Globalization and E-Commerce: Growth and Impacts in Mexico

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SUMMARY

- The eruption of e-commerce has generated widespread enthusiasm about the prospects for the eventual emergence of a digital economy in Mexico.
- Given the limited extent of a digital Mexican economy so far, this country has a large potential for the growth of e-commerce activities, as companies of all sizes are attracted to the Internet and the possibilities it opens for their business.
- Both the public and the private sectors are actively committed to fostering e-commerce, so that a favorable environment has ensued. This is further increasing Mexico's potential and readiness for the development of a digital economy.
- Major promotion initiatives are being undertaken by both federal ministries and state governments, many of which are being organized into a comprehensive project called *e-Mexico*, which is aimed at managing all government transactions and services online.
- Finance, retail and manufacturing are the most advanced sectors in the implementation of e-commerce strategies so far. In particular, most banks offer their basic services online, as a matter of course.
- One of the main barriers to the diffusion of e-commerce in Mexico is the fact that the overwhelming majority of business establishments are micro, small, and medium enterprises that lack both the resources to invest in IT and the technological and business culture to go online.
- The above point is compounded by the observed tendency that the larger the company the more likely it will set up a web site.
- SMEs (small and medium-sized enterprises) both constitute a barrier to and at the same time offer a large potential for the spread of e-commerce.
- Most dynamic and outward looking SMEs are being pulled into e-commerce by both the programs under implementation by the federal government to facilitate their adoption of digital technologies, and the requirements of larger customers and suppliers as to the exchange of orders, invoices, and payments over the net, in addition to ISO certification as a condition to being eligible as suppliers themselves.
- B-to-B e-commerce is the most promising activity for the development of e-commerce in Mexico. B-to-C e-commerce is limited by the extent of access to PCs, which in turn, is limited by the low-income level of most households, resulting in the poor effectiveness of web-based marketing campaigns. The Internet is still not as effective as traditional mass media like TV, radio, and newspapers for that purpose.
- B-to-B e-commerce is seen to go beyond e-commerce, in the sense that it can bring together all the players of an entire industry in a single e-market on the web, and horizontally integrate the value chain of that industry.
- The larger the chain the greater the possibilities for reducing intermediation costs and for improving inventory control and relations with customers. In this way, e-commerce is contributing to the development of production and business networks and so to the gradual rise of a network economy in Mexico.
- E-commerce is helping Mexican businesses to transform their corporate structures and management practices and methods, so as to make them more flexible and more able to conduct faster and more personalized transactions, to substantially reduce intermediation, or else to develop new and more efficient forms of intermediation, such as virtual communities of suppliers and customers.

INTRODUCTION

The Internet and the use of electronics for carrying out business transactions have been spreading quite rapidly in Mexico since the early 1990s. This has been concomitant to the diffusion of the use of computers and related devices for Internet access among the different sectors of Mexican society, such as mobile phones and palmtops, and especially of personal computers among growing segments of Mexico's younger population.

Although its early origins can be traced to the mid-1980s when the first node, called BITNET, was set up as a private telecommunications line (Gutiérrez and López, 1998), the Internet actually began in Mexico in early 1989, when the main campus of the Monterrey Institute of Technology (ITESM) established the first direct connection to NFSNET. According to NIC-Mexico (Network Information Center Mexico), it was on February 1 that year when the first server, a Microvax-II, was connected to the NFSNET backbone and the first ".mx" domain was established: dns.mty.itesm.mx. Merit Network, Inc., also attests to this as shown in Table 1, which presents the dates of the initial connection of other selected countries studied in this project.

TABLE 1
NSFNET Networks and Connection Dates by Country (As of May 1, 1995)

Country	Nets	Initial Connection
Brazil	165	06/90
Denmark	48	11/88
France	2,003	07/88*
Japan	1,847	08/89
Mexico	126	02/89
Singapore	107	05/91
Taiwan	575	12/91
United States	28,470	07/88*

Source. Merit Network, Inc. (ftp://nic.merit.edu/nsfnet/statistics/nets.by.country).
Note. *Merit began managing the NSFNET backbone in July 1988.

Up to 1991, the services provided in Mexico were restricted to Telnet, FTP, and email. In 1992, Gopher was added, which in 1994 incorporated *Veronica,* a search tool. Two new servers, Mexnet and RUTYC, were created during those years, which offered free connection at 56 Kbps (Gutiérrez and López, 1998).

In addition, in 1994, RedUNAM was created to market Internet services and the first private company, PIXELnet, was connected to the web; by mid-1995 commercial connections already outnumbered educational links. In 1996, the Mexico Internet Society was formed as a non-governmental, non-profit organization to coordinate global cooperation for Mexican Internet users (Gutiérrez and López, 1998).

During the Salinas and Zedillo administrations (1988-1994 and 1994-2000), the liberalization of the telephone industry—dominated up to then by the government-owned monopolistic provider, *Teléfonos de México* (Telmex)— resulted in the emergence of major competitors and opened the way for the explosion of public and private connections to the Internet from the mid-1990s on. This led to an equally rapid growth in the number of registered domain names in the first 12 years since the Internet began operating in Mexico, as Table 2 shows.

TABLE 2
Mexico: Internet Domain Cumulative Growth, Selected Dates 1989-2001

Date	Academic Institutions .mx	Academic Institutions edu.mx	Commercial Users (com.mx)	ISPs (net.mx)	Non-profit Institutions (org.mx)	Government Institutions (gob.mx)	Total
Feb. 1989	1	0	0	0	0	0	1
Sept. 1991	1	0	0	0	0	0	1
June 1994	40	0	5	0	0	0	45
Oct. 1995	83	0	100	14	5	9	211
Dec. 1995	101	0	180	20	13	12	326
June 1996	137	0	722	66	45	30	1,000
Dec. 1996	179	13	2,286	143	142	75	2,838
June 1997	198	83	4,025	208	269	128	4,911
Dec. 1997	188	168	6,043	262	389	201	7,251
June 1998	189	254	7,428	296	469	284	8,920
Dec. 1998	189	359	10,661	395	622	350	12,576
June 1999	177	471	16,698	511	940	404	19,201
Dec. 1999	177	557	25,026	639	1,221	510	28,130
June 2000	177	696	42,987	716	1,827	802	47,205
Dec. 2000	177	855	56,769	761	2,399	935	61,896
July 2001	177	1,048	67,714	811	3,011	1,115	73,876

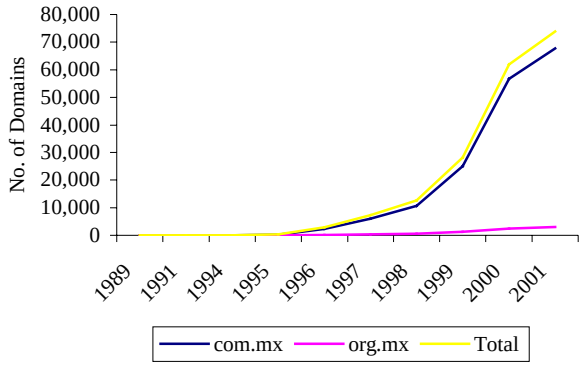
Source. NIC México, 2001.[1]

Beginning in1989 when the first web site was registered, the number of domains almost tripled in just the second half of 1996, and then more than doubled during 1997. This dynamism slowed down in 1998, but then picked up again with the number of domains doubling by December 1999. In January 1999 alone, more than 3,000 web sites were created, more than all the sites established in the first seven years since the Internet was launched in Mexico. The fastest growth, however, took place between 1999 and 2000 when the number of domains more than doubled; the rate declined substantially though in the first half of 2001. Sectorially, commercial domains have posted the fastest growth rates followed, far down, by those of non-profit institutions (Table 2); Figure 1 depicts the growth pattern of both sectors.

The swift growth of Internet domains has been concomitant with the rapid expansion in the use of computing equipment in Mexico, as documented in the section on Infrastructure in this paper. Growth of "com.mx" and "org.mx" domains, in particular, has resulted because private businesses and private organizations have been the main users of the Internet and have set up more web sites relative to the other sectors, as they are driven by the powerful search for profits and are more likely to have the required resources to do so. Also discussed in the section on infrastructure, by early 2000, nearly three-fourths of installed PCs in companies were connected to the Internet, yet; only ten percent of Mexican homes had access to a computer by the end of that year (Cruz González, 2000).

[1] The data was provided to the author by Mr. Oscar Robles, an executive at NIC Mexico.

FIGURE 1
Mexico: Internet Domain Growth, 1989-2001



Source. Table 2.
Note. Data for 1995-2001is from December of each year.

Also interesting to note is that according to NIC-Mexico, up to 1992 the "mx" domain was flat, that is, it carried no sub-domains. It was not until late 1993 that the first "com.mx" and "gob.mx" sub-domains were created and made available to Mexican users. Therefore, it can be said that electronic commerce was born in Mexico in 1993, when the com.mx sub-domain was formally set up, thus giving way for commercial companies to use the Internet to carry out business transactions.

In general, the growth of the Internet has been the result of a combination of a set of favorable factors that occurred in Mexico over the 1990s. On the one hand, an active private sector has openly embraced new technologies that promise to help companies improve both their productivity and competitiveness in the present tough economic environment. The rate of technological investment in Mexican companies relative to gross sales is nearly 2.0 percent, compared to some six percent registered in the U.S. In this environment, new productivity tools and business solutions, such as enterprise resource planning (ERP), supply chain management (SCM), electronic data interchange (EDI), and customer relationship management (CRM) are being adopted to improve business operations, especially manufacturing and procurement, as well as to cater more efficiently to customers' needs and tastes.

With the advent of the Internet, it was only natural that a wide variety of businesses in Mexico soon started making use of the immense possibilities opened by the web, particularly for conducting commercial transactions. As a result, new consulting companies and industry and business associations have sprung up in recent years and have become active promoters of e-commerce, as they vie to tap the Mexican market in this field, as will be documented in the ensuing section.

Not only the federal government, but also a number of state governments have been equally instrumental in the growth of e-commerce in Mexico by providing both telecommunications infrastructure and institutional support, especially in passing legislation that facilitates and gives official status to e-commerce transactions and documents, as will also be discussed in the first section.

Thus, a strong technological demand from private companies has combined with both an active promotion by e-companies and organizations and a decided commitment on the part of the public sector to produce a national environment that assists and bolsters the spread of e-commerce in Mexico.

NATIONAL ENVIRONMENT

In a business forum entitled "Productive Minds" held in Mexico City in October 2000, top corporate executives like Emilio Azcárraga Jean, chairman of *Televisa*, Mexico's largest television conglomerate; Carlos Slim Domit, Director General of Grupo Sanborns and son of the virtual owner of Telmex, the country's largest phone company; and Jorge Brake, chairman of Procter & Gamble Mexico, among others, expressed coincidentally and highly optimistic views about the possibilities open to Mexican businesses by the emergence of the digital economy and its core element, electronic commerce. The general perception was that this new economy and its related, Internet-based technologies will permit companies to be more efficient, flexible, and responsive to quick changes in demand, and thus more able to thrive in today's highly competitive market environments (García, 2000).

The above illustrates the excitement that has set in over the last decade in corporate and government circles about what is seen as Mexico's imminent transition to an increasingly digital economy. Not only corporate executives, industry captains, consultants, private sector organization leaders, and scholars, but also government officials and politicians are equally enthusiastic and take such prospects for granted.

A widespread sense of proclivity for the growth of market transactions carried out through the Internet or another form of network infrastructure is apparent, as it is for the creation of new, or the reorientation of existing, businesses that share this outlook and thus, focus on the consumer and on the systematic use of rules and standards to conduct their daily operations.

As a result, a diversity of fresh companies and organizations, as well as dedicated divisions and departments inside existing firms, have been created over the last few years, all dealing with the promotion and/or the practice of e-commerce. In like manner, a variety of departments and offices have been opened in federal ministries and state governments with the same purpose. Major private universities, like the Monterrey Institute of Technology (ITESM), have even opened masters' programs in e-commerce in various campuses nationwide.

A powerful propitiating cause for this generalized excitement is called the "Fox factor." It refers to the social and political momentum generated in the nation when Vicente Fox won the presidential election in July 2000 and particularly since he took office in December 2000 and began to form his overtly pro-business administration. These events have ushered in an atmosphere of generalized optimism among the different sectors of Mexican society as to the country's economic future, and particularly about its possibilities to both modernize its productive apparatus and, thus, to jump to the higher planes of the emerging digital economy, joining in part other fellow OECD (Organization for Economic Cooperation and Development) countries that have gone far in this same path.

Although such enthusiasm has receded considerably in the light of the slowing U.S. economy and the evident impacts it has already cast upon Mexico's economic landscape, by mid-2001 such bright prospects were still being entertained by the most powerful proponents of the free market economy advocated and promoted by the Fox administration, which are also the main promoters of e-commerce.

Economic Environment

Aside from the ferment created by the Fox factor, the Mexican economy has shown a declining and somewhat erratic dynamism in the last few years. Gross national product (GDP) reached US$574,445 million in 2000, growing at an unusual 7.2 percent, relative to 1999, compared to 3.7 percent in 1999 and 4.8 percent in 1998. On average, GDP grew at a modest rate of 2.8 percent a year from 1995 to 1999 (Banco de México, 1998; 1999; 2000).

The Mexican government predicted that the economy would pick up again in 2001, and was estimated to grow at least at a more robust 4.0 percent, which could even top 4.5 percent. The drastic slow down the U.S. economy has experienced in 2001, however, shattered those optimistic forecasts, to the extent that in mid 2001 economic authorities like the Bank of Mexico and the Finance Ministry were already debating whether GDP is to grow only 2.0 percent or less (Salgado, 2001).

Nonetheless, inflation has been declining while foreign direct investment (FDI), consumption, productivity and imports have been on the rise. From 18.6 percent in 1998, inflation dropped to 8.9 percent in 2000 and is estimated to decrease further to 6.5 percent in 2001, and to 3.0 percent in 2003. In turn, FDI inflows doubled from US$10.7 billion in 1998 to US$22.3 billion the following year, reaching US$13.0 billion in 2000. Productivity is expected to grow by 2.5 percent or even by up to 3.5 percent in 2001; private consumption is growing by 10 percent a year; and imports of consumer goods increased by 45 percent in 2000 (Banco de México, 1998; 1999; 2000).

Sectorally, the Mexican economy presents a fair picture. Over two-thirds consists of tertiary activities, mainly communal, social and personal services, which alone account for one-third. Contrary to what could be expected in a developing country, less than 5 percent corresponds to agriculture and other primary activities. Industry accounts for a little over a quarter of GDP, of which manufacturing represents by itself 73 percent (Table 3).

TABLE 3
Mexico: Sectoral Distribution of GDP, 2000 (in billion US$)

Sector	Value	%
Agriculture	24.7	4.3
Industry	160.8	28.0
Services	388.9	67.7
Total	574.4	100.0

Source: Instituto Nacional de Estadística, Geografía e Informática (INEGI), *Estadísticas Económicas*, 2001.

On the other hand, according to the *Instituto Nacional de Estadística, Geografía e Informática*'s (INEGI) 1999 National Employment Survey, Mexico's economically active population amounted to 39.7 million people, which represents 56 percent of the population aged twelve

years and over. Of those economically active Mexicans, only 33.7 million are employed, of which over half have a meager income of less than two times the minimum wage—about US$254—a month, and only 17 percent earn more than five times that wage or about US$635 a month (Table 4).

TABLE 4
Mexico: Employed Population by Income Level, 2000

Group	Population	%
No income	2.8	8.3
Under the m.w	4.2	12.5
1 – 2 t.m.w.	10.2	30.7
2 – 5 t.m.w.	10.7	31.7
Over five t.m.w.	4.0	11.9
Not specified	1.8	5.3
Total	33.7	100.0

Source. Instituto Nacional de Estadística, Geografía e Informática (INEGI), *Estadísticas Sociodemográficas*, 2001.
Note. t.m.w. = Times Minimum Wages (1 m.w. is about US$ 127/month).

The above is consistent with the fact that, according to the United Nations 2000 Human Development Report, 58.2 percent of total income was received by the richest 20 percent of the population in the period from 1987 to 1998, while only 3.6 percent was received by the poorest 20 percent in the same period (UNDP, 2000).

It can be stated, therefore, that it is only a small proportion of the Mexican population, and by extension of the Mexican households that can potentially afford to buy a computer. This means that access to the Internet as consumers for most Mexicans is structurally limited by the country's skewed income distribution.

Infrastructure

The numbers of installed computers, as well as Internet connections and users, have increased rapidly in Mexico. Select-IDC, an affiliate of IDC, Inc., and a top consulting firm since 1989, estimates that from a little more than one million in 1998, the number of users increased to nearly three million in 2000 (Table 5). According to NetValue, however, the figure for December 2000 was only 1.6 million, as Table 6 shows vis a vis other countries.

TABLE 5
Mexico: Internet Users, Selected Dates 1998-2000 (Millions)

Date	Users
Dec. 1998	1.31
Apr. 2000	1.80
Dec. 2000	2.90

Source. Garcés Rosas (1999), for December 1998; Mekdessi (2000), for April 2000; Select-IDC (2001), for December 2000.

In any event, the Promotional Group on E-Commerce Legislation (GILCE) estimates that the number will jump to seven million in 2003. This dynamism is an inherent function of the growth in the number of both desktop and laptop computers in homes, government offices, and businesses.

One million PCs were installed in homes and 3.9 million in offices by the end of 1999. Nevertheless, only 4.2 percent of Mexican homes had access to at least one computer, the market potential for PCs being 2.5 million homes at that time (Select-IDC, 2000a). One year later, the proportion of homes with PCs had increased to 10 percent, while in the United States, the figure was 50 percent (Select-IDC, 2000b).

TABLE 6
Internet Users in Selected Countries, December 2000 (Millions)

Country	Users
Mexico	1.59
France	6.87
UK	11.60
Germany	12.60
Spain	2.90
Denmark	2.25
United States	84.70

Source. *Blink* Newsletter, NetValue, February 2001. (http://mx.netvalue.com).

In January 2000, over 70 percent of installed PCs in companies were connected to the Internet. As a result, the number of PCs per employee was 0.73 on average and 1.0 in the case of the finance and service sectors (Torres Chávez, 2000).

Twenty-four million Internet access devices (PCs, fixed, and mobile phone lines) were in operation in 1999. That figure is estimated to reach 81 million by 2004 (Garcés, 2000). Geographically, the Chamber of Commerce of the city of Monterrey claims that the density of Internet accounts in the state of Nuevo León is 2.5 percent higher than in the Federal District (Mexico City). In general, the chamber believes 40 percent of Internet accounts are located in Mexico City, while Monterrey contains 20 percent (FINSAT, 2001).

According to the Federal Telecommunications Commission (COFETEL), fixed phone lines totaled 10.9 million at the end of 1999; about three-fourths of those lines corresponded to residential lines and the rest to offices (Jiménez, 2000a). By mid-2000, the number increased to 11.6 million, while as a result of a rapid growth in the previous year, mobile lines in turn reached 11 million and some 15 million by the end of the year (Jiménez, 2000b).

Of the 2.9 million Internet users estimated by Select-IDC to exist at the end of 2000, 60 percent were men and 40 percent were women. Fifty percent held a professional degree (bachelor's); most connected from home, 6.6 times a week; 30 percent were twenty-five years old and were economically active; and 17 percent were eighteen years old on average and not economically active (Negocios@Web, 2001). It is worth noting that the male-female mix was 77/33 by mid-1999 compared to 82/18 in 1997 (Select-IDC, 1999).

TABLE 7
Mexico: Telecommunications Infrastructure, 1999

Item	Indicator	
	Mexico	U.S.
Telecomm Investment as % of GDP	0.84	0.28
Main phones lines per 1,000 population	112.23	673.00
Cell phone subscribers per 1,000 population	79.41	315.55
Percent of digital phone lines	99.6	91.6
CATV subscribers per 1,000 population	20.38	251.34

Source. International Telecommunication Union (ITU), 2001.

More generally, and in a comparative perspective, Mexico performs in a mixed way regarding some of the main indicators on telecommunications infrastructure vis a vis the United States, as Table 7 shows. Abstracting from the size of the respective economies, Mexico's share of GDP channeled to investment in telecom is nearly three times that of the United States; another area where the former does well is in the proportion of digital phone lines. The reverse applies in the case of the other three indicators.

As to infrastructure for the Internet, Mexico ranks highest among Latin America's most advanced countries—Argentina, Brazil, Chile and Venezuela—regarding the number of Internet hosts per 1,000 inhabitants, though it ranks lowest in respect to Internet users per 1,000 inhabitants (Table 8).

TABLE 8
Latin America: Internet Infrastructure, 1999 and 2000

Country/Region	Internet hosts per 1,000 population, 1999	Internet users per 1,000 population, 1999
Argentina	3.90	24.61
Brazil	2.66	20.83
Chile	2.68	46.61
Mexico	4.16	18.71
Venezuela	.60	22.15
Latin America	3.08	21.86

Source. ITU, 2001.

In sum, a seeming readiness and willingness appears to exist for Mexico to embark into e-commerce ventures and thus to advance toward the transformation of its commercial and business apparatus in the way of a predominantly digital economy. Given the progress made so far by GILCE and the Mexican Committee on E-Commerce (COMECE) regarding the acceptance of e-payments, e-invoicing and e-orders, and the extent of the implementation of e-banking services, the sectors most ready to adopt e-commerce to the full are finance, retail and manufacturing.

NATIONAL AND LOCAL POLICIES

The use of electronic means for conducting commercial transactions in Mexico has been promoted and facilitated by the concerted efforts not only of private sector organizations and enterprises, but also of different government offices and branches at the federal and state levels. The latter do it mainly by providing basic infrastructure in telecommunications and an adequate legal framework, as well as through direct relevant actions. The private sector, in turn, does its part by way of a variety of initiatives through a number of dedicated organizations—committees, associations, and commissions—always in close collaboration with government counterparts.

Telecommunications

The federal government has conducted an active policy aimed at modernizing and liberalizing the country's telecommunications sector. The first step was taken by the Salinas administration

(1988-1994) when it privatized Telmex, which up to then, had been one of the nation's most strategically important state enterprises. The Zedillo administration (1994-2000) continued with the policy and first proceeded to liberalize and open the long distance phone market to private companies, which took effect in January 1997, and later on the local calls market. The new entrants were mainly joint ventures between top Mexican conglomerates and multinational telecommunications giants like AT&T and WorldCom. Presently, Telmex's main competitors in the long distance market are Avantel and Alestra, while Pegaso and Axtel represent the competition in the local calls market.

A joint venture between Mexico's Banamex Accival financial group and WorldCom, Avantel boasts a 3,915-mile long optic fiber network that supports communication of voice, data and video to anywhere in Mexico or worldwide. It is Mexico's premier supplier of Internet access with a 1,000 Mbps backbone and a 99.98 percent reliability rate in its transmissions, and claims to have been the first telecommunications company in the world to be awarded ISO 9002 certification (Avantel, 2001).

Alestra is also a joint venture, but in this case, between Grupo Alfa and BBVA Bancomer (51%) and AT&T (49%). The company has a 4,400-mile, last generation optic fiber network (89 percent in urban and 11 percent in rural areas) that provides access to AT&T's worldwide long distance network and handles high density voice, data, and video transmissions (Alestra, 2001).

The exploding mobile phone market, on the other hand, was born already liberalized. The top provider is Telcel, which caters to three-fourths of the 13 million cell phone users existing in Mexico to date; Iusacell comes in second with 2 million users. Pegaso entered the market in 2000 and its coverage is growing rapidly in large cities. The latecomers are Unefon and Vodafone; in February 2001, the latter announced that it was buying a 34.5 % share of Iusacell (Lloyd, 2001). Further, since 1999, Nortel Networks, the Canadian-based telecommunications giant, has invested over US$1 billion in Mexico to fund the installation of wireless optic networks for Unefon and Axtel (García, 2001a).

The link between mobile devices and the Internet will be greatly strengthened by Pegaso. In early 2000, Pegaso introduced Internet access in its equipment, and a program called Pegaso Office in mid-2001, which will enable businesses and individual users to access a virtual Intranet via cellular phones. Another service, called Pegaso Voz, will permit access to both the Internet and Intranets by means of voice commands, including phone dialing and e-mail. A third service, Conexión Pegaso, will provide connection between laptops and handhelds to a desktop at the office by means of a wireless modem in the form of an electronic card (Barros and Jiménez, 2001).

Vicente Fox's pro-business government is sure to pursue and even deepen this aggressive liberalization policy and to continue the objective of modernizing and extending Mexico's telecommunications infrastructure throughout the national territory established by the previous federal administrations.

Legislation and Regulation Framework

As with most developing countries, Mexico still lacks an adequate legal framework that regulates and gives full security to electronic commerce transactions. The telegraph and telephone laws

date back to 1884 and 1928, respectively, and yet continue to be important foundations for such a framework-to-be. Recent antecedents are the Banking Law of 1990, in which some provisions were made regarding telematic means; the Consumer Protection Law of 1992 where telemarketing was already considered; and the fiscal laws of 1998, which accepted tax returns and payments by electronic means for the first time in Mexico.

Yet, Mexican legislation only recognizes autograph signatures written on paper, not on electronic formats. Therefore, what is still required is a framework that gives both probative value and legal recognition to contracts and written consents established electronically, as well as to invoices exchanged and payments made through electronic means.

There seems to exist a general consensus in the Mexican e-commerce community in favor of a self-regulation approach based on standards and parameters adopted individually by companies and accepted precisely by consensus, instead of a compulsory regulatory framework (Álvarez, 2000). This view is in line with the one prevailing internationally about the need for a framework that provides security, technological neutrality, and confidence in online transactions, but not outright regulation (Mexican Association for Electronic Commerce Standards, [AMECE] web site, 2001).

In that context, representatives from Information Technologies Industry Mexican Association (AMITI), Electronics; Telecommunications and Informatics Industry National Chamber (CANIETI); Mexico's Bankers Association; the Notary Public National Association; the Telecommunications Federal Commission (COFETEL); the Bank of Mexico; the Ministries of Finance (SHyCP); and Trade and Industrial Promotion (SECOFI) created in late-1999 a dedicated Group for Promoting E-Commerce Legislation (GILCE) within AMECE. The group's first task was to prepare an initiative for the introduction of reforms on a set of legal norms: the Civil Code, the Commerce Code, the Federal Code for Civil Procedures, and the Federal Consumer Protection Law. The package was presented to Mexico's congress in December 1999 and approved by both chambers in April 2000; it was published in the Federation's Official Gazette on the 29 of that month (Cámara de Diputados, 2000).

In this way, Mexico became a pioneer in the introduction of reforms to provide e-businesses with a basic legal framework for them to conduct their activities and develop their full potential. Yet, this was only an initial step, though a significant one. What is now required is a full-fledged e-commerce law that integrates all the norms contained in the above legislative pieces. This was pointed out in the Second International Forum on Taxation held in Acapulco in August 2000, where public accountants made it clear that the Fox administration is expected to pass new legislation, as well as to enact a policy, that is consistent with technological progress and capable of facilitating the expansion of transactions on the Internet, simplifying administrative procedures online, and promoting auto regulation (Rendón, 2000).

The new law will have to be consistent with international norms and practices on this matter established by the United Nations and other organizations; it will have to include, in particular, an agreement with other OECD countries about adopting a common legal framework on e-commerce to prevent tax evasion and double taxation. This latter point was raised by a senior official from Mexico's Finance Ministry at the same August 2000 forum in Acapulco, and was shared by the other participants. Given the overall orientation of the policies promised by the

Fox administration, it can be expected that the much-needed law on e-commerce will be promulgated soon.

Government Participation

As already noted, the federal government is actively participating in the growth of e-commerce in Mexico by closely collaborating with the most important working groups, chambers, and organizations in the field like AMECE, GILCE, COMECE, and CANIETI.

In that spirit, in May 2000, an Interministerial Committee was established with representatives from ShyCP, SECOFI (renamed Ministry of Economics [SE] in December 2000), the Bank of Mexico, and COFETEL. Other members include AMECE, COMECE, and the Notary Public National Association. This committee is the main body for coordinating all the actions and initiatives related to e-commerce nationwide. As the ministry charged with the responsibility of promoting and coordinating both foreign and domestic trade as well as all commercial matters, SE has the leading role in the committee.

Already in the 1997-2000 Domestic Trade and Consumer Protection Program implemented and operated by SE (then SECOFI), a policy provision, entitled "Application of Technologies and E-commerce," was included in Chapter 4, in which the following objectives were established:

- Promote the development of new technologies at low-cost such as magnetic card reading devices for inventory and financial management.
- Foster the adoption of EDI and just in time (JIT) systems by wholesale businesses and their suppliers.
- Facilitate the development of electronic invoicing systems.
- Support the development of commercial transactions by electronic means.

This provision was the institutional framework for the initiatives that culminated in both the reforms to commercial laws and codes and the creation of the Interministerial Committee (SECOFI, 1996).

Many of those actions were carried out by the Zedillo administration within the portmanteau of a program aimed at training small, medium, and micro enterprises in the operation of new management methods and computing tools. A total of 94,000 managers and entrepreneurs, were trained in the past six years, to digitally manage their inventories and keep accounting records, as well as to communicate more easily with their customers and suppliers via the Internet (Pérez-Moreno, 2000).

In the same direction, in March 2001, SE established a new program to explicitly facilitate the adoption of digital technologies and thus the access to Internet-based solutions by SMEs. An agreement was signed to this end between SE and Microsoft, this latter by way of bNexus, a Mexican consulting firm. The program is aimed at inducing SMEs to buy a computer and enter the world of the Internet, and so includes the launching of a web site containing information on the business solutions offered to small and micro businesses by the federal government in the areas of credit, taxes, training, and technologies (Vizcaíno, 2001). This program is part of a project aimed at creating an electronic government.

Toward an E-Government

In early 2001, the Fox administration launched an ambitious project, entitled *e-Mexico*, whose objective is to make available to every person with Internet access, all the services provided by all the offices of the federal government. The idea is to reduce, and even eliminate, waiting time by gathering all hard-copy documents required to obtain permits and licenses in pubic offices and agencies; and to provide them via the Internet. The program will first focus on the health, education, and commerce sectors. A technical committee was created in February 2001 to operate the program, with representatives from several ministries and private organizations involved in e-commerce matters, in this case also including others from the main telecommunication companies operating in Mexico (Lloyd, 2001).

The project's basic foundation was an agreement among the various telecommunications companies operating in Mexico to connect their networks in a single nationwide, fiber-optic communications macro network intended to link the 2,470 sites in the country's 2,470 municipalities, with the 9,500 telegraph outlets presently operated by the Ministry of Transport and Communications (SCT), the project's head coordinator (Barros, 2001). The goal is to complete the macro network, transform the telegraph outlets into so called "Community Telecenters," and establish Internet-enabled municipal sites within two years. Once completed, the entire system will consist of a series of interactive institutional portals where all government services will be offered online, including ample access to the government's internal databases (Nisivoccia, 2001a; 2001b).

The project's core objective is, according to the SCT minister, to eliminate barriers and intermediation chains that hinder citizens' access to government services and promote a more balanced development. US$20 million will be invested in the first year and it is estimated that the total investment required to implement the project ranges between US$2 and US$5 billion (Barros, 2001).

E-Mexico will come to catalyze previous and ongoing efforts that are leading to the emergence of an e-government in Mexico. One is the implementation of a dedicated application called Government Contracts Electronic System (COMPRANET), which manages the dealings with all the suppliers that bid for government contracts. Another is the introduction, from 1998 on, of a utility by means of which taxpayers can prepare tax returns via the Internet through a web site set up by the Finance Ministry's Taxation Management System (SAT). One more relevant effort in that direction is the program called IMSS *Desde Su Empresa* (IMSS From Your Company), under development by the Mexican Institute for Social Security (IMSS), whereby IMSS aims at getting all its transactions with suppliers into its EDI network, which can be seen as an early step to building an Internet-based system. IMSS's informatics chief recently stated that 6,000 businesses are already using EDI in Mexico, and that the number will increase to 12,000 in 2002 (Pérez-Moreno, 2001).

As part of the actions considered for the implementation of the *e-Mexico* project, in March 2001 and in alliance with seven Mexican companies led by bNexus, Microsoft designed and launched a collaborative network called bCentral, which integrates the services of third-party companies, organizations and government offices. The package is offered at US$48 per month and includes: commercial transactions, electronic money transfers and payments, IMSS From Your Company transactions, AMECE's product catalogues, e-mail services, and the use of Microsoft's Office

suite. The network's main objective is to induce SMEs to improve their productivity by engaging in e-commerce transactions; it actually links companies of all sizes, including Costco and Carrefour, as well as large public institutions like IMSS (García, 2001b).

However, the trend toward an e-government has manifestations not only at the federal level, but also in most states in Mexico's interior. To begin, all state governments have created a web site with comprehensive information on government services and their respective state's main features. More importantly, a State and Municipal Public Administration Informatics Committee (CIAPEM) has been operating for the last several years to coordinate and promote the development of Internet-based instruments; to this end, CIAPEM organizes annual national meetings to discuss advances in this field (INEGI, 2001).

The State of Jalisco, home to Mexico's alleged Silicon Valley—Guadalajara—is one of the most advanced cases of digitalization and use of virtual resources. An Internet-based communications network was built over the last four years in Guadalajara, which now links all of the state's 124 municipalities to the different offices within the state government. Likewise, some of the most widely-used public services have been digitalized and made available online, including the registration of real estate operations, the acquisition of construction permits, the opening of new businesses, the payment of car registration and fees, and others like requesting birth and death certificates and purchasing theater tickets. All this can be done through the link labeled Gobierno Electrónico (Electronic Government) found on the main page of the Jalisco government's official web site. A recent initiative is the establishment of virtual museums where users can access a wealth of cultural materials via the Internet and other means like interactive CDs.

It is evident from the foregoing discussion that the Mexican government—more precisely the Fox administration—is strongly committed to the promotion of e-commerce and its related information technologies. This active involvement contrasts with the hands-off policy adopted by the two preceding administrations regarding information technology (IT) in general, though it has not been accompanied so far by an explicit position on trade policy, specifically on aspects like computing equipment and its major parts and components. Such definition is necessary for the projects and actions being undertaken to have a sound policy framework under which to develop and realize their full potential.

Private Sector Initiatives

Because of the proliferation of e-companies and services, new organizations have been established to both coordinate their activities and foster the development of a formal e-commerce system. One of the most important organizations is the Mexican Association for Electronic Commerce Standards (AMECE).

Established in 1986 as an association for promoting domestic commerce—with a membership of just 27 companies—AMECE boasts some 18,000 members in 2001. With the support and close collaboration of both the U.S. Uniform Code Council (UCC) and the International Article Numbering Association (EAN), AMECE is now entirely devoted to promoting and managing the use of standards related to e-commerce. The main standards managed by AMECE are bar or product codes, EAN location numbers, and EDI codes. AMECE works in two main areas through ad hoc committees: development of EDI implementation guides and design of product

codification standards, with the latter focusing on the development of an electronic catalogue (AMECE, 2001).

A related body that works very closely with AMECE is COMECE. COMECE has working groups on: e-payments, e-invoicing, security, and document certification. COMECE is the e-commerce community's chief liaison with government offices and private sector companies and organizations, including international bodies like the Asia Pacific Economic Cooperation (APEC) mechanism and the Free Trade Area of the Americas (FTAA) forum. It is Mexico's official information center on e-commerce, and it is charged with the promotion and implementation of e-commerce legislation in Mexico. For example, in August 2000 COMECE conducted an interview with Vicente Fox, then presidential candidate, to present him with both the progress and the needs of governmental support for e-commerce (COMECE, 2000).

In addition, major chambers like CANIETI and other organizations, such as the Mexican Association for the Information Technologies Industry (AMITI), have created dedicated areas to operate e-commerce programs. Likewise, Telmex, Mexico's quasi-monopolistic phone company, has in turn set up an e-commerce division.

Subsidiaries of top IT companies like Microsoft have also joined in the efforts to promote e-commerce in Mexico. In November 2000 Microsoft Mexico's e-commerce division announced a project called "The Acceleration of Business in the New Economy" that provides small and medium-sized businesses—of any type, that have possibilities for entering e-commerce—with low-cost digital technology. To this end, the subsidiary created, jointly with Compaq, a web site containing e-commerce solutions free of charge.

An essential aspect of the activities of most of these companies, associations, and chambers is the presentation of seminars, forums, workshops, and congresses where issues regarding the development of e-commerce are addressed, in an attempt to create awareness of, and to promote, the digital economy in Mexico. Thus, AMECE runs a monthly series of forums on topics such as: trends and opportunities in e-business, e-commerce company models, integration of supply chains to e-commerce, and e-invoicing. Tecnofín, a Mexico City-based e-commerce consulting firm, held an annual international congress series called E-Com 1999, E-Com 2000, and E-Com 2001. Select-IDC hosts annual meetings on Mexican Business Strategies on the Web (the May 2001 meeting addressed "Projecting Mexican Businesses toward the Digital Economy") and seminars like that held in October 2000, that addressed "Trends 2001: Technology and Business for the Digital Economy."

Other events have been held under the auspices of other organizations like Netmedia Publishing, a subsidiary of CMP Media Inc., which organized the E-Business Conference & Expo in Mexico City in September 2000, and the Company Executives and Marketing Association which coordinated an e-commerce forum in September 2000.

The proliferation of private sector initiatives and the consolidation of e-government actions and programs, including their extension to other states and municipalities, will surely deepen the involvement of the Mexican public sector, in general, in the promotion and facilitation of e-commerce, thus making Mexico's a national environment more favorable to the growth of the digital economy.

DIFFUSION OF E-COMMERCE

Because of the developments described in the preceding sections, e-commerce has extended over growing segments of the Mexican economy, which now use the Internet for conducting business as a matter of course. According to Select-IDC, the overall penetration of e-commerce in Mexico's traditional economy today is only 0.17 percent, though it will increase to 1.2 percent in 2004. In the case of purchases of goods and services from businesses (B-to-C), the proportion was 0.16 percent in 2000 and is estimated to reach 2 percent in 2004. When it comes to purchases of inputs by companies (B-to-B), the figure was as high as 6.1 percent in 2000 and is expected to hit 20 percent in 2004; these much higher proportions are due to the previous existence of EDI networks, which had been in operation in many companies well before the Internet broke into Mexico's economic milieu (Select-IDC, 2001b).

Comparatively, according to the U.S. Census Bureau, e-commerce sales in the fourth quarter of 2000 represented a 1.01 percent of total sales in the United States, which is not very far from Mexican standards (eMarketer, 2001a).

By mid-1999, 20 percent of Internet users were conducting some kind of transactions through the web. By December 2000, 19 percent of users were buying, and 7 percent were selling, products and services online. In total, PricehousewaterCoopers, Inc., estimates that about 15,000 web sites are in operation in Mexico that offer some kind of product or service (García, 2001).

According to NetValue, in mid-2000 the proportion of Mexican web surfers that had visited an e-commerce site was barely above 50 percent, a proportion far below the levels recorded in Europe and the United States (Table 9). Of those Mexican visitors, less than one-third had actually made a transaction.

TABLE 9
Visit Rates to E-commerce Sites in Selected Countries, 2000

Country	A	B
Germany	66.0	36.9
France	69.4	48.2
United Kingdom	74.1	59.4
United States	74.2	30.1
Mexico	53.7	31.9

Source. NetValue (http://mx.netvalue.com/news).

Note. "A" is Internet users that visited an e-commerce site; "B" is Internet users that made a formal, secure connection to an e-commerce site.

Moreover, it is estimated that as much as three-fourths of online purchases by Mexicans are with U.S. stores. This is reflected in the fact that the most visited web sites in Mexico are Yahoo.com, Microsoft's msn.com, and Passport.com (Table 10).

The most well-known and comprehensive portals and sites in operation in Mexico are T1msn; DeRemate, which has a direct link on T1msn; Banamex's Pl@za; Bancomer.com; Todito.com; and University of Guadalajara's Mexplaza. An interesting, more recent modality is that of sites which market real estate properties like BienesRaices.com.mx. A joint venture between Telmex and Microsoft, T1msn is perhaps the most comprehensive portal; by mid-2000, it had already recorded 200 million page views and was catering to the Spanish speaking market in the United States, Latin America, and the Caribbean. To this end, T1msn signed an agreement with

Fiera.com, a major provider in South America, which will be its exclusive e-commerce channel in Chile, Colombia, and Argentina, where Telmex is expanding its telecom business.

TABLE 10
Most Visited Web sites in Mexico, January 2001

Domains	Unique Visitors	% of Users	Overall Ranking*
yahoo.com	1,081,000	65.8	2
msn.com	1,058,000	64.4	1
passport.com	912,000	55.5	4
t1msn.com.mx	820,000	49.9	7
yahoo.com.mx	645,000	39.3	3
terra.com.mx	615,000	37.5	6
microsoft.com	540,000	32.9	17
Starmedia.com	473,000	28.8	5
icq.com	455,000	27.7	12
lycos.com	421,000	25.6	11

Source. Blink Newsletter, February 2001 (http://mx.netvalue.com/news).
Note. *average of: visitors, percent of users, days connected, pages viewed, time spent and user-sessions per Internet user.

The expansion of e-commerce has been a result of the rapid increase in the number of companies that have set up a web site. In mid-2000, 2,464 companies, 78 percent of those with 5,000 employees already had a site, while the figure for those with less than 15 employees was only 66 percent (Esquenazi, 2000). Thus, the larger the company the more likely that it will have a web site.

On the other hand, only 25 percent of those companies with over 5,000 employees performed e-commerce activities on their web sites, and 31 percent were in the process of doing that. Finally, 50 percent of those in the segment without web sites were planning to build one (Esquenazi, 2000).

Of the e-commerce conducted in Mexico, 77.5 percent corresponds to business-to-business (B-to-B) transactions and 22.5 percent corresponds to business-to-consumer (B-to-C) transactions. Thus, as anywhere, the largest growth potential for e-commerce lies in B-to-B e-commerce. In effect, of the 2.9 million web surfers estimated to exist at the end of 2000, 71 percent were in government, education, and the private sector (potential for B-to-B), while 29 were home users (potential for B-to-C) (Cruz Pantoja, 2000).

By sector, finance, retail, and public services were the most advanced in the implementation of e-commerce solutions. The highest proportion of companies that had a web site in mid-2000 were in the finance and public service sectors; 72 percent of those in the service sector did not have one (Esquenazi, 2000).

Online banking is the most common transaction. All major banks offer their customers the option of using their services through the Internet and, to that end, have built comprehensive web sites with all the necessary resources, particularly Bancomer and Banamex, Mexico's top financial institutions. Bancomer features a link called *Tu banco en Internet* (Your bank on the Internet) on its main page, while Banamex's is more specific with a link called Pl@za. All have started with and still use EDI networks, as do most companies that also use e-commerce in other sectors, like the automobile and electronics industries.

The above can be further appreciated in Table 11, where finance in general is the only sector where the three main service areas covered in web sites are most developed.

TABLE 11
Degree of Implementation of E-Commerce Services by Economic Sectors

Area	Sector with Most Developed Services
Detailed information on products and services	Finance, public services
Customer support	Finance, distribution, services
E-commerce	Manufacturing, finance

Source. Esquenazi, 2000.

According to Select-IDC, the most extensively traded goods in 1997 were software programs and two years later, books. Today, music items, computers, magazines, and travel products are the most demanded on the web, in addition to software and books.

Geographic Spread

Most e-commerce activity and Internet use take place in the country's most developed states: the Federal District, Nuevo León, Jalisco, and Mexico State. This is a function of the geographic distribution of installed PCs. Table 12 shows the distribution of installed PCs and those with Internet access. The highest concentration is in the Greater Mexico City metropolitan region composed by the Federal District and Mexico State; the northern region centered in Nuevo León, and the western central region, which includes Jalisco, follow it (Cruz González, 2000a).

Given the geographic concentration of the installed PC base, not only the bulk of PC use and Internet access but also most of the events and activities related to e-commerce take place in the country's most developed regions, mainly in Mexico City.

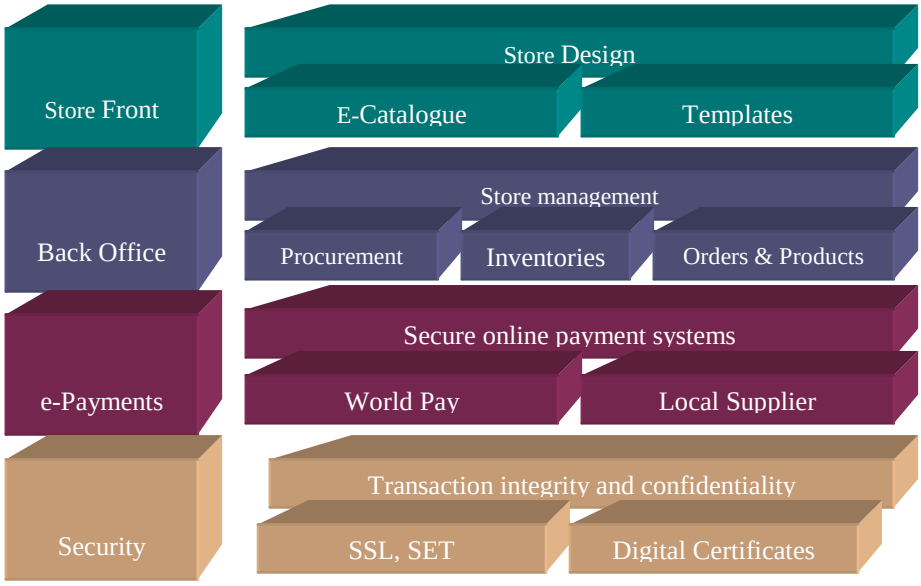
Nonetheless, Jalisco's and Nuevo León's state capitals—Guadalajara and Monterrey, the country's second and third largest cities—are in a virtual dispute to become the leading actor in the development of the new Mexican economy. In Monterrey, the local chamber of commerce has set out to make the city become Mexico's e-commerce capital, and is accordingly launching a program by way of supporting local small and medium-sized businesses with access to the Internet at a symbolic cost, helping them to design web sites, and accepting online payments to government agencies. The intent is for chamber members to participate in e-commerce with their own virtual store (FINSAT, 2001).

In Guadalajara, dubbed as Mexico's Silicon Valley since the late 1980s and actually the country's main telecommunications and computer manufacturing center, the efforts have gone further, as more formal and organized steps have lately been taken. In 2000, representatives from local businesses, local universities and the state government established the Electronic Economy Promotion Council, charged with the task of promoting the development and diffusion of e-commerce in the state of Jalisco, including investment and research in this field. The council's dynamos are the Jalisco State Department of Economic Promotion and the Jalisco office of the Electronics, Telecommunications, and Informatics Industry Chamber (CANIETI). One of the first major projects undertaken by the council was the establishment of the Jalisco Institute for Information Technologies, approved by the state government in March 2001, was to foster the development of new applications for electronic business, software programs, university-industry links, and product certification services.

In Mexico City, Select-IDC recently prepared a comprehensive package called Passport to the Digital Economy, which condenses the bulk of the services provided. Services include: systematic access to ad hoc solutions—called "models"—to the digital economy, e-commerce, Internet use in Mexican companies, and the market potential of Internet access; reports on web users, portals and online advertising, virtual stores, digital markets, and e-business services; and, in addition, access to the forum series called Business@Web organized annually by Select-IDC. Other activities include the publication of bulletins and research reports on the whole spectrum of e-commerce topics.

An array of other consulting companies has also decided to tap into the burgeoning digital market emerging with the explosion of e-commerce in Mexico. They too provide comprehensive solutions and information to Mexican businesses for their incorporation into the new economy. The most important include Punto.com, PSINet, areaB2B, Bancomer.com, B-Nexus, EMC2, Tecnofín, Oracle, Simbiótica, Ariba, eBrainstorm, AdNet, Modus Media International, KPMG Consulting, and LatinB2B, this latter in alliance with the *Société Generale de Surveillance* (SGS) of France. Another important player is NetValue, which provides general information services related to the measurement and valuation of Internet operations.

Figure 2
B-to-B and B-to-C E-Commerce Solutions



Source. PSINet, México, 2001. Soluciones PSINet eCommerce (www.PSINet.com.mx)

Some of these companies have been created anew; others are subsidiaries of multinational consulting firms that cater to the Mexican market (Select-IDC, Oracle and NetValue). Still, others are spin-offs of existing domestic firms, like Bancomer.com. These companies offer different modalities of solutions, although all revolve around a basic set of services, including web site design, hosting, and e-commerce strategy consulting. PSINet offers a different kind of service package as presented in Figure 2.

Key Enablers and Inhibitors

The diffusion of e-commerce is either fostered or dragged by a series of accelerating and inhibiting factors stemming from the country's political, economic, and social environment. Among the former, the most conspicuous are the following:

- Overall fair performance of the Mexican economy in the last few years reflected in a significant growth of GDP, low and declining inflation, a strong peso, and high international prices for crude oil.
- Widespread excitement about the emergence of a digital economy.
- Potential of the fledgling Mexican e-commerce market.
- Active involvement of both the public and private sectors in the promotion of the digital economy and e-commerce as its core element.
- Launching by the Mexican government of the *e-Mexico* mega project and those related, like bCentral.
- Construction of large web sites like T1msn and Pl@za.
- Mexico's close proximity to U.S. markets, and its free trade agreements with North America and the European Union.
- Continuing extension and improvement of telecommunications infrastructure by phone companies.
- Intensity of competition and the increasing number of competitors.
- Existence of a basic legal framework for e-commerce transactions and e-payments.
- Launching of programs like PricewaterhouseCoopers'—BetterWeb—to certify e-commerce providers' services as to security, quality, and adequateness of customer support, to gain the customer's confidence and trust.
- Initiatives like that by IBM Mexico and Telecom&Soft for the establishment of a nationwide network of e-business solution centers to help businesses put together Internet-based business strategies.
- AMECE's operation of an electronic catalog where its members can upload their products and advertise them at no cost.

However, the forces that constitute obstacles for the growth of e-commerce activities are also diverse and include:

- Only 11 percent of Mexican households can afford to buy a PC.
- SMEs account for 95 percent of Mexican business establishments.
- Less than 15 percent of SMEs have access to a computer and barely 14 percent have the support of a technician trained in IT, thus lacking financial and technological resources and an environment to do online business.
- Forty five percent of Internet users deem it unsafe to conduct online transactions, mainly payments.
- Mexicans traditionally prefer to go to stores and assess products personally.
- Only three percent of Mexican web sites offer products or services that meet the quality, security, and customer support standards required by PricewaterhouseCoopers to be eligible for certification in its BetterWeb program.
- Tendency to distrust both the quality of products advertised online and delivery time commitments of e- providers.

- Sizeable deficiencies and insufficiencies of telecommunications and IT infrastructure.
- Traditional resistance of large segments of the Mexican business community, especially SMEs, to go online, and in some cases, to even buy a PC
- Large investments and considerable time (six months to one year) required to install IT infrastructure and equipment, and set up e-commerce solutions.
- Indefinite time and conditions required to adopt the business philosophy required for the introduction of e-commerce activities.
- Inherent uncertainty and risk involved in e-commerce ventures as to investment returns, given the fact that up to now, Internet-based marketing campaigns have not succeeded as efficiently as in traditional mass media (TV, radio, newspapers).

The very high proportion of business establishments accounted for by SMEs represents a problem because in an economic setting like Mexico's, small generally means poor and inefficient; the problem is not size per se, but rather the direct correlation that exists between the size of a business and the amount and quality of resources and know-how it commands.

Nevertheless, SMEs constitute at the same time one of the sectors with the largest potential for the development of e-commerce, if only because they account, by far, for the largest segment of Mexico's business population. According to Select-IDC, it is companies with less than 100 employees that think most about adopting Internet-based business solutions. Larger companies with better IT infrastructure are less flexible, therefore, less prone to go online to do business. In November 2000, the director of Microsoft's e-commerce division predicted that the 4,000 or 5,000 most successful small businesses in Mexico would be users of electronic commerce in 2001 (FINSAT, 2000a). Of course, the segment most likely to have the resources, mindset and conditions to acquire IT equipment and expertise, and thus to engage in e-commerce activities, are the big export-oriented firms, most of which are subsidiaries of transnational corporations.

The growth of e-commerce activities in the future will then depend on the extent to which the government and private sector counteract the various inhibiting forces that restrain the multiplication of transactions on the web. From the perspective of the foregoing discussion, it seems likely that most of these obstacles can be gradually removed and that e-commerce may continue to thrive and develop in Mexico.

Estimating and Forecasting E-Commerce Revenues

By mid-1999, e-commerce transactions amounted to US$22 billion, of which 77 percent corresponded to B-to-B e-commerce and 23 percent to B-to-C e-commerce (Garcés Rosas, 1999). At the end of 2000, the value of B-to-B e-commerce transactions was estimated by the same agency to reach US$173 million, and B-to-C e-commerce deals only US$50 million, for a total of US$223 million (Cruz Pantoja, 2000).

However, according to The Boston Consulting Group's report "Electronic commerce in Latin America: beyond the web page" (Comercio electrónico en latinoamérica: más allá de la página web), the value of B-to-C e-commerce in 2000 was US$91 million, of which retail auctions accounted for 47 percent, computer hardware and software for 20 percent, and electronic appliances for 9 percent (Mural, 2000). Select-IDC estimates that B-to-B e-commerce transactions will account for 38 percent of total e-commence revenues and B-to-C e-commerce will amount to 30 percent in 2004 (Select-IDC, 2001a). On the other hand, COMECE's Vice

President of Supplies claims that the value of B-to-B e-commerce transactions in Mexico amounts to nearly US$2 billion a year. Although this seems to be an overrated estimate, it is in fact, conservative relative to a report from Forrester Research Inc.

In its 2000 Global eCommerce Model, Forrester Research Inc., estimated that the value of B-to-B e-commerce in Mexico that year was US$3.0 billion, while that corresponding to B-to-C e-commerce only amounted to US$230 million. These figures are well above those of Argentina, Chile, and even Brazil, but small if compared with Canada's with US$15.9 and US$1.5 billion, respectively, in spite of the fact that Mexico's population is over three times that of Canada (Table 13).

TABLE 12
E-Commerce Trade in North America, 2000 (US$ millions)

Country/Region	Business to Business	Business to Consumer
North America		
United States	449,900	38,755
Canada	15,867	1,496
Mexico	3,018	230
Argentina	617	47
Brazil	2,232	170
Chile	142	11

Source. Forrester Research Inc., Global eCommerce Model, 2000.

However, an analyst at the same consulting firm estimated that e-commerce revenues in Mexico reached US$3.2 billion in 2000, and even predicted that the figure would increase to US$107 billion by 2004 (Sanders, 2000) (Table 14).

TABLE 13
E-Commerce Trade in North America, 2000 and 2004 (US$ billions)

Country	2000	2004
North America	509.3	3,456.4
United States	488.7	3,189.0
Canada	17.4	160.3
Mexico	3.2	107.0

Source. Sanders, 2000.

Sander's forecast estimated that 94 percent of revenues in 2004 in the North American region would correspond to B-to-B e-commerce transactions and only six percent to B-to-C e-commerce deals. Although this prediction is not broken down by country, one can infer that the great bulk of e-commerce activity in Mexico will, in fact, be between businesses, rather than between business and consumers. This is consistent with the observations made in this regard in preceding sections. In any event, according to Sanders' figures, Mexico accounted for only 0.6 percent of total e-commerce sales in North America in 2000 with this proportion decreasing to 0.3 in 2004 (Sanders, 2000).

In order to give additional dimension to those predictions, it is worth noting that, according to CCID Consulting Co. an affiliate of China's Ministry of Information Industry, e-commerce revenues in that country totaled US$9.3 billion in 2000, and will increase to US$11.5 billion in 2001; it is important to stress that 99 percent of these figures correspond to B-to-B e-commerce

(eMarketer, 2001b). Likewise, the Census Bureau reported that e-commerce retail sales in the United States amounted to US$8.7 billion only in the fourth quarter of 2000 (eMarketer, 2001a).

The wide discrepancies observed in the above forecasts may be due, to a large extent, to the different methodologies used by each forecasting company. Another source might be the data used as the basis for those predictions. The fact remains that all are only estimates stemming from data presently known and future projections in the last instance, simply informed conjectures as to the way those figures may behave in the short or the mid-term. Most important is not the data itself, but the trends and proportions they may reveal.

ECONOMIC IMPACTS

The eruption of e-commerce has brought about major changes, firstly, in the mindset and outlook of Mexican executives and managers as to the way they can do business in a technology-driven, globalized economic environment. They are now more aware of the possibilities at hand for expanding their business potential and for transforming their companies into more flexible, specialized, and efficient organizations. In this way, e-commerce is helping Mexican businesses to undertake that transformation and thus, to make them capable of conducting more rapid and personalized transactions, in turn developing new and more efficient forms of intermediation. Indeed, E-commerce is fully playing its role as dynamo for the gradual development of a digital economy in Mexico.

Illustrating the above, Grupo Industrial Vitro, Mexico's top glass maker and one of the largest domestic industrial conglomerates, invested US$20 million in 2000 to build an Internet-based marketing arm to transform itself into a full-fledged e-commerce corporation. The project involved substantial changes in Vitro's internal structure and organization, and, more importantly, in the way the entire group does business. According to its director general, it was the advent of e-commerce that forced them to make these changes, the idea being to both supply and respond to the exigencies of global markets by advertising Vitro's products worldwide via the Internet (FINSAT, 2000a).

More generally, in a survey of 71 companies that had migrated to the new economy, Select-IDC found that one-third had reformulated their entire business strategy and product mix, and 13 percent had used the Internet as a new marketing tool. Fifty-four percent did not change their product base or services (Select-IDC, 2001a).

The impacts on distribution channels have been substantial too. One being that e-commerce is opening the gates for the entrance of a growing number of competitors, which is forcing all distributors to improve their companies and become more efficient. Another is that wholesale distributors are adopting e-commerce strategies that involve building web pages focused either on distributors or final users. Still another is that not only distributors, but also manufacturers are implementing strategies to sell directly to the final user, as many computer makers do. One more is that retail channels are also going online to engage their customers into their e-commerce transactions (Suriano, 2000).

On the public sector side, e-commerce is transforming the way government agencies interact with taxpayers, contractors, suppliers, and the public by leading the emergence of something closer to an e-government. As discussed in the previous sections, this is occurring at both the

federal and state levels. Entire ministries and state governments are actively transforming their procedures and institutional structures and making them amenable to Internet-based technologies and solutions. This is best illustrated by the so called *e-Mexico* project, which will both catalyze and reinforce these efforts, and will push further the development of e-commerce, mainly in its B-to-B e-commerce modality. All this is resulting in closer and more collaborative relations between government and business, and also between government and citizens.

Thus, e-commerce has led to the emergence of a dynamic community of practitioners and promoters in both the public and private sectors, which is growing rapidly and permeating into other segments of Mexican society.

IMPLICATIONS

Given the explosive growth of e-commerce worldwide, the large potential offered by Mexico's fledgling virtual markets, its propinquity to the United States, membership in NAFTA, the fair dynamism of its economy, and favorable environment that have taken hold in all sectors of society: Mexico is expected to continue developing and deepening its Internet-based commercial activities. One further circumstance also contributing to such a promising environment is the entrepreneurial orientation of the policies under implementation by the present federal administration.

As online transactions can, therefore, be expected to thrive in the same way as the dealings of taxpayers and citizens that demand public services from government offices, some emerging trends will take shape in the immediate future.

Some analysts and practitioners have pointed out that B-to-B e-commerce goes well beyond e-commerce, as it aims at two main goals: 1) to bring together all the players of entire industries into virtual markets; and, 2) to promote the horizontal integration of industry-wide value chains. For example, Gedas, a consulting firm in the auto industry, is trying to integrate all the value chains of that industry into a single virtual transportation market. In this way, e-commerce is contributing to the development of production networks and so to the rise of a network economy in Mexico as part of the trend pointed out by Manuel Castells (Castells, 1996).

Three major trends are arising in this regard:

- Formation of macro integrators, consisting of clusters of banks, airlines and other large corporations, which will try to bring their suppliers into their value chains through the web.
- Proliferation of e-markets in the form of virtual exchange realms where all the main players in an industry are linked over the net.
- Rapid expansion of the operations of so-called Application Service Providers (ASPs), given the high demand that can be expected for the technologies they provide over the net.

Other visible trends relating to new technologies are:

- Spread of the use of Internet-based solutions and other productivity tools like ERP and CRM to improve support for, and interaction with, customers.
- Explosion of mobile communication devices such as personal digital assistants, which will soon surpass, in number, traditional fixed access means like the PC.

- Adoption of EDIFACT, in substitution of the original ANSI X12 for EDI transactions. EDIFACT is already used by most financial institutions and by a growing number of government agencies and self-service stores.

Some analysts believe that all Mexican companies and institutions will wind up using EDIFACT under the pressure of those that already use it (Pérez-Moreno, 2001). The general view, however, is that the Internet permits one to overcome EDI's well-known limitations; the use of open platforms and Internet-based transfer protocols is facilitating the homologation of documents for online exchange, as well as the uniformity of legal norms and the validity of those electronic documents. However, this does not mean that the Internet is replacing EDI; in fact, the Internet is strengthening it. Thus, it can be expected that both will coexist complementing each other as carriers for the exchange of data and documents in the digital interstices of the Mexican economy.

A final issue that has also raised controversy is the possibility for e-businesses to be profitable, given the fact that it is still very difficult to make money in such ventures in spite of the large and growing number of users. One argument posits that if an e-commerce start-up can make a profit, it would not have a desirable profile for it would mean that the idea behind it already exists and so that one or many entrepreneurs are already exploiting it. According to this view, e-commerce ventures should be guided by the concept of "land grab"—used by English colonizers in North America— but in the conceptual sense, meaning to grab market territories (niches) regardless of whether or not they are occupied, provided that only a whole new business scheme is used (Pisani, 2000).

An alternative view is that e-businesses cannot loose money forever, for they are private enterprises; so, at some point they should produce profits. In this regard, it is recommended that they should adopt ad hoc business models tailored to each company's needs and activities, and go into deals unthinkable in the old economy, such as strategic alliances with rivals like that between Bertelsman AG with Napster (López Villegas, 2001).

The above point is evidently more relevant when considering that the future of e-commerce in Mexico, as anywhere, will largely depend on the extent to which e-ventures can be successful in the immediate future. This will, in turn, depend on the continuation and extension of the policies of support and facilitation implemented by the Mexican government, and the actions and projects undertaken by dedicated chambers, private sector organizations, and e-companies. According to the analyses presented in this paper, the prospects for this to happen are, in fact, promising.

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