing began to improve the effectiveness of EDI in Mexico.

The standardization of electronic transactions between businesses has become a priority for Mexican firms because electronic transactions are a safe way to reach modernization and cost reductions. Though there is no set standard as of yet, Mexico's legislators have agreed to approve a law regulating

ecommerce before year-end. This law, which will be based on recommendations from a law adopted by the UN Commission on International Trade, is similar to those being evaluated in other Latin American countries and guarantees that those documents meeting all the requirements for a valid electronic signature will be equivalent to paper documents.

This law is very important to Internet development in Mexico and much of Latin America for three main reasons. First, it addresses many of the transaction security concerns of banks as both buyers and sellers will have their own electronic signatures. Because of its banking significance Mexico's Banking Association (ABM) is planning to send to congress a proposal to strengthen the ecommerce legislation to influence methods for clearing online credit card payments. Second, the legislation also helps bolster consumer confidence about doing business over the Web because clearer lines will be drawn in terms of what constitutes binding contracts and instances of transaction fraud will decline due to the enhanced security benefits of the new system. Finally, Mexico as well as other LAC nations need to pass the legislation to reduce the risk to businesses and increase competitiveness of falling further behind industrialized and other LAC countries in terms of Internet and ecommerce development.

Below is an analysis of the opportunities opening in online trading simple as a result of this new legislation. This simple case study emphasizes just how many industries this law will influence when companies want to get online.

Financial Sector & Online Brokerage Solutions

Currently, Mexico's Central Bank is working with the Mexican financial sector to create an online brokerage regulatory scheme. Online stock brokering will kick off in Mexico by April 2000, according to Mexico's national banking and securities commission CNBV, the Mexican stock exchange and national brokerage firms. The scheme will regulate security issues surrounding online financial service transactions in Mexico and will use digital signatures and certificates to enhance security in online securities transactions.

The release of the program will be made in three steps.

- Ability to find security information and analysis on the Internet.
- Ability to request account balance statements.
- Ability to buy and sell stocks online.

There were many challenges in developing an online brokerage system. Those working to create the framework had many issues to resolve such as:

- CNBV had to define what constitutes a legal exchange of publicly traded shares between two parties.
- Under existing legislation, the initiation of a transaction could be verbal, for instance if a customer called a broker to purchase a stock, but at settlement of the trade, the customer needs to receive a written confirmation.
- The Internet presented many different problems for the CNBV because order initiation and confirmation is neither verbal nor written.
- Ultimately, the agency allowed emails to act as a form of confirmation.
- Insurance issues.

- All broker dealers have insurance policies in case of fraud, but these policies covered transactions executed through traditional channels.
- Because most of the banks had U.S. insurers, this quickly became a non-issue as the insurers cover U.S. online trading services.

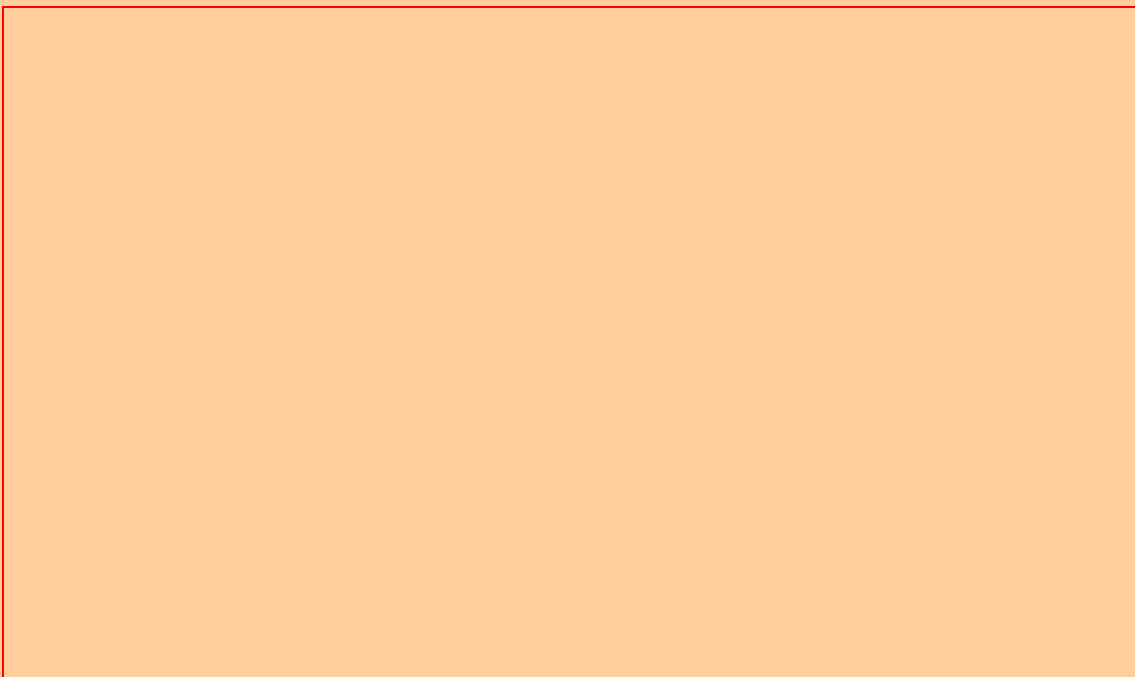
II. TELMEX Gaining Control of the Mexican Internet Market

Mexico's federal antitrust commission has described Telmex as "an agent with considerable power", but the possibility of officially designating Telmex a dominant operator has been squashed for the time being. As a result of the court's ruling, COFETEL will now regulate Telmex in terms of pricing strategy, service quality and access to financial information (the impact of which will be discussed in part three of this section). In the long term, Telmex will likely face greater restrictions to loosen its grip on Mexican telecommunications markets particularly as Telmex's Internet strategy will continue to draw attention to the company's telecommunications dominance. Its aggressive strategy foreshadows some sort of backlash from COFETEL as a result of its market dominance and anti-competitive practices.

In terms of ISP market share, [Telmex](#) has 75% of the country's Internet user market and has sold an average of 1,000 Internet connections per month as a result of a credit deal by which new Internet clients also receive a new computer and pay for it over two years. As a result of the credit deal, Telmex is Mexico's leading vendor of PCs. Demand for the deal is so great that Telmex continues to add new computer manufacturers to its list of partners. (Apple, Acer, IBM, Prodigy and Compaq). Though Mexican telecommunications regulation permits and encourages competition from other ISPs, no other service provider has the resources to underwrite a plan such as this.

III. Local Access

Local access is one of the single most important variables in Internet proliferation in Latin America. At this time, the cost of using the Internet in Mexico is expensive relative to industrialized nation standards. In Mexico, not only does a user pay a monthly rate to an ISP, customers also pay a per minute cost to the local phone company for connection time. While the monthly connection fee is very comparable to U.S. standards, the per minute charges can be twice as much the monthly fee. BCG estimates the total cost for a user in the United States who connects to the Internet 20 times per week is approximately US\$42 per month. In Mexico the corresponding amount is US\$54, while Brazilian users pay US\$83, and Argentine users US\$112.



In March 1999, COFETEL lowered total per minute access charges by requiring that Telmex's annual price hikes be less than 95.5% of the inflation rate. The regulation currently allows Telmex to raise basic telephony prices every quarter as long as rates have not reached the maximum allowable annual increase. Currently, local calls now cost about US\$0.14 per minute, which multiplied by the number of minutes logged onto the Internet can become quite an expensive variable charge. COFETEL hopes that with prices coming down this new regulation will continue to spur demand.

IV. NAFTA and the Internet

NAFTA has four main provisions that impact Internet and ecommerce development in Mexico. This treaty makes Mexico unique in terms of Internet opportunities relative to Latin America but also opens Mexico up to greater risks as a result of open borders with the US, the leading online revenue generator.

- NAFTA implements virtually free trade between two highly developed economies and a developing one within fifteen years. This is significant for Mexico in terms of access to the latest US telecommunications hardware and PCs as well as ecommerce. For example, Mexico and the United States on September 29, 1999 signed an agreement to promote Ecommerce between the two countries. Under the accord, Mexico hopes to promote small and mid-sized enterprise (SME) bilateral trade through electronic mediums. This agreement further opens the Mexican/US border to doing business electronically with new suppliers and with small and medium-sized suppliers who formerly communicated only via fax or phone. However, many believe that promoting ecommerce and the Internet in general means that Mexican companies will have to face increasing competition from United States-based companies that sell into Mexico via the Internet, making use of the NAFTA.
- NAFTA liberalizes foreign investment and trade in services by eliminating barriers to capital mobility and allowing foreign investors national status in a host country. It also opens previously closed industries to foreign investment, particularly in the case of Mexican telecommunications. Open foreign investment policies mean that entrepreneurs now have improved access to capital for their ventures and that large US corporations, through FDI, can accelerate the buildout of the

Mexican Internet infrastructure. All of this foreign investment comes at the expense of domestic investors, however, at this time most wealthy Mexicans are hesitant to invest in start ups, the limited institutional investor base is also too conservative and there are no Mexican capital markets instruments available to accommodate risky Internet ventures.

- NAFTA seeks to protect intellectual property rights, through agreement on policies, though enforcement of these policies remains at the national level. NAFTA regulations have jurisdiction over IP issues, which have been defined by US standards, but enforcement is still weak
- NAFTA outlines procedures for the joint administration of the treaty and for the resolution of disputes, which is a clause that impacts the three above in various capacities. Interpretations of the administrative committee may be highly influential in determining the extent to which NAFTA will have jurisdiction over cross border ecommerce transactions and international Internet regulations.

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Consumer portals in Mexico - the case of Infosel

[Presentation on Infosel](#)

Infosel was one of the very first Latin American online companies, and was well positioned to succeed

INFOSEL was originally set up in 1988 by as "Informacion Selectiva" by Grupo Reforma — a leading Mexican media conglomerate.

Grupo Reforma although established back in 1922, made its name recently by building one of Mexico's most influential media groups, based on high quality regional newspapers — papers which retained their regional focus while other successful regional newspapers diluted their appeal by trying to establish themselves on a national basis.

Infosel was originally set up as a electronic provider of financial information and an electronic trading system for fixed income securities trading in Mexico. In time, Infosel's customers started to rely on ***Infosel*** for assistance in establishing internal networks, as well as internet connections. The explosion in consumer internet demand in the mid 1990s left ***Infosel*** in a great position to leverage its expertise and technology to serve this market.

Essentially, Infosel was in the right place at the right time, and seized the opportunity.

By 1999, ***Infosel*** was serving three large customer groups:

- Electronic trading exchange
- EDI and internet services for companies
- ISP and Portal services for the private consumer mass market

By the start of 1999 ***Infosel*** had raced into pole position as Mexico's leading consumer internet company

Infosel's consumer internet services were based on:

- Internet Service Provision
- Taking advantage of content supplied through Grupo Reforma media properties (primarily newspapers around the country)

In detail, the offering included:

- Dial-up internet access (although still no high speed (DSL/cable) access yet)
- Search engine
- Community features - e-mail, chat-rooms, discussion forums, classifieds

- Content through Grupo Reforma family of newspapers
- Grouped around traditional categories:
- News / Sport / Entertainment / Health
- A growing proportion of revenues from Business-to-consumer e-commerce
- Online financial services
- Company store-fronts

But in 1999 the environment was getting more competitive:

Telmex — the Mexican telephone monopoly, acquired US Internet Service Provider *Prodigy*, and eclipsed Infosel as the number 1 ISP in Mexico.

Numerous Portal services were launching, including:

- US-based mega-portals
- StarMedia
- Yupi.com
- Yahoo!.Mexico
- (also most other US portals with the exception of Excite, have recently launched Spanish language versions)
- Latin America-based regional portals
- El Sitio
- eHola.com
- Universo Online (UOL) (Brazil's leading ISP & portal provider)
- Mexican-based portals for Mexico alone:
- Todito.com
- AdNet
- To2.com

Also, while *Infosel's* internet business had experienced accelerating growth, it was also recording accelerating losses, in order to invest enough to compete with the new incumbents.

In response to an increasingly intense competition, Infosel sought a major strategic alliance:

In July 1999, *Infosel* formed a major joint venture with *Telefonica Interactiva* — the internet services division of Spain's *Telefonica de Espana*

The objective was to combine the international content of Telefonica Interactiva with the products and services (and client base) of *Infosel*, and so cement *Infosel's* leadership position in the Mexican consumer internet market.

This was also part of a wider strategy being executed by Telefonica Interactiva, to build links with internet services throughout the Latin world:

- Ole in Spain; ZAZ in Brazil
- GauchoNet and Donde in Argentina
- **Infotel** in Mexico

Telefonica's network would be based on family similarities in the service, but fully local content — rather than a broad-brush pan-regional service, it would build a multi-local confederation of services

In October 1999, Telefonica Interactiva, renamed "Terra Networks", acquired 100% of Infotel from Grupo Reforma

\$500 MILLION DOLLAR JACKPOT!

Grupo Reforma were the beneficiaries of a huge windfall in exchange for their ownership of **Infotel**, amounting to ***\$60million in cash, and options in Terra stock worth \$440 million.***

This is classic corporate behaviour for Telefonica de Espana, which has built up a huge communications empire across Latin America by aggressively acquiring some of the best positioned players in different markets:

- **Infotel** will remain as a subsidiary within the wider Terra Networks internet conglomerate

Terra Networks is now aiming to develop a major portfolio of internet services and sites across the Spanish and Portuguese-speaking world, including:

- Internet Access via major ISPs in Mexico, Brazil, Spain, Argentina and Chile
- Portal sites serving each of these countries separately
- Local content arrangements
- Local branding
- Global technology management and development

The deep pockets of Telefonica de Espana and Terra's broad portfolio make Terra Networks a formidable competitor!

The multi-domestic approach may be the best one to combine the scale of the internet with the local demands of national populations.

Internet offers great opportunities to leverage scale over a wide area:

- Cuts cost of access
- Spreads cost of content and functionality over many customers
- Adds value as an intermediary as well as just a service provider

But customers are frequently resistant to content that they regard as culturally alien, either:

- specific to a culture that they do not regard highly
- specific to no discernible individual culture

The power of the internet to personalize can go some way towards allowing users to tailor their own experience as they wish.

But we believe that the easy and ready availability of content in a form that is culturally attractive to the user will be a major determinant of preferences where there are many alternative sources of content.

This means that a commercial approach that is successful at combining the scale advantages of the internet with highly locally specific content will be extremely effective.

This story highlights some important lessons about success on the internet in Mexico:

- Those who get there early are well placed for the future
- Especially if you can invest in many different areas without losing focus
- There are many many competitors emerging in the space, and a large percentage of them won't stay intact
- The ones that are both smart and lucky will probably go the way of Infosel
- There are likely to be many failed businesses
- The Latin internet is quickly becoming dominated by major emerging conglomerates (far faster than this happened in the US)
- Terra Networks / StarMedia / Yupi

The window of opportunity for Latin American entrepreneurs may be closing rapidly

- We expect business strategies based on a multi-domestic approach to conserve cultural identities, at least to a point
- *There will always be a local media industry (whether local TV/Radio/Newspaper) which will support local content*
- *Internet users will always demand this content which in turn will perpetuate the culture it represents*

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The Information Revolution in Latin America

12/6/99

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The Information Revolution in Latin America

Mexico Team II

CS377c / CLAS194

Will Budreau, Bernardo Naranjo, Simon Morris, Lisa Marino

1st December 1999



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Consumer portals in Mexico - the case of **Infotel**



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PORTALS IN MEXICO - INFOSEL

Infosel was one of the very first Latin American online companies, and was well positioned to succeed

- **Grupo Reforma, a leading Mexican media conglomerate established “Informacion Selectiva” or INFOSEL in 1988:**
 - Originally a provider of financial information and an electronic trading system for fixed income trading
 - But Infosel was in the right place at the right time, and seized the opportunity
- **Started offering internet access through an ISP, initially to clients, later to the general public**
 - Has developed services for three distinct markets
 - From electronic exchange, to EDI and internet for companies, to internet for the public at large
- **The portal front page was added in 1995 as the consumer internet started to take off**
 - Takes advantage of the internet access experience through serving commercial customers
 - Takes advantage of content supplied through Grupo Reforma media properties (primarily newspapers around the country)



This is a classic example of exploiting a first mover advantage

- 3 -



Slide 3 of 10

Infosel raced into pole position as Mexico's leading consumer internet company

THE CONSUMER-FOCUSED SERVICES:

- **Dial-up internet access**
- **Search engine**
- **Community features - e-mail, chat-rooms, discussion forums, classifieds**
- **Content through Grupo Reforma family of newspapers**
 - 7 national and regional papers
 - Mexico's "most influential media group"
- **Grouped around traditional categories:**
 - News / Sport / Entertainment / Health
- **Business-to-consumer e-commerce**
 - Online financial services
 - Company store-fronts
- **By various accounts Mexico's #1 or #2 ISP (vs. Telmex/Prodigy)**

And this was just the consumer side of the business...

- 4 -



Slide 4 of 10

CONCLUSIONS ON THE INTERNET IN MEXICO

The internet in Mexico is poised to take off, but the government should work to make it happen:



	Position:	Needs:
PEOPLE	<ul style="list-style-type: none">• Good education• Large supply of talent• Inexpensive	<ul style="list-style-type: none">• Make better use of this resource• Continued investment in IT for schools
LAWS & POLICIES	<ul style="list-style-type: none">• Underdeveloped• Some "bright spots" in different states• NAFTA membership	<ul style="list-style-type: none">• Move fast to develop policies at a national level• Accelerate deregulation to encourage competition• Leverage NAFTA policies
CAPITAL	<ul style="list-style-type: none">• NAFTA again• Proximity to US• Better positioned than others• Interest rates discourage investment	<ul style="list-style-type: none">• Interest rates must be controlled• Promote schemes to link US capital with Mexican entrepreneurs
INFRASTRUCTURE	<ul style="list-style-type: none">• Big gap here• Some good infrastructure• Lacks scale	<ul style="list-style-type: none">• Invest in infrastructure• More JVs with big US companies



Infosel was one of the very first Latin American online companies, and was well positioned to succeed

- **Grupo Reforma, a leading Mexican media conglomerate established “Informacion Selectiva” or INFOSEL in 1988:**
 - Originally a provider of financial information and an electronic trading system for fixed income trading
 - But Infosel was in the right place at the right time, and seized the opportunity
- **Started offering internet access through an ISP, initially to clients, later to the general public**
 - Has developed services for three distinct markets
 - From electronic exchange, to EDI and internet for companies, to internet for the public at large
- **The portal front page was added in 1995 as the consumer internet started to take off**
 - Takes advantage of the internet access experience through serving commercial customers
 - Takes advantage of content supplied through Grupo Reforma media properties (primarily newspapers around the country)

PORTALS IN MEXICO - INFOSEL

This is a classic example of exploiting a first mover advantage

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This story highlights some important lessons about success on the internet in Mexico



- **Those who get there early are well placed for the future**
 - Especially if you can invest in many different areas without losing focus
- **There are many many competitors emerging in the space, and a large percentage of them won't stay intact**
 - The ones that are both smart and lucky will probably go the way of Infosel
 - There are likely to be many failed businesses
- **The Latin internet is quickly becoming dominated by major emerging conglomerates (far faster than this happened in the US)**
 - Terra Networks / Yahoo! / StarMedia / Yupi
 - The window of opportunity for Latin American entrepreneurs may be closing rapidly
- **We expect business strategies based on a multi-domestic approach to conserve cultural identities, at least to a point**
 - There will always be a local media industry (whether local TV/Radio/Newspaper) which will support local content
 - Internet users will always demand this content which in turn will perpetuate the culture it represents



The internet in Mexico is poised to take off, but the government should work to make it happen:

CAPITAL

CONCLUSIONS ON THE INTERNET IN MEXICO

PEOPLE

LAWS & POLICIES

INFRASTRUCTURE

Position:

- Good education
- Large supply of talent
- Inexpensive
- Underdeveloped
- Some “bright spots” in different states
- NAFTA membership
- NAFTA again
- Proximity to US
- Better positioned than others
- Interest rates discourage investment
- Big gap here
- Some good infrastructure
- Lacks scale

Needs:

- Make better use of this resource
- Continued investment in IT for schools
- Move fast to develop policies at a national level
- Accelerate deregulation to encourage competition
- Leverage NAFTA policies
- Interest rates must be controlled
- Promote schemes to link US capital with Mexican entrepreneurs
- Invest in infrastructure
- More JVs with big US companies

The internet in Mexico is poised to take off, but the government should work to make it happen:

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PORTALS IN MEXICO - INFOSEL

In July 1999, **Infosel** formed a major joint venture with **Telefonica Interactiva**

- **The objective was to combine the international content of Telefonica Interactiva with the products and services (and client base) of Infosel**
- **This was part of a wider strategy being executed by Telefonica Interactiva**
 - Build links with internet services throughout the Latin world:
 - Ole in Spain; ZAZ in Brazil; GauchoNet and Donde in Argentina
 - Infosel in Mexico!
 - Network would be based on family similarities in the service, but fully local content
 - Rather than pan-regional, it would build an multi-local confederation of services
- **Infosel's internet business had experienced accelerating growth . . .**
- **. . . but also accelerating losses, to compete with the new incumbents**



*Partnership with a powerful competitor was **Infosel's** response to an increasingly competitive market*



PORTALS IN MEXICO - INFOSEL

Numerous other portals competed with **Infotel** for the Mexican consumer internet market



The Americans:

StarMedia
Yupi.com
Yahoo! Mexico

The Latins:

El Sitio
ehola.com
UOL

The Mexicans:

todito.com
Adnet
To2.com

Each competitor had an “angle”, each had money, and each was chasing the same group as Infotel



PORTALS IN MEXICO - INFOSEL

Perhaps it seems obvious in retrospect that **Infosel** would be swallowed by its larger partner . . .



The partner turned predator:

Terra Networks
(previously **Telefonica Interactiva**) acquired 100% of **Infosel** in October 1999



. . . although Grupo Reforma made a very tidy profit - \$60 million in cash and around \$440 million in Terra Networks stock!



PORTALS IN MEXICO - INFOSEL

Infosel will remain as a subsidiary within the wider Terra Networks internet conglomerate



- **Terra Networks is aiming to develop a major portfolio of internet services and sites**
 - Internet Access via major ISPs in Mexico, Brazil, Spain, Argentina and Chile
 - Portal sites serving each of these countries separately
 - Local content arrangements
 - Local branding
 - Global technology management and development
- **The multi-domestic approach may be the best one to combine the scale of the internet with the local demands of national populations**
- **The deep pockets of Telefonica de Espana and Terra's broad portfolio make Terra Networks a formidable competitor**

What's more, the market agrees - Terra's market value trebled to \$9.7 billion on its market debut!



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Slide 1: Introduction to the course. The course will cover the history and evolution of the Internet, the impact of the Internet on society, and the challenges of the Internet. The course will also cover the economics of the Internet, the law of the Internet, and the politics of the Internet. The course will be taught by Professor Binain.

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Presentation File Format
Version 4.0
Created: 12/16/1999 11:39:20 AM
Author: binain
Title: LatInternet final.ppt
Subject: Mexico
Keywords: Mexico, E-commerce, Infosel, LatInternet
Comments: This presentation discusses the state of e-commerce in Mexico, focusing on the role of Infosel and the challenges of the Latin American market. It covers topics such as internet penetration, digital infrastructure, and the impact of the 1995 telecommunications reform.

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Version: 2.6.2i, 19980814, built on i386 Linux, using libgcrypt 1.2.4
MIME-Version: 1.0, Content-Type: text/plain
Content-Disposition: inline
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MIME-Version: 1.0
Content-Type: text/plain
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Nature of Access: Mexico lags behind the rest of Latin America - Leaving open a huge opportunity to exploit the internet further

12/6/99

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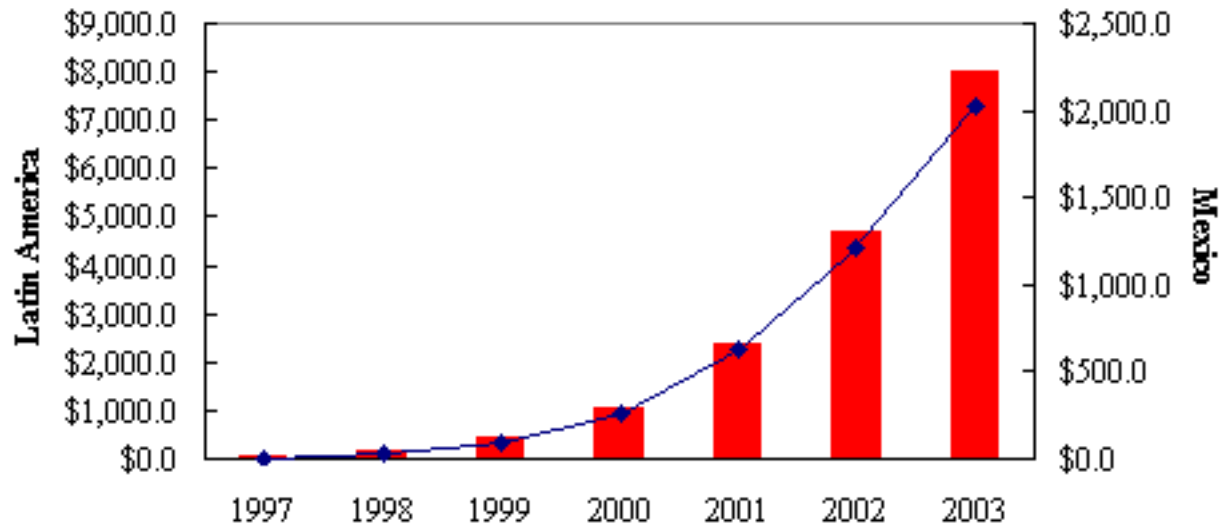
Reasons Favoring Internet and Ecommerce development in Mexico and Latin America

- I. Growth in E-commerce revenue for the region
- II. Proliferation of PCs, laptops and peripherals.
- III. Internet growth and Internet application development.
- IV. Growth in demand for corporate IT solutions.
- V. Growth in data communications services.
- VI. Potential to target a larger market because of common language.
- VII. IT experts expect business to business E-commerce to take off soon
- VIII. Latin American Internet projects are beginning to attract investment.

I. Growth in E-commerce revenue for the region.

Spending on Web commerce in Latin America reached \$167 million in 1998, an increase of over 361% from the prior year. As the region begins to show signs of economic recovery, IDC expects Latin America to have an average compound annual growth rate of 117% in Web spending between 1998 and 2003. Total E-commerce revenue is expected to surpass the \$8 billion mark by 2003 for the region. Further according to Forrester Research, Internet advertising in Latin America was \$20 million in 1998 and is expected to reach \$230 million by 2001, showing the anticipated growth potential in E-commerce for the region as businesses try to reach new target markets. Mexican E-commerce revenue is expected to have aggressive growth as well, growing from \$6 million in 1997 to \$2 billion in 2003 (IDC).

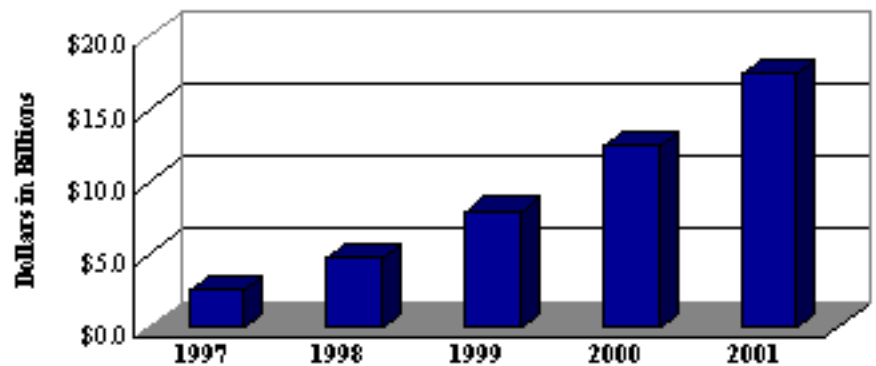
Total E-commerce Revenue for Mexico and Latin America (\$MM)



Source: IDC

■ Latin America ◆ Mexico

Total Worldwide Online Sales

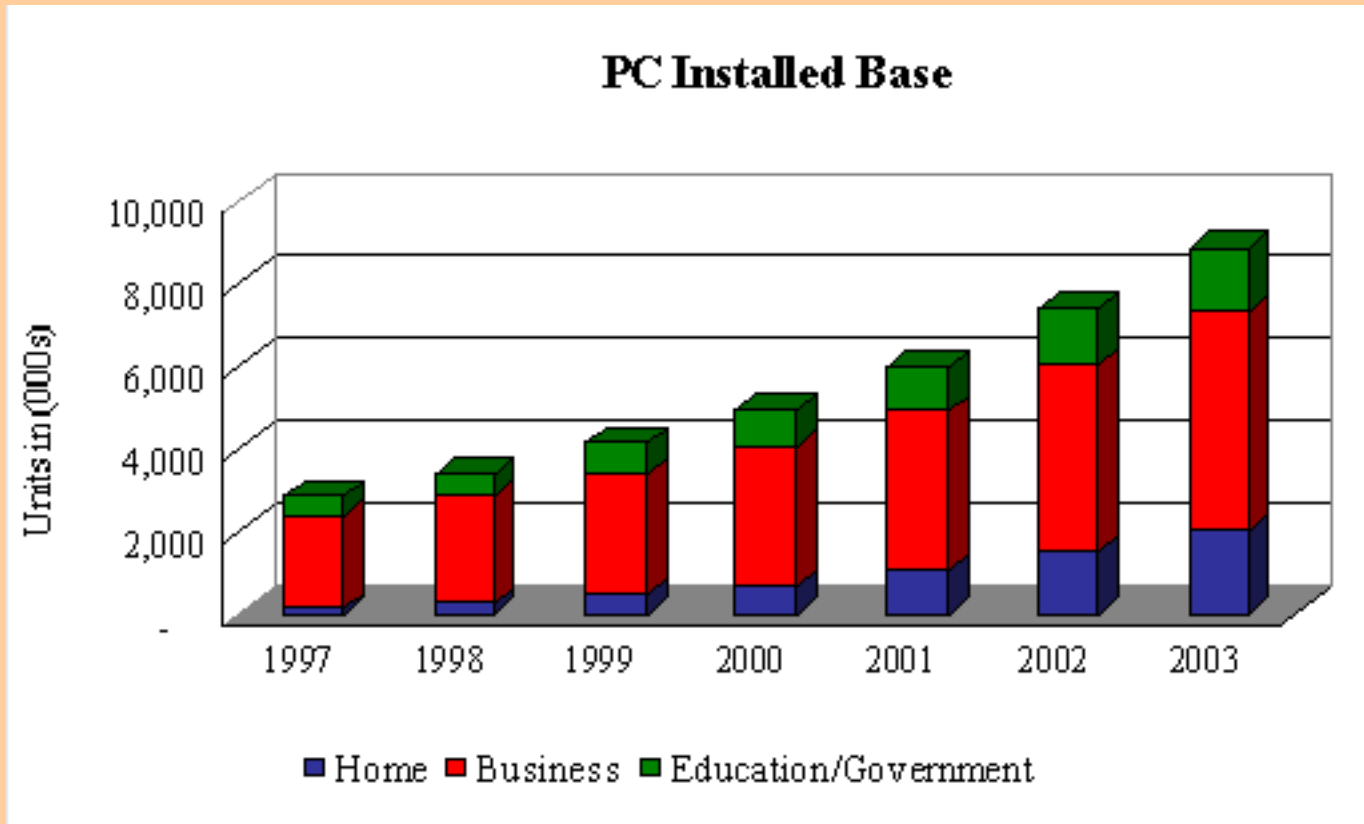


Source: Forrester Research

The boom in Internet usage in Latin America led this surge in Web commerce as Internet users have experimented with online purchasing of books, CDs and travel and financial services, most of which were purchased from foreign web sites. IDC estimates that nearly 75% of all money spent over the Web in Latin America went overseas, primarily to the U.S. There are four primary reasons for this. First, few local companies offer opportunities to purchase over the Web and those that do offer limited selection. Second, executing a credit card transaction in Latin America is difficult given bank reluctance to authorize online purchases. Third, users recognize that they can often purchase goods more cheaply through North America than locally. Finally, the delivery system in Latin America is generally unreliable and slow.

II. Proliferation of PCs, laptops and peripherals.

The proliferation of PCs and laptops within Latin America, a key component in developing the Internet, influences demand for E-commerce. IDC estimates that unit growth for 1998 reached 1.5% despite the economic troubles in the region and projects that PC and laptop unit growth will be 8.5% in 1999 for all of Latin America and 21.0% in Mexico. The growth will be driven by corporate IT deployments and the Internet.



III. Internet growth and Internet application development.

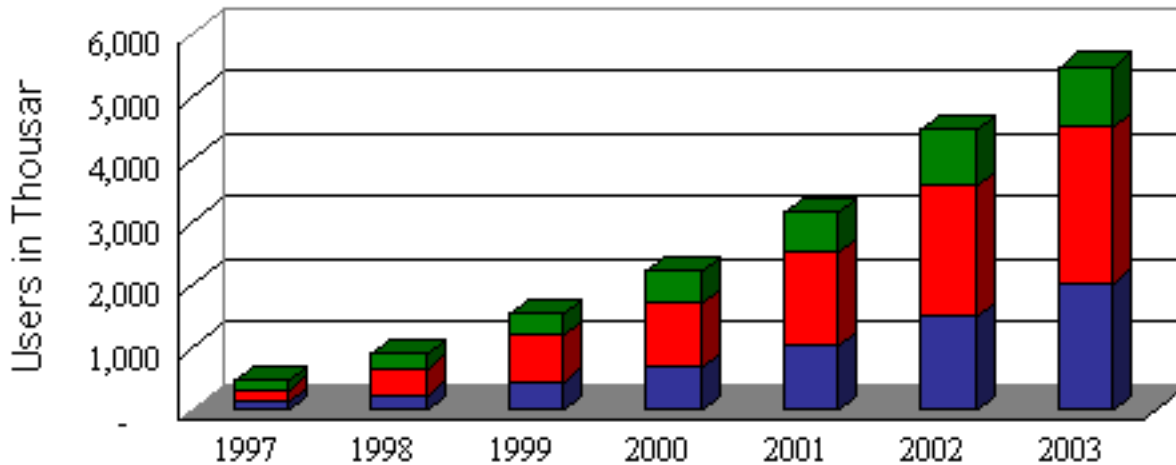
Latin America has become the fastest growing Internet region in the world, outpacing the global pace by a factor of 4 to 1. However, at present, fewer than 3.5% of the world's Internet users are located in the region, which had approximately 2.5 million active accounts and an overall penetration rate of .56% at the end of 1998 (Yankee Group, December 1998). The region, however, accounts for 6.6% of global GDP

The Yankee Group projects a CAGR of 87.4% in active Internet accounts through 2002, bringing the total number of accounts in Latin America to 26 million with a penetration rate of 5.0% by the end of the period. Assuming that the region maintains its existing ratio of users per account of 2.5:1, total users will grow to 65 million with an actual user penetration rate of 15.0%. Though tariffs are expected to decline over the next few years, with Mexico taking a step in this direction with COFETEL limiting the Telmex's local calling rate increases. Internet access revenues are forecasted to reach \$6 billion by the end of 2002 the region.

	1997	1998	1999	2000	2001	2002
Total Accounts Latin America (in millions)	1.14	2.51	3.77	6.55	13.19	23.38
Penetration Rate	.26%	.56%	.82%	1.45%	2.76%	5.41%

Source: The Yankee Group, December 1998

Total Internet Users - Mexico



Source: IDC

■ Home ■ Business ■ Education/Government

IV. Growth in demand for corporate IT solutions.

The overall IT services market in Latin America grew by a healthy 14.8% between 1997-1998 to reach U.S. \$8.45 billion. According to a study published by IDC, this market will grow to over \$13.9 billion by 2002. The most significant area of growth is in systems integration which is expected to grow from US\$1.3 billion in 1998 to US\$2.6 billion in 2002. This is followed by processing services, hardware support and installation, IS outsourcing, and packaged software support and installation. IDC suggests that services spending increases reflect the overall maturation of Latin America's IT market and users increasing demands for total solutions. Further, IT vendors are developing highly specialized services divisions to cater to users' varied technological and vertical market needs. At this point, however IT services spending is heavily concentrated in two vertical markets: banking/financial services and manufacturing. Together they represent nearly half of total IT services spending.

- *Enterprise resource planning solutions (ERP)*. In general, ERP solutions allow companies to better manage, track and run their businesses. This market in Mexico has been growing significantly. Three components will drive short-term ERP implementations in Latin America:
- Companies will want these solutions as a result of continued PC proliferation, which facilitates the automation of tasks and encourages information sharing across corporate functional groups.
- Those that develop and implement ERP strategies are beginning to offer lower priced solutions

targeting small and medium sized businesses.

- The influence of the US on Mexico's economy drives ERP demand as many subsidiaries of foreign companies deploy these systems to communicate with headquarters and local Mexican companies find ERP solutions useful when doing business with foreign customers and suppliers.
- *Use of the Internet Protocol as a medium through which to develop Internet applications for corporate enterprises and deliver new data communications services to customers.* As ERP and enterprise software markets continue to evolve, there will be a growing requirement for software vendors and integrators to adapt products to the Internet and use them as a development platform for customization. This platform will enable an IT manager to easily tailor a desktop specifically to an employee with the applications and information available to accomplish daily objectives. The Internet facilitates the maintenance and deployment of these solutions.

V. Growth in data communications services.

The 1990s have been a period of significant growth and technical evolution in the Latin American data communications markets. Though growth was still impressive during 1998, the impact of the financial crises that began in Asia and spread to Latin America slowed network infrastructure deployments during the year, but many expect a resurgence of network buildouts as the region's economy recovers. As a result of these new IT implementations, Dataquest forecasts that revenue for data communications services in Latin America will grow 30% annually to a level of nearly US\$9 billion by 2003 (80% probability). Value-added services will continue to evolve to become a key element of the Latin American telecommunications market, however, acceptance of newer technologies will lag the acceptance rate in developed countries by two to three years (90% probability).

Mexican telecommunication deregulation will further spur demand for data communications services domestically through increased competition and lower prices. Increased competition will require service providers to offer more advanced and bundled data communications products at a lower cost to remain competitive and hopefully spark demand for IT services.

As demand continues to grow for IT services, service providers will begin to offer new and more sophisticated services, such as virtual private networks (VPNs), web hosting, e-commerce site outsourcing and Voice over IP. These public services deliver advanced IT solutions with many of the capabilities and benefits of a dedicated private network without encumbering the customer with the technical management of their operation. Thus, many customers in Latin America that prefer to have solutions tailored to their special needs could take the route of the public network to achieve their goals. Dataquest predicts that Latin American demand for outsourced network services will emerge in the next few years because it is cost-effective, especially when a company needs to link many worldwide sites together, and permits the outsourcing of network management.

Table 1. Revenue for Data Communications Service Providers, 1996-2002 (Millions of US\$)

	1996	1997	1998	1999	2000	2001	2002	CAGR (%) 1996-97	CAGR (%) 1998-02
Argentina	109.2	150.0	198.0	263.3	352.9	476.4	643.1	37	34

Brazil	1,114.9	1,101.1	1,376.4	1,720.5	2,150.6	2,688.2	3,360.3	-1	25
Chile	65.0	75.0	93.8	117.2	146.5	183.1	228.9	15	25
Colombia	182.0	203.0	227.4	261.5	300.7	345.8	397.7	12	15
Mexico	258.5	349.6	472.0	637.1	860.1	1,161.2	1,567.6	35	35
Total Latin America	1,888.6	2,073.3	2,603.9	3,288.9	4,167.2	5,296.7	6,748.4	10	27

Source: Dataquest (April 1998)

VI. Potential to target a larger market because of common language.

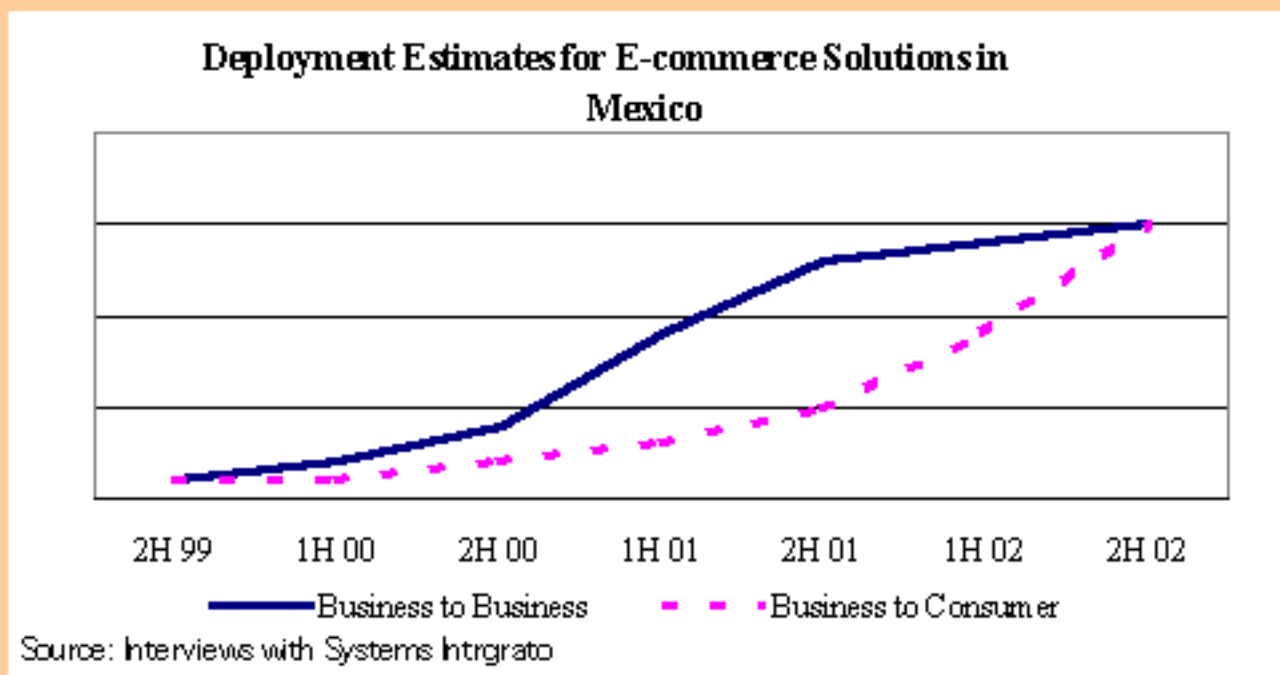
Though many criticize the business models of the Spanish language Internet portals such as StarMedia, Terra Networks, UOL and El Sitio for not having enough local content for each Latin American country, there is significant upside to their current approach to the business in the short term. While we do recognize that substantial differences exist between citizens of Spanish speaking nations and that viewing these countries as a homogenous market is impractical, first to market ideas can take advantage of the lack of Spanish product offerings and have the opportunity to establish a brand name for themselves in the Spanish speaking community.

As its middle class develops and begins to access the Web, few of these potential customers speak or read in English, however, they are beginning to have disposable income and spending patterns suggesting that they are less conservative with their purchasing decisions than many wealthy Mexicans. At this time, these Mexicans have little incentive to overcome the technological and financial issues that accompany Web access because they will have difficulty researching topics and making purchases.

VII. Systems integrators and service providers expect business to business E-commerce to enter lift off phase within the next 6 to 12 months and B2C within 12 to 18 months.

The most rapid growth opportunities in Mexican E-commerce are in the B2B sector. Systems integrators such as believe that demand for these types of solutions will enter the lift off phase in the next 6 to 12 months while the retail market is between one and two years away. Many foreign multinationals and large Mexican corporates are beginning to extend their existing B2B E-commerce strategies to Latin America, especially those companies that need to communicate with the home office abroad or those companies that do significant business with the U.S. These companies are working on solutions to improve customer relations by developing E-commerce sites and then connecting these sites to legacy systems, which will permit online sales and provide up to date information on product availability and delivery status. Overall, service providers, systems integrators, entrepreneurs and foreign MNCs are

creating demand for E-commerce solutions by educating other companies on the benefits of developing an Internet strategy.



VIII. Latin American Internet projects are beginning to attract investment.

Over the course of the last year, many foreign investors, both financial and strategic, have identified and invested in Internet opportunities in Latin America, thus helping to proliferate the Internet in the region and legitimize many of the E-commerce business models emanating from it. StarMedia led the pack and its success launched a wave of private equity investing in Latin America at impressive valuations. Many of these investors who focus exclusively on Latin America missed the enormous profit making opportunities in the U.S. Internet market. However, these funds are hoping to get their piece of the action as many believe Internet development in Latin America is similar to the level of U.S. development 3 or 4 years ago. New funds, such as the \$15 million Explorador Capital fund, focus exclusively on Internet opportunities in Latin America in an effort to capitalize on this potential. We are just at the beginning of this frenzy and we predict that investors will continue to find this space attractive for the next couple of years.

Strategic investors are also very interested in the region. StarMedia has already made four acquisitions to strengthen its local presence in individual countries, Further, Terra Networks created a joint venture with Spanish portal Ole! and purchased Mexican portal Infosel, Euromoney purchased an 80% stake in Internet Securities for \$43 million in January 1999, Thomson Financial Group purchased Porvenir, AOL Latin America swapped shares with Big Entertainment, and Sony Entertainment took an equity stake in Yupi.com. We can expect more industry leaders to begin looking for opportunities in Latin America to gain a presence in the region, expand their target market, complement their existing business model and leverage the expertise they have acquired. Local companies such as TV Azteca have also been active in investing in Internet projects and earlier this year launched the Mexican portal Todito.com.

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I. Still lacking local content.

Emarketer estimates that 72% of total web sites are in English and that 92% of all e-commerce is generated through U.S. web sites, which implies there is a significant void of Spanish language content. As a result, middle-class, non-English speaking Mexicans are eliminated from becoming potential Web purchasers. The lack of local content is a major reason why Internet proliferation has been slow in Mexico and Latin America. To demonstrate the demand for Spanish language content, Latin Trade magazine noted that some vendors in the U.S. like Charlesschwab.com and CDnow.com have as much traffic in Spanish as they do in English, indicating a severe void in Spanish content.

StarMedia, El Sitio, Terra Networks, Yahoo! and other portals that focus on Latin America are beginning to change the situation, however, many critics of these blanket approaches to the region argue that offering services to the generic Spanish speaking community does not meet local content requirements addressing the differences in language and interests between Spanish speaking countries. Further, when using any one of these portals, one realizes just how little Spanish language content is available. Searches often turn up a very limited amount of information.

II. Expensive services and telecommunications infrastructure.

As mentioned previously, the cost of using the Internet in Mexico is very expensive relative to industrialized nation standards. In Mexico, not only does a user pay a monthly rate to an ISP, customers also pay a per minute cost to the local phone company for connection time. While the monthly connection fee is very comparable to U.S. standards, the per minute charges can be twice as much the monthly fee. BCG estimates the total cost for a user in the United States who connects to the Internet 20 times per week is approximately US\$42 per month. In Mexico the corresponding amount is US\$54, while Brazilian users pay US\$83, and Argentine users US\$112. In Brazil, 7% of the households are connected to the Internet, but BCG estimates this figure would rise by 10% if Internet connection costs decreased to US levels. Argentina's connected households would increase to 23% from 16% and in Chile 32% of the households would be connected instead of the current 20%.

Besides the cost, the process of provisioning private data communications lines and other services is fraught with frustration because of the problems with capacity and infrastructure in the last mile. Customers in Latin America will have to realize that there will be delays in getting permits and in the provisioning of data lines. However, even if the service provider was to solve the last mile issues, there is another factor that effects Internet performance. Because most Latin American ISPs are connected to the Internet backbone via satellite uplink, a customer with a dedicated digital high-speed line connecting directly to a service provider could still experience poor performance during peak traffic hours, as all the users must share the satellite's bandwidth. Additionally, although many service providers project offering value added services such as web hosting, maintenance of the back end of an e-commerce site, VPNs and VoIP services, which are solutions that enable the customer to implement a sophisticated IT and Web commerce strategy without having to maintain an internal network, no service providers actually offer these types of products.

Mexico is trying to address its access cost issues by limiting the amount of annual price increases per year for Telmex to 95.5% of the inflation rate and also by encouraging other telecommunications competitors to enter the Internet market, although Telmex controls nearly 75% of the Internet user market.

III. Consumer culture issues

In interviews with consumers, one theme continued to surface, there is an extreme and inherent distrust of the general commerce system. Poor levels of customer service in Mexico fuel this distrust. Most retailers, for example, have very inflexible merchandise return policies, if they have them at all. Because of the distrust of the system and lack of customer service, consumers prefer paying for purchases in person to insure satisfaction with product selection and delivery. As a result, customers are highly skeptical of the security of online payment systems. The inability to return unseen merchandise purchased over the Internet and the lack of consumer protection against fraud or non-delivery means Mexicans consider purchasing via the Internet an inherently risky business. With respect to security for online transactions we believe it is primarily a marketing issue that needs to be addressed and will be overtime.

In addition to distrust issues, the country is still very entertained by the whole mall experience. Visiting any major Mexican shopping mall on any weekend and it is easy to understand the value of the mall as a social experience. For example, market research firms estimate that during the weekend one in six visitors to the mall in Latin America will be holding a shopping bag. The remaining "mall rats" meet up with friends, enjoy their families, eat and window shop.

IV. Business Culture issues

The ability to capitalize on an E-commerce business model requires new management and organizational skills within the firm and an appropriate regulatory regime and technological infrastructure in the firm's trading environment. Further, implementing an E-commerce strategy requires a more complex vertical value added chain of relationships for companies. This new system needs to support not only commercial transactions, but also a new level of customer service, as pre-and post-sale relationships become more important under this business model. These new forms of doing business require a transformation in

traditional operations, which includes redefining products, processes, and customer and supplier relationships. The management skills required for this new E-commerce business culture include a strong knowledge of one's industry, target market and competition, the ability to align IT strategies with the firm's overall strategy, and the ability and creativity to coordinate an e-commerce program with the company's sales and marketing strategy. Additionally, the company needs the technological base to handle online inquiries and transactions and a clear understanding of legal impact of E-commerce on the vender and consumer.

Currently, most Mexican companies are not prepared to implement the changes required for a successful E-commerce strategy. In general, Mexico has a traditional business culture that does not place a high value on market responsiveness or customer service, thus they have been reluctant to change their business model and embrace advanced technological solutions. Additionally, companies have not been proactive about considering how technological change will effect their business. Frequently, they do not see the competitive connection between a foreign company selling a similar product on the Web and their local company in Mexico City. BCG consulting just released a report highlighting this point and estimated that Latin American retailers would sell \$77 million over the Web to local customers in 1999 while U.S. retailers will sell over \$90 million to Latin Americans. BCG also said that U.S. sites frequently offer a wider selection of goods at a lower price, which threatens the business potential of E-commerce opportunities in Latin America.

Besides lacking a strong customer service orientation, many companies have been slow to adopt IT infrastructures to automate business procedures because many Mexican companies are still extremely price sensitive and feel the costs associated with a network buildout are too high given the perceived benefits. Overall, networking technology and solutions are still relatively new to Mexico and Latin America in general and many organizations do not understand the impact a sophisticated IT and E-commerce strategy will have on their business.

To date most Mexican companies use the web to inexpensively and effectively introduce themselves to potential clients, answer customer inquiries and attract new business opportunities. As a result, very few sites have transaction processing capabilities. Because many firms simply use the Internet to communicate with clients and continue to do business with customers in traditional ways, the full benefits of E-commerce are not realized. Additionally, Mexico is divided in terms of its Internet development because its northern states in Mexico, whose business practices are heavily influenced by US, are more sophisticated in terms of ecommerce and the Internet than many other businesses in the south.

V. Few local investors to provide funding for entrepreneurs.

At present, there are very few sources of local capital willing to bet on entrepreneurs in the early adopter phase of Internet development mainly because these investors do not understand the investment model for Internet companies, the technology or the valuations. Further, because of Mexico's institutional investor base and lack of capital markets instruments available to the private sector, few if any of these dollars finance start up companies. What pension funds do exist, for example, are generally very conservative in terms investment vehicles and in many cases are legally constrained from taking direct

positions in private companies. Further, the return requirements for institutional investors tend to promote a homogenous asset base. Capital market instruments are also completely inaccessible for Mexican start-ups as the market for IPOs has about dried up because of the economic difficulties and the equities market lacks the infrastructure to develop a U.S. type IPO model for technology and Internet opportunities.

Mexico is beginning to see the emergence of private equity funds that pool resources from local investors, however, much of this capital funds later stage companies outside of the telecommunications sector. At this point the majority of dollars spent on either the Internet infrastructure or Internet businesses comes from large Mexican corporations in the telecom and media space, such as Telmex, Avantel or TV Azteca (Todito.com).

VI. A disconnect between entrepreneurs and sources of foreign financing.

Besides a shortage of local investment capital, technology and Internet opportunities in Mexico have not attracted the attention of foreign financial or strategic investors until very recently. Further, these new ventures and sources of foreign funding have difficulty finding each other and many Internet start-ups in Latin America do not understand how to package themselves to attract foreign capital. When interviewing entrepreneurs we found that few if any had formal business plans, did not understand the financial forecasting process and did not realize the importance building out an infrastructure and management team had on the investment decision process. Additionally, most of these firms did not know where to obtain this type of advice. Although we were able to find three companies in varying stages of the financing process that have been able to attract the attention of credible U.S. Latin American private equity funds, these companies are the exception rather than the rule. These companies had consultants who understood the U.S. financing model and who helped them prepare solid business plans and management for the marketing process.

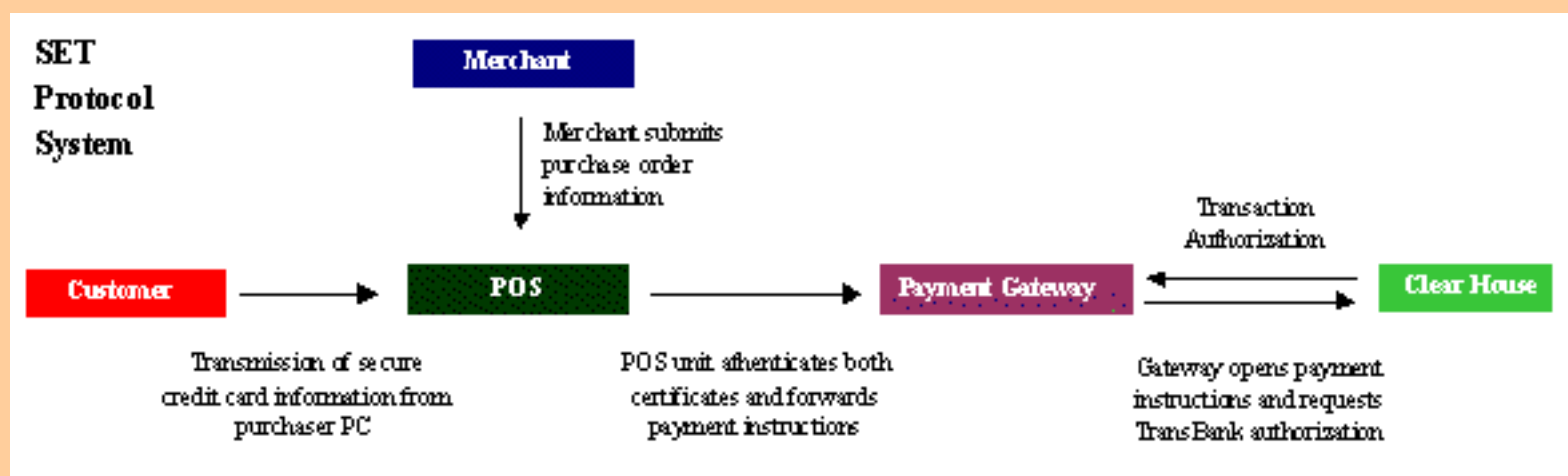
VII. Lack of credit card clearing system

Many argue that the bank clearing issues are the major stumbling block prohibiting the take off of E-commerce in Mexico and Latin America. While it will be important and will become a larger issue as the volume of E-commerce transactions grows, we do not believe that it is the primary reason for Mexico's lack of E-commerce activity. Further, the Mexican credit card clearing house is working hard to solve the issue.

Currently, there are no legal restrictions that prevent the banks from authorizing payments on line. The main problem is that the member banks of the credit card clearing house, are very consumed with fraud prevention and these banks do not have a set policy on credit card fraud. In cases where the merchant committed an error, which could mean not checking the ID of the customer, the signature on the card or that the customer put its ID number on the receipt, the clearing house is then authorized to withhold payment from the merchant and therefore the merchant bears much of the transaction risk. In cases where the merchant has not committed an error, the bank decides whether it will pay the charge or make the customer responsible. The importance of the customer relationship to the bank has a significant

correlation with which fraudulent charges get paid.

In an effort to limit online transaction fraud many Latin American banks are evaluating two different types of payment methods, each which uses a different encryption protocol. The first solution, the SSL protocol, is widely used in the U.S. and provides point to point channel encryption, but in no way validates the people on either end of a transaction are who they say they are, thus allowing for fraud. The second, the SET protocol is based on the emission of a digital certificate, which the bank will issue to cardholders for installation on their PC. The clearinghouse handles the distribution to and setting up of the merchants with their digital certificates. SET permits the consumer and the vendor to exchange all information necessary for a transaction except for credit card numbers. At the time of purchase, the customer's digital certificate forwards its credit card information to the clearing house and the merchant's certificate forwards the payment instructions. At that point the clearinghouse authorizes the credit card purchase and forwards these authorizations to the merchant. With the infrastructure in place, all the customer needs to do to initiate a transaction is open its "wallet", select the items it wants to purchase from a web page and wait for authorization.



Though SET offers better security it is difficult to implement and more expensive than an SSL solution. There also are significant logistical issues with distributing digital signatures to all parties of an Internet transaction. Further, because the digital certificate software is installed on a PC, the purchaser can not buy from anywhere, only from the PC with its certificate.

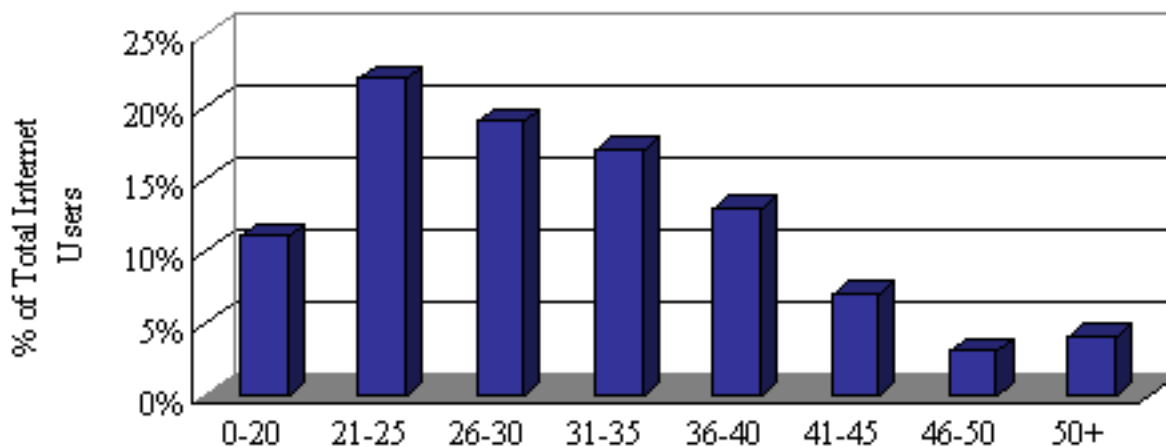
Recently, Visa International initiated Secure Electronic Transaction (SET) pilot programs in Brazil, Mexico, Peru and Venezuela. In Mexico, Visa is implementing the SET protocol with banks such as Citibank, Banamex, [Bancomer](#), Bital and SBanorte and the Mexican credit card clearing house. Many had expected a solution to the Internet payment issues before the end of 1999, but given the recent release of Visa's online program in Brazil, Mexico will have to wait at least until the first quarter of 2000 for a solution.

VIII. Unfavorable Economic Demographics

Internet user demographics in Mexico are no different than other Latin American countries. For example, the typical user is a university graduate between that ages of 21 and 40. Further, the concentration of income in the upper classes and the relatively low per capita wages for the remainder of the population

put the average Mexican at a disadvantage in terms of Internet access. The distribution of income in Mexico and Latin America is a major issue leading to the slow adoption of the Internet to date and these same issues pose a threat to future Internet and ecommerce development.

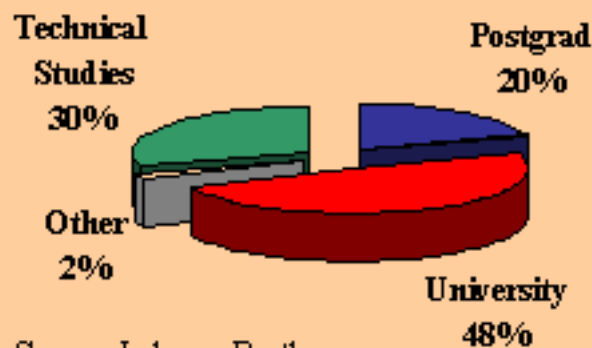
Internet Age Demographics



Source: Lehman Brothers

Comparing Mexican demographics to those of other LAC countries shows why Mexico has lagged its regional counterparts when many would expect it to be leading Internet development, given its proximity to the US and US impact on Mexican business. Mexico has the second largest population in Latin America and other than Brazil it is the only country who could capitalize on the economy of scale benefits of ecommerce for the domestic market, however, it only has 50 retail sites, according to BCG. Other LAC countries have to go after the pan regional business model to achieve these benefits, which means penetrating foreign markets.

Education Demographics



Source: Lehman Brothers

Populations in Latin American countries with largest Internet potential

(Pop in Millions)	1999	2010
Argentina	36.6	41.5
Brazil	168.5	192.2
Chile	15.0	17.0
Colombia	41.6	49.7
Mexico	97.4	112.9
Peru	25.2	30.0
Venezuela	23.7	28.7
Total	408.0	472.0

Source: Latin American Market Planning Report

The distribution of income is another factor that has and will continue to hamper the growth of the Internet in Latin America. Mexico has a smaller percentage of its population in the A class and a disproportionate percentage of the population in the D class relative to other LAC nations. Further the population of A class (1.6%) had 71% of the purchasing power in 1998 while the B, C and D classes earned 19%, 8% and 2%, respectively. In the case of Mexico almost 90% of the population can not afford an Internet connection.

Population by Socioeconomic Class

	A	B	C	D
Argentina	1.5%	8.4%	35.6%	54.5%
Brazil	2.5%	16.0%	29.0%	52.5%
Chile	2.0%	6.3%	41.9%	49.8%
Colombia	2.3%	7.8%	37.0%	52.9%
Mexico	1.6%	10.9%	22.3%	65.2%
Peru	2.6%	8.2%	32.8%	56.4%
Venezuela	1.0%	4.2%	20.0%	74.8%

Source: Latin American Market Planning Report

1998 National Purchasing Power by Socioeconomic Class by household

(US \$)	A	B	C	D
Argentina	196,652	60,433	18,627	15,063
Brazil	111,348	20,611	8,662	2,106
Chile	142,794	49,649	14,281	3,277
Colombia	105,006	42,962	8,975	1,845
Mexico	169,680	45,286	18,359	4,252
Peru	86,086	38,579	9,419	1,345
Venezuela	156,623	61,825	21,948	2,342

Source: Latin American Market Planning Report

[Back to the Overview](#)

The internet in Mexico is poised to take off, but the government should work to make it happen:

People:

Mexico has comparatively very good education and, as a result, a large supply of talent that happens to be relatively inexpensive.

THEREFORE

It needs to make better use of this resource, and to accelerate IT investment for schools and universities.

Laws and Policies:

Mexico's federal legal system is not yet well equipped to effectively foster internet usage and e-commerce. However, there are some "bright spots" in particular states, and Mexico's membership of NAFTA and its recent agreements with the European Community (EC) enables it to easily adopt many international practices as the standard.

THEREFORE

Mexico must move fast to develop policies at a national level, and accelerate deregulation to encourage competition, especially in the telecommunications sector. It should do more to leverage its NAFTA membership and EC agreements to implement NAFTA and EC rules at home.

Capital:

NAFTA membership and proximity to the US mean that Mexico is better placed than other Latin American countries to benefit from access to US capital. However the high interest rates in Mexico have often discouraged major capital investment in recent years.

THEREFORE

Mexico should focus on policies to control interest rates in order to encourage more capital investment. It should also more actively promote schemes to link Mexican entrepreneurs with US capital.

Infrastructure:

There is a big gap here for Mexico — Mexico has *some* good infrastructure but has fallen behind many other Latin American countries in establishing a robust telecommunications infrastructure on an appropriate scale.

THEREFORE

Mexico should encourage more investment in telecommunications infrastructure, either directly, or (better) indirectly through deregulating competition in the telecomms sector, and controlling interest rates, and encouraging more Joint Ventures between Mexican companies and large US companies.

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**Special Section:
E-Commerce
in Mexico and Latin America**

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Links to other Internet resources

General Mexico Information:

- [CONSULATE GENERAL OF MEXICO](#)
in Sacramento, CA

PORTAL	SITE ADDRESS	LANGUAGE
Adnet	http://www.adnet.com.mx	S
Blomberg Negocios	http://www.bloomberg.com/negocios	E,S
Cadê?	http://www.cade.com.br	P
Ciudad Futura	http://www.ciudadfutura.com	S
Consejero	http://consejero.com	S
EHOLA	http://ehola.com	E,S,P
El Sitio	http://www.elsitio.com	S,P
Infosel	http://www.infosel.com	S
Internetcom	http://internetcom.com.br	P
LatinoBeat	http://www.latinobeat.com	
Latino Link	http://www.latinolink.com	E, S
Latino Web	http://www.latinoweb.com	E
Mandic	http://www.mandic.com.br	P
NETBrasil	http://server.netbrasil.com.br	P
¡Olé!	http://www.ole.es	S
Overne!	http://www.overne.com	E,S
Picosito	http://www.picosito.com/main_en.html	E,S
Portal Network	http://www.portalecuador.com	S
QuePasa	http://www.quepasa.com	E,S
Starmedia	http://www.starmedia.com	S,P

Universo Online	http://www.uol.com.br	P
Yahoo! En Español	http://espanol.yahoo.com	S
Yupi	http://www.yupi.com	
Zaz	http://www.zaz.com.br	P
Zeek!	http://www.zeek.com.br	P
Zip Net	http://zipnet.com.br	P

Source: Merrill Lynch

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Please leave your feedback and insights

Your name:

E-mail:

Organization:

Comments:

The [visitors' comments.](#)

Consumer portals in Mexico - the case of Infotel

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The Information Revolution in Latin America

Mexico Team II

CS377c / CLAS194

Will Budreau, Bernardo Naranjo, Simon Morris, Lisa Marino

1st December 1999

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This story highlights some important lessons about success on the internet in Mexico

- **Those who get there early are well placed for the future**
 - Especially if you can invest in many different areas without losing focus
- **There are many many competitors emerging in the space, and a large percentage of them won't stay intact**
 - The ones that are both smart and lucky will probably go the way of InfoSEL
 - There are likely to be many failed businesses
- **The Latin internet is quickly becoming dominated by major emerging conglomerates (far faster than this happened in the US)**
 - Terra Networks / Yahoo! / StarMedia / Yupi
 - The window of opportunity for Latin American entrepreneurs may be closing rapidly
- **We expect business strategies based on a multi-domestic approach to conserve cultural identities, at least to a point**
 - There will always be a local media industry (whether local TV/Radio/Newspaper) which will support local content
 - Internet users will always demand this content which in turn will perpetuate the culture it represents

PORTALS IN MEXICO - INFOSEL

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InfoSEL raced into pole position as Mexico's leading consumer internet company

- **Dial-up internet access**
- **Search engine**
- **Community features - e-mail, chat-rooms, discussion forums, classifieds**
- **Content through Grupo Reforma family of newspapers**
 - 7 national and regional papers
 - Mexico's "most influential media group"
- **Grouped around traditional categories:**
 - News / Sport / Entertainment / Health
- **Business-to-consumer e-commerce**
 - Online financial services
 - Company store-fronts
- **By various accounts Mexico's #1 or #2 ISP (vs. Telmex/Prodigy)**

PORTALS IN MEXICO - INFOSEL

And this was just the consumer side of the business...

THE CONSUMER-FOCUSED SERVICES:

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In July 1999, Infosel formed a major joint venture with Telefonica Interactiva

- **The objective was to combine the international content of Telefonica Interactiva with the products and services (and client base) of Infosel**
- **This was part of a wider strategy being executed by Telefonica Interactiva**
 - Build links with internet services throughout the Latin world:
 - Ole in Spain; ZAZ in Brazil; GauchoNet and Donde in Argentina
 - Infosel in Mexico!
 - Network would be based on family similarities in the service, but fully local content
 - Rather than pan-regional, it would build a multi-local confederation of services
- **Infosel's internet business had experienced accelerating growth . . .**
- **. . . but also accelerating losses, to compete with the new incumbents**

Partnership with a powerful competitor was Infosel's response to an increasingly competitive market

PORTALS IN MEXICO - INFOSEL

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Numerous other portals competed with Infosel for the Mexican consumer internet market

Each competitor had an “angle”, each had money, and each was chasing the same group as Infosel

StarMedia

Yahoo! Mexico

Yupi.com

El Sitio

ehola.com

UOL

todito.com

Adnet

To2.com

The Americans:

The Latins:

The Mexicans:

PORTALS IN MEXICO - INFOSEL

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Perhaps it seems obvious in retrospect that Infotel would be swallowed by its larger partner . . .

. . . although Grupo Reforma made a very tidy profit - \$60 million in cash and around \$440 million in Terra Networks stock!

TELEFONICA DE ESPANA

PORTALS IN MEXICO - INFOSEL

The partner turned predator:

Terra Networks (previously Telefonica Interactiva) acquired 100% of Infotel in October 1999

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InfoSEL will remain as a subsidiary within the wider Terra Networks internet conglomerate

- **Terra Networks is aiming to develop a major portfolio of internet services and sites**
 - Internet Access via major ISPs in Mexico, Brazil, Spain, Argentina and Chile
 - Portal sites serving each of these countries separately
 - Local content arrangements
 - Local branding
 - Global technology management and development
- **The multi-domestic approach may be the best one to combine the scale of the internet with the local demands of national populations**
- **The deep pockets of Telefonica de Espana and Terra's broad portfolio make Terra Networks a formidable competitor**

What's more, the market agrees - Terra's market value trebled to \$9.7 billion on its market debut!

PORTALS IN MEXICO - INFOSEL

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Nature of Access:

Mexico lags behind the rest of Latin America - Leaving open a huge opportunity to exploit the internet further

- **Mexico has the second most Internet users in Latin America but Internet Penetration Rates well below other Latin American countries.**

	<u>Accounts (000s)</u>	<u>Penetration</u>
Brazil	1,200	0.75%
Mexico	225	0.23%
Argentina	220	0.61%
Chile	60	0.40%

- **Computer Penetration: equivalent to Brazil:**
 - Mexico: 4.1% - Brazil: ~5%
- **Relative to other Latin American countries, Mexico offers the cheapest monthly cost to access the internet**
 - BCG compared PC amortization costs, ISP fixed fees and per minute charges across Mexico, Brazil, Argentina
 - Average monthly Internet costs totaled \$47, \$52 and \$71 per month, respectively.

- 1 -



Slide 1 of 6

Telecom Infrastructure:

Mexico has some modern telecom infrastructure but still trails other Latin American countries in scale

- **Main obstacles: the lack of phone lines and outdated computer equipment, where Mexico lags behind other Latin American nations**
 - Phone lines/100 people - 9.2%, 10.5%, 20.1% and 17.3% for Mexico, Brazil, Argentina and Chile, respectively
 - Mexico has land-line access at rates not even half those of Chile and Argentina
 - Mobile phones (2/5 Argentina's penetration)
- **Online Transactions - Not yet handled for most Latin American countries**
 - Battle over encryption technology - SET (More secure) or SSL (US standard). Visa just introduced its SET system in Brazil and will roll out to the rest of Latin America
 - Chile at least has digital signatures recognized.
 - Mexico still requires written document or proof of delivery
 - EDI infrastructure weak as it is for the rest of Latin America and does not permit online purchases through the system

Before the internet can take off, the infrastructure issue will have to be addressed

- 2 -



Slide 2 of 6

Government Policies:

All of Latin America is underdeveloped in terms of Internet regulations.

- **Governments are taking a wait and see approach with on issues such as jurisdiction, taxation, and consumer protection**
- **Latin American Internet leaders are all addressing the electronic signature issue**
 - we expect most countries to adopt legislation in the coming months.
 - This is the single most important law influencing ecommerce that will come out of Latin America on the near future.
- **Deregulation and encouraging competition is a continuing project that will take most countries years to complete.**
- **NAFTA membership encapsulates many US commercial policies and supercedes domestic Mexican law.**
- **NAFTA eliminates trade barriers so that technology and ecommerce goods can flow freely**
 - free flow of capital to facilitate investments in start ups and Internet infrastructure,
 - US-influenced IP policies encourage proper protection.

NAFTA is Mexico's unique competitive advantage

- 3 -



Slide 3 of 6

Education:

Mexico's education system is adapting faster than most countries to the demands of the internet economy



- **High Literacy rate**
 - 90% in adults. (Brazil: 80%, Chile 95%)
- **Basic literacy programs on television and 200 Celatis**
 - Short-term programs for anyone
- **Over 1,000 high schools with IT-related programs**
- **Higher Ed - 4th, 5th, and 6th highest fields of new enrollment IT**
- **The online arm of Mexico's Monterrey Institute of Technology & Advanced Studies (ITESM) will start a correspondence Masters Degree in E-commerce in 2000.**

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Slide 4 of 6

Financing Sources:

Proximity to the US and NAFTA membership give Mexico a financing edge over other Latin American countries

- **Mexico suffers the same problems as most other Latin American nations**
 - No institutional investor base, weak capital markets infrastructure
 - conservative investment attitudes (not willing to take risks in Internet ventures because they do not understand the Internet business model or valuations)
- **US venture capital becoming important for financing entrepreneurs.**
 - However, these entrepreneurs have to compete for VC dollars regionally as well as with the growing number of US based businesses focused on Latin America and started by Latin American ex-patriots.
- **Internet start-ups in Mexico often do not understand how to package themselves to attract foreign capital.**
 - Few entrepreneurs have formal business plans
 - Many do not understand the financial forecasting process
- **Proximity to US investors enables better mutual understanding and ties**
 - Over 20 million Spanish-speaking Americans of Mexican origin
- **NAFTA membership gives Mexico many advantages in financing**
 - US VCs can benefit more easily from investments
 - Telecom and Internet projects have easier access to US corporate investment

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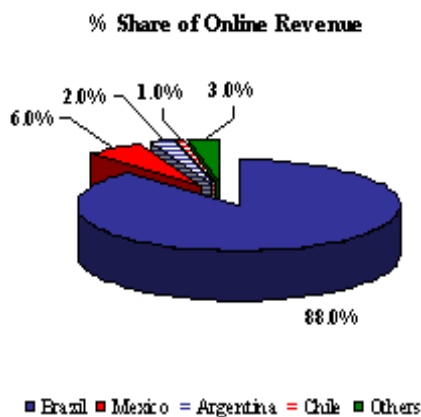


Slide 5 of 6

E-commerce:

Still, E-commerce has been very slow to take off in Mexico

- **Proximity to US & NAFTA may be a con as well as a pro**
 - Products are often available more cheaply across the border
 - Easier access to products of US online retailers (I.e. shipping)
- **Mexico has 18% of Latin American internet users, but only 6% of the e-commerce revenue**
- **Lags other Latin American countries in number of commerce sites per capita**



Total Online Retailers - BCG estimates

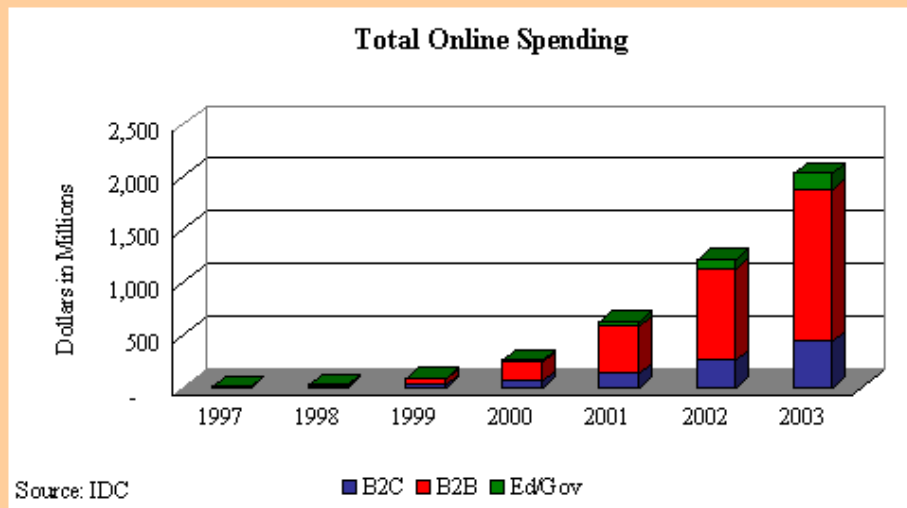
Mexico	50
Argentina	37
Brazil	307
Chile	18
Colombia	10



Ecommerce Overview

- Mexico has the second largest Internet user base in Latin America at close to 500,000 Internet accounts (June 1999) and the largest Base of credit card holders in the region at 21.6 million people.
- Much of the estimated \$83 million of US ecommerce transactions in 1998 by Latin Americans was completed by Mexicans, where the NAFTA agreement provides US based sites with free barriers to trade.
- In a study completed by IDC in 1997, researchers concluded that of the large Mexican companies, 73% had web sites and 100% intended to have sites by 1999. Further, many of these companies also offered employees access to an intranet site and 10% of these companies had plans to offer the ability to execute online transactions by 1999.
- Mexico is part of the NAFTA agreement and has better access to technology than many other Latin American nations and by having open borders with the US, Mexican businesses are encouraged to develop electronic transaction processing capabilities, particularly on the B2B side in an attempt to increase efficiency and competitiveness.

Given the above positive factors one would expect the level of ecommerce development in Mexico to be much more developed than it is. Though Mexico represents 18% of total online users, it accounts for about 6% of online spending. Lehman Brothers analysts argue that Mexico has not been able to reach a critical mass of Internet users who support a sufficient domestic ecommerce market. This coupled with the proximity with the US and subject to NAFTA regulations and the open trade borders make development of local e-tailing a challenge. Though online spending is expected to grow from \$89 million in 1999 to \$2 billion by 2003, much of this growth will come from purchasing from US websites.



- Grupo Telelink, SA de CV identified the key impediments to the proliferation of ecommerce in Mexico.
 - Security of online payment
 - Lack of Spanish content for Latin Americans/Mexicans
 - Detailed product information
 - Site ease of use

- Ease of payment
- Delivery time
- Speed of connection speed
- Customer service post sale

History of Electronic Transactions

- Electronic transactions in Mexico started with the implementation of NAFTA to allow Mexican businesses to increase competitiveness in their businesses.
- Adoption of these practices is in the early stages for small and medium sized companies in Mexico because of the high prices for the installation and development of electronic systems.
- In July 1999 pilot testing began to prove the effectiveness of EDI in Mexico.
- Currently over 3,000 companies are carrying out their non-payment transactions through EDI.
- Currently EDI system is not used for payments and only being used for coordination between the purchasing operations of a company and its suppliers in non-payment business to business transactions.

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Industry Study: Service Providers and Systems Integrators

[Service Providers](#)

[Systems Integrators](#)

Service providers and systems integrators are the leaders of E-commerce development in Mexico and Latin America. Every major Mexican service provider is promoting Internet proliferation and the development of services that permit companies to outsource much of the back end operations of an E-commerce solution to make implementing this strategy more cost effective. From the network equipment side, large U.S. players are leading the charge. The "Value Chain Alliance", a \$300 million joint venture set up to offer complete E-commerce solutions to Latin America, includes Cisco Systems network and infrastructure expertise, Compaq PCs and servers, Microsoft's software infrastructure, Interchange's Internet transmission expertise and Modulo's security system. Many of the smaller and independent integrators are using equipment offered by these major vendors, while other large integrators such as IBM and Oracle are deploying their own. All of these players are working hard to keep E-commerce in the media in an effort to promote awareness and educate both businesses and consumers about the benefits of the Internet and Web commerce.

When talking about an E-commerce solution one wants to discuss the whole process of integrating a company's existing IT system with a web site. Currently, most Mexican IT systems are very back office oriented and focus on facilitating the day to day data processing tasks for a business. These systems are not able to support an open, client-oriented architecture that accompanies an E-commerce model. For example, many of the internal ERP systems are not able to process orders over the Web automatically. The information must still be entered by hand. Further, internal logistical and inventory systems frequently do not have the capacity to automatically update a web site for product availability or shipment information.

In order to change the existing ways of doing business and promote E-commerce, systems integrators and service providers have embarked on an education campaign. As a result, service providers and integrators need to work on changing the culture of their customers with regards to IT and customer service. Additionally, because many of these executives are not IT savvy, they view the start up costs for an E-commerce site to be very prohibitive. Teaching executives to look past the initial start up fees, which can run anywhere from \$10,000 for the most simple equipment plus the cost of establishing a dedicated line to a service provider and the cost of the monthly web hosting service is the most difficult part of the process at this point. Few companies feel using the Web as a new distribution channel is worth the effort. All interviewees agree that once the education process is successful, demand will come from customers seeking solutions rather than having to create the demand, which is the case today.

Service Providers

In terms of business over the Web, service providers would like to become a portal for Web commerce by offering small and medium sized companies the opportunity to outsource their E-commerce sites. They envision offering a platform where the service provider aids the customer in developing and

implementing an E-commerce strategy and to develop an interactive solution that includes web-hosting services, back end transaction processing and customer database functionality all in a secure environment. These services remove the cost to maintain a network and allow the customer to focus on its core business. Analysts estimate that many small and medium sized businesses with an E-commerce channel will opt to outsource the maintenance of their site. Though this service is a lower cost alternative for customers, it is not yet available as most service providers only have web-hosting capabilities at this time. In order to offer this new solution service providers must have 24 hour a day service with network monitoring for increased reliability and install a secure dedicated line to each customer.

Systems Integrators

Systems integrators in Mexico estimate that E-commerce in the business to business sector will begin to grow substantially over the next 6 to 12 months while the retail sector will develop over the next two years. As a result, the integrators we interviewed that focus on Latin America are concentrating on the nearer term business to business opportunities. At present, there are two types of customers deploying business to business solutions. The first group is large Mexican corporations (greater than 1000 employees) and foreign multinationals that want to develop E-commerce sites and then connect these sites to legacy systems. Integrators are working on connecting sites to inventory systems to provide E-customers with product availability, to delivery systems to provide shipment tracking information and to sales systems to process purchase orders and automatically update inventory and accounting systems. The second group of E-commerce customers is made up of the medium sized companies (between 100 and 500 employees). Frequently, these companies have very limited legacy systems or no system at all and the integrators will aid in the development of an overall IT strategy that will include an E-commerce component. The education process is most important with the medium sized customers.

These integrators are also looking to establish highly flexible turnkey solutions that are cost effective and easy to install and maintain. The simple solution takes between two and three months to implement, while the more sophisticated alternative can take up to six months depending on how prepared the customer is in terms of legacy systems and web content. Even the simplest solution can be fully integrated with legacy systems, monitor traffic and report the detail of customer purchases.

In an effort to successfully promote E-commerce solutions systems integrators need to keep important customer issues in mind:

- Work on interoperability and development of an open networking architecture for customers as they build out with new technologies.
- Offer a migration path to more sophisticated technologies as networking requirements grow.
- Develop and promote solutions that allow customers to take advantage of the cost benefits of public networks such as VPNs, VoIP and service provider maintained e-commerce solutions. Because of the lower quality of service expectations among some Latin America companies, these low cost alternatives could find early adopters in the region despite quality deficiencies.

Industry Studies: Online Retailing

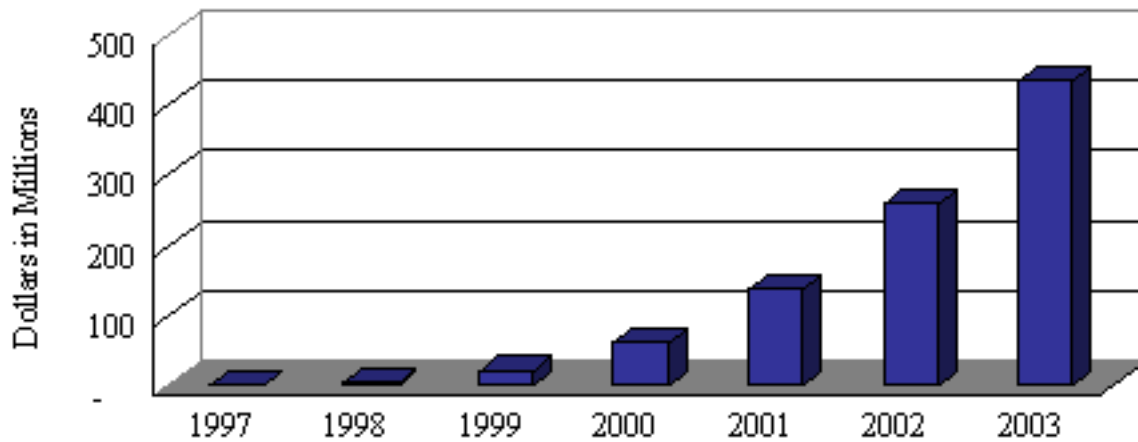
Boston Consulting Group performed a recent study on retail E-commerce opportunities in Latin America and concluded that Latin American retailers must improve their online stores before retailers from outside the region absorb their market share. BCG says that regional retailers are expected to make \$77 million in online sales in 1999 while U.S. retailers will sell \$90 million worth of Internet products and services to Latin America. Price and speed differences combined with the fact that U.S. companies offer wider selections, encourage Latin Americans to buy from the U.S. Below are worldwide projections of the major retail business segments that sell through the Internet. At present, Mexico and Latin America lack content in all of these categories.

	Worldwide Retail E-commerce Segments (\$MM)				
	1996	1997	1998	1999	2000
PCs	140.0	323.0	701.0	1,278.0	2,105.0
Travel	126.0	276.0	572.0	961.0	1,579.0
Entertainment	85.0	194.0	420.0	733.0	1,250.0
Clothing	46.0	89.0	163.0	234.0	322.0
Gifts/Flowers	45.0	103.0	222.0	386.0	688.0
Food/Drink	39.0	78.0	149.0	227.0	336.0
Other	37.0	75.0	144.0	221.0	329.0
Total	\$518.0	\$1,138.0	\$2,371.0	\$3,990.0	\$6,579.0

Source: Forrester Research

According to BCG, the challenge for retailers is to move fast and establish an early and dominant market presence. Further, Latin American retailers need to provide a more compelling consumer value proposition relative to their U.S. competitors. At this point in time, the retail market is highly fragmented with no one retailer able to dominate a product category, which enables first movers to market offering convenience, selection, service and competitive pricing, the opportunity to establish a strong market position. BCG projects that total Latin American online retailing could reach \$3.8 billion by 2003. Currently, most domestic online purchases in the region are concentrated in the books, computer equipment, electronics and groceries categories, which account for 77% of total online domestic sales.

Total Mexican B2C Spending



Source: IDC

In terms of Mexican B2C development, IDC projects that total online spending will reach over to \$400 million by 2003. We found a study completed by Grupo Telelink that summarized the online spending patterns of consumers during 1998. The study concluded that 48% of respondents purchased between \$50 and \$200 over the Internet in 1998, with almost 20% of the users spending more than \$200. Further, men have made most online purchases. Over 57.6% of women using the Internet have not made online purchase, while only 32.6% of men have not, but on average female aggregate purchases are larger.

Reasons for purchasing over the Web

Reason	% Total
Convenience	46.2%
Variety/Selection	28.0%
Price	20.0%
Entertainment	5.8%

Source: Grupo Telelink, SA de CV

What and from where are Mexican buying?

Product	% Total	Site	% Total
Books	29.8%	Amazon.com	27.8%
		CDNow.com	2.7%
Computer Equipment	28.5%	Barnes&Noble.com	1.8%
Music	11.8%		

Travel	10.3%	Ghandi.com.mx	1.5%
Other	19.6%	Microsoft	1.2%
		Other	65.0%

Source: Grupo Telelink, SA de CV

To date, there are four main reasons why E-commerce via the retail channel has not been successful in Mexico.

There really is nothing to buy locally. Mexican consumer content over the Internet is incredibly scarce, and BCG estimated as of July 1999, that the country had about 50 online retailers compared to over 300 for Brazil. There are the handful of companies selling basic items such as books, CDs and flowers via the Web, but prices are no less expensive than shopping in person.

Retailers have not changed their business models to reflect a new customer orientation. This includes establishing policies that increase customer responsiveness such as easy customer return procedures and methods for better responding to customer inquiries, either on or offline. Retailers have also not embraced the discount retail model. There are no stores that focus on high volume, low cost products such as the outlet businesses in the U.S. Further, customer demand and orders are driven by the look, functionality and performance of the retailer's web site. At present, most consumer-oriented web sites are very simple, not attractive or sophisticated and generally do not have the service provider connections and back office equipment needed to provide easy transaction processing.

Transaction processing continues to be a problem because of credit card clearing issues.

The Mexicans need to develop an online shopping culture, which has been hampered by two issues. First, there are few successful catalog business models in Mexico. Many retailers have tried and failed to offer products via this channel. Second, the Internet in general has not taken off in Mexico, although we believe that it will begin significant market penetration within the next twelve months because of changes in the pricing of services, continued PC growth and increased local content.

The retail situation is a typical chicken and egg scenario, much more so than business to business E-commerce. Users will have no incentive to buy through the Web if there is nothing to buy. This fact becomes especially important in the case of consumers that only speak Spanish. Their incentive to purchase over the Internet is even less given the scarcity of local content. Without demand for products, businesses take a large risk by trying to create this demand with a pull through model, especially the entrepreneur who may have the idea and customer service orientation, but lacks the resources to develop a sophisticated site with high quality performance that will attract consumers. Additionally, without content or a push from the consumer segment, the banking industry does not have a reason to address its online payment issues because the existing method for executing online transactions, while cumbersome, is functional given the volume of transactions generated to date.

Of all these issues, the lack of content is probably the most important. We believe that there is demand for online transactions in Mexico and Latin America given the existing Web purchasing statistics for the region. B2C start-ups will begin to take sales away from the larger players and start revolutionizing the retail sector in general, once these enterprises secure the financing to develop their ideas.

Large chain stores in Mexico and Latin America are the best positioned to capitalize on Web commerce opportunities because they have household brand names, can establish their own delivery systems and can execute transactions via the Web as long as the customer uses a store card. However, in general, it does not appear that the large retailers have fully addressed the customer service issues, which will negatively effect potential revenues and these stores are still focused on expanding their physical presence. Further, though most retailers have web sites, they are used for marketing purposes and not very sophisticated. Few have online purchasing capabilities.

Systems integrators suggest that retailing will develop a critical mass over the next two years and as service providers and Internet portals take a leading role in developing local content and E-commerce solutions. For example, StarMedia for example, with its acquisition of Servicios Interactivos, is beginning to help its customers develop turnkey E-commerce solutions with low cost access through its ISP service. We believe that retail E-commerce in Mexico will begin to take off with the sale of small items such as CDs and books because they are high in demand, customers know what they want and these goods are relatively cheap for the consumer so involve little delivery risk.

In Mexico, however, very little money exists to help companies develop the Internet market place, which has significantly slowed retail development as no well-known local name, such as an Amazon.com, exists to make consumers aware of the value of online purchasing. Further, in the U.S. for example, the venture capital world recognized the value of the Internet before Internet markets were developed. The U.S. was successful because investors were willing to bet on ideas before markets "existed", which in turn unleashed the demand for Internet purchasing and allowed these markets to grow.

Industry Studies: Financial Services

[Commercial Banking](#)

[Online Trading](#)

[Insurance](#)

In the U.S., the financial services sector has been very proactive in using the Web as a means of directly doing business with clients. Additionally, in terms of the asset management industry, companies have financed the growth of the Internet and E-commerce companies. In Mexico, the system is very underdeveloped. The retail banking and trading sectors have realized the value of the Web in terms of lower expenses, customer ease of use and improved information channels and are just beginning to implement online strategies. Overall, however, there are many areas where the financial services sector has not taken the lead to cultivate E-commerce.

Commercial Banking

Commercial banks influence three very important areas of E-commerce. First there is the retail/small business banking model. Most of the leading banks in Mexico have recognized the benefits of electronic banking and online banking sites are up and running.

The goals of the online banking program are to reduce costs in two ways. First, Internet banking keeps customers out of the branches while still allowing them to do basic transactions such as account transfers, views of account balances and credit card payments on a 24 hour a day basis. Analysts estimate that an online transaction costs a bank between 10% and 20% as much as a transaction executed in the branch. Second, an online banking program is a low cost and efficient way to inform customers of products and services.

Online banking was also an area where the banks proactively addressed customer service issues, which is promoting the use of this product. For example, each executed transaction receives a confirmation number when it is complete, the sites are very user friendly and self-explanatory and there is an email system to respond to questions and take suggestions. Over time many retail banks plan to offer investment vehicles such as online trading accounts and mutual funds through this channel as well.

A second area of E-commerce where banks are important is in lending to entrepreneurs developing E-commerce businesses. At this point, banks generally are not aggressive about lending money to small businesses in general, and the recent economic downturn has made the credit crunch in Chile even worse.

The third area of banking related to E-commerce is definitely the most widely discussed. The association of credit card issuing banks that run the clearinghouse for all credit card transactions, is blamed for not facilitating the development of E-commerce due to its reluctance to approve online credit card transactions.

Recently, Visa International initiated Secure Electronic Transaction (SET) pilot programs in Brazil, Mexico, Peru and Venezuela. In Mexico, Visa is implementing the SET protocol with banks such as Citibank, Banamex, [Bancomer](#), Bital and SBanorte and the Mexican credit card clearing house. Many had expected a solution to the Internet payment issues before the end of 1999, but given the recent

release of Visa's online program in Brazil, Mexico will have to wait at least until the first quarter of 2000 for a solution.

Online Trading

Online trading services have revolutionized investing in the U.S. and now many Latin American countries are looking to capitalize on this low cost business model in their domestic markets. The leading Latin American online trading company is Patagon.com, an Argentine service that hopes to replicate its business model throughout Latin America. During the first week of August, Patagon also purchased a seat on the Chilean stock exchange from Tanner Corredora, a Chilean on line brokerage firm. This license allows Patagon to establish online trading services in Chile and is the company's first attempt to move into other Latin American markets. Aggressively entering Chile is important for Patagon because the market leader, CB.cl, is growing and consolidating its first mover advantage.

Currently, Mexico's Central Bank is working with the Mexican financial sector to create an online brokerage regulatory scheme. Online stock brokering will kick off in Mexico by April 2000, according to Mexico's national banking and securities commission CNBV, the Mexican stock exchange and national brokerage firms. The scheme will regulate security issues surrounding online financial service transactions in Mexico and will use digital signatures and certificates to enhance security in online securities transactions.

The release of the program will be made in three steps.

- Ability to find security information and analysis on the Internet.
- Ability to request account balance statements.
- Ability to buy and sell stocks online.

There were many challenges in developing an online brokerage system. Those working to create the framework had many issues to resolve such as:

- CNBV had to define what constitutes a legal exchange of publicly traded shares between two parties.
- Under existing legislation, the initiation of a transaction could be verbal, for instance if a customer called a broker to purchase a stock, but at settlement of the trade, the customer needs to receive a written confirmation.
- The Internet presented many different problems for the CNBV because order initiation and confirmation is neither verbal nor written.
- Ultimately, the agency allowed emails to act as a form of confirmation.
- Insurance issues.
- All broker dealers have insurance policies in case of fraud, but these policies covered transactions executed through traditional channels.
- Because most of the banks had U.S. insurers, this quickly became a non-issue as the insurers cover U.S. online trading services.

Insurance

In general, insurance companies are behind other financial service sectors in terms of online offerings. Most life insurance companies use the Web as a way to inform their customers about products, but the actual selling of policies still occurs in person. Overall, insurance company strategies focus on building sales and support capacity for agents. However, one Mexican insurance company, Seguros Inbursa, a wholly-owned subsidiary of Mexican financial group Grupo Financiero Inbursa de Mexico, launched this past September a web site to sell its insurance plans online. Through the web page (www.segurosinbursa.com.mx), clients can buy a wide range of insurance plans including life, property and car coverage, and access Inbursa's consulting services.

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Nature of Access: Mexico lags behind the rest of Latin America - Leaving open a huge opportunity to exploit the internet further

- **Mexico has the second most Internet users in Latin America but Internet Penetration Rates well below other Latin American countries.**
- **Computer Penetration: equivalent to Brazil:**
 - Mexico:4.1% - Brazil: ~5%
- **Relative to other Latin American countries, Mexico offers the cheapest monthly cost to access the internet**
 - BCG compared PC amortization costs, ISP fixed fees and per minute charges across Mexico, Brazil, Argentina
 - Average monthly Internet costs totaled \$47, \$52 and \$71 per month, respectively.

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Telecom Infrastructure: Mexico has some modern telecom infrastructure but still trails other Latin American countries in scale

- **Main obstacles: the lack of phone lines and outdated computer equipment, where Mexico lags behind other Latin American nations**

- Phone lines/100 people - 9.2%, 10.5%, 20.1% and 17.3% for Mexico, Brazil, Argentina and Chile, respectively
- Mexico has land-line access at rates not even half those of Chile and Argentina
- Mobile phones (2/5 Argentina's penetration)

- **Online Transactions - Not yet handled for most Latin American countries**

- Battle over encryption technology - SET (More secure) or SSL (US standard). Visa just introduced its SET system in Brazil and will roll out to the rest of Latin America
- Chile at least has digital signatures recognized.
- Mexico still requires written document or proof of delivery
- EDI infrastructure weak as it is for the rest of Latin America and does not permit online purchases through the system

Before the internet can take off, the infrastructure issue will have to be addressed

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Government Policies: All of Latin America is underdeveloped in terms of Internet regulations.

- **Governments are taking a wait and see approach with on issues such as jurisdiction, taxation, and consumer protection**
- **Latin American Internet leaders are all addressing the electronic signature issue**
 - we expect most countries to adopt legislation in the coming months.
 - This is the single most important law influencing ecommerce that will come out of Latin America on the near future.
- **Deregulation and encouraging competition is a continuing project that will take most countries years to complete.**
- **NAFTA membership encapsulates many US commercial policies and supercedes domestic Mexican law.**
- **NAFTA eliminates trade barriers so that technology and ecommerce goods can flow freely**
 - free flow of capital to facilitate investments in start ups and Internet infrastructure,
 - US-influenced IP policies encourage proper protection.

NAFTA is Mexico's unique competitive advantage

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Education: Mexico's education system is adapting faster than most countries to the demands of the internet economy

- **High Literacy rate**

- 90% in adults. (Brazil: 80%, Chile 95%)

- **Basic literacy programs on television and 200 Celatis**

- Short-term programs for anyone

- **Over 1,000 high schools with IT-related programs**

- **Higher Ed - 4th,5th, and 6th highest fields of new enrollment IT**

- **The online arm of Mexico's Monterrey Institute of Technology & Advanced Studies (ITESM) will start a correspondence Masters Degree in E-commerce in 2000.**

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Financing Sources: Proximity to the US and NAFTA membership give Mexico a financing edge over other Latin American countries

- **Mexico suffers the same problems as most other Latin American nations**

- No institutional investor base, weak capital markets infrastructure
- conservative investment attitudes (not willing to take risks in Internet ventures because they do not understand the Internet business model or valuations)

- **US venture capital becoming important for financing entrepreneurs.**

- However, these entrepreneurs have to compete for VC dollars regionally as well as with the growing number of US based businesses focused on Latin America and started by Latin American ex-patriots.

- **Internet start-ups in Mexico often do not understand how to package themselves to attract foreign capital.**

- Few entrepreneurs have formal business plans
- Many do not understand the financial forecasting process

- **Proximity to US investors enables better mutual understanding and ties**

- Over 20 million Spanish-speaking Americans of Mexican origin

• NAFTA membership gives Mexico many advantages in financing

- US VCs can benefit more easily from investments
- Telecom and Internet projects have easier access to US corporate investment

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E-commerce: Still, E-commerce has been very slow to take off in Mexico

- **Proximity to US & NAFTA may be a con as well as a pro**
 - Products are often available more cheaply across the border
 - Easier access to products of US online retailers (I.e. shipping)
- **Mexico has 18% of Latin American internet users, but only 6% of the e-commerce revenue**
- **Lags other Latin American countries in number of commerce sites per capita**

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Legal Impediments to Electronic Transactions

- The standardization of electronic transactions between businesses has become a priority of Mexican firms.
- Electronic transactions are a safe way to reach modernization and cost reductions, but there is not set standard as of yet.
- Currently the online payment of a transaction among businesses is not allowed. Invoices and signatures need to be on paper according to the Treasury Ministry regulations.
- Internet regulation and the law are not predictable which creates concerns that the Mexican government will overtax the Internet.
- EDI regulations are expected later this year.

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Mexico to Approve Ecommerce Law in 1999

- Mexico's legislators have agreed to approve a law regulating ecommerce before year-end
- Mexico needs to pass the legislation to reduce the risk to businesses and increase competitiveness because ecommerce development in Mexico is falling behind other LAC countries
- Law will be based on recommendations from the United Nations Commission on International Trade Law, Uncitral.
- Main points of the proposal deal with electronic contracts and digital signatures.
- Mexico's Banking Association (ABM) is planning to send to congress a proposal to strengthen Ecommerce legislation.

Source: [El Financiero \(Mexico\)](#), BNA

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Provisions/Importance of the Ecommerce Law

- All electronic documents will be equal to paper copies in terms of legality.
- Law guarantees that those documents meeting all the requirements for a valid electronic signature will be equivalent to paper documents.
- Addresses many of the transaction security concerns of banks as both buyers and sellers will have their own electronic signatures,
- Also help change consumer confidence about doing business over the Web.

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Financial Sector Seeks Online Transaction Solution

- Mexico's Central Bank is working with the Mexican financial sector to create an online transaction regulatory scheme
- Online stock brokering will kick off in Mexico by April 2000, according to Mexico's national banking and securities commission CNBV, the Mexican stock exchange BMV and national brokerage firms.
- The scheme would regulate security issues surrounding online financial service transactions in Mexico.
- The group will focus first on digital signatures and certificates.
- The transfer will be made in three steps.
 - Clients will first be able to find information and analysis on the Internet
 - Clients will be able to request balance statements
 - Clients will be able to buy and sell stocks online.

Source: [El Economista \(Mexico\)](#)

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Main Challenges in Developing Online Regulations

- CNBV has to define what constitutes a legal exchange of publicly traded shares between two parties.
 - The initiation of a transaction could be verbal, for instance if a customer called a broker to purchase a stock, but at settlement of the trade, the customer needed to receive a written confirmation.
 - The Internet presented many different problems for the CNBV because order initiation and confirmation is neither verbal nor written.
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 - Because most of the banks had U.S. insurers, this quickly became a non-issue as the insurers cover U.S. online trading services.

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TELMEX Gaining Control of the Mexican Internet Market as in other Telecom Markets

- [Telmex](#) has 75% of the country's Internet user market
- Telmex has sold an average of 1,000 Internet connections per month as a result of a credit deal by which new Internet clients also receive the computer itself, paying for it over two years
- Demand for the deal is so great that Telmex continues to add new computer manufacturers to its list of partners. (Apple, Acer, IBM, Prodigy and Compaq)
- As a result of the credit deal, Telmex is Mexico's leading vendor of PCs.
- Though permitting competition from other ISPs, no other service provider has the resources to underwrite a plan such as this.
- Telmex actions foreshadow some sort of backlash from Cofetel as a result of this market dominance and anti-competitive practices.

Source: [El Financiero \(Mexico\)](#)

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Local Access

- In March 1999, Cofetel required that Telmex's annual price hikes be less than 95.5% of the inflation rate.
- Cofetel allows Telmex to raise basic telephony prices every quarter, and long distance prices once a year.
- Local calls now cost about US\$0.14 per minute
- Local access charges are an important variable in the proliferation of the Internet in Mexico. With Prices coming down this new regulation continue to spur demand.

Source: [El Economista \(Mexico\)](#), El Financiero (Mexico)

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Telmex is an "Agent With Considerable Power"

- Mexico's federal antitrust commission has Telmex "an agent with considerable power," but the possibility of officially designating Telmex a dominant operator has been technically quashed.
- Telmex will likely face restrictions to loosen its grip on Mexican telecommunications markets.
- As a result of the ruling, Cofetel will regulate Telmex in terms of pricing strategy, service quality and access to financial information

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