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E-commerce Environment and Trade Promotion for Latin America: Policy Implications from East Asian and Advanced Economies' Experiences

Yasushi Ueki



NACIONES UNIDAS



International Trade and Integration Division

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Abstract

Electronic commerce (e-commerce) is expected to introduce revolutionary innovations to businesses, management and international trade. In particular, supply chain managements (SCMs) are expected to be introduced by firms in order to establish optimal supply chains and dramatically reduce business costs. In addition, e-commerce is thought to provide opportunities for small- and medium-sized enterprises (SMEs) in accessing new clients and establishing new businesses. On the other hand, after their initial attempts, companies and policy makers began to recognize the prerequisites and bottlenecks in diffusing e-commerce and SCMs: 1) secure infrastructures that not only include information technology (IT)-related regulations and telecommunications but also logistics, shipping, and customs; 2) the gap in e-commerce between large firms and SMEs in developing countries; and 3) the digital divide between multinational firms and firms in developing countries. As a result, participants in an SCM are restricted to large multinational firms and their group firms within relatively small areas and regions. These problems are true for Latin America and the Caribbean.

This study will compare the experiences in the field of information and communication technologies (ICT) and e-commerce in Latin America with those of East Asia, and those advanced economies such as those of Europe and the United States. The observations on the penetration of ICT will show that Latin America is not far behind the other regions, though the amount of business-to-business e-commerce (B2B) will not reach a satisfactory level. One of the reasons for this fact may be the weak inter-regional industrial

linkage in manufacturing sectors. Another finding is that large Latin American companies such as producers of primary products have started introducing B2B for procurement (e-procurement).

One of the conclusions derived from these observations is the importance of information sharing with advanced economies; these economies have accumulated demand information in order to establish global SCM and to promote international trade. By using this type of information, the firms in Latin America and the Caribbean can improve their production and inventory. With more networking, these companies can take advantage of new opportunities in forming closer ties with these attractive markets. These networked infrastructures can also work to promote inter-regional international trade as long as there are coordinated rules and standards to interoperate with systems of regional countries in the framework of integration of regional economies. In order to cultivate these fruits of e-commerce, adequate coordination of public policies is indispensable.

Introduction

In the late of 1990s, when use of the Internet began to spread to almost all of the activities undertaken by people and businesses around the world, Internet-based electronic commerce was expected to introduce revolutionary innovations in businesses, management and international trade. In particular, information-sharing with clients and the clients of clients, and coordination of business activities with trade partners based on shared information, or the so-called supply chain management (SCM), were expected to be introduced by firms in order to dramatically reduce business costs and establish optimal supply chains. These production chains involve the procurement of materials for production, distribution, wholesale and retail, inventory management, and document and payment procedures. In addition, e-commerce was thought to provide opportunities for SMEs in accessing new clients and establishing new businesses.

As a result of the burst of the “dot-com” bubble in many countries, interest in e-commerce and supply chain management (SCM) seems to have waned. A US-based SCM provider, Manugistics, announced a 5% decrease of total revenue for the second quarter of 2002 compared to the same period of the prior year.¹ On the other hand, German SAP reported a slight improvement of sales for the third quarter of 2002 compared to the same period in 2001. For the quarter, revenues in the Europe, Middle East and Africa region increased 9% and in the Asia-Pacific region 4%, while those in the Americas region were down 4%.²

¹ Manugistics 2002, Press Release, September 26, <http://www.manugistics.com/news/detail.asp?id=319>.

² SAP, News, 2002 October 17, , <http://www.sap.com/company/press/press.asp?pressID=1496>.

But companies, especially those in high-tech fields that faced a business decline, are likely to find a way out of the difficulty by applying information and communication technologies (ICTs) to cut costs and improve their business. Also, some companies that have invested in these systems in the past are reaching the stage of cultivating the fruits of the investments. For instance, NEC, whose PC business seems to be in red, began operating a new SCM system for their PC business in November 2002 to shorten the lead-time from sales planning to shipping to 4 days. The system is composed of two systems: a sales-side system which can estimate demands based on data such as volume of sales, inventory and seasonal variation, and a production-side system that is used for procurement of parts and production planning. The company invested about three billion yen (US 2.4 million) in the system and expects an annual 4 billion-yen return from the investment.³ In the United States, Toyota has been promoting a SCM project called 'Monarch' since 2001. The company made available US\$ 50 million to improve inventory control of repair parts and accessories. A part of the system has already been in operation since 2002.⁴ SAP holds the view that a number of leading high-tech companies are implementing SCMs to improve productivity, reduce inventories, and lower costs in order to maintain a competitive edge in the market, despite the drop of SAP's revenues in the United States reduced in the third quarter in 2002 as mentioned above.⁵

In contrast to these situations worldwide, IT decision-makers in Latin American firms showed little interest in SCMs in a survey conducted by IDC Latin America in October and November 2001, citing insufficient justification for the use of SCMs and lack of familiarity with its benefits as reasons. Less than 10% of the firms surveyed were using SCM software.⁶ On the other hand, Latin American countries are trying to strengthen economic relations not only with the United States but also with European and Asian countries by entering into free trade agreements (FTAs), and by intensifying foreign direct investment and other entrepreneurial arrangements. In these changing economic conditions, can Latin American firms gain benefits from international trade or establish long-term business connections without Internet-based connectivity to their highly computerized trading partners? In addition, in the midst of declining prices of commodities and labor-intensive products, and of global competition, can firms in Latin America maintain sound management without introducing information systems? It is difficult to answer these questions adequately, but the experiences of multinational companies (MNCs), which are a history of battles with these issues and computerization, will provide some lessons.

This paper aims to provide information on the recent experiments regarding the introduction of e-commerce and SCMs and to derive implications for business and policy makers in Latin America from experiences in East and Southeast Asia. In the first chapter, the concept of SCMs and e-commerce will be summarized. In addition, some practical problems faced by firms and the possibility of governments' roles will be mentioned. The subsequent four chapters provide comparative analyses and case studies. In the last chapter, conclusions including policy implementations will be derived.

³ Nikkei BP, 2002 November 5, (in Japanese), <http://itpro.nikkeibp.co.jp/free/NC/NEWS/20021105/3/>.

⁴ Nikkei BP, 2002 August 28 (in Japanese), <http://itpro.nikkeibp.co.jp/free/NC/NEWS/20020828/3/>.

⁵ SAP, News, 2002 October 29, <http://www.sap.com/company/press/press.asp?pressID=1519>.

⁶ IDC Latin America, Newsletter, Vol I, Issue 23, March 2002, <http://www.idclatin.com/>.

I. E-commerce: A Need for Efficient Management

Globalization became a byword to express the recent situation of the world economy. This word portrays a situation in which persons, goods, money and information can transfer globally and freely to optimize resource allocation. Even end-consumers can search, choose, purchase or exchange goods and services from all over the world, and go abroad to spend their leisure time for sightseeing, shopping and learning. Companies can establish optimal management to realize profit maximization while facing global competition because their clients can find substitute providers from all over the world. Of course, all of these opportunities are made possible by the use of the Internet and other information and telecommunications systems.

Although this description of the effects of globalization is simplistic, these effects cannot be realized without having secure infrastructures and management systems. The case of overseas travel can provide an interesting example. Even if a traveler were literate in the Internet and could sign up for his/her accommodations and air tickets via the Internet, he/she could not enjoy the vacation without having telecommunication systems that provide efficient booking over the Internet. Furthermore, if he/she made online payments using credit cards, the booking system should be linked up securely to credit card company systems to complete the booking procedures.

Multinational Corporations (MNCs) are conducting more complicated operations day after day. They are making deals not only with their offices and subsidiaries but also with hundreds or thousands of clients, sellers, financial institutions, and distributors all over the world.

Facing global competition, these companies are trying on the one hand to reduce costs as much as possible, and to find new business opportunities by using the Internet, on the other. The examples of companies mentioned below will provide clues to think of the goals to be aimed by the business community at large.

A. Best Practices

1. Dell Model: A Best Practice

Dell Computer was the pioneer in direct sales of personal computers (PCs) via telephone and Internet, built-to-order (BTO) systems, online technical support and supply chain management (SCM), in order to shorten the cycle between the component, the manufacturer and the end customer, and to reduce inventories of materials, parts, and products to almost zero. Thanks to this system, Japanese customers can order customized PCs with peripherals they want from the Dell's website, from which order information is transferred to Dell's production base in Malaysia, or more recently in China, and the status of the ordered products is confirmed via the website (Ueki, 2001). This is one of the best practices, targeted by many MNCs when they elaborate e-business strategies.

The advantage of the Dell model is that the company makes the customers reveal to the manufacturer valuable information regarding customer product preferences, and at the same time completely grasps inventory levels in the virtual 'shop.' Dell can use this fully managed information for the planning of production, the procurement of inputs and parts and shipping. This information is shared by parts' suppliers and shipping agents, establishing a seamless SCM. In contrast, those companies with offline sales channels do not obtain precise information on the overall inventories in the shop. As a result, they have to depend solely on market prospects to define production and delivery plans. This means that even if a company cooperates with parts suppliers for better inventory management and production processes, the system would be fragile against unanticipated demand fluctuations, leading to increased stocks in the shop. To deal with unexpected declines in demand, the company will have to liquidate some stocks at bargaining prices, thereby damaging the company's brand image.

2. Toyota System: The Origin of SCM and its Evolution

It can be said that the idea of a SCM has its root in Toyota's Just-in-Time (JIT), or *kanban*, system. Originally, the concept depended on human intelligence and simple, paper-based information exchange system in the factories with its affiliated (*keiretsu*) suppliers. Since the 1980s, Toyota has promoted the computerization of the Toyota Production System (TPS). This is looked upon as a fusion of daily endeavors to improve (*kaizen*) by human and ICT means. In the era of the Internet, the system has evolved into "*e-kanban*" or TOPPS (Toyota Parts Procurement System).

Toyota's total quality management (TQM) has developed to include research and development (R&D) and marketing activities. The TQM concept is based on the synergy between three sub-systems: TPS; TDS (Toyota Development System); and TMS (Toyota Marketing System). One marketing activity based on the Internet is the website, 'GAZOO', which complements sales activities of automotive dealers by providing information and e-commerce opportunities with customers, by keeping close relations with customers via the GAZOO member community, and by gathering and processing individual customer's information. With these multi-marketing channels and TDS in place, Toyota aims to increase order production and to shorten the period for development of cars suited to customers' tastes (Kuroiwa, 2002).

3. Japanese Automobile Firms: As Service-oriented Manufacturer

The application of the Internet to business will provide opportunities for the manufacturing sector to increase value-added. The Japanese automobile firms, which are well-known for their efficient production systems, are changing into manufacturing-based service businesses in order to accomplish higher customer satisfaction levels.

In the case of Mitsubishi Motors, the company introduced in Japan an innovative sales system called “Customer Free Choice (CFC),” when it started selling its new subcompact car “COLT” in November 2002. The new system allows customers to add or delete equipments in conformity with their specific needs. While the system provides more freedom of choice to customers, the company has to manage 300 million patterns of combination of automobile parts. To make this complex system operational, the company revamped the whole business processes from development to sales at the planning stage, designed the car in such a way to minimize the number of parts, and introduced a new system to track the production process.⁷

In the area of customer services, Toyota implemented a new scheme to fully integrate the group’s ICT and related business lines and to benefit from the overall ICT infrastructure in Japan. A telematics terminal, called the “G-BOOK”, is now installed in Module, “WILL CYPHA”, to provide its drivers with safety, security, and entertainment benefits as a standard equipment of the model for the first time in October 2002. The G-BOOK service, based on a “CDMA2000 1x” network run by a Toyota’s affiliate company (KDDI), provides vehicle location/navigation, vehicle notification, music, game and *Karaoke*, emergency roadside maintenance, e-commerce and more. Removable SD card media permits downloading of maps and entertainment contents not only from users’ PCs, Personal Digital Assistants (PDAs) and mobile phones but also at 4,800 terminals in convenience stores across Japan. Registered members can access these services for a flat-fee connection, or maximum of 650 yen (about 5 dollars) per month, and fares for charged contents.

As a new leasing scheme, Toyota has introduced a new purchasing format “P-WAY”, which charges car lease users for the mileage covered in driving, information of which is transmitted from the onboard G-BOOK terminal to the G-BOOK Center operated by GAZOO.com. The monthly charge is billed to the lessees. The charge includes expenses such as automobile taxes, insurance and G-BOOK fee, which is discounted in proportion to the distance driven (<http://www.will-cypha.com/>).

B. The Concept of Supply Chain Management (SCM)

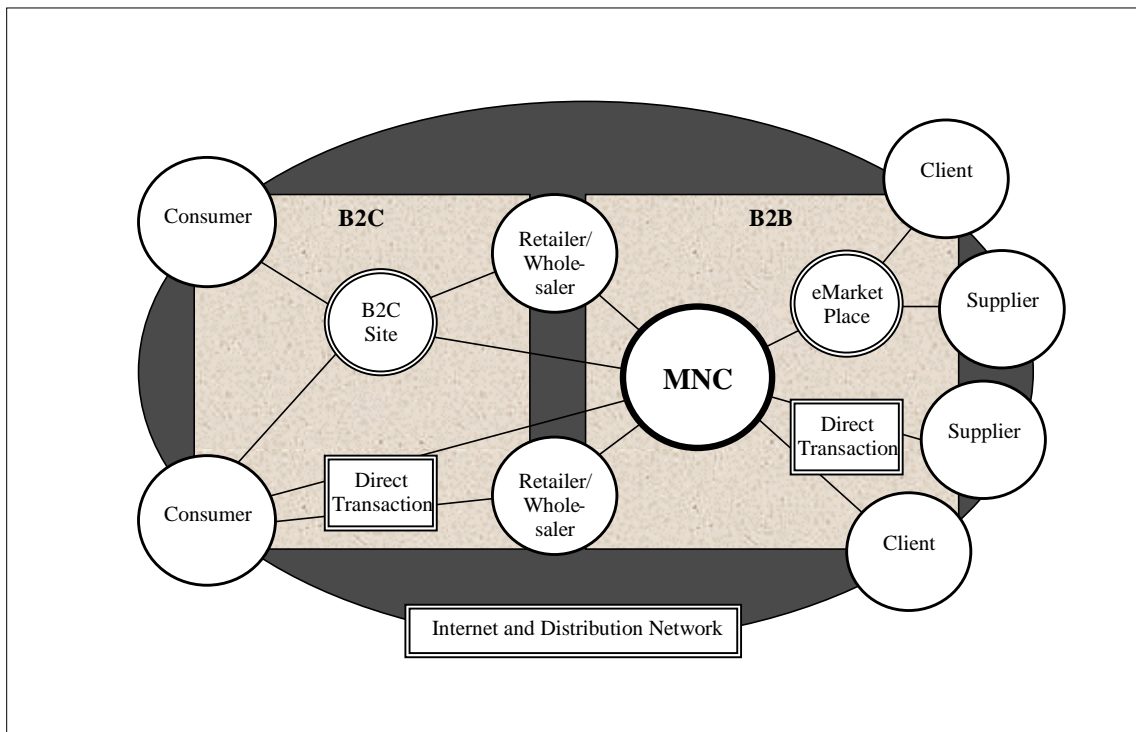
The business structure of an MNC equipped with e-commerce, as shown in Graphic 1, might facilitate a visualization of Internet-based globalization. The MNC can place orders to purchase materials and parts from its suppliers. The MNC can make transactions of its products with its corporate clients and retailers/wholesalers. All these agents can be connected via telecommunications networks to exchange commerce-related data directly with each other or via e-marketplaces.⁸ These transactions between corporations over telecommunications networks are categorized as business-to-business e-commerce (B2B). The same structure can be found for the transactions of final products between companies and consumers. Consumers can finalize the purchasing procedures on goods and services from the MNC and retailers/wholesalers via the Internet. These transactions are customarily called business-to-consumer e-commerce (B2C).

⁷ Mitsubishi Motors, Press Information, October 31, 2002, <http://www.mitsubishi-motors.co.jp/NEWS/0210-03/3519.html>, and Nikkei BP IT Pro news, December 16, 2002, <http://itpro.nikkeibp.co.jp/free/NC/NEWS/20021216/1/print.shtml> (in Japanese).

⁸ An “e-marketplace” is a website offered by third party service providers, which allows a business transaction online among companies. The operators provide facilities not only for matching demand and supply online but also for providing access to finance and distribution services in order to facilitate the transaction in question.

In practice, however, the process of individual transactions is very complex because the process is much longer and more firms are involved. The complexity can be appreciated by looking at the supply-chain operations reference-model (SCOR) developed by the Supply-Chain Council (SCC) (see Graphic 2). The spans covered by the model are: i) all customer interactions from order entry via paid invoice; ii) all product transactions from a firm's supplier's supplier to its customer's customer; and iii) all market interactions from the understanding of aggregate demand to the fulfillment of each order. On the other hand, the model disaggregates the transaction processes to five elements such as planning (demand/supply planning and management), sourcing (procurement of goods and services), production (production of products), deliver (management of order, transportation, and distribution) and return (processes for returning products or receiving returned products). Then the model defines each basic supply chain as a chain of three (sourcing, making, and delivering) execution processes. The planning processes manage each interaction of two execution processes (sourcing-making-delivering) to balance the supply chain.

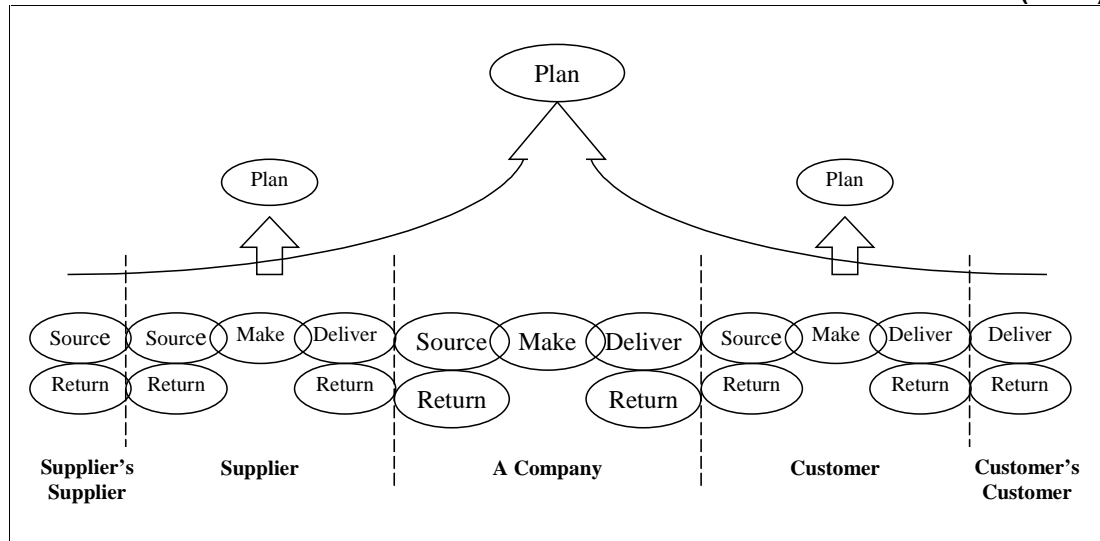
Graphic 1
COMMUNICATIONS INFRASTRUCTURES FOR GLOBAL SCM



Source: derived by the author based on information of Horimai et al. (2002).

Graphic 2

SUPPLY CHAIN OPERATIONS REFERENCE MODEL (SCOR)



Source: Supply-Chain Council (SCC), 2002.

C. The Need for Credible Infrastructure and Government Efforts

The first lesson that can be learned from the two companies' cases (i.e., Dell and Toyota) and the conceptual framework mentioned above is that the efforts of MNCs to introduce a SCM should spill over to up- and down-stream of value chains. Secondly, information fed from suppliers or clients should be incorporated to the supply chains by actually applying it in the planning process. In turn, this means that more precise information is required in order to establish the SCM-based management system and to avoid uncertainty. Thirdly, in addition to information systems, what is necessary is the capability of the firms to follow the SCM planning process as originally programmed.

In addition to potentially becoming essential countermeasures against inefficiency and uncertainty that result in increase of inventories of materials, parts, and products, SCMs and e-commerce can become a new channel to clients/sellers and effective tools to improve the procurement process. By using e-commerce, final consumers will be able to get more satisfactory goods and services, while producers can get information on final consumers, clients and demands to improve their business and management. The use of e-commerce for the procurement process to cut costs will also open up business opportunities to suppliers of materials and parts including SMEs.

In practice, more and more companies make plans for production and procurement with minimum inventories by implementing a "JIT" or SCM approach. The introduction of electronic data interchange (EDI) and SCMs has started mainly among large firms and MNCs. They have also been common among wholesale and retail distributors and manufacturers such as those of automobiles and electronics since the 1980s. Thanks to the innovation in ICT and efforts toward standardization, the costs for their introduction have dramatically decreased. As a result, the use of these systems became common between parts suppliers and wholesale distributors across the total supply chain. It can be expected that these changes in the manufacturing and distribution sectors should impact the structure of upstream and downstream supply chains in the coming years, as

envisaged by SCOR. In addition, clients' needs to decrease the cost and lead-time of procurement will push suppliers to introduce these systems. This means that SMEs will be required to participate in these kinds of networks because even one participant in the production chain that remains "paper-based" can ruin all the efforts toward procedure automation in complicated activities. It should be stressed that producers of primary commodities in the developing countries will also have to respond to these requirements.

The management systems facilitated by JIT and SCMs depend on strict and flexible process control and information technologies because a malfunctioning in a part of the total supply chain can spill over into the rest of the process. In the worst case, firms may have to stop their production, as happened in one of the Toyota factories in the United States in October 2002 because of a U.S. port lockout. In usual cases, firms have to confirm the status of shipment and delivery in each process and re-arrange their plans to keep optimal conditions in order to make these fragile computer-based management systems operable. This means that high ICT penetration facilitates cargo movement and distribution while calling for the willingness of the workforce to adjust to the new ICT system and business practices. It also requires reliable communication infrastructures and stable business environments. Some of these concerns were present in the case of Intel's site selection in Latin America in the middle of the 1990s. It is said that the company attached great importance to labor unions and related regulations as well as the availability of high-quality transportation infrastructures.

In the case of international trade, other uncertainties can be added. Problems arise when the trade partners are not equipped with well-organized information and management systems. This problem can be often found in developing countries. Another problem is related to the factors and processes that are unique to international trade: specific obligations to be met by exporters and/or importers and to be dealt by government organizations such as customs and port authorities. The delay or lack of transparency of necessary procedures increases uncertainties that should be corrected in the planning processes. On the other hand, these governmental organizations, which deal with obligatory procedures should provide information on the delivery status of cargos. This kind of information constitutes an important feedback element for a SCM.

These observations imply that governments can play an important role in providing better infrastructure, or at least in not hindering the management of the private sector. In particular, document procedures submitted to the governments, customs services and port and airport managements should be promoted to support private firms' efforts to accelerate material flows in synchronization with information flows.

II. Prerequisites for E-commerce

Prerequisites for fully implementing e-commerce and a SCM include, among others, a higher level of ICT penetration and the readiness of countries to spur business efficiency. They also include the improved provision of public services and greater integration with the global economy by way of the Internet. Are Latin American countries all set to participate in an Internet-based economy in comparison with East Asian countries? The following analysis will show a catching-up process by Latin American countries.

A. Penetration of ICTs: A Comparison between Asia and Latin America

1. Telecommunications Infrastructure

In the latter half of the 1990s, a high growth in demand for Internet and mobile phone service from companies and individuals led not only to explosive domestic but also international traffic worldwide. Deregulation in the telecommunications sector implemented throughout the 1990s and policies to promote ICT growth and development generally introduced in the second half of the 1990s provided a better investment environment in telecommunications infrastructure. In addition, optimistic demand prospects on telecommunications services made it easier for investors to finance infrastructure development plans. Although the telecom companies in the United States and Europe are now facing financial difficulties, the ICT investment boom in the late 1990s has brought about large benefits to developing countries, especially to Asia and Latin America. As shown in Table 1, the growth rate of the number of telephone lines was highest in Asia, followed by Latin America.

Table 1
MAIN TELEPHONE LINES
(in thousands, %)

	Africa	United States & Canada	Latin America	Asia^a	Europe	Oceania
1995	12 311.4	177 302.2	43 845.5	181 688.4	263 161.5	10 942.7
2001	20 918.3	210 319.3	86 263.1	391 179.0	325 102.8	12 305.1
CAGR ^b (%) 95-01	9.2	2.9	11.9	13.6	3.6	2.0

Source: ITU, 2002.

Note: ^a Asia covers the Middle East and South Southeast and East Asia. ^b CAGR stands for Compound Annual Growth Rate.

2. Penetration of ICT

According to the statistics of the International Telecommunication Union (ITU), in 2001 Latin America and the Caribbean accounted for 6.8% of telephone subscribers, 6.7% of mobile subscribers, 4.5% of Internet users, and 4.3% of estimated PCs in the world. Although these figures might leave an impression of a low penetration by Latin America, the shares are in accordance with the distribution of world GDP in 2000, which was 4.5%. If we compare individual Latin American countries, ICT penetration ratios are unevenly distributed. Penetration of main telephone lines was only 0.97% in Haiti, while the rate for mobile subscribers in Cuba was 0.07%. Similarly, penetration of Internet users was 0.36% in Haiti and 0.96% for PCs in Nicaragua (Table 2). High levels of disparities can be observed for major Asian countries as well (Table 3).

On the other hand, a comparison between major Asian and Latin American countries gives an impression that Latin America falls behind Asia. When compared to Malaysia's per capita GDP of 3 838 dollars in 2000, the penetration ratios of Internet and PCs in Argentina (7 697 dollars GDP per capita), Brazil (3 507 dollars), Chile (4 609 dollars) and Mexico (5 807 dollars) are lower. Internet penetrations in Brazil and Mexico are inferior to even those of Thailand (2 012 dollars) (Table 2, 3). Although the current situations in Latin America are not at an optimal level, a "catch-up" by the region might be on the way, as indicated in Table 4. The number of Internet users in Latin America and the Caribbean will grow at its highest rate between 2000 and 2004, and the region's world share will likely increase from 5% to 8.4%.

Table 2
PENETRATION RATES OF ICT IN AMERICAS

	Telephone Subscribers (per 100 inhabitants) 2001	Main Telephone Line (per 100 inhabitants) 2001	Cellular Mobile Subscribers (per 100 inhabitants) 2001	Internet Host (per 10,000 inhabitants) 2001	Internet Users (per 10,000 inhabitants) 2001	Estimated PCs (per 100 inhabitants) 2001
Argentina	40.24	21.63	18.61	124.14	800.28	5.34
Aruba	85.03	35.03	50.00	87.08	2 264.15	
Bahamas	59.69	40.03	19.66	0.91	549.45	
Barbados	56.93	46.29	10.64	4.85	373.83	9.33
Belize	26.00	14.44	11.55	13.65	737.70	13.52
Bermuda	107.79	87.15	20.64	798.92	3 901.37	49.54
Bolivia	15.21	6.22	8.99	1.84	146.19	2.05
Brazil	38.51	21.78	16.73	95.71	465.58	6.29
Canada	97.51	65.51	32.00	931.90	4 352.73	39.02
Chile	57.92	23.90	34.02	79.20	2 001.99	8.39
Colombia	24.68	17.05	7.63	13.41	269.61	4.21
Costa Rica	30.54	22.97	7.57	20.79	933.63	17.02
Cuba	5.17	5.10	0.07	0.78	106.79	1.96
Dominica	30.98	29.06	1.56	27.88	777.77	7.50
Dominica Rep.	25.67	11.02	14.65	48.17	214.53	
Ecuador	17.04	10.37	6.67	2.63	254.43	2.33
El Salvador	21.84	9.34	12.50	0.80	79.67	2.19
Grenada	39.16	32.75	6.41	1.20	520.00	13.00
Guadeloupe	82.18	44.93	63.59	10.02	175.44	21.74
Guatemala	16.17	6.47	9.70	5.67	171.13	1.28
Guyana	17.84	9.19	8.66	0.23	1 091.95	2.64
Haiti	2.07	0.97	1.11		36.28	
Honduras	8.33	4.71	3.61	0.49	61.68	1.22
Jamaica	46.68	19.73	26.94	5.53	384.91	5.00
Martinique	114.53	43.00	71.53	8.57	127.46	13.00
Mexico	35.40	13.72	21.68	91.49	362.23	6.87
Nicaragua	4.90	3.12	2.99	4.20	98.54	0.96
Panama	35.53	14.83	20.70	26.99	317.01	3.79
Paraguay	25.52	5.12	20.40	4.80	106.44	1.42
Peru	13.67	7.75	5.92	5.18	1 149.73	4.79
Puerto Rico	64.29	33.64	30.65	4.01	1 518.22	
St. Kitts and Nevis	59.99	56.88	3.12	0.71	516.10	19.05
St. Vincent	24.04	21.96	2.08	0.27	308.57	11.61
Suriname	36.69	17.58	19.11	1.34	330.00	
Trinidad & Tobago	41.33	23.99	17.34	52.86	923.08	6.92
United States	110.87	66.45	44.42	3 714.01	4 995.10	62.25
Uruguay	43.76	28.29	15.47	210.93	1 190.12	11.01
Venezuela	37.55	11.20	26.35	9.18	527.77	5.28
Virgin Islands	85.27	56.37	28.90	205.67	1 003.22	
Americas	61.55	35.21	26.35	1 335.40	2 169.39	26.61

Source: ITU (<http://www.itu.int/ITU-D/ict/statistics/>).

Table 3

PENETRATION RATES OF ICT IN EAST AND SOUTH EAST ASIA

	Telephone Subscribers (per 100 inhabitants) 2001	Main Telephone Line (per 100 inhabitants) 2001	Cellular Mobile Subscribers (per 100 inhabitants) 2001	Internet Host (per 10,000 inhabitants) 2001	Internet Users (per 10,000 inhabitants) 2001	Estimated PCs (per 100 inhabitants) 2001
China	24.99	13.81	11.17	0.69	260.00	1.93
Hong Kong	143.12	57.66	85.46	573.52	4 586.14	38.46
Indonesia	6.17	3.70	2.47	2.13	186.19	1.07
Japan	118.44	59.69	58.76	559.03	4 547.10	34.87
Korea	108.44	47.60	60.84	92.14	5 106.83	25.14
Malaysia	49.86	19.91	29.95	31.10	2 394.96	12.61
Philippines	17.72	4.02	13.70	4.00	259.30	2.20
Singapore	119.56	47.14	72.41	479.18	6 051.51	50.83
Taiwan	153.89	57.34	96.55	764.34	3 490.20	22.32
Thailand	21.27	9.39	11.87	11.32	556.11	2.67

Source: ITU(<http://www.itu.int/ITU-D/ict/statistics/>).

Table 4

INTERNET USERS WORLDWIDE BY REGION*(in millions)*

	2000	2001	2002	2003	2004	CAGR (%) 00-04
North America	136.7	156.3	167.7	179.8	196.3	9.5
Europe	108.3	144.4	175.7	196.2	221.1	19.5
Asia-pacific	115.9	165.0	181.5	205.0	235.8	19.4
Latin America	19.3	26.2	33.1	43.4	60.6	33.1
Africa	4.6	6.7	7.7	9.2	11.1	24.6
Total	384.8	498.7	565.7	633.6	724.9	17.2

Source: eMarketer, May 2002 (<http://www.emarketer.com>).

Note: North America includes the US and Canada. Mexico is included in Latin America.

3. Broadband

Broadband Internet will obviously improve the environment for e-commerce. Its high-speed transmission enables purchasers to search and download product information with ease and to purchase digital products and services online, while sellers appeal to their customers by using multimedia technologies. The flat rate charge enables purchasers to choose and contemplate whether or not to buy a product, and download large-size files without considering the connection time to the Internet. Also, broadband Internet makes it much easier for private users to exchange business software and contents such as audio CDs, movies, and games that are main products sold on B2C e-commerce. However, there is a possibility that these businesses would be harmed when strict protection of intellectual property rights is not provided, a concern expressed by the music industry.

Statistics on broadband users and its penetration depends on the definition. According to the estimates by eMarketer on broadband penetration to households (Table 5), users are concentrated in North America and Asia-Pacific. About 80% of broadband households are found in these two regions. Figures corresponding to Asia-Pacific in 2002 are a little smaller than those of North

America and are likely to overtake the latter in 2003. Latin America's data show a delayed diffusion in comparison to the other regions, although the highest growth rate is expected for the region.

Table 5
BROADBAND HOUSEHOLDS WORLDWIDE BY REGION
(in thousands)

	2000	2001	2002	2003	2004
North America	7 600	13 500	20 385	28 585	38 002
Asia-Pacific	5 825	12 565	20 125	30 931	49 607
Europe	1 505	5 964	11 341	18 690	26 810
Latin America	139	562	1 174	2 018	3 208
Total	15 069	32 591	53 025	80 224	117 627

Source: eMarketer, June 2002 (<http://www.emarketer.com>).

Table 6
INTERNATIONAL BROADBAND PENETRATION AS OF DECEMBER 2001

	Broadband Households (in thousands)	Broadband as % of Total Households	Internet Households (in thousands)	Internet as % of Total Households
Korea	7 500	51.7%	8 265	57.0%
Hong Kong	545	26.0%	1 241	59.1%
Canada	2 300	19.7%	6 505	55.6%
Taiwan	1 125	18.2%	2 604	42.0%
Sweden	542	13.4%	2 546	62.1%
United States	11 200	10.4%	56 379	52.3%
Netherlands	550	8.1%	4 196	61.7%
Japan	2 570	5.8%	21 497	48.2%
Germany	2 090	5.4%	14 858	39.1%
France	605	2.5%	7 448	30.4%

Source: eMarketer, August 2002, cited in US DOC (2002e).

The front-runners in terms of broadband diffusion in Asia and worldwide are Hong Kong (China), the Republic of Korea, and Taiwan Province of China, followed by Japan and Singapore (Aizu, 2002). In the case of Korea, Hanaro Telecom, a new entrant to the local call system, introduced ADSL (Asymmetric Digital Subscriber Line) services at the end of the 1990s in order to differentiate their services from those of the major incumbent company, Korea Telecom. Other factors acting as major diffusers of ADSL are: i) the large number of Korean Internet cafés (PC bang); ii) Korean “pari pari” (impatient) mentality; iii) the majority of population living in apartment-dwellings; and iv) a great success in opening new markets including online games (Ueki, 2001). Singapore was one of the first countries that introduced broadband diffusion with so-called ‘Singapore One’ initiative in the mid-1990s. However, this initiative was not successful because the planned services did not meet real consumer needs (Aizu, 2002). Although Japan is a follower to Korea in the introduction of ADSL, deregulation there created severe competition, forcing the ADSL rates to the lowest level in the world. Competition in the ADSL market is now extending to fiber optic networks.

Latin America and the Caribbean has started late in the broadband era. Less than 1% of the world broadband users were located in the region in 2000 (Table 5). In Brazil, 15% and 7% of households connected to the Internet used a high-speed telephone line such as ISDN and DSL, and cable modems, respectively, in the second quarter of 2002 (Nielsen/NetRatings, August 15, 2002).

In Chile, the number of broadband connections rose by 39.8% during the second quarter of 2002. At the end of June of the same year, there were approximately 115,660 broadband Internet accounts, almost half the number of cable modem accounts. Of these broadband accounts, 38% were of ADSL. During the same period, the number of cable modem connections grew 37%, while the number of ADSL accounts rose 45.7%. These connections were concentrated in the Metropolitan region, which accounted for 73% of the broadband connections and 58% of dial-up accounts (Business News Americas, October 31, 2002). Argentina has a large number of potential users of cable Internet network. It is the only country in the region with more than 50% cable penetration rates (Whinston and Choi, 2002). Reflecting current environment of IT infrastructure, 47% of Argentina's broadband clients used cable modems in June 2002. It was expected that the the number of broadband clients would increase from 97,000 in December 2001 to 115,000 in December 2002, or 17.5% growth in Argentina (<http://www.psi.gov.ar/estadodelasi.htm>). Although the number of broadband connections in 2004 will reach to more than 20-fold of the level in 2000, the percent share of Latin America and the Caribbean in the world total would only be around 2.7%.

B. ICT Markets in Major Latin American Countries

ICT markets in Latin America are dominated by two giants: Brazil and Mexico. According to IDC Latin America, Brazil and Mexico accounted for the largest share of the telecommunications markets representing 65% of the estimated region's market value of 72.4 billion dollars in 2001.⁹ Regarding IT expenditures for 2002, IDC Latin America expects a 3% decline to 27.5 billion dollars, 47% of which correspond to Brazil, followed by Mexico with 24%. Argentina, facing effects of currency devaluation and expenditure reductions in hardware (-68%), software (-55%) in services (-56%), will account for only 4% of overall IT spending in Latin America. The country remaining strong is Colombia. Based on 2% of GDP growth, IDC is forecasting a 7% boost in IT spending in 2002, with 8% in software and 6% in services.¹⁰ Similar prospects can be made for Internet users: Brazil and Mexico together now represent more than half of the total of Internet users in the region, and high growth is also expected for both countries. Growth in Argentina will be moderate compared to other countries in the region (Table 7, 8). To complement the overview on the recent ICT market discussed above, four country studies (Argentina, Brazil, Chile and Mexico) will be reviewed in the following section.

Table 7
LATIN AMERICA IT SPENDING BY COUNTRY
(%)

	Argentina	Brazil	Chile	Colombia	Mexico	Venezuela	Rest of Latin America
IT Spending	4	47	4	6	24	5	10
% of GDP in 2000	1.2	2.3	1.7	1.6	0.9	1.4	

Source: IDC Latin America, Newsletter, Vol I, Issue 35, September 2002 (<http://www.idclatin.com/>), CORFO (<http://www.corfo.cl>) cited from IDC.

⁹ IDC Latin America Press Center, October 23, 2002, http://www.idclatin.com/press_center/023.html.

¹⁰ IDC Latin America, Newsletter, Vol I, Issue 35, September 2002, <http://www.idclatin.com/>.

Table 8
INTERNET USERS IN LATIN AMERICA BY COUNTRY
(in millions)

	2001	2002	2003	2004	CAGR (%) 00-04
Argentina	1.5	2.0	2.5	3.0	26.0
Brazil	6.1	8.8	12.5	16.4	39.1
Mexico	2.3	3.2	4.6	6.4	40.7
Rest of Region	5.5	8.0	11.4	15.0	39.7
Total	15.3	22.1	31.0	40.8	38.7

Source: eMarketer, 2001 (<http://www.emarketer.com>).

1. Argentina

High growth of IT markets among the countries in the region was expected for Argentina until the beginning of the decade 2000. Market size was expected to grow from 2 900 million dollars in 1997 to 4 860 million dollars in 2001 with an annual average growth of 13.8%. Among IT products, hardware and services were thought to be the two leading segments. The software sector, estimated at 417 million dollars, equivalent to one third of the combined market value of hardware and services in 1997, was expected to grow fastest and to reach half of the two major markets.

Table 9
IT MARKET IN ARGENTINA (I)
(in US\$ million)

	1997	1998	1999	2000	2001
Hardware	1 165	1 330	1 370	1 610	1 820
Software	417	530	630	790	960
Services	1 118	1 370	1 580	1 510	1 720
Inputs (Computing Accessories)	200	240	260	310	360
Total	2 900	3 470	3 840	4 220	4 860
Annual Growth (%)	20.8	19.7	10.7	9.9	15.2

Source: Prince (2001b).

IT MARKET IN ARGENTINA (II)
(in \$ Peso million)

	1999	2000	2001	2002 (p)	Variation (in Peso 01-02)	Variation (in US\$ 01-02)
Hardware	1 370	1 610	1 100	720	-34.5%	-81.8%
Software	630	790	680	1 100	61.8%	-55.1%
Services	1 580	1 510	1 590	1 800	13.2%	-68.6%
Inputs (Computing Accessories)	260	310	320	350	9.4%	-69.6%
Total	3 840	4 220	3 690	3 970	7.6%	-70.1%

Source: CICOMA (www.cicoma.org.ar) cited from Prince & Cooke.

Contrary to the optimistic projections, the recent economic recession has negatively affected the IT market. The devaluation in January 2002 raised dramatically the prices of computers and

software. As a result, computer sales fell by more than 90% in the first quarter of 2002, when PC prices tripled during the same period (EIU ebusinessforum.com, August 21, 2002). What should be noted is the contrast of the IT market measured in local currency and in US dollars in 2002. The software market, in particular, was expected to expand by 60% and the services market seemed to surpass the pre-financial crisis level. A recent incipient turnaround of the economy might also revert the present ICT outlook. According to Prince & Cook (2002), IT and the communications market, seemingly including the telecommunication sector, will reach 1 445 million dollars in 2003 or a 31.4% higher than the spending level in 2002.¹¹ This estimated value will represent close to 1.4% of GDP in 2003, at a similar level of 2001 and is superior to that achieved in 2002. By IT category, hardware will be the highest growth of 37.5% in pesos, followed by computer accessories (34%) and services (30%). In the category of telecommunications, access to the Internet will increase by 18.7% compared to 2002.

2. Brazil

The Brazilian IT market is equally divided between the two categories, hardware, and software and IT-related services. This market division characterized the latter half of 1990s as well. Brazil opted for a devaluation policy before Argentina, which still keeps facing severe macro- and microeconomic difficulties. As can be appreciated from the figures of 1999, the market in that year grew by 14% in local currency, although it reflected a 27% drop in US dollars when compared to the year earlier. The same pattern can be observed for 2001.

Table 10
IT MARKET IN BRAZIL
(R\$ billion)

	1995	1996	1997	1998	1999	2000	2001(e)
Software	1.7	2.8	3.5	4.5	5.4	5.9	6.9
Service	3.3	4	4.6	5.5	6	7.1	7.7
Hardware	5.4	6.9	8.1	9.7	11.1	12.6	14
Total	10.4	13.7	16.2	19.7	22.5	25.6	28.6
Growth (%)	6.1	31.7	18.2	21.6	14.2	13.8	11.7
Total (US\$ billion)	11.3	13.6	15.0	17.0	12.4	14.0	12.2
Growth (%)	-25.4	20.2	10.2	13.0	-27.0	12.9	-13.1

Source: Softex (<http://www.softex.br/>).

3. Chile

Investment in IT in Chile increased in the late of 1990s. IT expenditure over nominal GDP which was about 0.8% in 1985, rose from about 1.3% in 1997 to 1.7% in 2000. The expenditure in 2000 was 1 568 million dollars, half of which were accounted for by hardware and network access facilities, followed by services' share of 40%. A recent survey by the Santiago Chamber of Commerce (CCS) projects an annual growth rate of 8.4% during the period 2000 and 2004 to reach to 2 167 million dollars in 2004. By category of products and services, a high annual growth of 12% is expected for services, followed by 8.6% of software and applications.

The growth of infrastructure for the period 2000-2004 is projected at a moderate rate of 5.3%, slower than the other sectors; its relative market size will become smaller than services. However, a recent slowdown of the economy in Chile and Latin America seems to make these estimates a bullish scenario. A study conducted by IDC and national chamber of commerce

¹¹ This projection is based on the assumption of 3.6-3.9 peso/US\$, 4-6% of GDP growth and less than 30% of inflation.

estimated growth rate of PC and servers sales in 2002 at 1-2% (Diario Estrategia, October 17, 2002).

According to CCS (2001), more than half of IT spending in 2000 in Chile was done by the business sector. The study shows that IT outlay incurred by private companies represented 56% of total, households 31%, and the government 13%. Meanwhile, 47% of the private sector expenditure in IT was undertaken by large companies, followed by 37% of medium-sized, 14.3 % of small and 1.6% of micro companies. The SME share of 53% in IT expenditure by the private sector is not large considering that SMEs and micro companies represent 97% of the total number of Chilean firms, but not necessarily small when compared to their combined turnover of 28% in total sales in 1997.

Table 11
IT MARKET IN CHILE
(US\$ million)

	2000	2001	2002	2003	2004
Infrastructure	786.3	771.7	827.4	893.5	965.3
Software and Applications	159.3	169.8	186.7	203.4	221.9
Services	622.7	716.3	779.2	884.8	980.2
Total	1 568.3	1 657.8	1 793.3	1 981.7	2 167.4
Growth of Total (%)		5.7	8.2	10.5	9.4

Source: CCS (2002).

4. Mexico

The IT market size in Mexico expanded from about US\$ 3 770 million in 1997 to 5 934 million dollars in 2001 with an annual average growth rate of 12%. Among IT products, hardware and services were two main product categories, with annual growth rates higher than 10%. Services with the market size of about 1 030 million dollars achieved the highest annual average growth of 15.8% and reached more than half of the equipments' markets. Software market expanded from 428 million dollars to 632 million dollars during the same period. Although the size is the smallest among the three categories, the annual average growth rate was as large as that of equipments. This resulted in the decrease of weight of software in the IT market. The number of Internet users went up in the latter half of the 1990s and particularly in 1997 swelling from 39,100 in 1994 to 3.6 million in 2001. By sector, business and households dominated other sectors. Although the business sector is the largest user group, the growth rate of households is much higher than that of businesses.

Table 12
IT MARKET IN MEXICO
(in US\$10 million)

	1996	1997	1998	1999 /e	2000	2001
Equipments	182.0	231.0	238.0	251.0	333.0	344.8
Software	33.6	42.8	49.4	52.2	60.8	63.2
Services	76.0	103.0	130.0	163.0	178.0	185.3
Total	292.0	377.0	417.0	466.0	572.0	593.4
Annual Growth (%)	n.a.	29.1	10.6	11.8	22.7	3.7

Source: Select-IDC, 1996-2000 were cited in INEGI (2002).

Note: Units of data from 1996 to 2000 were revised based on data in 2001.

Table 13

THE NUMBER OF ESTIMATED INTEREST USERS IN MEXICO*(Unit: 1,000)*

	1994	1995	1996	1997	1998	1999	2000	2001
Government	1.8	3.2	4.9	13.9	31.1	167.2	192.8	283.7
Education	17.1	33.0	69.1	141.8	154.1	166.4	276.0	354.1
Household	4.0	10.1	29.2	140.9	297.5	478.2	1 066.2	1 389.6
Business	16.2	47.5	83.5	299.1	739.7	1 010.5	1 177.4	1 608.2
Total	39.1	93.7	186.7	595.7	1 222.4	1 822.2	2 712.4	3 635.6

Source: Cofetel (http://www.cft.gob.mx/html/5_est/Graf_internet/estiminternet_01.html).

C. Informatization of SMEs

Penetration of ICT to companies, especially SMEs, has been a common barrier among the world economy against extending e-commerce networks and SCMs. But recent studies show improvements in the use of e-commerce by SMEs. In North America, the most advanced region in the usage of the Internet in the 1990s, nearly 70% of U.S. SMEs with Internet access purchase online. Office supplies, computers, software and commodity products such as travel are popular items to be bought online. Over 40% of small (20-99 employees) and medium (100-499) businesses connected to the Internet buy office supplies online at least once a month, though the figure of banking services was 22%. SMEs equipped with broadband access are more frequent online shoppers. 23% of them purchase commodity products at least once a month, while the figure of dial-up SMEs was 13%.¹² In Canada, 78% of SMEs had Internet access in 2001, compared to 74% in 2000 and 61% in 1999. In addition, 46% of SMEs had engaged in e-commerce in 2001, up from 41% in 2000 and 27% in 1999.¹³

The experiences in North America can be seen as benchmarks for the use of ICT, its effect on the regional economy, and the barriers to network entry for SMEs. However, comparative studies with other regions such as Asia and Europe, where many countries with large SME bases and diversified cultural backgrounds are integrated into economic unity or under an institutional framework, will provide equally interesting implications for Latin America.

1. Europe

A survey conducted by the EU Eurostat provides a comparison of e-commerce situations between 13 EU member states, plus Norway. According to this survey, 92% of SMEs (10-249 employees) and almost all of the large firms (more than 250 employees) have already been equipped with PCs. Some 68% of them had dial-up and ISDN Internet access. DSL access was not popular. When it comes to web access and establishment of websites, gaps between large firms and SMEs and between countries widen. E-commerce usage for purchases made through all kinds of computer networks is limited to only 26% of the firms. Though the gap between large firms and SMEs is clear, the gap between countries is more noteworthy. Denmark, Germany, Netherlands, Finland, and UK led this field. The small figures of more than 2-year experiences of Internet-based e-commerce mean that it began diffusing in the late 1990s. The figure corresponding to "ordering" in Table 14 does not include manually sent, received or written e-mails. The same situation can be confirmed from the figures of e-commerce sales. The firms used the Internet for providing

¹² Yankee Group, Research Notes, July 23, 2002, <http://www.yankeegroup.com/rn/ygrn7-23-2002.html>.

¹³ Nua, October 31, 2002, <http://www.nua.com>.

company brochures and catalogues, and have developed interfaces allowing the taking of orders. Firms identified speed of processing, simplification of tasks, cost savings and offers from many suppliers as the benefits of e-purchasing. The researching of new/more customers, speed of processing, the avoiding of market share loss, geographic expansion of market, cost reductions, and simplification of tasks were identified as benefits of e-sales. If we compare e-procurement and e-sales, we will see that enterprises were more active in e-purchasing than in e-selling.

Table 14
SHARE OF ENTERPRISES USING ICT AND E-COMMERCE IN EUROPE
(%)

		All	DK	D	EL	E	I	L	NL	A	P	FIN	S	UK
Use of ICT at the end of 2000														
Computer	SME	92	95	96	84	91	86	90	87	92	89	98	96	92
	Large	97	100	96	98	100	99	99		100	99	100	100	100
Web access	SME	67	86	67	50	66	66	54	62	76	72	91	90	62
	Large	81	99	77	84	97	94	70		91	94	97	99	90
Own web site	SME	44	62	65	28	6	9	39	31	53	30	58	67	49
	Large	80	89	86	54	35	22	67		86	59	93	91	80
Use of E-commerce for Purchases in 2001														
E-commerce (EC)	SME	25	36	35	5	9	10	18	23	14	12	34	31	32
	Large	47	66	51	8	20	21	28		30	22	45	37	50
Internet EC used for more than 2 years	SME	3		5	1	3	2	5		4	3			
	Large	2		5	1	3	2	5		4	2			
Ordering	SME	18	34	29	5	8	8	17	23	13	10	34	53	
	Large	34	62	40	6	16	17	25		25	16	45	71	
Payment	SME	6	17	8	1	3	5	8	13	6	4	10	48	
	Large	7	37	7	3	8	9	14		7	6	12	33	
Electronic delivery	SME	6	46	6	1	4	3	6		3	2	44	64	
	Large	6	73	4	1	9	8	11		6	5	74	87	
Use of E-commerce for Sales in 2001														
E-commerce (EC)	SME	17	27	29	6	6	3	9	22	11	6	13	11	16
	Large	42	46	48	13	24	8	27		26	19	26	19	35
Internet EC used for more than 2 years	SME	2		4	1	1	1	2		3	1			
	Large	4		5	3	6	1	7		7	4			
Product information	SME	12		25	6	4	2	7		10	5	28		
	Large	32		41	10	17	6	26		22	12	50		
Taking orders	SME	11	24	20	5	4	2	6	22	10	3	13	17	
	Large	29	29	37	9	11	5	22		20	9	26	26	
Electronic delivery	SME	1	7	2	1	1	0	1		1	1		4	
	Large	3	13	3	3	7	1	10		4	1		7	

Source: Eurostat, 2002b.

Note: B (Belgium), DK (Denmark), D (Germany), EL (Greece), E (Spain), F (France), I (Italy), L (Luxembourg), NL (The Netherlands), A (Austria), P (Portugal), FIN (Finland), S (Sweden), UK (The United Kingdom). SME does not include micro enterprises (0-9 employees).

As barriers to e-purchasing, firms cited uncertainties about the conditions under which transactions take place, most notably for payment. A small stock of suppliers, problems of speed and timeliness of delivery were also recognized as important barriers. As barriers to e-sales, maintenance, development costs, and products not suitable to e-commerce ranked high (Eurostat, 2002b). Of the barriers to using the Internet that affect SMEs more seriously than large enterprises, Eurostat (2002b) pointed out the following: uncertainties about the future opportunities and benefits of ICT and e-business adoption; limited sources for experimentation; their business strategies focused on small and clearly defined niche markets, which are restricted to certain regions and/or certain parts of the values chain. This will not bring large benefits from entering into

global business via the Internet. There were also concerns about integration of their legacy IT systems in new IT solutions and e-business models.

Table 15

**SINGLE MOST IMPORTANT REASONS FOR NOT USING
THE INTERNET BY SIZE OF ENTERPRISE**

Reason for not using Internet	% of enterprises		
	Micro (0-9)	Small (4-49)	Medium (50-249)
No skilled personnel	17	20	16
It would not pay off	18	14	16
Do not trust technology/security	3	2	3
No confidence in regulatory environment	1	1	2
National differences in consumer protection	0	4	0
Cost of distributing product too high	2	2	0
Customers' access to Internet is insufficient	6	9	5
Does not apply to my type of enterprise/product	43	40	40
Don't know/no answer	9	9	18
Total	100	100	100

Source: European Commission (2002).

2. Asia-Pacific

A survey of more than 450 SMEs in Sydney, Hong Kong and Tokyo strongly indicated that SMEs acknowledged and accepted the benefits of web presences to their own businesses and that up to 75% of them will have their own websites by the end of 2002. The survey also indicated that 27% of SMEs were connected to DSL or cable broadband Internet.¹⁴ Another report demonstrated that more than 90% of SMEs in Australia own computers. The rate of Internet connection of small businesses was 79%, and 95% for medium businesses. The most important use of the Internet was for e-mail, with 94% of SMEs connected for this reason, followed by reference information about products and services for purchase. Meanwhile, 49% of firms stated provision of better services to customers, and 43% of them promotion of efficiency as major reasons for connecting to the Internet. The portion of SMEs with online purchases that represent more than 5% of their total purchasing activities rose from 33% to 51% over the past year. The use of Internet selling was also becoming popular for SMEs. The rate of small firms receiving sales orders over the Internet rose from 19% to 29%, and the rate of medium firms rose from 35% to 47% since the previous year.¹⁵

Hong Kong (China)

In Hong Kong, the percentage of establishments using PCs, and the percentage of establishments with PCs connected to the Internet, was 50% and 37%, respectively, in 2001. By firm size, 93% of large firms (those with 100 or more employees for the manufacturing sector and those with 50 or more employees for other industrial sectors), 79% of medium ones, and 46% of small ones (with less than 10 persons engaged regardless of sectors) were using PCs. Although the percentage of large firms with Internet connections has increased from 78% in 2000 to 86% in 2001, the corresponding figures in medium and small enterprises (64% and 33% in 2001), remained stable as compared to 2000 (63% and 34%). The gap in percentages of web presence was large, with 57% of large, 29% of medium and 8% of small firms in 2001. Ninety-eight percent of

¹⁴ Yankee Group, News Releases, June 17, 2002, <http://www.yankeegroup.com>.

¹⁵ The Age, "SME embracing online business: survey," July 30, 2002, Sydney, <http://www.theage.com.au/articles/2002/07/0/1027926881715.html>, and Nua.com, July 31, 2002, <http://www.nua.com>.

them indicated the provision of establishment, product and services information as the purpose of the establishments of websites. Seventeen percent indicated that the main purpose of their websites was a channel for online ordering, payment or delivery of products and services.

Table 16
ICT USAGE BY FIRMS IN HONG KONG
(%)

	All		Large		Medium		Small	
	2000	2001	2000	2001	2000	2001	2000	2001
PC Usage	50	52	92	93	78	79	48	46
Internet Access	37	37	78	86	63	64	34	33
Website Usage	7	11		57		29		8

Source: ITBB, 2001.

Usages of e-businesses are much more limited. About 6% of firms had ordered or purchased goods, services or information through electronic means (hereafter e-means) that included an interactive response system through telephone lines, designated private network, and the Internet. Through e-means, about 40% had received goods and services such as software and songs transmitted through electronic media, and information. The percentage of establishments having sold these goods and services or offered/accepted orders or purchases that were placed completely through e-means, was only 1%. About 4% of establishments had them delivered through e-means. These figures mean that e-procurements are much more popular than e-sales. The percentage of receipts received from selling goods, services or information through e-means to total amounts of business was very small but increased from 0.11% in 1999 to 0.17% in 2000.

Table 17
E-BUSINESS BY FIRMS IN HONG KONG

	2000	2001
Establishment having ordered/purchased goods, services or information through electronic means (%)	4.9	6.2
Establishment having received goods, services or information through electronic means (%)	35.3	40
Establishment having sold goods, services or information through electronic means (%)	0.3	1.1
Establishment having delivered goods, services or information through electronic means (%)	8.1	12.4

Source: ITBB, 2001.

Japan

According to the survey conducted by the Shoko Chukin Bank (2002), about 90% of SMEs have already incorporated the Internet. Even among small SMEs with less than 50 employees in the manufacturing sector, 30 in wholesales and 20 in retail and services, 79% have already introduced it. About 70% of the businesses that have already introduced the Internet have established their own websites. The purposes of Internet usage are mainly information collection (80.7%), communication with clients by e-mail (71.2%) and information collection and sharing within the firm (50.9%). In addition to these main purposes, receipts of orders and order placements with specified businesses, purchase of materials, office supplies and software were recognized as

important instances of Internet usage. More than 50% of SMEs recognized the effects of the Internet in improving management.

In contrast to the case of the Internet, SMEs are cautious about introducing e-commerce. About 40% of them have introduced it to the extent of accepting orders and sales via websites but do not allow making settlement on the websites. As for the effects of B2C, 75.4% of the firms recognized the increase of sales and orders. As merits of B2B, 31.9% cited the increases of sales and orders, followed by the cutting down of purchase prices (14.9%), reduction of distribution costs (14.9%) and reduction of labor costs (8.5%). Quick response, easily comprehensible explanation of products and services on the websites and secure methods of payment were recognized as important factors of B2C effectiveness. In case of B2B, quick response, client information security and secure methods of payment were cited as the major factors.

Table 18

USE OF THE INTERNET AND E-COMMERCE BY SMES BY INDUSTRIAL SECTOR IN JAPAN
(%)

		All	Manufacturing			Non-manufacturing			
			Material	Processing		Wholesales	Retail	Services	
Internet	Feb. 1999	49.9	54.7	47.8	60.4	45.7	42.5	52.1	54.7
	Aug. 2002	87.1	88.4	85.0	91.4	86.0	88.5	84.6	88.4
Website	Feb. 1999	46.6	46.0	44.4	47.0	47.3	37.1	51.4	72.7
	Aug. 2002	67.7	68.9	63.6	73.2	66.8	62.2	77.2	84.6
E-commerce Introduced	Aug. 2000	40.1	35.6	34.7	36.2	44.6	31.8	49.3	61.6
	Aug. 2002	38.9	35.4	37.9	33.7	41.8	27.5	55.7	61.2
No Plan	Aug. 2000	20.7	23.6	22	24.6	17.8	25.2	13.3	11.1
	Aug. 2002	32.4	35.6	35.6	37.3	29.7	34	25.4	20.7

Source: The Shoko Chukin Bank, 2002.

Korea

According to a survey conducted in July 2001, 60% of the firms in Korea have introduced the Internet. But a gap in the penetration rate can be found between micro firms with less than nine employees and firms with more than 10 employees. By industry, 87.5% of the firms in the finance and insurance industry have introduced it, followed by construction (73.6%), other services (68.5%) and the petrochemical industry (61.5%). Agriculture and maritime services (43.6%) and light industry (46.1%) were the least connected industries to the Internet. Among the establishments connected to the Internet, 55% of them use ADSL, followed by dial-up (12.8%), 128Kbps leased line (11.5%) and cable modem (9%). In contrast to the high penetration rate of the Internet, e-commerce use was not popular in Korean businesses. Only 9.6% of them have engaged in it (MIC, 2002). The primary reasons for the low penetration of e-commerce were lack of standardization, lack of system implementation funds and expense, market conditions and uncertainties over profitability (MOICE, 2002).

Table 19

INTERNET AND E-COMMERCE PENETRATION BY SIZE OF BUSINESS IN KOREA IN 2001
(%)

	Total	5-9 employees	10-49 employees	50-299 employees	300-999 employees	More than 1,000
Internet	60.1	46.7	77.3	88.5	97.7	99.4
E-commerce	9.6	8.2	11.3	12.7	19.7	30.0

Source: MIC, 2002.

3. Latin America

Argentina

The introduction of IT by firms has been progressing rapidly. Many firms have incorporated the Internet. By company size, almost all of the large companies have finished introduction of the Internet, as have 94.7% of medium sized enterprises. Its use is also prevailing among small enterprises, and the penetration ratio has increased from 68.7% in 1999 to 86.3% in 2000.¹⁶

Following the increase in Internet usage, companies are improving on the quality of IT introduced and expanding its applications. In infrastructure, the use by firms of the dedicated lines, especially those to the Internet, has increased. In the same period, the penetration ratio of dedicated lines among large companies leaped from 40% in 1999 to 72%, from 8% to 19% in medium sized enterprises, and from 2% to 10% in small sized enterprises. In addition, 68% of large-, 47% of medium-, and 31% of small-sized enterprises had established their own websites by 2000.

Table 20
COMPUTERIZATION OF COMPANIES BY SIZE IN ARGENTINA (I)
(%)

	Use of the Internet		Internet Access via Dedicated Line		Companies with Websites	
	1999	2000	1999	2000	1999	2000
Large	97.6	100.0	40.0	72.0	62.0	68.0
Medium	86.0	94.7	8.0	19.0	37.0	47.0
Small	68.7	86.3	2.0	10.0	21.0	31.0

Source: Prince (2001a, b).

(II): IN DECEMBER 2002

Size of Companies	Internet access	Broadband	Own website
Large (+200 employees)	100	97	88
Medium (50-200 employees)	98	64	63
Small (4-50 employees)	89	39	43
Micro (< 4 employees)	12	13	8

Source: Secretaria de Comunicaciones (<http://secom.psi.gov.ar/>) cited from Prince and Cooke.

Note: Total of the company clients of the Internet is approximately 140,000 (more than 20% of total).

Although the diffusion of the Internet and company websites is progressing rapidly, the introduction of e-commerce is limited to only a few firms. Even among large enterprises, only 12% have carried out electronic sales. The situation among smaller enterprises is much worse (medium: 10%, small: 4%). Among companies that have introduced ERP or have better information infrastructures, 60% of their ERP is compatible to make e-procurement. Only 36% of them performed e-procurement via the Internet, mainly acquiring office supplies (70%), software (10%), electronics products (5%) and computers and peripherals (5%). However, 26% of the firms that did not make a purchase had plans to do so in the next 6 months after the survey period (Prince & Cooke, 2001c).

¹⁶ According to Prince (2001b), classification of enterprises in Argentina is as follows: large (very large (more than US\$1,000 million sales and more than 5,000 employees); large (sales: 500-1,000, employees: 500-5,000); medium large (sales: 150-500, employees: 200-500)); and SMEs (medium small (sales: 50-150, employees: 50-200); small (sales: 0.25-50, employees: 4-50); micro (sales: less than 0.25, employees: less than 4)).

Brazil

According to the survey conducted by FIESP (Sao Paulo Industrial Federation), the Internet penetration ratio does not vary with size, which shows a relatively high penetration. As shown in the table, about 60% of micro businesses had access to Internet mail. In addition, 70.5% of them have a presence on the web. What is interesting is that some micro firms were more sophisticated users than small and medium businesses, though lots of micro businesses did not use any applications. Smaller enterprises could use free Internet services to avoid its costs, although it involves some security issues. More than 20% of micro and about 15% of small and medium businesses used them, though a majority of SMEs used paid access. On the other hand, larger firms used paid 24-hour access or proprietary access.

Table 21

APPLICATIONS USED ON THE COMPUTER NETWORKS BY SIZE OF BUSINESS IN BRAZIL

	Micro (<10 employees)	Small (10-100)	Medium (101-500)	Large (501-3,000)	Mega (> 3,000)
Internal E-mail	13.1	27.3	58.4	84.1	88.2
External E-mail (Internet)	57.4	78.1	87.1	93.2	88.2
Websites (Internet)	70.5	81.4	88.5	94.7	100.0
E-business	4.9	3.8	4.4	11.4	5.9
None	24.9	9.0	2.4	0.8	0

Source: FIESP (2000).

The use of Internet for B2C was limited to a fraction of the firms. Among smaller enterprises, less than 7% had used it for this purpose. Even among mega firms, the rate was less than 15%. The same figures were found for the usage of B2B. The rate of B2B usage for purchases was lower and the figure for the mega firms was about 6% (FIESP, 2000). A main barrier to diffusion of e-commerce was the need for change in internal operations, which was common to all firm sizes. This was followed by low client and supplier use. The finance problem and lack of information were identified as more serious among micro businesses than larger ones (FIESP, 2001).

Table 22

MAIN REASONS NOT TO USE E-COMMERCE

(% of Companies Agreed)

Difficulty/Reason	Micro	Small	Medium	Large	Total
Internal Operation	68	57	60	53	58
Low Use by Clients	39	49	44	55	46
Low Use by Suppliers	36	47	45	38	45
Investment/Finance	48	37	36	36	37
System Integration	35	33	37	29	34
Lack of Information /Knowledge	55	36	28	23	33
Security/Privacy	35	33	33	29	32
No Technology/Solution Service	22	29	27	22	27
Human Resource	23	23	18	20	21

Source: FIESP (2001).

Chile

Introduction of IT into business activities was promoted recently. A typical example of this is the penetration of the Internet into micro companies, which was 37% in 1999 and reached 57.6% in 2001. In contrast, their usage of Internet applications is limited to certain large enterprises. Only 11% of companies have websites and experiences of e-procurement. As expected from these

figures, habitual usage of the Internet by businesses was mainly for e-mail (98%) and information search (93%). The figures of procurement and sales were only 18% and 10%, respectively.

The usages of Internet and its applications are likely to be more popular among larger firms. In case of purchase via Internet, 27% of the large firms have purchased via Internet, though the figure of the micro firms was about 10%. By contrast, among companies that had purchased something via Internet, smaller firms used e-procurement more intensively than larger companies. This implies that although smaller firms face obstacles before undertaking its introduction, more smaller firms will find the benefits to use it once they have succeeded in its introduction.

The reasons why smaller firms hesitate to use e-commerce include of course technical and security problems but in many cases they do not find e-commerce a real necessity for their businesses: while the commonly cited reasons are related to infrastructure (26.3%) and/or security (20.6%) issues, in practice almost half of the firms cited “no relevance” as the reason for not selling via the Internet. These barriers, including technical aspects, can be avoided by using application service providers (ASPs), the market for which 47% was accounted by SMEs in 2001. CORFO, the government economic development agency, encourages the use of ASPs.

A recent study by the government (Subsecretaría de Economía, 2002) provides complementary information on the introduction of IT by companies, including SMEs.¹⁷ This study showed that 41.8% of SMEs have Internet connections and 12.6% have websites, figures that are lower than the results of the Camara de Comercio de Santiago (CCS). SMEs are using mainly telephone and fax, and about 40% of small-sized enterprises do not use a PC. Introduction of PCs was encouraged recently and 40.8% of PCs were installed within the last two years.

Table 23
INTERNET USAGE BY COMPANY SIZE IN CHILE IN 2001
(%)

	Internet Connection			Websites		Sales via Internet	Purchase via Internet	% of their Purchase via Internet
	1999	2001	2006	2001	2006			
Micro	37.0	57.6	68.0	8.5	21.0	4.1	9.9	20.0
Small	64.0	77.2	83.0	21.1	41.0	13.9	15.9	8.3
Medium	81.0	92.7	99.0	35.7	58.0	20.0	20.0	7.5
Large	93.0	97.2	99.0	62.7	89.0	29.4	27.1	5.0
Total	n.a.	61.4	71.0	11.2	25.0	6.1	11.1	17.9

Source: CCS (2001), pp. 126-127, CCS (2002), p. 49.

There still exists room to expand computer networking to SMEs. Penetration of LAN among those with PCs is 41.3%. Although 41.8% of SMEs have access to the Internet from their offices, 5.1% of them are accessing from outside the companies. Meanwhile, 47% of the companies accessing to Internet from outside or without accesses cited budget constraints as the reason, and 20.5% showed no interest in it because it is not important for their business, and because neither their clients nor suppliers were connected. The percentage that corresponded to budget constraints as the main problem was more serious among smaller companies. On the other hand, 55.9% of the

¹⁷ Classification of Establishments by Annual Sales in UF is as follows: Small (UF2,401-25,000 (US\$100-1,042)); Small-medium (UF25,001-50,000 (US\$1,042-2,083)); Medium (UF50,001-100,000 (US\$2,083-4,167)); Medium-large (UF100,001-300,000 (US\$4,167-12,500)), UF1=US\$24.

companies mentioned improvements of their sales as the main reason for introduction of the Internet, followed by the improvement of internal management and productivity.

Table 24
ICT PENETRATION BY SIZE OF FIRMS IN CHILE IN 2002
(%)

	Fixed Telephone	Fax	PC	With PC no Internet	Internet	Dial-up	Dedicated	Budget Constraints
Small	92.7	69.3	58.2	21.2	37.0	21.2	15.7	47.5
Small-Medium	99.1	91.4	90.4	22.5	67.9	38.6	29.4	38.4
Medium	99.4	96.3	97.1	12.3	84.9	40.3	44.5	37.4
Medium-Large	99.9	97.8	98.4	5.8	92.6	28.1	64.5	33.6
Total	93.7	73.3	64.0	20.4	43.6	23.8	19.9	47.0

Source: Subsecretaría de Economía (2002).

The principal activities via the Internet were e-mail, used by 81.7% of SMEs, followed by contact with banks (64%), and contact with public services (61.6%). But their usage by service categories was mostly simple. Within contact with banks, although a revision of state of account is used by 95% of them, transactions that accompany payments were below 20%. Among public services, the main usage was declaration or payment of tax (67.1%) and obtainment of certifications (39.5%), as often cited in other countries. Other usages like transmission of documents for trade were only 6.9%.

Regarding e-commerce, contacts with providers and clients were 31.8% and 27.3% respectively. The main purposes of contact with providers via the Internet were inquiry for price and offers (61.7%), and transactions that are characteristic to recent e-commerce such as purchase of inputs and services (27.8%), while inquiries regarding the status of orders (13%) were minor. The same situations can be observed from contacts with their clients. The main usage was information exchange (74.7%), while sales of products and services were only 18.3%. As the reasons for not using e-commerce, 54% of the companies mentioned “no necessity,” followed by “no use by suppliers or clients.” Problems of human resources, technical difficulty and fear of frauds, all of which are often mentioned, are considered as minor barriers.

Table 25
PRINCIPAL REASONS FOR NON-USE OF E-COMMERCE IN CHILE

	Purchase of Inputs	Sale of Products and Services
No Necessity	50.5	54.1
Providers/Clients do not use Internet	16.1	23.2
Human Problem	5.5	7.7
Technological Problem	4.1	7.4
Fear of Frauds	5.6	4.4

Source: Subsecretaría de Economía (2002).

Mexico

As in other countries, informatization of Mexican firms began among larger ones. According to the survey conducted by the Instituto Nacional de Estadística, Geografía e Informática (INEGI), 69.1% of them had already introduced information equipment in 1998 when the Internet started penetrating explosively into the economy worldwide. By size of businesses, the penetration ratio among large firms was 96.1%, that of medium-sized, 62.3% and that of small enterprises, only

27.9%.¹⁸ By industrial sector and size of the firms, the same distribution of the percentage of firms equipped with the Internet can be seen in services and the commercial sector, but smaller-sized enterprises in the manufacturing sector, or 61.9% of them, had introduced information equipment compared with mainly 21.1% in services and 23.6% in commerce in 1998. The equipment introduced consisted of personal computers (89.9%), servers (5.9%) and workstations (4.4%) in 1999. While many businesses had already introduced IT equipment, about 70% was introduced after 1995. That is, 31.6% of them were before 1995, 10.7% in 1996, 21.1% in 1997, 24.7% in 1998 and 12.0% in 1999. This may imply that the Mexican firms have invested in IT equipments to introduce or renew them. Compared to the high penetration ratio of information equipments, the number of networked computers was limited. Similarly, 28.6% of the firms with the equipment had access to the Internet and 25.8% to e-mail. By industrial sector, 17.8% of firms in the commercial sector had access to the Internet and 16.7% with e-mail, 35% and 30.5% for services, 39.0% and 35.2% for manufacturing respectively.

According to a survey on e-commerce by Erosa (2000), 54.2% of the sample firms had already done e-commerce, and 75% of those using it were medium and large enterprises. Most of them seemed to have introduced it toward the end of 1990s. It is interesting that 52% of these firms have more than 2 years experience. But firms with longer experience are mainly large ones, and most medium-sized enterprises only have 1-2 year's experience. Its introduction by sector was dominated by manufacturing, followed by services. Years of experience are longer in the service sector where companies with more than 2 years experience dominate, although more than half of the firms in commercial and manufacturing sectors had less than 2 years of experience. Motives to introduce it were mainly requests from clients and improvement on competitiveness. Interaction with clients, orders and purchase orders, and sales were identified as the main usages. Its introduction made impacts on personnel, company organizations and requirements for businesses. Change of personnel, an increase in qualified persons, and cultural change across organizations became necessary for them. In particular, SMEs felt the impacts of it on all of their organizations. The development of systems, efficient logistics and distribution, and electronic payment were considered as required business platforms. Technical and cultural problems were identified as common barriers among most businesses of all sizes, though large enterprises considered the absence of a legal framework as the most important barrier.

From the observations made above, the situation of informatization of enterprises can be summarized as follows. Mexican enterprises had invested in IT equipments in the latter half of the 1990s, and are in the early stage of e-commerce except some sectors, and their use of the Internet and Internet-based systems is concentrated in medium-sized and large enterprises. According to Duran (2002), the debt crisis of the 1980s promoted the modernization of management among large businesses through the introduction of information technology. The following PC diffusion opened a low-end market for administrative solutions for medium-sized businesses. From the middle of the 1990s, local software suppliers focused mainly on the low-end market for SMEs including packaged software, while MNCs such as SAP and Oracle aim at large companies such as *Petróleos Mexicanos* (Pemex), state and federal government, and retail sector.

D. E-readiness

Usage of e-commerce will depend not only on information infrastructure and informatization of the corporate sector, but also the recipient culture and e-literacy. To measure these factors in a

¹⁸ According to the website of INEGI, the classification of Establishments by Size in 1998 is as following: small (commerce: less than 5 employees, services: <5, manufacturing: <30, construction and agriculture: <100); : medium (commerce: 6-20, services: 6-50, manufacturing: 31-70, construction and agriculture: 101-250).

comprehensive way, some indexes have been developed and been revised for further improvement.¹⁹ Several indices employed in this paper, which are thought to be representative ones among others, seem to suggest that Latin America scored higher in e-readiness than Asia as a whole. In the EIU ranking, even Argentina, a country under severe economic turbulence, ranked as high as Malaysia. The rankings for Colombia, Peru and Venezuela are higher than that of Thailand, which is one of the manufacturing bases in South East Asia. However, several weaknesses of Latin America will emerge when the indices are compared against each other. For example, the Information Society Index (ISI) points to a large gap between the limited number of highly ranked countries of Asia and the rest composed of other Asian and Latin American countries. A comparison between the two regions excluding the top 5 Asian countries eliminates the gap, or even, Latin America ranks a bit higher than Asia.

Table 26
INDICES OF E-READINESS 2002

Rank in Region	The Americas			East and South East Asia		
	Country	EIU E-readiness Rankings ¹ (of 60)	Information Society Index ² (of 55)	Country	EIU E-readiness Rankings ¹ (of 60)	Information Society Index ² (of 55)
1	United States	1	4	Singapore	11	13
2	Canada	9	14	Hong Kong	13	11
3	Chile	28	33	Taiwan	20	10
4	Mexico	30	40	Korea	21	18
5	Brazil	34	42	Japan	25	12
6	Argentina	35	32	Malaysia	32	30
7	Venezuela	37	39	Thailand	46	46
8	Colombia	38	43	Philippines	49	45
9	Peru	39	48	China	51	52
10	Ecuador	50	49	Indonesia	52	54
11	Panama	n.a.	34	Vietnam	56	n.a.
12	Costa Rica	n.a.	41			

Sources: (1) EIU (<http://www.ebusinessforum.com/>), (2) <http://www.worldpaper.com/2002/feb02/isi.jpg>.

Notes: (1) EIU E-readiness Ranking, 2002, (2) IDC 2002 Information Society Index.

¹⁹ The two indices discussed in this paper are representative examples but have different characteristics; IDC's information society index (ISI) includes 23 indicators measuring capability of a nation's citizenry to exchange information internally and externally. Among the 23 indicators, 5 indicators are related to social aspects such as school enrollment, newspaper readership, and freedom of expression. Therefore, by measuring 18 indicators, the ISI formulation places a relatively high priority on the ICT aspects. The e-readiness ranking of EIU (Economist Intelligence Unit) evaluates multifaceted factors. The EIU's index focuses on the evaluation of the extent to which a country's business environment is conducive to Internet-based opportunities.

III. B2C E-commerce

B2C is relatively new to Internet users, though the use of information systems for data exchange and purchasing goods and services by businesses has existed for some time. The still short period of Internet usage for B2C purposes, coupled with other concerns on Internet use such as security, payment, personal information and credibility, had made consumers hesitate to use it. However, the B2C market is expected to grow at a high speed in the future. The rationales of expected high growth include the increasing number of Internet users who have already accumulated online experiences and are accustomed to B2C transactions, on the one hand, and greater efforts by service suppliers to enter the markets of high potential, on the other. Efforts should be made to find a model that best suits their targeted markets, as this service is new. In addition to new business opportunities provided, B2C will become an effective tool for capturing the real demand of consumer needs/preferences across the production chain, thereby acting as a social optimizer of resource allocations.

A. Market Conditions

1. World Market Estimates

According to IDC projection, global B2C revenues will grow from 118 billion dollars in 2001 to 707 billion dollars in 2005. Meanwhile, the number of home Internet shoppers will increase from 119 million to 317 million during the same period.

At the same time, B2C revenues will grow from 4% of companies' total revenues in 2001 to 7% in 2005 at the world level. This study also indicates that only 23% of U.S. companies had incorporated their order processing mechanisms into their website functions. Only 14% of these companies have tied their websites to their supply chains, although 75% of these companies took note of the importance of integration of their web operations with their back-end systems.^{20 21}

As often pointed out, the B2C market is much smaller than that of B2B. Nevertheless, the channels to consumers will be very important for businesses because they provide opportunities to access to new customers and enable them to manage customer relationships with more rigorous inventory control. In fact, B2C is a promising business of high growth expectation. This is true to Asia Pacific and Latin America.

According to an eMarketer study, the B2C market in the Asia-Pacific region, estimated at 3.2 billion dollars for 2000, is modest in comparison to the 36.2 billion dollars transactions of B2B in 2000. B2C transactions for Asia-Pacific are estimated to reach 38 billion dollars by the end of 2004.²² In Latin America, E-consultancy's study found that B2B transactions are currently double of those of B2C. The B2B market in Latin America is expected to hit US\$ 3.5 billion in 2002, compared to 1.5 billion dollars for the B2C market. Though B2C transactions are much smaller than those of B2B, the growth rate of B2C will be much higher than that of B2B. The B2B market for Latin America is forecasted to grow by 28.6% to reach 4.5 billion dollars in 2003, and will be worth 9.3 billion dollars by 2005 while B2C market of the region will grow by an estimated 73% in 2003 to reach 2.6 billion dollars and a market worth US\$ 6.4 billion by the end of 2005.²³

2. B2C in Developed Countries

Some products and services are more suitable for B2C transactions than others. For example, digitized products like software, games, music and movies; products with well-defined specifications, products with little quality differences like home appliances, computers, computer peripherals. Also suitable for B2C markets are standardized procedures for applications to financial services including stock exchange operations, online ticket purchases, tourism, and government services. It should be noted that apart from the different methods in measuring B2C transactions, differentiated B2C growth rates between countries can arise from different market characteristics, idiosyncrasies and consumer behaviors of the countries involved.

For example, in the United States, the largest B2C market in the world, 40% of 17.9 billion dollars expenditures in the third quarter 2002, excluding the transactions related to auction sites, was spent on travel. Among non-travel expenses, computer hardware (2.7 billion dollars), office materials (1.4), apparel and accessories (1.3), consumer electronics (0.8) and books (0.5) were major items transacted online.²⁴ On the other hand, Japan's B2C is dominated by the automobile (347 billion Japanese yen, equivalent to 2.9 billion dollars) and real estate (326 billion yen or 2.7 billion dollars) sectors, of total transactions in 2001, excluding again auctions which reached 1,484 billion yen, or about 12 billion dollars.²⁵ PC and related items (148 billion yen, 1.2 billion dollars), travel (119 billion yen, 0.99 billion dollars), entertainment (109 billion yen, 0.91 billion dollars)

²⁰ News.com, April 24, 2001, http://news.com.com/2100-1017-256373.html?legacy=cnet&tag=mn_hd.

²¹ A later study by Gartner also expects a high growth of B2C market in the 2002 holiday season, though sales might be halved compared to 2001. By regions, B2C spending in Europe for 2002 will rise 75% to reach the same share as North America in B2C world markets. Spending in Asia Pacific excluding Japan will rise by 35% to US\$3.3 billion but lose its relative weight in worldwide sales from 9.6% in 2001 to 8.7% in 2002. Latin America, though 1.5 billion dollars spending will be less than half of Asia Pacific, it will grow 53% from the previous year and probably second highest in the world (Gartner G2, October 4, 2002, <http://www.gartner2.com/qa/qa-1002-0107.asp>).

²² eMarketer "Asia-Pacific E-Commerce: B2B & B2C," <http://www.emarketer.com/products/report.php?2000125>.

²³ Nua, July 16, 2002, http://www.nua.com/surveys/index.cgi?f=VS&art_id=905358503&rel=true.

²⁴ comScore Networks, Oct. 2002, cited in eMarketer (<http://www.emarketer.com>).

²⁵ About 120 yen per US dollar was used for conversion.

followed the top two categories. METI et al. (2002) expect a catching up of other sectors and total amount of B2C will reach 16.2 trillion yen (135.98 billion dollars) in 2006.

Differentiated market behavior can be observed also when e-commerce sales are compared to total sales. In Japan, e-commerce accounted for 0.55% of the final household consumption expenditure, which is expected to reach 5.8% in 2006. By category of products and services, the ratio of PCs and related items (12.2%) were the highest in 2001, followed by automobiles (2.8%), books and music (1.07%), entertainment (0.92%), travel (0.86%), real estate (0.74%) and finance services (0.63%). The e-commerce ratios for the rest of the products and services remained below the overall average of 0.55%. Japanese B2C is well known for the high penetration of “m-commerce” or e-commerce via mobile phones. The size of the market is 120.5 billion yen or 1.01 billion dollars, that accounted for 8.1% of total B2C transactions in 2001 and is expected to grow to 3 239 billion yen or 27 billion dollars) with a 19.9% share in 2006. Although 71.4% of total m-commerce was spent on entertainment, travel and other services are expected to become the main segments in m-commerce around 2006 (METI et al. 2002).

In the case of the Republic of Korea, MOICE (2002) indicates that e-commerce transaction totaled 99.15 billion dollars in 2001 up from 47.93 billion dollars in 2000. B2C amounted to 2.15 billion dollars accounting for 2.2 % of total e-commerce transactions (0.61 billion dollars and 1.3% in 2000, respectively). This high B2C growth can be understood by the retailers’ success to appeal to Korean impetuous mentality (Ueki, 2002). As a transaction channel, online shopping malls doing both online and offline sales are increasing their share in total B2C sales. According to MIC (2002), in the third quarter 2000, 52.8% of total revenues of online shopping malls were accounted for by those malls equipped with both online and offline channels and increased their sales to represent 57.4% of total revenues for the same quarter of the following year. By the items purchased at online malls during the month of December 2000, books were the most popular goods making up 19.3% of the total, followed by computer hardware and accessories (10.5%) and home appliances (7.2%). However, the shares of these items declined in May 2001 mainly because of sales increases of other items such as cosmetics and leisure goods. What is interesting in the country where the penetration of broadband Internet is highest in the world is the drastic decrease in the share of CDs and video, and computer software. The percentage of CDs and videos to total sales at online shopping mall dropped from 11.1% in December 2000 to 6.1% in May 2001 and the figure of computer software from 2.8% to 1.2%, due partly to piracy reasons (Ueki, 2002). Another feature of Korean e-commerce is the high penetration of online stock exchange trading. In terms of transaction amounts, online trading made up over 95% of the Korean Securities Dealers Automated Quotation (KOSDAQ) market and 75% of the Korea Stock Exchange (MIC, 2002).

3. B2C in Latin America

According to BCG estimates (2001), online retail markets in Latin America have reached 1 281 million dollars in 2001, a 137% growth from 540 million dollars of 2000. Revenues in Brazil represented 71% of B2C in the region with 906 million dollars, followed by Mexico (134 million dollars) and Argentina (119 million dollars). These three countries made up 90% of the regional market, while the B2C growth rate between 2000 and 2001 was high for Brazil (137%), Chile (122%) and other countries in the region (128%).

Table 27

B2C MARKET IN LATIN AMERICAN BY COUNTRY IN 2001

	Brazil	Mexico	Argentina	Chile	Other Countries	Total
US\$ million	906	134	119	45	77	1 281
% of Regional Market	71	10	9	4	6	100
2000-01 Growth Rate (%)	170	75	60	122	128	137

Source: BCG (2001).

By product category, the automobile sector was the largest with sales of 504 million dollars accounting for 39% of the total B2C transaction of the region. This sector was followed by consumer auctions, travel, and computer hardware and software. Automobiles also recorded the highest growth of 396% compared to the previous year, followed by travel (160%). One of the main features of Latin American B2C is the relatively high share of foods and beverage. The growth of these items was steady and increased from 31 million dollars in 1999 to 50 million dollars in 2000, a 61% growth for 2000 and a 58% growth rate for 2001. This category is strong in Brazil and Argentina where people are accustomed to having groceries delivered to their homes (BCG, 2002).

Table 28

B2C MARKET IN LATIN AMERICAN BY PRODUCTS CATEGORY IN 2001

	US\$ million	% of Total	Growth Rate (%)
Automotive	504	39	396
Consumer Auctions	203	16	87
Travel	140	11	160
Computer Hardware and Software	139	11	48
Food and Beverage	79	6	58
Consumer Electronics	62	5	76
Books/ Music/ Video	59	5	74
Home Appliances	52	4	25
Flowers/ Cards/ Gifts	8	1	110
Other	26	2	90

Source: BCG (2001).

A study by Prince (2001) estimated that Argentina would register a high B2C growth, with the estimated B2C sales of 20 million dollars in 2000. Though this figure was much lower than the BCG's estimate of 75 million dollars for the same year, Prince (2001) projected that B2C business in Argentina would reach 1 billion dollars in 2004. In this country, 23% of the Internet users had B2C experiences as of June 2000. The products purchased were similar to those in other countries: books (48%); audio CDs (36%); software (18%); subscription (10%); electronic art (8%); and ticket purchases (6%). The B2C purchasers are mainly more adept users of Internet with more than 4 years of Internet experience. That is, 59% of purchasers had more than 4 years of Internet experience, and 33% had experienced between 2 and 4 years, while 21% had 1-2 years and 5% less than 1 year. These numbers seem to suggest that more Internet users will try to use B2C services, as the Internet penetration ratio increases.

E-commerce in Brazil keeps a high growth trend even in the economic slump. Total online sales in this country grew 1.9% in September from August, reaching R\$ 471 million (US\$ 131mn), according to a study conducted by the local e-commerce chamber "Camara-e.net". Online sales amounted to 3.4% of all sales for the products covered, with online vehicle sales accounting for

R\$ 371 million of the total.²⁶ This e-commerce chamber expects that e-commerce in the country will reach R\$ 1 billion (255 million dollars) in 2002, up 150% compared to 2001.²⁷

Apart from automobile sales, Brazil is known for a high penetration in e-banking. Brazil is the second largest e-banking market after Norway. While the Internet penetration at the country level was below 10% in 2001, about 24% of Internet users made at least one online banking transaction. At Brazil's largest bank Banco do Brasil, 81% of transactions have already been done online. It is estimated that e-banking brings great benefits to bank management. Banks are said to not only gain 10% higher profits from clients who do their banking online but also can drastically reduce operational costs by using e-mails instead of snail mails to send and receive information.²⁸

In Chile, transactions of B2C were estimated at 1.4 million dollars in 1998 and almost all were conducted at foreign sites. A strong demand growth for B2C even in the aftermath of the speculative booms worldwide in the end of 1990s led the sales to increase to 52.9 million dollars in 2001. More recently, the sites of Chilean origin came to represent 70% of online consumption, and 15% of Chilean Internet users used B2C services.²⁹ It is expected that the market size will reach 165.3 million dollars in 2004 and 23% of Internet users will use B2C services then. B2C sites have not been dominated by particular product groups; real estate is the largest segment with 13% of the total, followed by tourism and hotels (9%), foods and beverages, computer, finance, flowers and gifts, and books and magazines, each of these items representing close to 7% of the total. By types of sellers, “brick and mortar” companies with electronic channels (“click and mortar” stores), dominate the Chilean B2C market representing 82% of the B2C total number of sites, while 81% of the total B2C sales are accounted for by this type of companies (CCS, 2002).

B. Cases of Specific Industries

Apart from consumer auctions, the largest B2C market in Latin America involves the sectors of automobile and travel. As mentioned, the dominance of automobiles reflects a strong position of this sector in the Brazilian market. In other regions as well, the automotive market was large in Japan and a high growth was observed in the U.S. Travel was popular not only in Latin America but also in the U.S. and Japan. Sales value per one B2C transaction in automobile is known to be much larger than that in tourism though the travel B2C is probably more familiar to the public.

1. Automobile Industry in Brazil

Automobile companies are taking advantage of the JIT system in the production process. In the Internet era, they try to benefit from the ICT innovation not only in the production process and R&D activities but also in the sales channel aimed at BTO (built-to-order) production and zero-inventory of finished cars, as well as new revenue sources from information services. Despite many initiatives, main usages of Internet by their customers are merely information search for buying new and used cars. The cases shown below are some examples in which the Internet can enable the manufacturing firm to elevate productivity that will eventually lead to car price reductions, and the incorporation of more value-added services for greater consumer satisfaction.

General Motors of Brazil (GMB) began to sell in 2000 the low-end car “Chevrolet Celta” on the Internet at a discount (8.5% on average). This discount was made possible by greater profits

²⁶ BNamericas.com, November 6, 2002 <http://www.bnamericas.com/>.

²⁷ BNamericas.com, October 24, 2002, <http://www.bnamericas.com/>.

²⁸ BNamericas.com, November 7, 2002, <http://www.bnamericas.com/>.

²⁹ According to a report by Santiago Chamber of Commerce (CCS), transactions of B2C were estimated at US\$20 million in 2000, 31 million dollars (49% growth) in 2001, and US\$40 million (32%) in 2002, which accounted for only 0.2% of total retail transactions (Revista Comercio, No.8875, January 21, 2003, CCS, <http://www.ccs.cl/>).

that derived from the application of measures such as the monitoring of real-time demand data, the delivery of the vehicle from centralized inventory system, and the Internet linked to production, inventory management and sales. What is unique to GM's strategy is that the company used Internet access not only from the household but also from Internet "kiosks" at the dealerships. By installing the kiosks and having well-trained salespeople in Internet use, GM endeavored to target the middle-class, a customer segment to which Internet access was not yet widespread. GM succeeded not only in producing and distributing cars efficiently but also in penetrating this market segment. In October 2002, GM sold 11,300 units online as a whole; of the total, 9,560 corresponded to the Celta model, and more importantly, 87% of total Celta sales were made online.

Today the Celta model has become the world's most-sold car online (BCG, 2001).³⁰ This new business is supported by the lean and cost efficient production system in the Gravatai automotive complex where Celta is manufactured. In this industrial complex, 16 suppliers jointed forces to function as one single plant. By sharing some facilities such as cafeteria and security services, the investment cost was reduced. Furthermore, by introducing the "modularity", GM's assembly plant receives pre-assembled modules delivered just-in-time by neighboring suppliers. These efforts led to 60% fewer suppliers and 50% fewer parts that would be necessary in a traditional manufacturing system.³¹ In addition to efficient management of sales channel and production system, the direct sales enabled the company to avoid tax levied every time an invoice is made. This has meant that taxes are collected, when a manufacturer sells a vehicle to a dealer and again when the dealer sells it to a consumer.³²

2. Tourism

E-commerce in tourism is composed of a value chain that includes B2B and B2C transactions. Distinct from those travel services purchased by business entities via websites, even prior to the Internet era, the global distribution systems (GDS) existed as a B2B device, which connected travel agencies, airline companies, hotels, financial institutions and others. As the Internet became popular, airline companies, hotels, and travel agencies began direct online sales to final customers, as a typical form of B2C transaction. In parallel, GDS vendors transformed their systems into Internet-based interfaces with final customers. A well-known case at the world level is Travelocity.com, the first site to offer travel reservations, comprehensive destination and event information on the Internet that was launched in 1996 by Sabre, a large GDS vendor.

As airline companies used the GDS at the initial phase of the development, the Internet became one of the important sales channels for airline companies. According to Airline Business (2002), the proportion of tickets sold over the web has grown to over roughly 10% for the typical carrier, and the level of e-ticketing recorded in the information on airlines' GDS systems reached 11%. The ratios are much higher for North America where 33.5% of sales were online and 51% of all tickets were e-tickets. Over half of the tickets were sold over their websites in the case of the most advanced airlines in the Internet use. In Latin America, the Chilean airline, Lan Chile, sold online 5% of tickets for domestic flights in November 2002.³³

Currently, specifications for exchanging data between and among travelers and travel-related businesses based on extensible markup language (XML) are being developed by the "Open Travel Alliance" (OTA) comprised of more than 150 companies representing all sectors of the travel industry, including air, car, cruise, rail, hotel, travel agencies, tour operators and associations and

³⁰ BNamericas.com, November 11, 2002, <http://www.bnamericas.com/>.

³¹ General Motors, July 20, 2000, "GM do BRASIL Inaugurates a New Industrial Model: The Gravatai Automotive Complex," http://www.gm.com/cgi-bin/pr_display.pl?1513.

³² <http://www.detnews.com/2000/autos/0007/20/a01-93675.htm>.

³³ BNamericas.com, December 4, 2002, <http://www.bnamericas.com/>.

technology providers, working with the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT). This technical specification seems to become one of the representative infrastructures for building global travel marketplace.

In Latin America and the Caribbean, the Internet use for tourism has been promoted, thanks to the strong preference of American travelers to the region. Impacts of the change in the tourism business environment have been more significant for the Caribbean where a larger share of GDP, foreign exchange earnings and employment are derived from the tourism industry. In Cuba, efforts to open e-commerce started in 1996 with “Cubaweb.cu”, a tourism website to attract foreign visitors and investment partners to the country. Following this site, Cubaweb protégé created a B2B system that streamlines orders from tourism operators.³⁴ Regarding the GDS introduction, the percentage for Latin America is higher when compared to other indices of ICT (Table 29). The Caribbean Tourism Organization (CTO) established the website (<http://www.doitcaribbean.com/>) designed as a gateway to 34 member countries to streamline the information search by travelers.

Table 29

INSTALLATION OF MAJOR GLOBAL DISTRIBUTION SYSTEMS BY REGION

	Amadeus		Sabre		Worldspan		Total		Share 2000
	1997	2000	1997	2000	1997	2000	1997	2000	
United States	7 396	5 499	15 616	18 082	8 390	9 655	31 402	33 236	24%
Canada	15	154	1 305	2 555	170	227	1 490	2 936	2%
Mexico	164	263	1 862	1 752	1 200	1 395	3 226	3 410	2%
Caribbean/ Latin America	5 731	6 748	2 876	6 405	55	103	8 662	13 256	10%
Europe/Russia	25 777	32 559	5 783	9 665	6 700	6 877	38 260	49 101	35%
Far East/Australia	2 700	5 876	4 471	26 115		505	7 171	32 496	23%
Mid East/Africa	545	1 460	1 540	1 549	900	1 490	2 985	4 499	3%
Total	42 328	52 559	33 453	66 123	17 325	20 252	93 106	138 934	100%

Source: HEDNA (<http://www.hedna.org/>).

C. Drivers of B2C

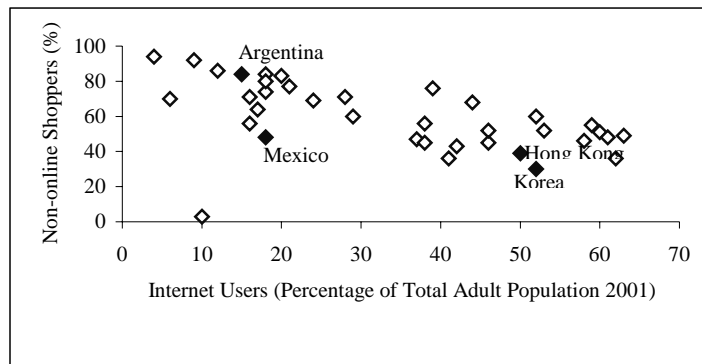
The lessons to be learned from the cases in Brazil and Japan in the automobile sector are: i) ways to carry out B2C businesses highly depend on the users' income levels and the sophistication of supporting ICT infrastructures of the country concerned; and ii) the firms' willingness to take advantage of users' information to make their business more efficient or develop new business opportunities. In a sense, the intensified efforts on these fronts mean that the automobile companies are transforming themselves into service-oriented manufacturers. In the case of tourism, the Caribbean countries are responding to such changes in the business environment in the following way; U.S. travel agents who intermediate transactions between the Caribbean tourism sectors and U.S. final customers use such information systems as the GDS while main customers from the U.S. use the Internet intensively for purchasing travel services.

The above observations also imply that B2C usage depends not only on the Internet penetration ratio but also on how the firms can establish business models suitable to market conditions. Graphic 3a and 3b below support this hypothesis. A higher Internet diffusion is likely to facilitate online purchases and orders and the use of Internet as an information search tool though

³⁴ <http://www.american.edu/carmel/ms4917a/ECommerce.htm>.

the actual purchase is done offline. In addition, the higher the Internet penetrations are, the more dispersed the usages of pure online shopping. On the other hand, online shoppers, or Internet users buying or ordering goods or services online, will not necessarily increase as the Internet gets diffuse, as can be seen from the difference between Korea and Hong Kong. In the latter, only 8% of the Internet users were categorized as online shoppers, but 44% were offline shoppers who have bought or ordered goods or services outside of the Internet as a result of information found on the Internet. Nor, is the security concern a decisive factor in the online/offline choice of the consumer. In the case of Korea, for instance, although Korea's Secure Socket Layer (SSL) indicated a low security level during the initial phase of B2C development, this did not prevent consumers from making online purchases. Consumers are likely to take risks if the goods or services are attractive enough. Otherwise, they do not resort to online purchases in order to avoid risks. Of course, consumers will enjoy shopping in itself but not necessarily using an online channel.

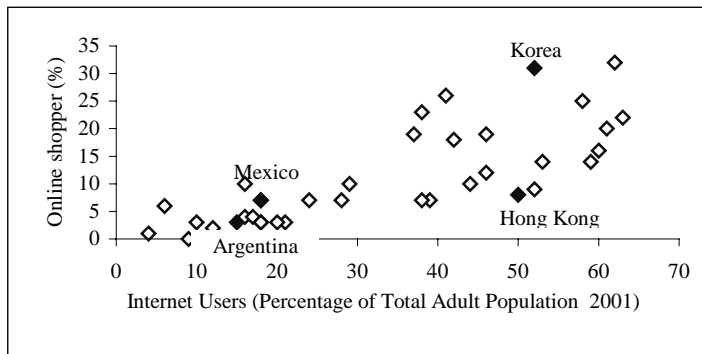
Graphic 3^a
RELATIONSHIP BETWEEN INTERNET DIFFUSION AND NON-ONLINE SHOPPERS



Source: author's construction based on the data in Taylor Nelson Sofres Interactive (2002).

Note: Non-online shoppers (Percentage of Internet users who have never shopped online, and who do not plan to shop online).

Graphic 3^b
RELATIONSHIP BETWEEN INTERNET DIFFUSION AND ONLINE SHOPPERS



Source: author's construction based on the data in Taylor Nelson Sofres Interactive (2002).

Note: Online shoppers (Percentage of Internet user who has bought or ordered goods or services on the Internet).

IV. B2B E-commerce

Sharing information within and between firms was first introduced and promoted by MNCs and large national companies. In the first stage of the introduction, Electronic data Interchange (EDI) was a tool to facilitate data exchanges within a firm and between firms with close ties via leased lines. These EDI networks were mainly connected with domestic firms. As this kind of “closed” and secure system was expensive in installing, the introduction was limited to large firms. Though EDI as a system contributed to making a firm more efficient, it became increasingly clear that the potential benefits could not be reaped fully as long as EDI connections were confined to small fragments or groups that composed only a part of the supply chain. Facing this problem, the idea of SCM emerged to overcome this bottleneck optimizing the overall supply chain by using ICTs. The transition of EDI to the web-based one also enabled the firms to use the system at lower costs. In addition, the usage of the Internet for procurement provides buyers with opportunities to decrease the costs and suppliers with opportunities to bid. These features will serve to increase the amount of B2B e-commerce.

A. Market Estimates Worldwide

Many research institutes projected high growth rates for B2B transactions worldwide for the first half of 2000s, though these estimates varied widely. The lowest growth estimate was made by Ovum which projected for 2004 an amount 6.5 times as large as the one in 2000. A higher estimate came from Gartner which projected a 13.7 times increase for the same period.

Based on the eMarketer's estimate which seemed more representative, the amount would increase from US\$ 278 billion in 2000 to 2 367 billion dollars in 2004, or 71% growth annually.

Table 30
COMPARATIVE ESTIMATES: B2B E-COMMERCE WORLDWIDE
(In US\$ billions)

	2000	2001	2002	2003	2004	2005
eMarketer	278	474	823	1 409	2 367	-
AMR Research	371	704	1 375	2 261	3 350	4 739
Computer Economics	3 068	5 232	6 815	9 907	-	-
Forrester Research	604	1 138	2 061	3 694	6 335	-
International Data Corp. (IDC)	282	516	917	1 573	2 655	4 329
Gartner Group	433	919	1 929	3 632	5 950	8 530
Morgan Stanley Dean Witter	200	721	1 378	-	-	-
Goldman Sachs & Co.	357	740	1 304	2 088	3 201	-
Ovum	218	345	543	858	1 400	-

Source: eMarketer, AMR Research, IDC, Gartner Group, 2001, cited in eMarketer (<http://www.emarketer.com>).

By region, North America accounted for 70% of the world B2B market in 2000, followed by Asia-Pacific share of 16%. Latin America's share was only 1.3%. The estimate of eMarketer suggests that Europe will grow at an annual rate of 135% between 2000 and 2004, the highest growth among the regions. Latin America will register a second high growth of 112% in the same period. Asia-Pacific annual growth was estimated to be 70%, the lowest among the regions. As a result, North America will lose its share to less than 60% while Asia-pacific to 11% in 2004. Meanwhile, Europe will increase its share to 29%. Latin America's share will be only 2.1%, despite its increase.

Table 31
B2B E-COMMERCE BY REGION
(In US\$ billions)

	2000	2001	2002	2003	2004	% Share in 2004
North America	159.2	316.8	563.9	964.3	1 600.8	57.7
Asia-pacific	36.2	68.6	121.2	199.3	300.6	10.8
Europe	26.2	52.4	132.7	334.1	797.3	28.7
Latin America	2.9	7.9	17.4	33.6	58.4	2.1
Africa/Middle East	1.7	3.2	5.9	10.6	17.7	0.6
Total	226.2	448.9	841.1	1 541.9	2 774.8	100.0

Source: eMarketer, 2001 (<http://www.emarketer.com>).

B. EDI in Asia and Latin America

EDI is a legacy system developed in the 1970s. Thanks to the standardization efforts in each country's industrial sector and the development of the United Nations Directories for Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT), a syntax for EDI was developed in the 1980s, and EDI became an important infrastructure for exchanging electronic data between companies not only within but also between different sectors. Even now, EDI is used as a basis to construct a SCM. In the United States, EDI plays a critical role in supporting B2B. EDI sales for merchant wholesalers accounted for 88% of their e-commerce sales. Manufacturing plants that use primarily EDI networks for accepting online orders accounted for two-

thirds of e-commerce shipments of responding plants in the mid-2000s, while plants primarily using the Internet accounted for only 5% of e-commerce shipments (US DOC, 2002a). In Chile, numerous proprietary digital networks have been established to provide secure electronic transactions such as Transbank-Edibank that has served the financial and mining sectors; Transaction that aimed at traders and supermarkets; Editrail that connects the customs service with specialized agencies; and Redbanc that is a network of automatic teller machines (ATM) for private banks (Presidential Commission on New Information and Communication Technologies, 1999).

EDI is currently being revised in response to the change in technology and business management promoting SCM over the Internet. Projects are conducted in cooperation with UN/CEFACT and are represented by many countries and international organizations, such as S.W.I.F.T. (Society for Worldwide Interbank Financial Telecommunication), IATA (International Air Transport Association), European Commission, International Chamber of Commerce, ISO, International Chamber of Shipping and EAN International. Lots of EDI and SCM vendors, as well as user companies, are developing systems in accordance with the UN/EDIFACT to maintain data exchange with other systems.³⁵

Comprehensive information on the usage of EDI is scarce. EAN (2002) provides sporadic information calling for caution on its interpretation. According to EAN International, which is organized by 97 member organizations representing 99 countries, the cumulative number of EDI users in the world totaled more than 155,000 in 2002. The number in Asia is 44,000 and less than 54,000 in Latin America. By country, Brazil and Japan are the most advanced countries in these regions, followed by Mexico, Colombia, Korea, Chile and Singapore. Both Brazil and Japan have introduced their own national standards. In Brazil, electronic banking has prevailed according to the data of Febraban (Brazilian Federation of Banking Association) cited in Tigre (2001). According to the press release in 2000, BASF, a large chemical company, planned to use the services of GE Global eXchange Services (GXS) to receive a forecast from a Brazilian automobile company in RND (a local data standard used in the automotive industry) or EDIFACT format, and process it into SAP.³⁶ EDI EANCOM is a subset of UN/EDIFACT messages that provides clear definitions and explanations, and allows trading partners to exchange commercial documents in a simple, accurate and cost-effective manner. This was also widely used among advanced countries, except for Japan and Singapore. Web/Lite EDI or web-based EDI is becoming familiar not only among EDI leaders but also to followers such as Chile, Uruguay, Philippines and Thailand.

The EAN's data on activity level by sectors also provide relevant information. Compared to the world average, activity levels in Asia are high, while those in Latin America are low. By region, active sectors are retail and distribution, finance and customs for Latin America. In Asia, retail and distribution, healthcare and electronics sectors are relatively high. If we compare the two regions, Latin America is clearly more active in the financial sector than Asia. On the other hand, Latin America is much less active in electronics than Asia. In customs services, though the activity level in Asia is low, the figure for Hong Kong, for example, seems to be underestimated if 100% of the computerized procedures for international trade realized by the Hong Kong Tradelink system are taken into consideration. By sector, the activity level seems to reflect industrial structures of each country. For example, the electronic sector is led by Brazil, Japan, Korea, Taiwan and Singapore where local and international MNCs locate international or regional headquarters, R&D facilities, and factories for production of high-end products.

³⁵ Website of EAN International, <http://www.ean-int.org/index800.html>

³⁶ GXS, press releases, September 28, 2000, <http://www.gxs.com/gxs/press/release/20000928>.

Table 32

**NUMBER OF EDI USERS IN EAN MEMBER COUNTRIES
IN ASIA AND LATIN AMERICA**

		EDI EANCOM		Web/Lite EDI		Other Standards ^a		Total	
		2001 ^b	2002 ^b	2001 ^b	2002 ^b	2001 ^b	2002 ^b	2001 ^b	2002 ^b
Latin America	Argentina	71	71	10	10	210	400	291	481
	Brazil	4 000	4 500	5 300	5 300	33 500	33 800	42 800	43 600
	Chile	29	40	794	1 000	250	250	1 073	1 290
	Colombia	1 000	1 200	400	1 000	n.a.	n.a.	1 400	2 200
	Costa Rica	24	30	0	20	n.a.	n.a.	24	50
	El Salvador	10	20	0	20	75	200	85	240
	Mexico	2 300	3 500	2 000	3 000	n.a.	n.a.	4 300	6 500
	Uruguay	18	23	70	150	n.a.	n.a.	88	173
	Venezuela	55	80	n.a.	n.a.	n.a.	n.a.	55	80
Asia	China	10	15	n.a.	n.a.	0	0	10	15
	Hong Kong	71	76	393	460	n.a.	n.a.	464	536
	Indonesia	2	3	n.a.	n.a.	n.a.	n.a.	2	3
	Japan	200	300	20	20	40 000	40 000	40 220	40 320
	Philippines	60	65	65	80	n.a.	n.a.	125	145
	Singapore	50	50	n.a.	n.a.	1 125	1 125	1 175	1 175
	Korea	1 400	1 500	n.a.	n.a.	n.a.	n.a.	1 400	1 500
	Thailand	189	280	217	390	n.a.	n.a.	406	670
	Vietnam	0	n.a.	n.a.	n.a.	n.a.	n.a.	0	n.a.
World Total	37 584	46 108	14 559	18 700	77 613	91 155	129 756	155 963	

Source: EAN International (2002).

Note: ^a The number for Brazil is the total of RND (3,500), CNAB/Febraban (8,000) and other projects (3,500). The number for Singapore is the total of EDITRANS (25) and EDIMAN (1,100). ^b Number in Dec. 2001 and estimated number in Dec. 2002.

Table 33

**EDI ACTIVITY LEVEL BY SECTORS IN EAN MEMBER
COUNTRIES IN ASIA AND LATIN AMERICA**

		Activity Level from 0 to 5 (0=not active, 5=very active)								Average
		Customs	Electronics	Finance	Health-care	Public Sector	Retail & Distribution	Textile	Transport	
Latin America	Brazil	1	4	5	4	1	4	2	3	3.0
	Chile	5	0	4	0	0	4	3	0	2.0
	Colombia	3	0	2	3	0	5	4	0	2.1
	Costa Rica	2	1	4	0	1	5	0	1	1.8
	Dominican Republic	4	2	4	2	1	3	2	1	2.4
	Guatemala	3		4			4		3	3.5
	Mexico	4	0	5	2	4	5	1	2	2.9
	Nicaragua	3	0	0	2	0	4	3	0	1.5
	Panama		0	0	0	0	1	0	0	0.1
	Uruguay	4		0			3			2.3
Venezuela	3		5	3		4	1	1	2.8	
Ave. of Latin America	3.2	0.9	3.0	1.8	0.9	3.8	1.8	1.1	2.1	
Asia	China	4	2	2	2	3	4	3	1	2.6
	Hong Kong	1	1	0	4	3	5	2	1	2.1
	Japan	2	5	2	4	3	5	3	3	3.4
	Malaysia	0	0	0	2	0	4	0	0	0.8
	Philippines	1	1	4	0	1	4	2	0	1.6
	Singapore	4	3	2	2	4	4	0	3	2.8
	Korea	5	5	5	4	5	5	4	2	4.4
	Taiwan	3	4	4	3	1	5	2	4	3.3
	Thailand		1		2		3	1	2	1.8
Ave. of Asia	2.6	2.3	2.7	2.5	2.3	4.3	1.8	1.6	2.5	
Average	2.9	1.7	2.8	2.1	1.6	4.0	1.8	1.4	2.3	

Source: EAN International (2002)

In Japan, EDI was used by 78.2% of respondents to the survey conducted by JIPDEC/ECPC (2002). The main users were companies in the electronics industry, wholesales, trading companies, and retail business. Ninety percent of the firms that accept orders and/or place more than 5,000 monthly orders have implemented it. On the plus side of EDI, cost reduction of document processing (58.5%) and labor savings (56.1%) were cited by the majority of firms, followed by the reinforcement of partnerships with clients. The burdens faced in the process of its introduction were the interconnection and adjustment with the firm's own internal systems, adjustment with clients, and alternation of internal business processes.

According to Erosa (1999), the use of EDI in Mexico began by multinational companies. Its users in Mexico in the beginning of 1990s were limited mainly to the automobile, commercial and financial sectors. The promotion of EDI from 1997 became a trigger for its diffusion to sectors such as finance, commerce, services, insurance, health, transportation, government and communications. During this period, EDIFACT was defined as the standard for banking and commercial sectors. In the late 1990s, about half of Mexican firms, mainly large ones in the manufacturing sector, introduced EDI. A 1998 survey shown in Erosa (1999) indicated that the most advanced sector was commerce and that 80% of respondents used it. Meanwhile, 54% of the manufacturing sector follows the commercial sector although the number of respondents who have already introduced it was largest. In contrast, the public sector was only 9.9%. The reasons why the two sectors were advanced are different. The commercial sector had knowledge of the effects of IT and know-how of IT usage through the adoption of the bar code format, and aimed at mainly improving the internal efficiency of the company. In the case of the manufacturing sector, its benefits to the purchaser-supplier relation were thought to be the reason for its adoption. By firm size, although more than 50% of medium-sized and large enterprises had introduced it, less than 20% of small businesses have done it. The reasons for introducing EDI are different among companies, size of businesses and industrial sectors. For example, 47% of the enterprises with EDI, mainly large ones, introduced it in accordance with their own business strategies. But 30% of them cited pressure from the business community, or pressure from global competition. This answer dominated medium-sized enterprises. More than 50% of the medium-sized enterprises, especially the 70% of these enterprises in the manufacturing sector indicated pressure as the reason for introducing EDI. By the usage of EDI, 65% of respondents employing it undertook commercial transactions, while 29.8% of them performed financial transactions.

C. B2B in Asian Countries

As can be appreciated from the information regarding the use of EDI, major Asian countries are making intensive use of e-commerce in manufacturing sectors. To complement several estimates made by specialized agencies, market conditions in Japan, Korea and Singapore will be discussed in detail below.

Japan

The transaction of B2B was about 285 billion dollars in 2001, which accounted for 5% of total demand for intermediates and final goods. The market has grown at an annual rate of 60% since 1998. The percentage of transaction on e-marketplaces in total B2B were about 10% in 2001 and is not expected to change until at least 2006. About 85% of the B2B was implemented by electronics and automobile industries. The percentages of B2B in total transactions were 30.5% in automobiles and 24.2% in electronics, more than in any other sector. In 2006, B2B are expected to reach 1 trillion dollars, or more than 3.5 times the level in 2001. The total share of electronics and automobile will decrease to 43% as the result of growth in other sectors. The sectors that are expected to increase their shares are construction, from 1.1% in 2001 to 11.5% in 2006, followed

by textiles and daily commodities (8.7%), iron and steel, nonferrous metal, raw materials (6.6%), food products (6.5%), chemicals, and industrial and precision machinery (5.6%). These changes will be caused by the rise of the percentages of B2B to total transactions. Among the leading industries, the ratios will reach 49.7% in automobile and 46.7 % in electronics. The ratios of the followers will also leap to 27.6% in textiles and daily commodities, 27.2% in paper and office supplies, 23.5% in transportation and tourism, and 20.6% in iron and steel, and nonferrous metals. These expectations imply that the use of B2B will go back to upstream or primary industries, and go to downstream industries.

Table 34
B2B ESTIMATE FOR JAPAN

	% Share of Total B2B		B2B over Total Transaction (%)	
	2001	2006	2001	2006
Food Products	2.4	6.5	1.3	12.6
Textiles and Daily Commodities	2.4	8.7	2.2	27.6
Chemicals	1.3	5.6	0.8	11.4
Iron and Steel, Nonferrous Metal, Raw Materials	2.6	6.6	2.3	20.6
Industrial and Precision Machinery	2.8	5.6	1.8	12.0
Electronics	44.3	24.7	24.2	46.7
Automobile	39.7	18.7	30.5	49.7
Construction	1.1	11.5	0.4	13.9
Paper and Office Supplies	0.4	4.1	0.8	27.2
Electricity, Gas and Water Service	0	0.6	0.0	5.1
Finance and Insurance	0.003	0.03	0.0	0.1
Transportation and Tourism	1.6	5.1	2.1	23.5
Communication and Broadcasting	0.0	0.1	0.1	1.1
Data Processing and Software	1.1	1.8	4.0	22.6
Other Services	0.1	0.1	0.0	0.1
Total	100.0	100.0	5.04	17.5
Total Value (trillion yen)	34.0	125.4		
Total Value (US\$ billions, US\$1=120 Yen)	283.6	1045.3		
% of eMarketplace to Total B2B (%)	11.7	10.9		

Source: METI et al. (2002).

Korea

According to MOICE (2002), the volume of B2B transactions amounted to 22.74 billion dollars in the third quarter 2001, a 22.4% increase over the previous quarter (18.58 billion dollars). By the classification of operators, purchaser-driven trade, in which sellers access B2B sites run by purchasers, accounted for 76.5% (17.4 billion dollars) of the total, and increased by 19.5% compared to the previous quarter. Seller-driven trade, in which purchasers access sites run by the seller, accounted for 20% (4.55 billion dollars), and increased by 36.9%. Brokerage-driven trade, in which sellers and purchasers access B2B brokering sites for trades, accounted for 3.4% (790 million dollars).

Among both purchaser-driven and seller-driven trade, partner-based trade, which migrated from offline transactions between trade partners with long-standing regular partnerships to an online environment, accounted for most of the transactions. Open type trade, based on competition among suppliers, was used mainly for procurement of maintenance, repair and operation (MRO) and standardized parts and materials at the purchaser-driven sites. By industrial sectors, transactions by the manufacturing industry accounted for 78.3% of total B2B in the third quarter of 2001, followed by wholesale and retail (14%), communications (1.4%), transportation (1.0%) and

utilities (electricity, gas, water supply) (0.9%). The dominance of partner-based trade and manufacturing imply that B2B were used not as a temporal cost-cutting method but instead for implementing SCMs.

Table 35
B2B in Korea by Operators
(US\$ billion, %)

	Total	1) Purchaser-driven		2) Seller-driven		3) Brokerage-driven
		Open Type	Partner -base	Open Type	Partner -base	
2Q 2001	18.6	14.6		3.3		0.6
Q 2001	22.7	17.4	(3.4)	4.6	(0.4)	0.8
%	100.0	76.5	(19.4)	20.0	(7.7)	3.4
Growth (%)	22.4	19.5		36.9		14.3

Source: MOICE (2002).

Singapore

According to IDA (2001), B2B sales value in Singapore was S\$ 5.67 billion (3.4 billion dollars)³⁷ in 1998, S\$ 40 billion (23.6 billion dollars) in 1999 and an estimated S\$ 92 billion (53.4 billion dollars) in 2000. The main users in 2000 were finance and banking, wholesales and retail, and manufacturing. Sales value of export e-commerce increased at a faster rate than their domestic counterparts. The countries in which the most companies conducted their B2B sales were Malaysia, Indonesia, Taiwan, China, Korea and Japan. The use of B2B increased as a procurement method. B2B procurement has increased from S\$ 5.44 billion (3.3 billion dollars) in 1998 to S\$ 10.9 billion (6.4 billion dollars) in 1999 and to an estimated S\$ 17.9 billion (10.4 billion dollars) in 2000. Companies in Singapore bought more from overseas companies in the U.S., Malaysia and Japan.

IDA (2002) estimated that total B2B sales revenue reached \$ 112 billion (62.5 billion dollars) in 2001. Sales by industrial sectors were dominated by wholesales and retail, which accounted for 38.9% of total revenue, and finance and banking (34.7%). The portion of B2B sales revenue as a percentage of total sales revenue of Singapore companies was 18% in third quarter 2001, which was more than Australia (16%), Hong Kong (16%), Taiwan (14%) and Korea (11%). The main B2B and B2C trade partners abroad were in the Asia-Pacific. It was reported that 53% of the total e-commerce occurred in the Asia-Pacific, followed by North America (29%), Europe (14%) and Africa and Middle East (4%). Main destination countries in the Asia-Pacific include Malaysia, Australia, Japan and Hong Kong. The U.S. was the single largest country as the source of overseas revenue.

Table 36
B2B Sales Revenue by Sectors in Singapore in Q3 2001
(S\$ million, %)

	Wholesale & Retail	Transport, Strage & Communication	Real Estate, Renting & Business Activites	Manu-facturing	Hotels & Restaurants	Financial Inter-mediaries	Others	Total
Q3 2001	11 494	4 221	1 550	1 672	20	10 265	314	29 535
% Share	38.9	14.3	5.2	5.7	0.1	34.8	1.1	100.0

Source: IDA (2002).

Note: % of total revenue was calculated by author from the figures of sales.

³⁷ Period average S\$1 (Singapore dollars) per US dollar in IMF's IFS were used for conversion: 1.6736 (1998); 1.69496 (1999); 1.72396 (2000); 1.79172 (2001).

Singaporean companies were relatively new to e-commerce. It is reported that 43.2% of the companies with e-commerce capabilities started their activities in 1999. Their sales were predominantly derived from the closed networks in the initial stage of the usage; more B2B transactions were conducted over open networks in the third quarter of 2001 (IDA, 2002). According to a Singaporean government study announced in 1999, the usage of B2B was highest among electronics manufacturers, with 14% of them already trading on the Internet, followed by 9.2% of freight forwarding companies (NCB, 1999 cited in Ueki, 2001). These figures imply that B2B usage diffused from manufacturing, transport and wholesale and retail sectors to other industrial sectors.

D. B2B in Latin America Countries

As already confirmed from the information on the usage of EDI, B2B usage is found mostly in the financial, retail and distribution sectors. This feature has been common in Asia and Latin America. But from the experiences in Asia, the manufacturing sector, especially in electronics and automobiles, has occupied a large share of total B2B transaction, and has shown the best practices. These experiences seem to encourage the introduction of these systems into other sectors in the initial stage of B2B diffusion as well. On the other hand, the size of these sectors in Latin America is not large except in Brazil and Mexico, although the growth of B2B is vast. In this section, the B2B market estimates of Argentina, Brazil, Chile and Mexico are analyzed first. Then companies in Latin America that are representative firms in the region will be discussed.

1. Market Estimates

In Argentina, the transaction value via e-commerce was estimated at 150 million dollars in 2000 and 515 million dollars in 2001. B2B occupied 130 million dollars, or 86.7% of total transactions. The Argentine share in Latin America was 4.2%. High growth in e-commerce was expected before the recent economic instability. B2B in 2004 is expected to reach 12 000 million dollars, 92 times larger the transaction in 2000. Although the expected growth in B2C is more moderate than B2B, it will run up to 1 000 million dollars or 50 times the value in 2000. The share of B2B in Argentina would increase to 92.3% and Argentina's share of total e-commerce in Latin America, to 15.9%.

Table 37
E-COMMERCE IN ARGENTINA
(in US\$ millions)

	2000	2001	2002	2003	2004
B2C	20	65	180	400	1 000
B2B	130	450	1 460	4 580	12 000
Total	150	515	1 640	4 980	13 000
% Share in Latin America	4.2	7.6	11.9	15.6	15.9
B2B/Total (%)	86.7	87.4	89.0	92.0	92.3

Source: Prince (2001b).

Market estimates of B2B in Brazil are different depending on the research institution, ranging from 0.6 billion dollars by Morgan Stanley to 109 billion dollars by Computer Economics. These estimates may have been affected by differences in the definition of B2B. Even though the market size is larger than other countries, the expected growth rates are moderate when compared to other countries in Latin America.

Table 38
COMPARATIVE ESTIMATES OF B2B E-COMMERCE
REVENUES IN BRAZIL
(In US\$ billions)

	2001	2002	2003	2004	2005
Computer Economics	109.0	163.4	201.6	-	-
eMarketer	5.3	10.5	20.6	34.7	-
Forrester Research	4.4	9.4	22.5	59.4	-
International Data Corp.	1.0	1.8	3.2	-	-
Morgan Stanley	0.6	1.3	2.3	-	-
Yankee Group	15.3	21.8	30.9	40.8	51.7

Source: eMarketer, 2001 (<http://www.emarketer.com>).

In Chile, the penetration of e-commerce to the economy has been very drastic. The transaction of e-commerce, estimated at 5 million dollars in 1998, reached 461.9 million dollars in 2000. An annual growth rate of 100% is expected between 2000 and 2004. This high growth will be led by B2B. The size of B2B transactions was 426 million dollars in 2000 and represented only 0.2% of total transactions. However, it is estimated to reach 7 903 million dollars and represent 4.6% of total transactions as result of not only 107.5% annual growth rate but also perhaps its penetration to a larger variety of companies. In 2004, almost all e-commerce transactions will be B2B. Chilean businesses have fostered their entrepreneurship and tried to take these business opportunities by establishing websites. According to CCS (2001), the number of B2B sites, which was 28 in September 1999, reached 249 in December 2000.³⁸

Table 39
E-COMMERCE IN CHILE
(In US\$ million)

	1998	1999	2000	2001	2002	2003	2004
B2B	5	75	426	1 415	3 008	5 600	7 903
% of Total Transaction	n.a.	0.1	0.2	1.0	2.0	3.5	4.6
B2C	1.4	12.6	35.7	52.9	82.3	17.8	165.3
Sales of Chilean e-tailers	0	2.6	20.4	37.0	63.0	94.0	135.0
% of Chilean sites	0	20.6	57.1	69.9	76.5	79.8	81.7
Total	6.4	87.7	461.9	1 468.9	3 092.3	5 721.3	8 072.9
% of B2B	78.1	85.5	92.2	96.3	97.3	97.9	97.9

Source: CCS (2001, 2002).

Concerning the e-commerce market in Mexico, Pyramid Research expects online transactions to grow from 1.2 billion dollars in 2001 to approximately 38 billion dollars in 2005. Higher growth rates in B2B than B2C was also expected. As a result, B2B, which accounted for 77% of the total e-commerce transactions in 2000, will reach 84% in 2005 (US DOC, 2002c). US DOC (2002c) cites the data on e-commerce penetration by Select-IDC, which indicates the increase of weight of B2B in the Mexican economy. According to this report, the B2C penetration in the Mexican economy is likely to increase from 0.16% in 2000 to 2% in 2004. The portion of B2B will go up from 6.1% to 20% in the same period.

³⁸ According to a new report by the Santiago Chamber of Commerce (CCS), transactions of B2C were estimated at 321 million dollars in 2000, 1 415 million dollars (341% growth) in 2001, and 2,472 million dollars (75%) in 2002, which accounted for 1.6% of total retail transactions (Revista Comercio No.8875, January 21, 2003, CCS, <http://www.ccs.cl/>).

2. Attempts in Latin America

In the context of SCM, MNCs from the U.S., Europe, Japan and Latin America have already connected with their networks. Brazil and Mexico are the only two countries in Latin America that have a sizable production based on high-tech industries. Contract manufacturers in Mexico that produce PCs and other electronic products are based on the information shared with their clients and suppliers. In Brazil, German automobile parts maker Brose group introduced a JIT module based on SAP's system in its new plant in Curitiba.³⁹ Ericsson introduced JIT to their telecommunication equipments business in Brazil. The program was launched in Brazil in 1999, following the start in Sweden in 1996. The company reduced supply inventory and lead-time by making use of the *Kanban* with second tier suppliers and VMI linking with suppliers and global partner alliances such as Solectron and Panalpina.⁴⁰

Usage of e-commerce and establishment of SCM was facilitated by manufacturers of high value added and 'light' products (lightweight products used optical electronics technology), and by businesses that required speedy and punctual managements. The following are examples of heavy industries of national capital that are of great importance for the Latin American economy.

CEMEX (Cement; Mexico)

This case seems to be one of the best practices among the attempts in Latin America. This Mexican company's efforts to restructure their cement business by using ICT started in the mid-1980s. In 1989, the firm developed Cemexnet, which linked all of its production plants via satellite. With the opening of a central coordinating office, the system made it easier for the plants to remain abreast of supply and demand. The firm also streamlined financial information flow and back-office functions, which were gradually automated. In 1993, it implemented the Dynamic Synchronization of Operations, a logistics system using GPS technology to link delivery trucks with computers and GPS transmitters to a central control center. Because this system enabled dispatchers at operations centers in Monterrey, Mexico City and Guadalajara to view the location, speed and direction of each truck, they could quickly choose optimal combinations of trucks and customer destinations to fill orders on time. In addition, the system informed dispatchers of traffic conditions, inventory and customer locations and allowed the reroute of trucks to avoid traffic jams and to redirect deliveries in case of a change in order by the customers. In 1998, the global digital program began to connect offices around the world via satellite and the Internet. An online portal enabled its suppliers, distributors, and customers to check their order status.

The effects of the changes were tremendous. The delivery time to construction sites was reduced from three hours to 30 minutes. Cemex sells more than 20% of its cement over the Internet. These assets of information systems have allowed online direct integration of each firm that Cemex has acquired by capital participation since 1992, within a short period of two to three months. In addition, the experiences acquired during the implementation of these computerization processes have become valuable assets that have been applied to other important e-business spheres.

In September 2000, Cemex launched CxNetworks in order to build new and innovative businesses by using Cemex's strengths of market presence, industry knowledge, global reach, strong IT base, and logistical capabilities in the construction industry as leverages. The business portfolio of the company is composed of three areas: Arkio; Latinexus; and Neoris. Latinexus is an e-procurement service provider helping clients make their sourcing and procurement processes more efficient, both on and off line. The firm was launched in July 2000 in partnership with Votorantim and Bradespar of Brazil and Alfa of Mexico. Neoris (formerly Cemtec) is a consulting

³⁹ SAP Info, <http://www.sapinfo.net/resources/RFILE151603c68587dbe05c.pdf>.

⁴⁰ JIT in a telecom business - A Brazilian experience, <http://www.abai.com.br/sapics.ppt>.

company developing innovative technology-based business solutions for clients in a wide variety of industries, launched in December 2000. To form the firm, CxNetworks merged Cemtec, a Cemex's internal IT supplier established in 1993, with Amtec in Argentina, CyberMedia in Venezuela, Intec in Spain, and Mlab in Brazil, with hopes to create a broader presence in Latin America. Arkio, which was launched in October 2001, is a distribution company providing one-stop shopping convenience for construction professionals.⁴¹

CODELCO (Copper Mining; Chile)

Codelco is the world's largest copper mining company and run by the Chilean government. To integrate all its functions, business exchanges and areas into a single online database, the firm launched the SWING (integrated management software) project, with its first phase beginning in mid-1996. In March 1998, the new SAP/R3 based system was installed in every division and the head office. In 1999, the system became fully functional. Project design was a major engineering task that included 230,000 hours of training for 5,000 workers. In the development process, 60% of old applications, access to which was restricted to a small group of specialists, were replaced by client-server technology.

The SWING project was divided into six main modules: financial accounting and controlling; service and material management; investment project management; sales and distribution; equipment and plant maintenance; and human resources. SWING implementation required the development of other projects that covered communications, training, management of change, security, auditing, technology and organizational development.

The benefits to the firm generated by this new system included faster control of losses, preventive action, the availability of up-to-date inventories, and a culture of greater participation and responsibility in administrative processes. To improve interaction with supply companies, the firm created a single corporate registry with up-to-date information accessible to all divisions. The management was modernized by implication of SAP/R3 logistics module, the inauguration of an Internet website, and the use of electronic document exchange with the customs service (Annual Report, 1998, 1999). In addition, benefits were given to its clients and suppliers. The firm's website is based on these systems; a manufacturer can bid on an upcoming project, or a supplier can check the status of an invoice.⁴² The firm plans to add new services to its portal so that copper and molybdenum buyers will be able to monitor shipments, and change shipment dates and itineraries.⁴³

The firm is going further with the integration of corporate processes. SAP announced Codelco's plan to introduce SAP's new system, which is a part of a Codelco business plan called "Standard Enterprise Project." Tools of the new system drive supply chain management. A part of their platform supports the collaborative and analytical environment necessary for users and clients to communicate and collect forecasting information, which will then allow for strategic and timely decisions. Functions of the new system will also enable and facilitate e-commerce via the Quadrem e-marketplace, which will be mentioned below.⁴⁴

⁴¹ CIO Magazine, August 15, 2001 (http://www.cio.com/archive/081501/cement_content.html), Wired.com, Issue 10.07 - July 2002 (<http://www.wired.com/wired/archive/10.07/Cemex.html>), ebusinessforum.com, November 9, 2000 (<http://www.ebusinessforum.com/>), Cisco Systems (2001), and companies' websites.

⁴² Business Week online, October 25, 1999, http://www.businessweek.com/1999/99_43/b3652015.htm?scriptFramed.

⁴³ Business News Americas, November 21, 2002 (<http://www.bnamericas.com>).

⁴⁴ SAP, press room, August 5, 2002, <http://www.sap.com/Singapore/company/press/press.asp?pressID=1378>.

PDVSA and PetroLatin (Petroleum; Venezuela)

PDVSA, the property of the Venezuelan State, is a worldwide energy corporation engaged in operational and commercial activities both inside and outside Venezuela. PetroLatin is an e-commerce portal for the oil industry, launched in December 2000 and backed by Venezuela's petroleum industry chamber. The firm currently has 650 clients and has attained revenues of 4 million dollars. PDVSA and all its subsidiaries agreed to join PetroLatin in November 2001. PetroLatin and PDVSA's e-procurement branch, Bariven, started to interconnect PDVSA's SAP system with PetroLatin's OEX e-commerce platform. Bariven invested US\$ 1 million in the integration process. The partnership started functioning from August 6, 2002. Due to the increase of transactions by PDVSA, PetroLatin is expected to handle transactions worth US\$ 10 million in 2002.^{45 46}

QUADREM (Mining, Minerals and Metals)

Quadrem is an e-marketplace that allows the global mining, minerals and metals industries to meet the need for e-procurement, offering supply chain solutions. Initially, the Dallas-based firm was financed by the 14 largest mining, mineral and metals companies of the world. The number of shareholders was increased to 19⁴⁷ as the number of participants increased. To respond to the demands of global users, the firm established offices in eight regional locations⁴⁸ and permitted transactions around the clock in four languages.

The firm, initially started by 14 members in May of 2000, has grown to include over 1,800 total trading partners in 2002. The origins of the participants are diverse: Africa (330), Asia (72), Australia (278), Europe (119), North America (462), South America East (88), and South America West (451), according to the firm's website. Companies from the southern hemisphere are in the majority. The volume of transactions has increased at a monthly average rate of 30% during the past year, or a 20-fold growth in trading dollar volume over the same period. The transactional value is expected to reach over 400 million dollars in 2002, By adding another 400 million dollars from value added services such as auctions and orders by request for quotations, global transactions handled over the site are expected to reach 800 million dollars in 2002 and increase to 1.5 billion dollars in 2003. The company predicts that more than 3,500 suppliers will be using its trading platform by the end of 2003.

In South America West (Chile-Peru), it is expected that its supplier list will grow to 600 in 2003, and 30% of them will become fully integrated with the site in 2003, operating via direct links. The Chilean copper mine Minera Escondida and Peruvian gold mine Minera Yanacocha, operated by BHP Billiton and Newmont, have committed to online procurement transactions of 130 million dollars via the site in 2003.

Codelco has a plan to begin the process of moving more than 1 billion dollars of annual spending onto the Quadrem site. By integrating Quadrem with Codelco's SAP applications,

⁴⁵ Business News Americas, October 18, 2002 and November 14, 2002, <http://www.bnamericas.com/ecommerce/>.

⁴⁶ In the petroleum industry in Latin America, Petrobras, a Brazilian state oil company, has created an e-procurement subsidiary, whose launch is scheduled for June 2003. The e-procurement subsidiary will unify purchasing activities among Petrobras' 40 business units. The company has already used B2B for sales. Some 400 clients, or 70% of the company's customer portfolio, use the B2B portal "Canal Cliente," which was launched in 1998 (Business News Americas, February 7, 2003). In Colombia, a state oil company Ecopetrol is preparing a B2B portal, through which the company will improve its procurement processes, communication with partners for exploration, relationships with clients, managements involved with government agencies such as planning, control and publication and so on (Business News Americas, February 13, 2003).

⁴⁷ Alcan Inc, Alcoa Inc, Anglo American plc, Barrick Gold Corporation, BHP Billiton, Companhia Valedo Rio Doce (CVRD), Corporacion Nacional del Cobre de Chile (Codelco), De Beers Consolidated Mines Ltd, Glencore International AG, Imerys, Inco Limited, Newmont Mining Corporation, Noranda Inc, Pechiney, Peñoles, Phelps Dodge Corporation, Rio Tinto, Votorantim Group, WMC Limited.

⁴⁸ Australia (Brisbane, Perth), Brazil, Chile, Canada, France, South Africa and US.

Codelco will be able to automate the request for quotes and bid-receipt processes, and to issue electronic purchase orders directly from SAP. The company faxes as many as 15,000 requests for quotes per month to suppliers and processes them manually. Bids also are processed manually, and purchases against contracts are entered into the SAP individually. The automation of procurement processes and acceleration of process cycles are believed to bring 2 million dollars of annual potential savings to the firm.⁴⁹

VITRO (Glass; Mexico)

Vitro, including its subsidiary companies, is one of the world's leading producers of flat glass, glass containers, and glassware. Since 1997, the firm has employed digital solutions to reshape and improve its business platform, aiming at improving the relationship between its business processes and product development, strengthening its supply chain management, and enhancing its customer relationship management. Its flat glass unit obtained benefits during 1998 from the successful centralization of procurement functions for the three glass-related businesses. Headcount in the procurement departments for these businesses was cut from 103 to 81, slashing administrative costs by 32% and over 30 million dollars in purchasing savings. The time between request and delivery dropped overall by 27%. The standardization effort focused on leveraging relationships with suppliers and volume pricing.

In 2000, the firm redefined its e-business strategy by 2002, making a collaboration agreement with IBM to reshape its culture and operating processes. The framework agreement included certain projects with suppliers (e-procurement) and employees, enhancing intranet services such as communications, information sharing, procedures, human resource and financial information and the like. The firm supposed that this e-procurement project would make it possible to source 80% of raw materials through the Internet. The company also launched a plan to invest 20 million dollars in the e-business strategy in 2000 in order to build an Internet-based marketing arm and transform itself into a full-fledged e-commerce corporation.

The firm's annual report in 2001 mentioned that it continuously conducted mandatory executive and employee training through its human resource development center and e-learning program in areas such as finance, e-business, sales, marketing, information analysis and decision-making in order to reinforce and align its corporate culture. It also referred to the importance of e-procurement in improving operating efficiency or streamlining the procurement process and to control procurement costs. In May 2002, the firm announced an agreement with EDS on the outsourcing of IT services in order to concentrate on its core business and increase efficiency levels in IT services and reduce its cost structure.⁵⁰

⁴⁹ Quadrem's website (<http://www.quadrem.com/>), Business News Americas, October 31, and November 21, 2002 (<http://www.bnamericas.com>), Information Week.com (<http://www.informationweek.com/story/IWK20020328S0018>).

⁵⁰ Annual Report (1998, 1999 and 2001), Press Release (February 11, 2000 and May 19, 2002), [ebusinessforum.com](http://www.ebusinessforum.com), March 8, 2001 (<http://www.ebusinessforum.com>), Palacios (2001).

V. Facilitation of E-commerce and International Trade

As analyzed above, the ICT penetration and suitable business environment, especially the computerization of companies including their connectivity with the Internet, are considered as prerequisites for promoting the use of e-commerce by the private sector. With respect to e-commerce diffusion on international trade, there are additional issues to be addressed. In the area of B2B transactions, though MNCs are promoting global SCMs, a limiting factor on international trade via electronic means is the fact that the SCM formation is still restricted to MNCs and large companies. In case of B2C, though it is often presumed that final consumers can access foreign websites to purchase goods and promote international trade, generally speaking, there seem to be some hurdles in making such practices popular.

The diffusion of the Internet started out with private initiatives. The same thing is true for the case of e-commerce. It is not difficult to imagine from the data shown above that the competition between ICT service providers and between ICT users in an industry will promote the investments in the Internet and e-commerce not only by large enterprises but also by SMEs. In addition, private initiatives will be encouraged to establish transnational e-commerce and work toward global SCMs. On the other hand, the private sector faces a series of challenges in establishing a basis for e-commerce and SCMs in practice. Each government can support this business development and private activity in order to avoid market failures. Cooperative bilateral and multilateral relationships, government-business cooperation, and initiatives by international organizations will be indispensable for building infrastructures for global-scale e-commerce.

A. International E-commerce and Supply Chain Management

E-commerce and a SCM based on the Internet were thought to be the key to promoting international trade because every person and establishment around the world can access such websites anytime from every corner of the world. This also created an expectation that many venture businesses and SMEs would benefit from increased business opportunities opened by the Internet. But some data on e-commerce transactions indicate that the expectation can be fulfilled only after getting past some obstacles.

In the UK, a nation that is closely integrated into European economies, 81% of the total value of online sales by the non-financial sectors in 2001 was received from within the UK, while 12% was received from other EU countries and the remaining 7% from outside the EU (ONS, 2002).⁵¹ In Chile, 65% of the B2C sites cover the Latin American region and only 14% reach the international market. In addition, less than 10 firms gained 80% of the total B2C sales in the country (CCS, 2002). The high concentration of online transactions was confirmed in other markets in Latin America. Latin America's top 25 online players accounted for more than 83% of total online sales. The higher concentration in the online sales was reported in the region's largest markets, Argentina, Brazil and Mexico (BCG, 2001).

The reasons for these phenomena should be considered from both sides, that of the suppliers and consumers. Though it is very difficult to explain them in detail, the factors related to the confidence to the firms and systems, and quality of services such as delivery time and real costs added to the international trade seem to be common concerns among both sides.

In the case of B2B, the development has started from the introduction of EDI among multinational, large and medium businesses. Many of these relatively large firms have facilities for dealing with problems related to international trade. On the other hand, the systems that were developed were often based on the individual firm's and/or domestic standards, which made it difficult to realize the interoperability between different systems. In addition, in the case of building connections between firms in developed countries and SMEs in developing countries, problems of capability and costs on the developing countries' side prevent the operations. When it comes to the establishment of SCM, relationships and closer cooperation in information exchange, production, inventory management and logistics across the broad supply chain between many different firms are necessities which are difficult to materialize internationally. As a result, the international networks of EDI and SCM are organized by multinational firms and their group firms.

In the case of Japanese firms' EDI, 11.8% of respondents to the survey conducted by JIPDEC/ECPC (2002) have introduced EDI into international transactions, with 0.8% under development and 3.9% with plans to do so. Among the firms that have introduced EDI, 69.6% of them exchanged data directly with foreign partner firms. Among the firms which have realized EDI with foreigners, 32.6% did so via affiliated companies abroad, 8.7% via companies in Japan and 6.5% via trading companies in Japan. UN/EDIFACT (34.1%) and ANSI X12, an American standard, were dominantly used as syntax rules. UN/EDIFACT was used more for exchange with Europe and Asia, and ANSI X12 with North America. The trading partners with which data was exchanged were mainly North America, but also included Germany, Asia NIEs, Malaysia and UK.

⁵¹ The ratio of intra-European Internet exports to total exports may partly reflect the overall (intra-Europe) tendency of European trade. In Canadian professional scientific and technical services, the accommodation and food services industry, and the arts, entertainment and recreation industry, more than 50% of the value of Internet sales were to customers abroad, while the propensity to export of wholesale and retail trade, which accounted for over a quarter of Internet sales, was low; at 13.6% and 3.2% of all sales respectively (OECD, 2002).

Table 40
INTERNATIONAL EDI CONDUCTED BY JAPANESE
FIRMS BY PARTNER COUNTRIES

Partner Country	Number of Firms	% of Total	Partner Country	Number of Firms	% of Total
United States	28	57.1	Korea	10	20.4
Canada	1	2.0	Taiwan	6	12.2
Mexico	0	0.0	Hong Kong	7	14.3
Other Latin America	2	4.1	Singapore	11	22.4
Russia	0	0.0	Malaysia	7	14.3
United Kingdom	6	12.2	Indonesia	2	4.1
Germany	13	26.5	Philippines	3	6.1
France	3	6.1	Thailand	3	6.1
Italy	1	2.0	Other Asia	3	6.1
Netherlands	3	6.1	Australia	4	8.2
Spain	1	2.0	New Zealand	1	2.0
Sweden	5	10.2	Papua New Guinea	0	0.0
Norway	1	2.0	Other	7	14.3
Other Europe	8	16.3	North America (*1)	29	59.2
China	4	8.2	Other Asia and Australia (*2)	12	24.5
Number of Respondent	49				

Source: JIPDEC/ECPC, 2002.

Notes: (1) North America includes U.S., Canada and Mexico. (2) Other Asia and Australia exclude China, Indonesia, Philippines, Thailand, Brunei, New Zealand, and Papua New Guinea.

B. Public Policies for E-commerce Promotion

As shown above, the private sector has faced the problems not only before establishing information systems but also after undertaking e-commerce and SCMs. In order to promote e-commerce, therefore, governments have introduced public policies that consisted mainly of three factors. The first one is the improvement of conditions for e-commerce including the establishment of e-commerce-related laws, public key infrastructure (PKI), consumer protection, website certification, and protection of personal information. The second is a provision of supports for SMEs to introduce PCs, Internet and e-commerce. The third is so called e-government, in which governments become a trading partner of the private sector and become more efficient and transparent, and thus promote e-commerce usage by the private sector.

Concerning the first point, developing countries have established e-commerce laws in the end of 1990s by referring to the model law of UN Commission on International Trade Law (UNCITRAL). This is true for Latin American countries (Kuwayama, 2001). But many e-commerce-related issues are left as open issues not only in developing countries but also in developed countries. To establish harmonized rules internationally, such issues are tackled by UNCITRAL, OECD, and other international organization, and private business organization such as International Chamber of Commerce and Global Business Dialogue on E-commerce (GDBe). Concerning the second and third points, more differences can exist among countries because they depend on conditions and strategies of each country.

Malaysia, where the electronics industry is one of the most important sectors, is facing intensive competition from China. The government is encouraging a variety of policies to help

SMEs adopt ICT and achieve greater efficiency, increase value added, and strengthen industrial linkages with MNCs by providing funds and loans. Currently 17.1% of SMEs have started to utilize computer aided design software (CAD) and another 16.6% have applied e-commerce solutions in their operations. To support the efforts to enhance the skills of SME employees, the Small and Medium Industries Development Corporation (SMIDEC) has collaborated with training providers to provide grants covering 80% of the costs of training courses such as program logic controller (PLC), AutoCAD and IT courses. The industrial linkage program (ILP) is a cluster-based industrial development program provided by the government, especially focused on ICT clusters, to make a platform for collaboration between MNCs, large companies and SMEs. As of the end of June 2002, 932 SMEs have registered online, of which 167 have already linked with large companies and MNCs. E-manufacturing Grant is a scheme to provide SMEs with assistance in introducing ICT software and accompanying hardware like ERP and SCM.⁵²

Korea has one of the most advanced comprehensive policy frameworks for e-commerce in Asia. The policy is composed of the following components: a regulatory framework; the expansion of an operational base for e-commerce such as the upgrading of an Internet access network, the establishment of a graduate school program, e-commerce standardization, logistical infrastructure and e-payment; the promotion of e-commerce and e-procurement in the public sector; building an e-business network for all industries; and globalization of e-commerce including bilateral and multilateral cooperation. For expanding e-business networks, the government selected 30 industries to which it will provide support. In addition, it considered e-business implementation by SMEs as a prerequisite for e-commerce growth and extended its support to 30,000 SMEs for their IT project through April 2002 (MOCIE, 2002).

In e-government, Latin American countries have a higher profile. UN-DPEPA and ASPA (2002) ranked Brazil, Mexico, Argentina, Uruguay and Chile from Latin America and Singapore, Korea and Japan from Asia as the global leaders of e-government based on the e-government index. Among these countries, Brazil, Korea, Mexico and Singapore were categorized under “transactional presence”, having realized complete and secure online transactions like obtaining visas, passports, birth and death records and licenses; online payment for parking fines, automobile registration fees, utility bills and taxes; digital signatures to facilitate procurement and business with the government; and secure sites and user passwords. Only 17 countries including the United States were evaluated under this category. The report also stated that the approach most common in Latin America, particularly in Chile and to a lesser degree in Paraguay, Argentina and Uruguay, is moving toward prioritizing service delivery to businesses, while Brazil seems to have developed an approach that was more balanced between business and citizen services.

In Brazil, e-procurement systems are in operation in federal and some regional governments. The federal government procured 20% of its goods and services via the e-procurement portal Comprasnet (www.comprasnet.gov.br), saving 4% in costs. The government has more than 160,000 registered suppliers. In Chile, it is expected that 23,000 suppliers will register to the government’s e-procurement program Chilecompra (www.chilecompra.cl) by the end of 2002. The system was used by more than 200 public entities. In Peru, the Inter-American Development Bank (IDB) has approved 8 million dollars for Peru’s e-government project, Proyecto Huascarán. 4 million dollars will be used for the e-government portal itself and 4 million dollars for the government’s procurement portal. Following Brazil, Chile and Mexico, Ecuador’s tax agency, SRI, unveiled an online tax declaration system. Businesses and individuals are able to declare value added tax, income tax and other taxes over the SRI site (www.sri.gov.ec).⁵³

⁵² SMIDEC, media release on August 22, 2002 and website, <http://www.smidec.gov.my/>.

⁵³ BNamericas.com, September 9, October 7, October 21, October 24, 2002, <http://www.bnamericas.com/>.

C. Online Trade Directory, ASP and E-marketplace: E-commerce Services for SMEs

There seem to be three measures for SMEs that will allow for their participation in networks of e-commerce and SCM. The first one is to participate in closed networks established by large firms by connecting their own networks directly to such networks. In the past, the cost to put EDI-based networks in place was too expensive for SMEs to implement. But the recent technological transition to an Internet-based system made the investment more payable. The second measure is to use open e-marketplaces or application service providers. SMEs can outsource systems, including ERP necessary for building e-commerce and SCM from an ASP. In some cases, e-marketplaces not only provide order- and bidding-related services but also consulting, payment, insurance, shipping, logistics and collaboration systems by forming alliances with professionals of these processes. The third measure is to create a network in cooperation with SMEs or with trade organizations such as the chamber of commerce.

1. ASP and E-marketplace in Asia

In developing countries, use of ASP and e-marketplaces is becoming popular, especially in the field of B2B. One of the reasons is that SMEs do not have such legacy systems as EDI. One of the famous sites in Asia is Alibaba.com. The firm, established in Hong Kong in 1999, has grown to become one of the world's largest marketplaces with over 1 000 000 registered members from more than 200 countries. Users of the website can browse information on companies and trade classified by 27 industry categories and 700 product sub-categories, ranging from textiles to electronics. Alibaba is headquartered in Hong Kong and has its operational base in Hangzhou, China with branch offices in California, London, Seoul, Taipei, Shanghai, Beijing and over 10 regional sales offices throughout Mainland China. Alibaba.com was named "Best of the Web: B2B" by Forbes magazine (www.alibaba.com). If multi-product e-marketplaces (e-commerce) like Alibaba.com with multi-industry company participation were named horizontal e-marketplace (e-commerce), those based on a specified industry with participation by firms in targeted industry and their suppliers and buyers could be called vertical e-marketplace (e-commerce). This type of e-marketplace can be found in Asia. For example, Hong Kong-based iSteelAsia.com was launched in 1999, aiming to offer an open and neutral marketplace for steel trading (www.isteelasia.com).

The providers of these kinds of e-marketplaces are very active in Hong Kong and Singapore in Asia. They are expanding internationally by using their linguistic ability in English and Chinese and human networks as leverage. Other countries in Asia are entering this high-potential market, with a special focus on their competitive export market (Ohki, 2001). In Thailand, FoodMarketExchange.com was established as the trading hub for foodstuffs. Biz Dimension, which headquarters in Bangkok, declared on their website that it makes promoting food export and supporting Thai food suppliers, especially small and medium enterprises (SMEs), its first priority (www.foodmarketexchange.com).

In Thailand, the government is also promoting e-commerce projects. "E-marketplace for exporters" is a project for export promotion, established by Department of Export Promotion, Ministry of Commerce in cooperation with the five professional website companies (Internet Venture; Psquare Network; Samart Internet; Thai Portal; We Thai Dot) in order to facilitate international trade between Thai manufacturers and exporters (www.depthai.go.th). The ministry has been working for this project since fiscal year 2001 and about 8,000 exporters are expected to join the project. Another interesting project is "ThaiTambon.com (www.thaitambon.com/)," which targeted SMEs and went officially online in June 2000. This was initiated by the Prime Minister of Thailand and coordinated by the Ministry of the Interior. What is unique is that this project has

close ties with two other projects. One of the two projects is “Tambon Net,” which will launch Internet access points in all districts and be used for e-commerce by local firms. The other is “one district one product project,” a nationwide economic policy for development of products at the grass roots level, in other words, policy for promotion of local community-based products of all districts in the country. By August 2002, 5,300 districts had already provided their information on 17,000 products and 7,000 local tourist attractions are available on the e-commerce website. Online transaction has also started in several products (AFACT, 2002, Country report of Thailand).

2. Online Trade Directory, ASP and E-marketplace in Latin America

ASP and e-marketplaces are commonly used by SMEs in Latin America. The characteristic behavior of service providers in Latin America is that they are proactive in extending their businesses to the whole region, especially to Argentina, Brazil, Chile and Mexico. This seems to be promoted by their common backgrounds that include language, and perhaps business networks and culture that have been harmonized through negotiations for regional integration. Business directories of firms in Latin America have also been uploaded to the websites such as ecuadoreports.com (Ecuador), rednegocios.cl (Chile), venexport.com (Venezuela). World Trade Point Federation (WTPF), which took over the Trade Point program created by UNCTAD in the 1990s in order to assist SMEs in developing countries with their international trade through the use of ICTs including provision of trade directories, provides a list of websites of trade points in 15 countries and in 30 cities in Latin America and Caribbean (<http://www.wtpfed.org/>).

One of the largest private directories is amarillas.com developed by the Chilean firm, Mercantil. The firm, established in Chile in 1990, launched its first online directory in 1995. In 1999, the parent company of the website operators was founded in Cayman Islands and expanded its business to other Latin American countries, including Argentina, Brazil, Mexico, Peru and Columbia. From 2002, amarillas.com was opened and directories of North America and Europe were added to the website. On Chilnet.cl, a Chilean’s business portal run by Mercantil, not only business directory but also sales channel and online advertising are provided. MercosurB2B.com, a firm in Uruguay, provides services such as MarketPlace where the firms can offer and request products, services, strategic alliances, sell a company, and look for investors, a Virtual Trade Show where they can show their products in different online pavilions and virtual stands, and B2B Postman where they can offer an Internet communications system with 600,000 companies from all over the world. It agreed with the Uruguayan Chamber of Industry (CIU) that it would favor the associates of the CIU by allowing the use of several Internet tools to search for new markets and new buyers. The chambers of commerce in each country are playing important roles in promoting e-commerce among SMEs. The Inter-American Development Bank has provided 1 million dollars to Colombia’s chambers of commerce confederation to support its efforts to promote e-commerce among SMEs.⁵⁴

ASP is also another important root for national firms and SMEs in Latin America to access to e-commerce. For example, a UK-based e-marketplace developer Directory Systems operates three e-marketplaces in Chile: Miningdirectory.com; Forestrydirectory.com; and Petrochemicaldirectory.com. These sites were designed to function primarily as a document transfer marketplace rather than a tool for natural resources companies to select the cheapest supplier. One of its devices that encourage SMEs to join the site can be found in the price list. In the case of suppliers, although they have to pay an annual subscription fee of 1000 dollars, transaction commissions will not be charged to them. In addition, it has signed agreements with SME organizations in Chile, Peru and Mexico to provide a reduced fee of 700 dollars for the first year of their incorporation with websites that operate with certified SMEs. In Chile, by adding the

⁵⁴ BNamericas.com, November 12, 2002 <http://www.bnamericas.com/>.

FAT ASP fund, a technical assistance fund that is a financial instrument of Chilean Economic Development Agency (CORFO) for SMEs to finance the use of ASP software, the cost can decrease to half. As a result of these preferential treatments, about 90% of suppliers in Latin America have become SMEs.⁵⁵

D. Initiatives for Establishment of Transnational E-commerce for Trade Facilitation

1. Interconnection of E-marketplaces: Trials in Japan

Even though SMEs are increasing their presence on the websites by participating in e-marketplace and registering company lists made by trade organizations, the majority of them have not succeeded in finding foreign partners and markets abroad. Differences in language and business culture, more complex settlement procedures for international trade than for domestic transactions, and higher transaction costs of international trade including long lead time, trade finance and insurance. To overcome these hurdles, a Japanese consortium, supported by Ministry of Economy, Trade and Industry Japan (METI) and in cooperation with other Asian countries, is conducting some experimental trials.

One trial is named e-Asia Market Place (e-AMP), promoted by seven Japanese companies (Graphic 4). The concept of the project is to connect existing e-marketplaces established in Asia via a portal named e-Hub, placed in each country in order to strengthen partnerships between Asian companies and to establish SCM across Asia. Participants can develop new business partners and use facilities to support international transactions such as automatic translation, credit information of companies and procedures for international trade. The consortium implemented an experiment with a Korean consortium in 2002.

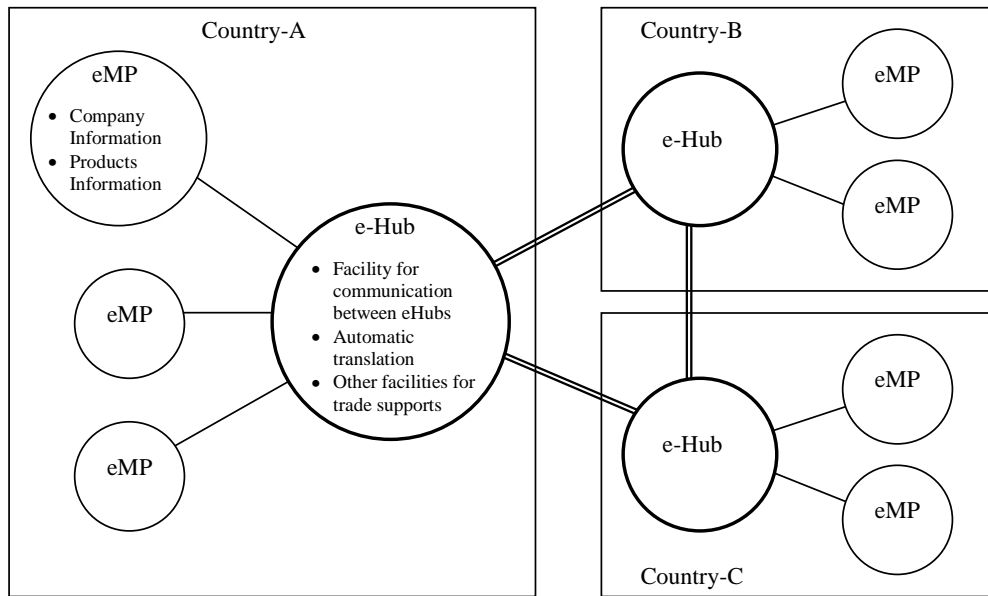
The other project in Japan financed by METI in 2001 is named “e-Asia Marketplace Fukuoka,” conceived by the government of Fukuoka Prefecture. The project envisaged that the firms in Kyushu Island in the western region of Japan would become major players of international business, transforming Fukuoka Prefecture into a gateway to Asia, and connecting Kyushu’s economy directly with Asia. In June 2002, a global e-marketplace named Nextrade was launched by a Fukuoka-based firm in partnership with two Japanese trading companies, Mitsui and Sumitomo. Nextrade has received support from e-Asia Marketplace Fukuoka Promotion Council, as well as from Fukuoka Prefecture Government, and the Fukuoka Center for Promotion of Small and Medium Enterprises. The project is aimed at developing the local economy and promoting the globalization of SMEs, whose characteristics are different from those of e-AMP (Graphic 5).

The e-marketplace was designed to fulfill the project’s concept. Firms registered to the site can make business references, ask to submit cost estimates, negotiate business terms and place orders by themselves by using facilities installed on the website. Therefore, the website provides not only facilities for automatic translation, negotiation on terms and conditions and joint purchases but also such services as trade finance and logistics by forming partnerships with trading companies. E-Asia Marketplace Fukuoka Promotion Council has officially formed business tie-ups with Hong Kong Trade Development Council (HKTDC), operating Tdctrade.com (www.tdctrade.com), and with China External Trade Development Council (CETRA), operating Taiwantrade (www.taiwantrade.com.tw), a global online trading hub designed to stimulate access to B2B for SMEs. Firms registered to F-Town (a Fukuoka prefecture’s portal), CETRA and HKTDC, can register with Nextrade to use its e-marketplace.

⁵⁵ BNamericas.com, October 17, 2002 <http://www.bnamericas.com/>.

Graphic 4

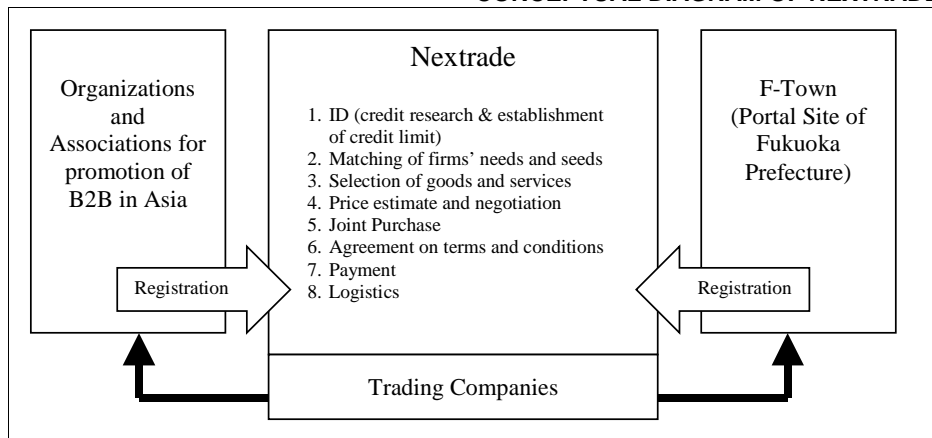
CONCEPTUAL DIAGRAM OF E-ASIA MARKET PLACE



Source: derived by the author based on information from e-AMP's website (<http://www.eamp.jp/>).

Graphic 5

CONCEPTUAL DIAGRAM OF NEXTRADE



Source: derived by the author based on information from Nexttrade's website (<http://www.nexttrade.jp/>).

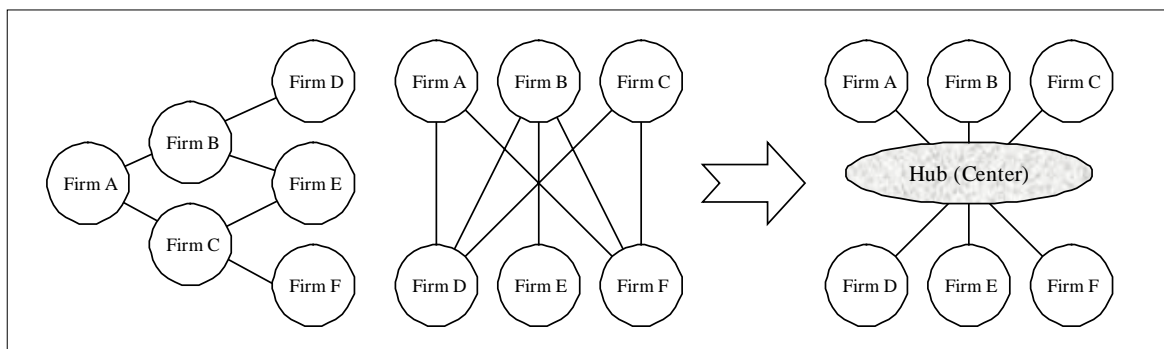
2. Establishments of Transnational Vertical E-commerce

In developed countries, each industry and leading firms in an industry have developed their own EDI standards for their related firms and small suppliers, which are enabled by leased lines and value added networks (VAN). Though these closed networks provided secure transactions, suppliers have to introduce multiple systems to connect with domestic and foreign clients using different systems. One answer to this problem was to establish a center or a hub to connect firms in

different groups, industries and countries and to streamline network topology and information flow (for an illustration of the concept, see Graphic 6).

Graphic 6

STREAMLINED INFORMATION NETWORKS FOR E-COMMERCE



In the case of the automobile industry, xNX (network exchange) has been developed in individual countries and regions where large automobile clusters have been formed, such as Australia (AANX), Europe (ENX), Japan (JNX), Korea (KNX), and the United States (ANX), in order to share a secure network among accredited participants. Following the establishments in each country, efforts for interconnections between each xNX have been made. One result of the efforts is the interconnection between ANX and JNX established in November 2002. It can be said that a step-by-step approach was taken to establish a global network in the case of automobile industry. These efforts are expected to extend, leading to interconnections between other xNXs as described by Kuwayama (2001).

In the case of the electronics industry, especially the assembly of ICT products, electronic components, distribution of ICT products and semiconductor manufacturing, there have been attempts to build a global network from scratch by setting a common standard and rule. One example is RosettaNet. It was established in the United States in 1998, and merged with Uniform Code Council (UCC) in 2002. Its participants are major PC makers, contract manufactures, distributors, resellers, foundries, material producers, and SCM solution providers from around the world. Their activities have been extended to the countries and regions where the electronics industry is agglomerated. The first such organization established outside the United States was in Japan in 2000, followed by Europe, Singapore, Korea and Malaysia. These participants can exchange information with each other in accordance with its codes via a hub installed by RosettaNet's regional organization. In addition, in China, the Ministry of Foreign Trade and Economic Cooperation (MOFTEC) has agreed to take the lead and form a RosettaNet China Promotion Group. In the Philippines, the Semiconductor and Electronics Industries in the Philippines (SEIPI) are showing interest in it as well.

It is important to note that Asian governments have promoted RosettaNet's organization and participation in its regional organization by domestic firms. In Korea, the Ministry of Commerce, Industry and Energy partially funded the development of a book titled "Emerging RosettaNet: Global E-business Standardization" by providing a grant of US\$ 16 000, announcing their support for its diffusion in Korea, and allocating US\$ 400 000 to develop a hub platform technology and gateway server based on its standards to motivate SMEs to implement it at a moderate cost. In Malaysia, the national and Penang government were actively involved in establishing the organization and promoting participation by SMEs. A 1.4 million dollars RosettaNet Grant was allocated by the government to help local companies implement it. In Singapore, the Inforcomm Development Authority not only promoted its establishment but also approved a US\$ 240 000 fund

for the development of the e-Learning Center. In 2002, a funding scheme was created specially for RosettaNet implementation projects, a program that will be valid from April 2002 to March 2003. In case of Taiwan Province of China, the government supported RosettaNet through the Institute for Information Industry (III), an agency that assists the Taiwanese government in facilitating and developing IT industry in Taiwan. These governments' promotions and supports in Asia are considered to lower hurdles and encourage SMEs to participate in the global e-commerce network (Foong, 2002).

3. E-finance for Business Facilitation: Cases in Colombia

Governments in Latin America tend to be less enthusiastic about playing roles in interconnecting private companies via Internet or private e-marketplaces for business promotion than Asian counterparts. In such environments, Colombian trade development bank Bancoldex (<http://www.bancoldex.com.co/>) implemented a pioneering experiment in 2001. Its "Virtual Bank" service enables its clients to refer to detailed information such as credit status and dates of payments. The bank has a plan to start a service to accept on-line loan requests soon after its service initiation.

Bancolombia, a Colombian bank, operates its B2B portal "Credipagos Virtual." The bank offers a credit line that allows clients to pay their suppliers through e-commerce transactions, of which services are targeted at local SMEs. Currently 1,300 firms are using the services. In addition, the bank offers another B2B application "Facturanet," which allows companies to charge their bills electronically. This service is linked with e-marketplace Todo1 (<http://www.todo1.com/>). Todo1, a Miami-based firm that was born from the strategic alliance between Venezuelan financial company Mercantil and McKinsey, also allied not only with Bancolombia but also with Bank of Pichincha in Ecuador. Depending on the alliances, the website prepares online services for B2B, B2C, online banking, international trade and so on. Business News Americas reported on the discussion for platform integration with Todo1 and a Mexican e-marketplace (on February 3, 2003).

E. Trade EDI for Trade Facilitation

The need for more speedy distribution of materials, parts, and products call for a restructuring of trade-related documents processing submitted for procedures for government, customs, finance, insurance, cargo loading and so on. If this processing cannot keep up with movements of goods, there would be a bottleneck in establishing efficient SCMs. In nature, these procedures require accurate documentation with repeated transcriptions of the same items. This will mean that these procedures can fit in well with computerization.

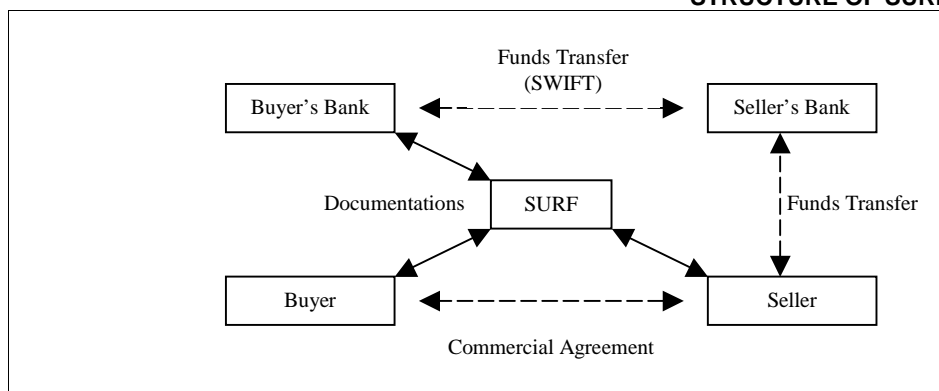
In the economic communiqué of the Lyon G7 Summit released in 1996, the G7 agreed on the need for uniform documentation, electronic transmission standards and simpler customs procedures among G7 in order to facilitate the free flow of trade, reduce costs for business and government, complement efforts in the WTO and promote growth. APEC economies agreed to voluntarily reduce or eliminate the need for paper-based documents in cross-border trade by 2005 in developed economies and 2010 in developing economies. In accordance with these political commitments, some Asian governments have worked to introduce computer-based systems to automate procedures submitted to customs and port authorities. On the other hand, there are a lot of hurdles due not only to technological aspects but also to legal and security concerns in the case of procedures related with trade finance.

One of the great strides forward for the establishment of trade finance has been the achievement of EDI by Bolero. Bolero International Ltd., the company operating bolero.net, was

founded in 1998 in order to process B/L (bills of lading) and other trade-related documentations electronically. At first it was a 50-50 joint venture between S.W.I.F.T., the industry-owned cooperative supplying secure messaging services and interface software to financial institutions, and TT Club (Through Transport Mutual Insurance Association), the provider of liability and equipment insurance to ship operators, stevedores, terminal and depot operators, port authorities, freight forwarders and other transport operators. It is said that the ownership by these two major shareholders that are representative of more than 10,000 organizations provides it with a unique neutral positioning which sets it apart from interests of a specific company, market or country.

To back up the validity of electronic transactions, it requires users to make a contract with the bolero.net Rulebook. It provides a common set of rules, including the legal rules which underpin the system, for the ability to transact electronic bills of lading, detailed operating procedures and a few operational rules involving precise and technical points of user-to-user operations. Technically it supports its own standard boleroXML to enable its users to take full advantage of e-commerce. One service provided by the infrastructure is SURF (see Figure 7). The system can automatically check all commonly used trade documents and provide settlement options.

Graphic 7
STRUCTURE OF SURF



Source: simplified pictures cited in bolero.net, and Horimai et al. (2002).

The transactions via Bolero are implemented not only between high-tech industries in developed countries but also between developing countries and developed countries. One case is that of by the Colombian Coffee Federation (FNC) (Kuwayama, 2001). Another recent case is the transaction of ore and coal between Japan and the southern hemisphere. Nippon Steel will begin using it within 2002 for transactions with Brazil's Companhia Vale do Rio Doce. It has also started testing the system with two major Australian companies, BHP Billiton Ltd. and Rio Tinto Plc. These three firms supply 75% of the iron ore and 30% of the coal that Nippon Steel uses annually. Nippon Steel will press other shipping and mining companies for work and cost reductions, and aims to boost Internet purchases of coal to more than 50%.⁵⁶ Responding to private sector initiatives, the Colombian government is proceeding to affiliate with Bolero. The government of Brazil and Chile are considering an affiliation with it.⁵⁷

Computerization of procedures for customs and port services has been promoted in Asia, which was facing the demands for rapid distribution of goods and competition between ports in

⁵⁶ Bolero.net, October 24, 2002, cited from the Nikkei Financial Daily, <http://www.bolero.net/news/inthenews/index.php3?printable=1>.

⁵⁷ Bolero.net, "bolero update," Vol.9, May/June 2002, http://www.bolero.net/japan/download/bolup_vol9.pdf.

Asia. The leaders in this field are Hong Kong and Singapore. In the case of Singapore, a first version of electronic customs clearance system named Tradenet was introduced in 1989, which was developed and operated by a private firm established by the Singaporean government, Singapore Network Services (SNS). Its name was changed to CrimsonLogic in 2002. To integrate information systems and achieve one-stop service of trade-related procedures, governmental organizations cooperated and coordinated with each other (Ohmae, 2000). Following these leading countries, Japan, Korea (KTNET) and Taiwan (Trade-van) have also developed these kinds of systems led by government initiatives. In Japan, TEDI, a pilot project of a trade finance system was implemented towards the end of the 1990s. In addition to the migration of other trade-related systems to the Internet, the Japanese government plans to achieve one-stop service of all of the procedures for international trade by using TEDI as a hub.

To achieve a seamless information flow, these countries took three approaches. One was regional cooperation. The following seven organizations organized the Pan-Asian e-Commerce Alliance (PAA): DagangNet (Malaysian); Infoshare (China); KTNET; SNS (CrimsonLogic); TEDI Club (Japan); Tradelink; and Trade-van (Hong Kong). PAA is promoting the following five projects: secure cross-border transaction services; mutual recognition of public key infrastructure (PKI); establishment of a Pan-Asian portal; cargo tracking service; and financial facilitation. The ASEAN-Japan economic partnership expert group (ACEPEG) announced a report in 2002 that included expressions calling for support of activities for trade facilitation, such as simplification, harmonization and digitization of customs procedures, and digitization of inter- and intra-corporation trade-related procedures. The second is to make connections with Bolero. KTNET has signed a strategic partnership agreement with Bolero to link Bolero's service with KTNET's trade automation services for the Korean trade community (MOCIE, 2002). Tradelink also announced collaboration with Bolero to provide Hong Kong traders with a one-stop solution for global trade.⁵⁸ The last approach is related to free trade agreements (FTAs). In the past, Asian countries, especially Japan and Korea, were not enthusiastic about forming bilateral FTAs. Facing proliferation of conclusions of FTA in other regions, these countries are changing their strategies on FTAs. In the case of the Japan-Singapore FTA named "The Japan-Singapore Economic Agreement for a New Age Partnership (JSEPA)," a chapter on paperless trading was included to strengthen cooperation, and promote the exchange of views and information, cooperation between private entities, reviews of its implementation and establishment of a joint committee.

Malaysia is keen to introduce electronic systems. Port Klang Community Services (PKCS) –an EDI Community-based system– was established in Port Klang in 1993. Malaysian Customs Administration has introduced the Customs Information System (CIS) as well as CIS-DagangNet Interface that enables EDI between CIS and its clients through DagangNet in October 1995. Followed by some projects for EDI promotion, transactions in near-paperless environment have been constructed in the port community at Port Klang, Kuala Lumpur International Airport (KLIA) and at Johor. Creation of the same paperless environment at the Penang State and the East Coast of Peninsula Malaysia (Port of Kuantan, Kuala Terengganu and Kota Bharu) is also planned. In addition to national EDI projects, Malaysia has promoted some projects to realize the exchange of electronic messages internationally as shown in the following table (AFACT, 2002, Progress report of Malaysia).

⁵⁸ Bolero.net, September 18, 2002, <http://www.bolero.net/news/pressrel/tradelink.php3?printable=1>.

Table 41

INTERNATIONAL PROJECT FOR PROMOTION OF EDI IN MALAYSIA

Partner	Project	Content
ASEAN	TEDI of Japan (ASEAN level)	DagangNet tabled the ASEAN-TEDI project as an e-ASEAN pilot project in January 2002 in order to provide "ASEAN" flavor to the TEDI. Palm Oil and Stainless Steel were identified as the pilot commodities while invoice, packing list and bill of lading were identified as pilot documents. The pilot run was scheduled for November 2002.
China Hong Kong Japan Korea Taiwan Singapore	Pan-Asian E-commerce Alliance (PAA)	PAA was founded in July 2000 by CrimsonLogic (Singapore), Trade-van (Taiwan) and Tradelink (Hong Kong). DagangNet (Malaysia), Infoshare Information Technology Development (China), KTNET (Korea), and TEDI Club (Japan) joined PAA. PAA aims to promote and provide secure, trusted, reliable and value-adding IT infrastructure and facilities to enhance seamless trade globally. PAA's on-going projects are: secure cross-border transaction key services; mutual recognition of public key infrastructure; establishment of a Pan-Asia portal (http://www.paa.net/); cargo tracking service; and financial facilitation.
Indonesia	Asian Region Customs EDI project	MOU on customs-to-customs pilot exchange of electronic messages was signed in April 2002.
Iran	Asian Region Customs EDI project	MOU on customs-to-customs pilot exchange of electronic messages was signed in September 2000.
Japan	TEDI of Japan (bilateral)	DagangNet agreed with Japanese organizations including Mitsubishi Corporation in 2001 that Dagang Net will facilitate and establish TEDI Malaysia while Mitsubishi-related business investments in Malaysia will form the pilot users. Once successful, Dagang Net will facilitate all Japanese related businesses in Malaysia while TEDI Club will facilitate all Malaysian related businesses in Japan, to participate in this project.
Korea	Asian Region Customs EDI project	The weekly exchange of the export declaration between Royal Customs Malaysia (RCM) and Korea Customs Service (KCS) is ongoing.
United States	MITI-SANCRT U.S. Customs	Since 1995, Malaysian Ministry of Trade and Industry (MITI) has been transmitting textile visa information to the U.S. Customs Electronic Visa Information System (ELVIS) by using CUSVIS message format defined by the U.S. Customs. The U.S. Customs requested MITI to switch to new format (SANCRT) by the end of 2002.

Source: "Progress Report of Malaysia," 20th AFACT Meeting in 2002.

In Latin America, the restructuring of customs authorities and regional cooperation has been underway in order to cultivate the benefits of electronic transactions. For example, since the early 1990s, Peruvian customs has carried out a reform program including introduction of more transparent legislation, change in human resource management, and introduction of information systems. As a result, the organization succeeded in reducing tariff levels, personnel and release times and increasing customs revenue (Wilson et al., 2002).

In Chile, National Customs Service has developed systems for foreign trade procedures. The National Customs Service, EDI-Chile, the Customs Chamber and value-added networks providers cooperated in order to respond to the growth in international trade. The EDI system for customs procedures, which was standardized by UN/EDIFACT, was administered by EDI-Chile. In the initial stage, the information on import statements between the national customs service and customs agents was automated. Following this, the EDI system for customs procedures was

inaugurated in the Customs Services at Talcahuano, Valparaiso and the Metropolitan Region. As the result of its success, the customs agency incorporated the remaining customs posts in the country in May 1997. As a result, more than 80% of the customs agents were using the EDI system, and more than 90% of import statements were processed automatically. As the benefit of its operation, the response time to an import statement was expected to be reduced from 48 to 2.2 hours. In addition of the development of the system, the redesign of foreign trade procedures of the National Customs Services was implemented in order to streamline the process of receiving and approving customs documents and improve supervisions. A new single form for importing goods into Chile, which reduces the forms for imports, payments and temporary entry to a single one, was to be inaugurated in 1999 (Presidential Commission on New Information and Communication Technologies, 1999).⁵⁹

Mexico expects paperless services to be available to the trading community in 2004, which is largely due to extensive works carried out to automate processes in the transport of manufactured components across the border. In Mexico, the system has decreased clearance times from 730 minutes to 65 minutes (Ministry of Foreign Trade and Economic Cooperation, Australia, 2001). On this border, another cross-border project called “Wiring the Border” was implemented by the US-Mexico Chamber of Commerce to create a virtual network of SMEs and to identify SMEs that have the potential of increasing sales, revenues, profits and employment if they became web-enabled.⁶⁰

In other countries in Latin America and the Caribbean, 26 countries have already introduced UNCTAD’s Automated System for Customs Data (ASYCUDA) from mainly the middle of the 1990s in order to develop a computerized customs management (<http://www.asycuda.org/>).⁶¹ Customs service agencies in this region will continue to restructure their organizations and develop systems that are integrated into platforms connected with systems of related agencies and private sectors in order to reap more benefits from EDI.

⁵⁹ EDI-Trade, a company providing value added network (VAN) services for transmit messages related with international trade, was founded by Customs Chamber of Chile and others in 1994. Currently, “ISIDORA (system integration by Internet for development of Customs’ operations and regulations),” a project to realize real-time transmission of customs documents to reduce cost and time, is promoted by National Customs Services (“Edi-Trade En Linea,” September 2002, www.edinet.cl).

⁶⁰ United States-Mexico Chamber of Commerce, <http://www.usmcoc.org/pro/env3.html>.

⁶¹ Caribbean (Anguilla, Antigua and Barbuda, Aruba, Barbados, Belize, Cuba, Dominica, Grenada, Guyana, Haiti, Montserrat, Netherlands Antilles, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands), and Latin America (Bolivia, Colombia, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Venezuela).

VI. Concluding Remarks

A. Prerequisites for E-commerce Growth

The data shown above suggest that the use of ICT in Latin America will increase rapidly and catch up with other regions. The fact that the penetration ratio of telecommunications, Internet and PCs has a positive correlation with GDP bodes well for the future; the penetration ratios in 2000 were too low compared to the 6-7% of world GDP produced in Latin America in 2000. However, the broadband diffusion in Latin America in a massive scale may be delayed for several years. Taking the quality of the connection into account, the real difference can be wider than the difference in figures, because the providers in the leading Asian countries have begun competition in the 8Mbps and higher speed broadband market. Latin America faces positive and negative conditions for promotion of broadband. A positive side is the high population concentration and economic activity in urban areas, which make use of ADSL and CATV Internet more feasible. The recent unstable economy can be a negative condition. Considering other business factors that indicate comprehensive readiness to e-society, Chile is improving its position. The leading countries in Latin America, namely Argentina, Brazil, Chile and Mexico, are in a better situation to promote e-businesses than Asian followers such as Indonesia, the Philippines and Thailand. Among smaller countries in the two regions, Chile and Malaysia share some common features; the small number of ICT users and relatively high penetration of ICT.

Among bigger countries, Brazil, China and Mexico have attractive sizable markets for foreign investors and advanced ICT users, though penetration ratios are relatively low.

As more people get online, B2C transactions are increasing explosively. However, contrary to actual or expected high B2C growth, not everyone is convinced of a bright future. The reasons seem to be related to large differences in the values of B2C transactions between countries and to a high concentration of these transactions in a limited number of service suppliers. In addition, there are few standardized B2C business models. Currently, many businesses are on their way to finding business models suitable to targeted markets, and some have succeeded in doing so, as in the case of GM in Brazil. An encouraging sign is Latin America's increasing share (now 4%) of in the world B2C market. Though this percentage is about half of the region's share in world GDP, the same applies to the Asia-Pacific region, whose participation in world B2C and world GDP in 2001 reached 13% and 28%, respectively.

B2B is considered a promising area. The prospects for the transactions are several times bigger than those of B2C. The leading sectors in B2B use are finance, retail and distribution, and leading export industries. These features are common to Asia and Latin America. In the areas where e-commerce is applied to service industries, Latin American countries are promoting it strongly. Brazil's e-finance is one of the most successful cases worldwide. In contrast to these positive aspects, the share of Latin America in world B2B transactions is expected to reach only 2%, much less than the over 10% rate for Asia. The underlying reasons for different B2B levels include, among others, the difference in industrial sectors, especially in the leading export sectors, the roles played by multinational companies in the structure of international division of labor, and the degree of regional economic integration. Historically, export manufacturers, such as those of automobile and electronics, have used EDI for document processes like procurement via leased line, which today are evolving into Internet-based SCMs. This is true for of Latin America, where large exporters, mainly in primary products, have begun introducing e-procurement systems. The Asian advantage in B2B originated from the accumulation of these processing manufacturing sectors and organization of inter-regional production networks. In Latin America, only Mexico has significant experience with these networks. Though these industrial sectors are also found in Brazil, their SCM networks with the Asian exporters and producers are scarce and weak. Without these production networks that will make multiplier effects on B2B transactions, the potential of B2B would remain limited. To gain the benefits of B2B, Latin American firms should make ties with Asian production networks stronger. In addition, more firms have to participate in production networks in the regionally integrated economy.

To harvest potential benefits of e-commerce, the computerization of firms is indispensable. Data on the EU show that there are large differences in the level of PC and Internet usage, establishment of own websites and implementation of e-business. In addition, ICT use by the private sector is relatively new; even in developed countries such as EU and Japan, many firms started using them toward the end of the 1990s, and the leading countries in Latin America did the same at the end of the 1990s. A comparison of their penetration ratios also shows that firms in Latin America are not far behind the firms in the EU and Asia, which suggests a great possibility of e-business diffusion in the region.

With respect to SCM implementation, large gaps still exist between firms and between countries, although multinational firms began introducing transnational information sharing and SCMs. The low penetration of e-commerce into SMEs hinders front-runners of SCMs such as large national firms and MNCs from establishing complete SCMs and deepening them. The existence of these bottlenecks makes it difficult to share information and distribute materials and products punctually and speedily. As a result, participants in an SCM are restricted to large multinational firms and their group firms within relatively small areas and regions. What should be noted,

however, is that some micro firms are advanced users even though smaller firms as a whole tend to be less ICT-intensive. This may imply that micro firms' simpler structure of organization and information sharing, and decision-making from the top down might enable them to establish information systems at lower costs or to use them more intensively.

Online international transaction networks within and across regions should be encouraged. This task seems to be more challenging than mere informatization of SMEs and their involvement in SCMs, as shown by the experiences of Japanese firms. For transnational e-commerce to flourish, there are several prerequisites to be fulfilled on both sides of trade partners and countries in the areas of security, payment, business procedures and technical standards, and customs procedures and arrangements. As can be expected, complying with obligated procedures on international trade can be more burdensome for the public and private sectors of developing countries. In addition to these challenges, there seem to be problems that are specific to SMEs. They do not have sufficient marketing capabilities to attract foreign clients to their websites. Nor do they possess enough know-how and human resources to deal with complicated document procedures for international trade, and credit worthiness necessary for international transactions. To overcome these hurdles, individual firms, business consortiums, regional and national governments and international organizations are trying experiments and policies, or working to establish related rules and standards. The countries of Latin America and the Caribbean should actively participate in the rule-making process.

B. Policies for E-commerce Development

In order to develop e-commerce in Latin America rapidly and efficiently, some policies and strategies will be necessary. Current conditions, advantages and disadvantages in Latin America compared to other regions should be assessed and taken into consideration for policy implementation. In addition, detailed studies on both best practices and examples of failures in Latin America will provide interesting policy prescriptions. This paper, though of an exploratory nature on the issue of e-commerce of Latin America and the Caribbean, outlines the following policy areas:

Well-defined policy target

In various surveys, many SMEs answered "no need" or "no use by clients/providers" as a reason for not introducing e-commerce. Some SMEs do not find any specific need to use it. In the case of EDI, more than 90% of the Japanese firms that deal with more than 5 000 monthly transactions have introduced the system already. Despite lower initial costs of the Internet-based systems, fixed costs to introduce and maintain the systems still remain extremely high for many SMEs. Those firms without frequent transactions are not motivated to introduce the systems. However, as argued in the paper, frequent and relatively large transactions involving SMEs with MNCs and among SMEs themselves entice potential users to introduce the systems. Therefore, in order for e-commerce to be an effective business tool for SMEs, a double track approach should be adopted: i) promotion of SCM networks of MNCs that involve SMEs in production and marketing and distribution; and ii) creation of a critical mass of SMEs as ICT users in SCM-related activities. The lack not only of SCM networks but also of a critical mass can be understood as a kind of market failure that causes a negative chain reaction. Policies should be implemented to avoid this market failure.

Policy flexibility

Adoption pattern of ICTs and e-commerce have been very different by size of firms and by industrial sectors. To deal with the diversity, policies should be designed to make SMEs respond to

changes in economic conditions and technological progress in a flexible manner. To achieve this, information sharing among firms and the governments in charge of policy design and implementation will be indispensable. Business organizations and governments should also cooperate in this process by identifying the difficulties faced by firms, their policy needs, and market and technical trend analysis.

Support to increase SME presence in e-markets

Even after SMEs establish their online presence, they do not necessarily succeed in finding new clients and suppliers. This is because SMEs are often recognized as online strangers. Generally speaking, they do not have enough presence to attract new clients, enough confidence to attract clients and suppliers and capability to negotiate with foreign firms to close trade deals. Governments, business organizations and portal sites can provide support measures against these problems.

Measures for cutting transaction costs

Before finalizing international transactions, piles of complicated paperwork and arrangement of international logistics service are necessary. These procedures will be burdens for SMEs to promote e-commerce. Paperless trade is expected to decrease these trade-related costs. In addition, these simple, standardized and/or harmonized regulations and procedures will decrease the costs and make the government's involvement more transparent. Additional benefits are a cost reduction in implementing paperless trade that might arise from developing interoperable systems among organizations related to trade facilitation in different countries. There exist strong "economies of network" in having a paperless trade system implemented by as a large number of countries and trade facilitation organizations as possible based on a standardized/harmonized format. At the same time, logistics providers can build partnerships with e-commerce promoters, including business organizations. Further efforts to simplify and/or harmonize the trade facilitation measures will enhance further intra-and inter- regional economic integration.

Financial support

From the viewpoint of developing countries, there are several financial aspects that can be considered as important barriers in actively participating in e-commerce and carrying out completely ICT-driven trade. In general terms, high priority has been given to financial support for investment in ICT equipments and services, with the result that more SMEs have introduced PCs. Concerning ICT-driven trade, private service suppliers such as bolero.net began providing e-finance services mainly to large scale firms. But SMEs without international credit worthiness or bank accounts may not be able to use these kinds of financial facilities. To facilitate international trade, a project, originally conceived as a purely provincial one in Japan, has successfully created a regional partnership with several trading companies and extended their services to other Asian countries such as the Chinese Province of Taiwan, and Hong Kong (China). Latin American countries should also try to find adequate solutions to the Internet era by examining the experiences in other regions and assessing financial environments of and options available for the proper region.

C. Strategies for Cultivating Latecomer Advantages

E-commerce has been most diffused among financial institutions, wholesalers, retailers and distributors, and leading export manufacturers such as automobile and electronics in developed countries. In the case of the manufacturing sector, the established information networks for procurement and SCM are expanded to connect with those of developing countries. Facing the

limits of individual efforts to improve supply chain management, MNCs are forming alliances to establish common standards for data interchange. What is important for developing countries is to take advantage of being later comers to promote informatization of these industrial sectors to a level similar to that of developed countries. In doing so, a true leap-frogging in SME's informatization and their incorporation into SCM systems can be achieved. To reap latecomer advantages, the following strategies can be implemented.

Selection of a *de facto*-MNC-based standard or national standard

There is consensus that technical standards should be guided by competition among different standards. This may be true of the selection of “e-business” standards. Nonetheless, as MNCs are facing difficulties in coordinating such standards within the company and with other companies and integrating their management with information systems, it will be very difficult for these MNCs to respond to changes in standards once a standard is introduced. Quick and frequent changes in standard adoptions incur heavy costs for SMEs while SMEs might be more flexible to accommodate these changes. In the case of businesses dominated by foreign MNCs, it might be better to promote a standard established by MNCs to be adopted by national firms. By introducing it, firms in developing countries can introduce e-commerce and SCM at lower costs speedily. By participating in such activities, firms in developing countries can exert influence on the decision regarding the standards in order that their own business preferences will be reflected in the subsequent standards.

Usage of information collected in advanced regions for transnational e-commerce

Low levels of e-readiness in developing countries are one of the hurdles in establishing efficient supply chains. Despite this, in order to close the digital divide in the corporate sector, developing countries can use information and networks that have been developed in developed countries. Substantial leapfrogging is possible when the producers and exporters of developing countries can access the information chain run by developed countries' agents who collect and process valuable information on final consumers there. It is crucial that there are no ruptures in cross-border information flows; useful information on final consumers of a developed country should be effectively translated into useful production information for a developing country agent who is at the other end of the information chain. This continuous information chain will also facilitate precise control of production and inventory. To reap these benefits fully, information systems among the firms should be interoperable with those systems in developed countries, in order to optimize internal business management. Based on these systems, firms in Latin America can take advantage of new opportunities to form closer ties with these attractive markets.

Shared bases for promotion of intra- and inter-regional e-commerce

E-commerce and SCMs operate more efficiently when traders and exporters across countries work with a common base or standard. For example, language diversity in Asia is one of the serious barriers to e-commerce and regional market integration, and in that sense, automatic language translation capacities of e-commerce programs have provided an effective solution to this problem, giving a strong push to intra-regional e-commerce. Intra-regional e-commerce has also been facilitated by the interconnection of customs and trade facilitation systems that are available to the majority of the countries in the region.

With respect to regional integration, Latin America is a forerunner. Based on a common language and propelled by trade and investment liberalization efforts and integration of regional markets, many large Latin American firms are expanding their businesses in their own region. Despite more advanced stages of regional integration on many fronts than Asian countries, Latin

American regional trade has been on a declining trend in recent years, due mainly to the precarious economic situations and partly to persistently high infrastructure costs (e.g., transport, telecommunications and others). In order for e-commerce to flourish at the regional level, transaction costs must be reduced substantially not only in the area of infrastructure but also in that of trade facilitation. In this respect, more enhanced information systems on trade facilitation at the regional level are desirable. However, these networked infrastructures can work to promote intra-regional trade only when there are coordinated rules and standards in the framework of regional integration schemes. The task of building common rules and standards on a regional level should be coordinated with similar ongoing processes in other regions of the world, which includes Asia-Pacific. In order for e-commerce to be a true instrument for strengthening economic relations between Asia-Pacific and Latin America, the countries in both regions should work together on many issues relating to e-commerce, including rules and standards.

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