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The Rapid Emergence of Electronic Commerce in a Developing Region: The Case of Spanish-Speaking Latin America

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ABSTRACT

In several respects, Spanish-speaking Latin America appears to be a "fast follower" of electronic commerce, i.e. a region of the developing world that is capable of relatively rapid adoption of e-commerce technologies and business models. The region has one of the world's fastest-growing rates of growth of Internet connectivity, and demand for information technology is soaring. The telecommunications infrastructure is improving and access costs are declining. Business and technological information from North America and Europe is readily available. However, certain structural and cultural characteristics are shaping the ways in which e-commerce can drive economic renewal in Spanish-speaking Latin America. These characteristics include a relatively weak technological and educational infrastructure, highly skewed distribution of income within national populations, scarcity of capital for new ventures, a traditional business culture that does not place high value on market responsiveness or customer service, and a policy and legal system that requires retrofitting. Nevertheless, the connectivity boom in the region has generated an array of e-commerce opportunities that are

E-Commerce in Spanish Latin America

attracting many contenders from within and outside the region. This paper surveys recent research on the emergence of e-commerce in Spanish-speaking Latin America and describes the challenges facing this region as it enters the network economy.

KEYWORDS :

Electronic Commerce, Network Economy, Developing Regions, Latin America

INTRODUCTION

Electronic commerce is rapidly changing the economic landscape in high-income countries and redefining products, services, markets, and channels. The underlying technologies of the Internet are providing a strong impetus to the creation of electronic markets, accelerating migration toward various forms of digital business and increasing the use of open systems within and among enterprises to achieve new forms of horizontal coordination and collaboration. Analogous transformations of services and delivery channels are taking place in public or not-for-profit industries such as government services, education, and healthcare. E-commerce promises to have major implications for the world trading system as well.

Many discussions about the barriers to electronic commerce in the developing world focus on problems of access to technology. But access to technology is not the primary factor affecting the development of electronic commerce in Spanish-speaking Latin America, where practically the entire range of E-commerce technologies is available on the open market. The primary barriers are

infrastructural and organizational. Although the telecommunications infrastructure in Latin America is being rapidly improved, low quality, narrow bandwidth, and high connection costs are slowing the spread of electronic commerce in a number of countries in the region. The organizational barriers have to do with the speed and effectiveness with which Latin American firms and governments can adopt and adapt electronic commerce technologies and business models. Although the simplest forms of electronic commerce are available to any firm with an Internet connection, full web-enablement of a business implies significant changes within the firm and in its environment. E-commerce requires acquisition of new management and organizational skills and behavior within the firm. It also requires an appropriate external technological infrastructure and regulatory environment, and an appropriate trading environment in which suppliers and customers are capable of electronic communication with the firm. These are deeper and more complex changes than adoption of new technology per se.

Most of the attention given to electronic commerce in the business and management literature focuses on its development in the high-income, technologically kinetic countries where it originated. This paper surveys and summarizes recent web-based and empirical survey research on the development of electronic commerce activity in Spanish-speaking Latin America, a developing region that is recovering from a period of political and economic stagnation. The potential benefits of electronic commerce in developing regions include increased access to markets, opportunities to create economic value from cultural assets, reduced administrative costs, and improvement of public services (see for

example IBM 1997). There are also threats: failure to properly adopt and adapt technologies that enable economic commerce capability could result in exclusion from the more technologically advanced parts of the international economy. Those most at risk are the least able to adapt to technological and business changes quickly and intelligently: smaller, poorer firms with constrained access to technological, human, and financial resources, traditional firms (whether bureaucratic or patriarchal), highly regulated firms, and firms in countries with outdated telecommunications, regulatory, and educational infrastructure. Obviously, neither size nor wealth nor even technological prowess guarantees successful migration to IT-intensive electronic commerce business models. The e-commerce business literature frequently emphasizes the wrenching organizational transformations and heroic behavior required for successful adoption of e-commerce technologies and business models, considering the risks and uncertainty involved in betting on unfamiliar and novel ways of doing business (see for example: Mougayar, 1997; Ware et al., 1998)

In Spanish-speaking Latin America, modernization of the public and private sectors is creating high demand for investments in information and communication technologies. Like other trading regions, Latin America has a legacy infrastructure for Electronic Data Interchange and Electronic Funds Transfer in the banking, transportation, international trade, and other exporting sectors. Newer e-commerce technologies in the form of Internet, web, and Enterprise Resource Planning systems are diffusing very rapidly among segments of the business and

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consumer sectors with sufficient purchasing power and an international outlook. This paper reviews recent research on e-commerce in Spanish-speaking Latin America and describes the challenges presently facing this region as it enters the network economy.

THE BUSINESS SIGNIFICANCE OF ELECTRONIC COMMERCE

Electronic commerce is a moving target, driven by waves of innovation in information and communication technologies. The term electronic commerce "refers generally to all forms of transactions relating to commercial activities, including both organisations and individuals, that are based upon the processing and transmission of digitised data, including text, sound and visual images" (OECD 1997). Four streams of information technology are converging to form electronic commerce: electronic messaging; corporate digital library or information pools and collaborative technologies; electronic document interchange, especially EDI and electronic funds transfer; and electronic publishing in support of marketing, sales, advertising, and customer support (Kalakota and Whinston, 1996). Newer forms of electronic commerce, notably commercial transactions over open networks, are the thin edge of the wedge of an ICT-based business revolution. Most current interest in electronic commerce is due to the emergence and very rapid diffusion of the Internet/Web technological package, which is based upon open systems, interoperability, and easy-to-use interfaces. The Internet/Web technology package includes a high-speed telecommunications infrastructure, the TCP/IP transmission protocol, client-server computer architecture, easy interface software (browsers), and specific languages

and scripts. The combination of TCP/IP protocol, client/server architecture, and platform-independent languages and browsers permits the functional integration of diverse systems and networks, including older and proprietary ones.

The Internet/Web package is the technology driver of electronic commerce. The business drivers are trade globalization (which is moving trade-related electronic commerce issues onto many policy agencies), the year 2000 problem (which is hastening the migration from legacy IT systems to new forms of internetworked business computing), and the extraordinarily rapid diffusion of Internet/Web technology throughout the public, private, and not-for-profit sectors in many technologically advanced countries. This rapid diffusion is indicative of the ease of use and affordability of the Internet/Web technology package. Internetworking with interactive multimedia will become increasingly widespread as the cost of processing power declines and as bandwidth increases, creating an electronic "marketspace" which will support many new kinds of business-to-consumer and business-to-business electronic commerce. Business-to-consumer electronic commerce has captured the greatest amount of public attention, with travel, entertainment, and some forms of retailing becoming the pioneer on-line industries. However, business-to-business electronic commerce is by far the fastest-growing type of electronic commerce in North America. Business-to-government electronic commerce, while not as significant as other types in terms of volume, is often regarded as strategically important. The electronic commerce policy briefs in several G7 countries encourage governments to play the role of "model user", and public projects, for example defense procurement in the United States

and telemedicine in Canada, have driven the electronic commerce learning process for many small and medium high-technology firms. Finally, many firms are installing the Internet/Web technology package in the form of Intranets, uncovering huge potential for developing organizational resilience and flexibility, and reportedly obtaining gigantic returns on investment (Telleen, 1997).

Forecasts of electronic commerce envisage not just a sharp increase in the volume and value of transactions conducted electronically, but also deep structural changes and many qualitative changes in the business environment (i.e. OECD, 1998). The newer forms of electronic commerce present many challenges and opportunities to business as a consequence of improvement, transformation or redefinition of products, processes, services, and business models. Managers currently regard electronic publishing in support of selling, advertising, marketing, and customer support as the primary dimension of electronic commerce (Riggins and Rhee, 1997). However, electronic commerce enables a wider range of sources of business value, including new information-rich communication channels with customers, new sales channels, communication cost savings, accelerated time to market, improved customer service, enhanced brand image, faster organizational and technological learning, closer relation with customers, improvement of product/service innovation capability, and availability of new business models (Bloch, Pigneur and Segev 1996). These are generally not the kinds of value that businesses, especially SMEs, have in mind when implementing Web-based commerce for the first time. SMEs generally approach the Web primarily as a new advertising opportunity and secondarily as a convenient, low cost

medium for communicating with collaborators (Poon and Strom 1997), exploring the simpler or more obvious e-commerce applications before discovering the more complex or less evident ones.

CHARACTERISTICS OF ELECTRONIC COMMERCE ACTIVITY IN SPANISH-SPEAKING LATIN AMERICA

Internet demographics in Latin America

About 0.5% of the world's Internet hosts are in Spanish-speaking Latin America. Of these, about 35% are in Mexico, 19% in Argentina, and 19% in Chile. Nua estimates that in January 1998 there were 101 million Internet users in the world, of which 1.25 million in all of Latin America (including Brazil), although some estimates put the number at almost twice that, with a million Internet users in Brazil alone (Nua 1998). In North America about 22%-27% of the population are Internet users. In Latin America the proportion ranges from 0.01% in Paraguay and 0.04% in Ecuador to nearly 6% in Costa Rica (ibid.).

The rate of growth of Internet use in Latin America is among the highest in the world - about double that of other regions (Nua 1997a). Internet use in Latin America has grown faster than any other communication medium or consumer electronic technology (Nua, 1997b). Importation of electronic equipment has been liberalized in many Latin American countries and computer equipment is widely available at prices not unlike those in North America. The telecommunications infrastructure is improving, especially in urban areas, and costs of Internet connection services are declining. The result is spectacularly high connectivity growth rates. The number of

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Internet hosts in the region increased at an annual rate of 144% in the eleven largest Latin American economies between 1993 and 1997 (CNN, 1998). In Mexico, the number of registered sites increased by 350% between October 1996 and October 1997, and a population of one million Internet users was forecast for 1998 (Santoyo, 1997). The *Revista Computación Global* estimated in August 1997 that there were about 100,000 Internet-enabled computers in Venezuela, and that based on the rate of importation of computers, the number of Internet users could double within one year (RCG, 1997a). Some estimates have the overall number of Internet users in Latin America exploding from 8.5 million in 1997 to 34 million in 1999 (Business Week, 1998).

Most of the recent growth in registered web sites in the region has been among commercial sites (ones with the .com domain extension). In Mexico, 83% of the new sites established in 1997 were commercial sites (Santoyo, 1997). This is consistent with the overall trend in Latin America in which the vast majority of websites are established and managed by businesses. It was expected that the number of Latin American business websites would triple in 1998, to over 500,000 (Business Week, 1998).

The profile of the typical Latin American Internet user is not unlike like that of typical North American user in the first few years of the WWW. In Mexico 70% of Internet users are male, on average 35 years of age; 45% are married and 30% work in the computer industry (Santoyo, 1997). Most pay for their Internet subscriptions and use the net daily, in preference to TV, radio, or the press, and 75% consider the Internet to be indispensable. About half anticipated

having an Internet-based bank account by 1998.

How are firms using e-commerce in Latin America?

Currently, Internet technologies are used primarily by corporate Latin America for purposes of marketing and internal communication, although many examples of pioneer Internet-based business-to-business electronic commerce are known in the region. These include Disco Supermarkets in Argentina and Cifra, a large Mexican retailer, which have supply-chain management arrangements with local suppliers (Lorek, 1998). Reports indicate that many larger Latin American firms are aggressively investing in Web-related information technologies and beginning to integrate intranets, extranets, and Web marketing into their business models (IDC, 1998). However, in late 1997 only a very small percentage (16%) of these firms' desktop PCs had access to the Internet, a situation due to the prevailing pay-per-minute telecommunications connections. With the improvement of telecommunication infrastructure in the region, larger firms are expected to turn away from ISPs toward leased lines from carriers for Internet access services.

Firms deriving income primarily from consumer-oriented electronic commerce are as yet a novelty in the region, although many commercial presences on the Internet are being established in anticipation of soaring consumer electronic commerce markets. The kinds of online business activities described in the local Spanish-language IT press suggest that the first generation of business-to-consumer firms conducting electronic commerce in Spanish-speaking Latin America has found a highly

specialized niche: the social and cultural needs of national expatriates. For example, Cmet Net, a Chilean ISP, broadcast soccer games via the Internet and discovered an expatriate market (Interr@, 1997). Similarly, Teleflores, a Caracas flower supplier using a toll-free telephone number, established an Internet presence and received about ten orders per month from Venezuelan expatriates for delivery of flowers in the city (RCG, 1997b). Judging from the client lists of Internet service providers in the region, until recently most of the electronic commerce activity concerned the development of websites for public institutions, international programs, commercial events, services to business, and some firms catering to local consumers. For example, Antipodes, an Internet service provider in Chile, in addition to its training, intranet, and web hosting services, develops websites for clients, of which (among those listed) one is an international organization, two are public agencies, two are event organizers, one is a publisher, one an educational institution, three are industrial firms offering foundry, software, and furniture construction services, and two are firms catering to individual consumers: a travel agency and a women's luxury apparel supplier. The boom in Internet use in Latin America is leading to experimentation with on-line purchasing of music, books, and services such as financial and travel services. Users can sometimes purchase these services more cheaply with a better range of choice from online providers in North America than from local retailers or agents. For example, 80 percent of Charles Schwab Corp.'s stock trades in Latin America take place via the Internet (Lorek, 1998). As cable, wireless, and telephone connectivity improves in the region, urban areas may support electronic markets large enough to maintain largely consumer-

oriented local electronic commerce activities such as on-line grocery stores. CyberMarket in Santiago, Chile reportedly did about \$1m worth of business in 1998 through its virtual stores.

The young, educated, affluent Internet users of Latin America are the primary targets of the current wave of local businesses preparing their "tiendas virtuales" (virtual stores) and online services. However, in 1998, it was still cumbersome for Latin American consumers to make purchases over the Internet in the region due to unavailability of online payment facilities (Frutos, 1998). This is why many Latin American consumers use the Web for information collection purposes but conduct their transactions offline.

Challenges to E-Commerce in Latin America

Latin American firms face four kinds of challenges in their search for viable electronic commerce activities: the challenges of payment, trust, cost, and new business models.

At present, a major impediment to business-to-consumer electronic commerce in most Spanish-speaking countries of Latin America is the inability to conduct transactions with consumers on-line. Credit card payments are not authorized without a physical signature, requiring a separate exchange of information by fax. Consumers are highly skeptical of the security of online payment systems. Furthermore, prevailing practice places the responsibility for fraudulent use of credit cards on the cardholder, not on the card issuer. Many subscribers to telephone or electrical services in Latin America know how frequently erroneous billing occurs and how

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difficult it is to correct the error or recover excess payments. Local banks and credit card companies have been slow to make arrangements for secure online payment, and the widespread lack of consumer protection against fraud or non-delivery means that Latin American consumers consider online commerce to be inherently risky until it is proven otherwise. Thus, although credit cards have remained the payment instrument of choice in business-to-consumer electronic commerce in North America, it is likely that other forms of electronic payment, such as electronic wallets or smart cards, will find greater favor in Latin America.

The payment problem is part of a larger problem of trustworthiness that Latin American businesses face. Latin American businesses traditionally do not value a strong customer service orientation, and such firms are unable to exploit for business purposes interactive technologies that increase ability to respond to customers. A study of Uruguayan and Argentine firms with e-mail addresses found that half of them did not answer requests for information (Moston, 1998). Even firms attempting to develop traffic by offering free e-mail services and web space to have found that customers are suspicious of their motives. Although consumer-oriented electronic markets in Latin America are beginning to gain depth, serious issues of payment security, consumer protection, product quality, and order fulfillment reliability remain to be addressed before consumer-oriented e-commerce can become widespread (Frutos, 1998). On the other hand, the trust issue presents a business opportunity to firms that can establish their trustworthiness to consumers.

The high cost and low quality of

telecommunications services has been a major impediment to the increased general use of the Internet in Latin America. Outmoded and unreliable telephone connections in many countries result in narrow bandwidths offered by many ISPs, with consequent slow connections. In Venezuela the cost of Internet connectivity can be about US \$6/hour for firms. In Chile, the cost of a basic dialup connection in 1997 was \$US60/month. Total bandwidth of Chilean connections to the outside was about 9Mb/sec, provided by satellite (Lorek, 1998). In 1998, the cost of an Internet connection in Argentina was \$60 per month for 2 hours/day of use, plus costs of local calls. High demand for connectivity has spurred investment in several major communications infrastructure projects for the region, for example the Americas II Cable System, a 40Gb, 8000-km fiberoptic cable, and a new Internet hub, the Latin Internet Exchange in the Dominican Republic. Cable television is a popular service among high-income urban Latin Americans, and the largest high speed Internet access projects in Latin America involve the introduction of cable modems.

The rapid growth of Internet usage in Latin America is substantially changing the demographic profile of users: younger users, females, and unilingual Spanish-speakers now account for the bulk of first-time Internet users in countries with booming Internet populations (Infobeat, 1997a). By 1998, the Spanish-speaking population of Internet users had grown to about 14 million, making it, along with Japanese and German, one of the three primary, non-English-speaking language groups on the Web (EMA, 1999). It was anticipated that the number of Spanish-speaking Internet users would exceed 30 million by 2000, although fewer than 2% of all Web pages

are in Spanish. Of 218,000 Spanish-language Internet hosts in 1997, about 55% were in Spain and 45% in the Americas (Del Toro, 1998). By 1998 the Spanish-speaking web user population began to attract firms seeking to service the entire market rather than geographic segments of it. At least a dozen small, Spanish-language, portal sites were in existence, including Apali, Dónde, El Índice, Eliana, Encuentrelo, Mundivia, Olé, Ozú, Ozú-España, Telepolis, Trovator, and Ugabula, each servicing a primarily national market. However, the attempts to aggregate the Spanish-speaking market originated in the United States. By 1998 Yahoo and AltaVista had introduced Spanish-language versions of their site. In a bid to become the Yahoo! of Latin America, a Silicon Alley startup, StarMedia, raised \$80 million in private equity financing in 1998 to provide online services and create interactive communities in Spanish and Portuguese.

The StarMedia case is probably not the last time that U.S.-based firms will challenge Latin American service providers with their ability to put together packages of technology, capital, and business skills to aggregate and service previously fragmented Latin American markets for Internet-based products. Similar patterns could repeat themselves in the areas of financial services, digital music, or online publishing and news services. To take the example of the latter, Latin America presently does not possess a recognized branded interactive newspaper or news service that covers the entire Spanish-speaking portion of the continent. However, a number of Latin American newspapers are available on-line, sometimes superbly rendered. Argentina's La Nación won the 1999 EPPy [Editors and Publishers] Awards competition for interactive newspapers in

the Best Overall non-U.S. Newspaper Online Service category, putting this publication in the winner's circle with the Washington Post. El Nuevo Herald from Miami, which has a full-time staff of two, won the award for Best Overall U.S. Newspaper Online Service with a circulation under 100,000. The business model for digital newspapers presently requires subsidy of the digital version by the locally-produced printed version. However, the growth potential is much greater for digital publications than for paper publications, because the potential number of readers is much larger and the cost of production and delivery is much lower. It may be surmised that eventually, one Spanish-language publication will occupy the niche for an Americas-oriented interactive newspaper.

ENABLING E-COMMERCE: BUSINESS EDUCATION, TECHNICAL SUPPORT INSTITUTIONS AND PUBLIC POLICIES

Several differences exist between the ways that electronic commerce is developing in Latin America and in North America or Europe. These differences concern the role of infrastructure to support technological change in industry and the promotion of training, policy development, and collective action. The most important actors in this type of activities are institutions of higher education, public or private technology support centers, collaborative programs, industry-supported development projects, and governments elaborating explicit policies to promote electronic commerce. The higher education, public, and private association sectors are not prominent actors in the Latin American economic commerce landscape.

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As in North America, Western Europe, and parts of Asia, institutions of higher education in Latin America have played an important role in introducing the Internet into society by familiarizing it to students. However, in contrast to North America, much of the formal electronic commerce skills development in the region appears to be provided by Internet service providers and other consulting firms, rather than by universities, community colleges, or public technical support institutions. The curriculum runs from basic Internet navigation skills and capability in e-mail, news groups, and the World Wide Web, to web page design and marketing strategies. The supply and adequacy of technical skills for electronic commerce in Latin America is a relatively unexamined policy issue. Microsoft recently estimated that the Latin American software industry was being held back by a deficit of 20,000 unfilled technical positions.

North American, European, and Asian universities are quickly developing business-oriented electronic commerce courses and programs in business and computer science faculties. Presently over sixty electronic commerce course syllabi are available on the WWW (Davis et al., 1998). These include introductory courses, courses on marketing, business processes, international relations, and public policy, all focusing on electronic commerce. A growing number of universities are offering concentrations in electronic commerce at the undergraduate or Master's level. A number of other universities offer specialization in a technical area of electronic commerce in conjunction with a business degree.

Most business, engineering, or computer science schools in Spanish-speaking Latin

America are not offering courses on "electronic commerce". This is a serious shortcoming that probably reflects a deeper management skills deficit in the enterprise sector. An associated shortcoming is the lack of electronic commerce research groups in the higher education sector. Presently the primary sources of knowledge in Spanish-speaking Latin America concerning local experiences in electronic commerce are the local IT industry press and the occasional seminar with presentations by spokespersons from firms. The region has only one identifiable business-oriented research center, which is specialized in legal issues surrounding electronic commerce. This center, CENIT (Centro de Investigación en Information Technology) in Buenos Aires, has produced studies on electronic cash, digital banking, and electronic commerce law.

Because of the scarcity of business research on electronic commerce in Latin America, cases of successful on-line businesses or firms exploiting electronic commerce are not widely known in the region. The examples of electronic commerce business models put forward in the local IT press often refer to paradigmatic e-commerce cases from the United States such as Amazon.com, Peapod, Virtual Vineyards, Travelocity, Annie's, Autoweb, CD Now, Egghead Software, etc. The principal forms of diffusion of information about electronic commerce are conferences or seminars and the Spanish-speaking trade press.

Events such as conferences or seminars on electronic commerce take place regularly in most of the major cities of the region. The events are held in conjunction with trade expositions, or they may be academic conferences held under the auspices of technical associations, or are seminars

offered by local Internet service providers or international software or equipment vendors. The demand for business-oriented events related to electronic commerce appears to be strong.

Approximately one dozen Spanish-language information technology periodicals and news services publish news stories and articles about electronic commerce. In several cases the online edition of journals is free, although with delayed availability. Most of the news items are translations of stories from the international information technology press, but some of the periodicals contain information and stories about local information technology activities, including occasional stories about local firms engaging in electronic commerce.

Another weak link in the development of electronic commerce in Spanish-speaking Latin America is the set of institutional arrangements to provide technical and management support to firms. Such arrangements can take the form of projects, programs, or centers. National and local electronic commerce support institutions have become fairly widespread in North America, Europe, and parts of Asia. Typically they provide the following services to industry: education and training, consulting, clinics and seminars, technical support, assistance in implementing electronic commerce technologies, technical or management research, publication of news, product development, or assistance in management of material, product data, or supply chains (Meyers, 1997). The strongest such institutions in Latin America are those related to Electronic Data Interchange and standard-setting, such as the Asociación Mexicana del Código de Producto, the Instituto Guatemalteco de Codificación,

EDI*Chile, EAN Venezuela, and the Instituto Colombiano de Codificación y Automatización Comercial. These are generally private, not-for-profit institutions that offer technical and collective services to members.

Europe, Asia, and North America have many projects and programs to promote electronic commerce, especially initiatives to demonstrate technological and business feasibility, to improve and harmonize the regulatory environment, and to improve infrastructure and information for electronic commerce. For example, the G7 (Group of Seven: Canada, France, Germany, Italy, Japan, United Kingdom and United States) have a global pilot project entitled "A Global Marketplace for SMEs" with initiatives to establish a global information network, assess the legal, technical, and institutional requirements for SMEs to engage in electronic commerce, and establish international electronic commerce test beds (G7, 1998). The Organization for Economic Cooperation and Development sponsors research and fora on policy for electronic commerce. Its policy framework focuses on Internet content, privacy, security, cryptography, access to services, telecommunications policy, consumer protection, taxation, policies to promotion diffusion of electronic commerce to SMEs, and the effects of electronic commerce in several industries, such as tourism. The European Union sponsors several major research and technology development (RTD) programs such as ACTS (Advanced Communication Technologies and Services), Trans-European Telecommunication Networks (TEN-Telecom), ISIS (Information Society Initiatives in Standardization), and Language Engineering in Telematics Applications. These programs represent major financial commitments on

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There is nothing equivalent in Latin America, although UN agencies provide a number of services in standard setting and electronic trade facilitation to the region. The United Nations Centre for Facilitation of Procedures and Practices for Administration, Commerce and Transport (CEFACT) is located within the UN Economic Commission for Europe but plays a role of EDI standards setter since representatives from other UN regional commissions participate in its work of maintaining and promoting UN/EDIFACT standards for electronic data interchange. UNCTAD, the United Nations Conference on Trade and Development, is establishing the Global TradePoint Network, with over 100 centers in 70 countries providing trade information and electronic commerce facilitation to SMEs (UNTPDC 1998). The TIPS Network, funded by UNDP and European governments, provides trade information and brokerage services to firms.

Finally, mention may be made of the public policy dimension of electronic commerce. Electronic commerce has become a highly salient policy issue among governments of industrialized countries. High level initiatives are underway in the major economic groupings of industrialized countries (G7, European Union, OECD) concerning policy issues the resolution of which is regarded as central to the international deployment of electronic commerce. Also, many national governments or their advisory groups have produced policy statements concerning electronic commerce. The key international policy issues at the present time have to do with security, privacy, customs and taxation, commercial rules regarding digital contracts, technical standards, regulation of

content, intellectual property, and prevention of fraud. National policies typically address these issues as well as more parochial ones, which generally include the diffusion of electronic commerce capability among Small and Medium Enterprises, access, existing and new telecommunications infrastructure, skills, and technology development initiatives.

No national e-commerce policy statements from Spanish-speaking Latin America are identifiable on the Internet. Ironically, the e-commerce policy statements that are available in Spanish are mainly from the U.S. and Europe. Much of Latin America's early involvement in policymaking for electronic commerce took place through participation in regional and international agencies. One regional policy exercise in electronic commerce is underway: the Trade and Electronic Commerce Task Force of the Inter-American Development Bank's Informatics 2000 Initiative. This Task Force is addressing international legal and regulatory issues along the lines of those described above.

In summary, in many respects the public sector is lagging in its involvement in electronic commerce in Latin America. National and regional agencies need to address issues concerning infrastructure, investment, education, access, and conversion of firms to electronic commerce business models.

TECHNOLOGICAL LEARNING AND E-COMMERCE IN SPANISH-SPEAKING LATIN AMERICA

From the 1920s until the 1980s, most Latin American countries practiced state-led economic development strategy behind high

protective barriers, encouraging production for domestic markets. Latin American import substitution policies were quite successful in encouraging industrial and technological development, and the portion of industry in national economic output increased in most countries. However, indigenous industry was for the most part not internationally competitive and was unable to generate enough foreign exchange to maintain investment. Subsequent market liberalization promises long term increases in efficiency and incomes, but it has come at the cost of the social friction provoked by adjustment. High levels of poverty, downward mobility of the middle class, and high concentration of national income within the wealthiest stratum of the population are problems that most Latin American countries have had to cope with as they try to develop competitive economies.

Latin American countries have also suffered a certain loss of indigenous technological capability, especially in the manufacturing sector, with the dismantling of the import-substitution regime. The region is coming to specialize in raw materials, semi-processed industrial commodities, and some assembled manufactured products (Katz and Stumpo, 1996). Market liberalization has led to a huge balance of trade deficit in higher value-added goods and services as firms purchase imported knowledge inputs rather than producing them in-house or contracting for their production by local public R&D institutions. Loss of subsidy income and loss of captive national markets for their technical services have put many elements of the Latin American public S&T infrastructure, especially national R&D labs and universities, in a fragile situation. National "innovation systems", the complexes of public and private institutions

that promote and diffuse knowledge and technologies, are generally weak in Spanish-speaking Latin America, largely as the result of very low levels of public investment in scientific and technological infrastructure, research, and education over the past two decades (Alcorta and Peres, 1998). In Latin America, the ratio of national R&D spending to gross domestic product (GERD/GDP ratio, a conventional metric of investment in innovation), is about .3%, similar to the rate of investment in science and technology in Subsaharan Africa or in the Arab States.

With the exception of a number of large projects financed by regional development banks, Latin America's investment in e-commerce infrastructure is nearly entirely market driven. The demand for information and communication technologies is high. Many local Internet service providers (ISPs) have emerged, often also offering web design services, training, technical consulting and systems integration, and occasionally sales of software and hardware. In January 1998, almost thirty Internet service providers in Spanish-speaking Latin America were offering services explicitly framed as electronic commerce-related, not counting four such Spanish-language providers in the United States. The ISPs range from relatively large firms such as Eniac in Caracas which implements EDI solutions for multinationals to a number of smaller Internet service providers which have begun to offer enterprise servers on the local market. Rapidly increasing demand for IT services in Spanish-speaking Latin America has attracted many foreign software and hardware suppliers to the region. For example, Microsoft is experiencing annual growth rates of thirty to forty percent in the region (Infobeat, 1997b).

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The deepening of electronic commerce business and technological capability is a key issue for Latin America. Although local innovation agglomerations are known to exist in several cities, in general the siting of computer or electronic assembly operations in Latin America does not appear to have led to the development of local IT-related innovation systems. For example, a study of the IT industry complex in Guadalajara, Mexico, found that most firms were engaged in assembly and contract manufacturing. There were few locally-owned computer or electronics firms, little R&D, no linkages between R&D and indigenous entrepreneurship, limited local production of components, no research or teaching linkages with universities, and no involvement of local capital, which preferred investment in real estate (Dedrick and Kraemer, 1998). E-commerce may provide a better set of opportunities for technological deepening. Already the development of e-commerce in Latin America has provided opportunities for a local technical service industry to emerge. The range of opportunities to develop viable e-commerce business applications for Latin American cultural products is huge, including possibilities in the music, news, and tourism industries. Similar opportunities exist in healthcare, government services, and retailing.

CONCLUSIONS

Several factors determine the diffusion of e-commerce in a country. These include the extent and nature of organizations providing Internet access, the quality of the telecommunications infrastructure and the cost of access to it, personal income and access to personal computers, the availability of technical skills, and the

policy and regulatory environment concerning security, equity, cultural concerns, etc. (Press, 1997). Among the many determinants of a region's ability to take up and use e-commerce technologies and business models, the obvious ones have to do with availability of infrastructure, skills, and financing. The less obvious ones have to do with business culture and norms and the prevailing regulatory regime. Barriers to entry to electronic commerce are as much organizational and managerial as technological, and electronic commerce should be regarded as an approach to business rather than as a primarily technological issue.

In Latin America, "electronic commerce" means primarily the technical, organizational, and regulatory arrangements to permit international electronic trading, including the supply of information to firms and the correct configurations of national telecommunications infrastructure. Among Internet Service Providers and probably in the public imagination it largely means Web-based consumer-oriented retail commerce. In contrast, in North America "electronic commerce" increasingly signifies a broad range of ICT-enabled business transformations, including intranets, extranets, "closed" and "open" EDI and its recent permutations such as virtual private value-added networks, and business applications of networked interactive multimedia. In North America, electronic commerce is coming to refer to management of highly networked enterprises, requiring not just skillful technical manpower but also business managers with hybrid management and technological skills.

Infrastructure supporting electronic commerce in Spanish-speaking Latin

America reflects the older emphasis on electronic trading, on the one hand, and the newer emphasis on Web-based services, on the other. Electronic trading is the province of national and international public or private EDI and standards bodies, while Web-based retailing is the province of Internet Service Providers and the information technology press. The older forms of electronic commerce are associated with private, not-for-profit institutions to promote collective action in trade-related electronic commerce, and the newer forms of electronic commerce are primarily market-driven. Most of the policy development work appears to take place in regional or international agencies, with activities at the national level or among subregional economic groupings just beginning. Institutions of higher education and national public or private technical assistance agencies are largely absent from the electronic commerce scene in Spanish-speaking Latin America.

Infrastructure and program drivers to support electronic-commerce related technical change need to be strengthened in the region. Moreover, the policy environment does not engage the technologically literate public in dialogue, and the policy agenda, where it exists, has not yet related economic development initiatives to electronic commerce. The consequence of the Latin American pattern of development of electronic commerce capability is likely to be the concentration of this form of advanced business activity among large exporting firms and among firms servicing high-income urban consumers.

Latin America has much to gain from electronic commerce, and much to lose from it. Overall, the potential to develop true

mass use of Internet connectivity for economic and social purposes is constrained in Latin America by low purchasing power among much of the population and by the weak electronic infrastructure in many public institutions, especially schools, health centers, government services, and community centers. The emergence of e-commerce capability in Latin America among export-oriented firms and firms catering to consumers with relatively high incomes is a natural consequence of the social configuration of ability to mobilize new technology in Latin America. However, the longer term prosperity and well-being of the region will require a diversification of this model in a number of directions, including the diffusion of e-commerce capability among smaller or traditional firms in order to reduce technological exclusion; the promotion of local, knowledge-intensive business clusters; the nurturing of Web-based entrepreneurship and venture investment capability; the application of networked, interactive multimedia to generate business value from cultural assets; the expansion of the pool of technical and management skills required to develop and implement e-commerce solutions in the Latin American context; and the deployment of e-commerce applications in ways that strengthen the performance of public institutions.

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