

**Information and Communication
Technology (ICT) for development of
small and medium-sized exporters
in Latin America:
Colombia**

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IDE-JETRO

This document was prepared by André Kublik Walter, consultant of the International Trade Division of the Economic Commission for Latin America and the Caribbean (ECLAC). This is the complete version of his summary paper, which forms part of the book "Information Technology (IT) for Development of Small and Medium-sized Exporters in Latin America and East Asia", compiled by Mikio Kuwayama, Matsatsugu Tsuji and Yasushi Ueki, 2005. The views expressed in this document, which has been reproduced without formal editing, are those of the author and do not necessarily reflect the views of the Organizations.

United Nations Publication

LC/W.49

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Printed in Santiago, Chile – United Nations

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Abstract

With the advent of globalization and possible free trade agreements with the United States and the European Union, as well as other agreements at the regional and hemispheric levels, such as MERCOSUR and the Free Trade Area of the Americas (FTAA), small and medium-sized enterprises (SMEs), which represent more than 90% of Colombian companies, need to adapt to a new type of competition. They must incorporate information and communication technologies (ICTs) in order to promote the country's export capabilities and prepare for the new challenges that lie ahead.

In a very short period of time, ICTs have become one of the priorities of the Colombian Government and business community. They have made significant inroads in both the public and private sectors of Colombian society, which have begun to incorporate the new technologies into their activities.

In the International Institute for Management Development (IMD) World Competitiveness Yearbook of 2004, Colombia is ranked at number 41 among 60 countries, and in the Global Competitiveness Report of 2003 of the World Economic Forum, it is ranked at number 51 among 102 countries. Colombia thus occupies an intermediate position in competitiveness rankings, indicating that progress has been made in the last few years. Significant improvements have been made in ICT-related legislation, Internet access and ICT promotion on the part of the Government and private actors.

Government initiatives have been decisive in bringing about this process. Colombia has a programme known as the Connectivity Agenda (2000), which has progressed well beyond theory to a concrete plan of action. Different stages of the programme have been implemented in both the public and private sectors, though its focus hitherto on the public sector means that SMEs have yet to see clear benefits. However, within Latin America, Colombia is a latecomer in the area of ICTs, and unfortunately has not made up much ground in recent years. Colombia has the second largest population in South America, but accounts for only 4.5% (www.Emarketer.com.), of its Internet users.¹ This can be attributed to economic, social and cultural causes, such as language barriers and lack of training programmes.

¹ Note that most of the data and information presented in this paper were compiled before July 2004.

I. Current ICT market situation and ICT use by SMEs

A. The digital divide

“Digital divide” is the term used to describe the gap between countries that have access to ICTs (telephones, computers, Internet access) and related services and those that do not. According to a number of studies conducted by Connectivity Agenda and international agencies (World Bank, the International Telecommunication Union, Harvard University), Colombia is at an intermediate or incipient stage in ICT development. Its position is improving, however, and, as we will see later in this document, it is expected to reach Latin American standards in the not-so-distant future. The most common variables used to measure ICT levels are access to technology, educational status, economic factors and the political situation.

B. Market estimates of ICT investment levels

Colombia is at the lower end of the scale in terms of per capita investment in computing technology. In 2003, this figure was US\$ 39, whereas Argentina invested US\$ 98 per capita even in 2001 (the worst year of its recent crisis), Venezuela invested US\$ 72, Mexico US\$ 77 and Brazil US\$ 108 (CCIT, 2004).

1. Telephony

a) Fixed lines

Local telephony in Colombia expanded strongly in the last decade, registering an annual growth rate of 10.4% in installed lines, which doubled the country’s capacity in nine years. The number of fixed lines in Colombia increased from 2.8 million in 1991 to 8.7 million in 2003 (ITU, 2004).

Colombia has a density of 20.03 telephone lines in service for every 100 inhabitants. Installed lines are highly concentrated in the country’s four largest cities (Bogotá, Medellín, Cali

and Barranquilla), which reflects on Internet use. In 2000, these four cities accounted for just 28% of the population, but they had a total of 3.4 million subscribers, or approximately 49% of the lines in service (CRT, 2003). Colombia is an urbanized country today, with most of the population living in or near cities. This is an important factor to consider in increasing and expanding ICT use.²

TABLE 1
TELEPHONE LINES

	Main telephone lines (thousands)		Per 100 inhabitants
	1998	2003	2003
Argentina	7 323	8 009	21.88
Brazil	19 986	38 810	22.32
Chile	3 046	3 467	23.04
Colombia	6 366	8 768	20.03
Mexico	9 926	14 941	14.67
Peru	1 555	1 839	6.71

Source: “Telephone lines”, International Telecommunications Union (ITU), 2004, online <<http://www.itu.com>>.

b) Mobile telephones

Mobile telephony has become one of the most important services in the telecommunications sector because of growth in subscribers and billing. Revenues of mobile telephone providers add 22% to the sector. From June 2002 to June 2003, the number of subscribers increased by 35%, from 3.8 million to 5.8 million. This growth continued into the second semester of 2003, with the entrance of a new service provider. As well, average rates dropped 13% in 2003, which increased the number of minutes per call (CRT, 2003).

TABLE 2
CELLULAR MOBILE SUBSCRIBERS

	Subscribers (thousands)		Per 100 inhabitants
	1998	2003	2003
Argentina	2 530	6 500	17.76
Brazil	7 368	46 373	26.36
Chile	964	6 445	42.83
Colombia	1 800	6 186	14.13
Mexico	3 349	25 928	24.45
Peru	742	2 908	10.61

Source: “Mobile subscribers”, International Telecommunications Union (ITU), 2004, online <<http://www.itu.com>>.

² Bogotá, the capital, has 7 million inhabitants; three other cities, Medellín, Cali and Barranquilla, have 2 million each. The other four cities have more than 500,000 inhabitants each. There are 23 cities in Colombia with 100,000 inhabitants each (Coinvertir 2004).

2. Internet use

a) Overview of Internet use in Colombia

There are an estimated 2.7 million Internet users in Colombia, well above the projections of previous years. Despite this rapid growth, the number of users remains below the figure recorded in the most Internet-intensive countries in Latin America. The number of computers per 1,000 inhabitants is 34, compared to an average of 50 in the rest of Latin America (CCIT, 2004), and this number might even drop because of a law enacted in January 2004 which levies value added tax (VAT) on computer purchases. Prior to this computers were tax-free and their low prices encouraged use. A study by the Colombian Chamber of Information Technology and Telecommunication (CCIT) found that the measure had pushed up prices and therefore decreased computer penetration figures, especially for households and SMEs. By contrast, Internet use across Latin America is expected to increase rapidly.

TABLE 3
PROJECTED INTERNET USERS IN LATIN AMERICA
(In millions of users)

Country	2001	2002	2003	2004
Argentina	1.5	2.0	2.5	3.0
Brazil	6.1	8.8	12.5	16.4
Mexico	2.3	3.2	4.6	6.4
Rest of region	5.5	8.0	11.4	15.0
Total	15.3	22.1	31.0	40.8

Source: On the basis of information provided by the Telecommunications Regulation Commission (CRT), Bogotá, D.C., 2003.

TABLE 4
INTERNET USERS IN COLOMBIA

Date	Dial-up	Dedicated lines	Total users
December 2000	692 076	180 894	872 970
June 2002	1 105 803	490 749	1 596 552
December 2002	1 329 495	670 718	2 000 213
June 2003	1 992 642	739 559	2 732 201

Source: On the basis of information provided by the Telecommunications Regulation Commission (CRT), Bogotá, D.C., 2003.

b) Locations of Internet access in Colombia

Statistics show that Colombians usually use the Internet from their homes. Households account for 49% of use, workplaces 41% and schools 10% (NAP Colombia, 2004). This pattern of Internet use is observed in most Latin American countries.

Colombian users have yet to fully explore the multiple options offered by the system, such as telemedicine and business-to-consumer (B2C) commerce. The preferred use of the Internet is for navigation, at 42%, followed by e-mail at 30% and other uses at 28% (NAP Colombia, 2004).

3. Hardware and software

The hardware and software markets have grown in step with needs for information, and they are an important factor in the country's ICT development.

Hardware use in Colombia has increased in recent years, but has been affected by the adverse economic situation. The number of PCs per 1,000 inhabitants rose from 18 to 34 between 1995 and 1997, dipped to 28 in 1998 and increased again to 31 in 1999. Microsoft-Colombia estimated the total number of computers in Colombia at between 1.25 million and 1.3 million in 1999.³

Hardware supply and services are provided mainly by multinational companies. Their clients fall into three main groups: households, SMEs and large clients that include corporations and the Government. Hardware supply companies have found that households, especially those higher up the economic scale, have been a strong factor in driving demand, as needs for Internet increase.

The national software industry distributes and markets major world software brands, produces a certain amount of product and service packages for local markets and develops packages for specific client needs. Growth continues to be focused on local market sales, while potential revenues from exporting these services are expected to be small.

Nonetheless, the production of local software is one of the most promising areas of Colombia's ICT sector. A growing number of local companies have consolidated and developed a capacity to respond to the demand for software within the country, and they have even begun exporting. Although trade in this segment is still in deficit, the industry's development strategy is likely to bring it towards a balance in coming years. Colombia now exports approximately US\$ 25 million in software and is seeking to increase this to US\$ 2.4 billion within five years, though this goal is still distant.

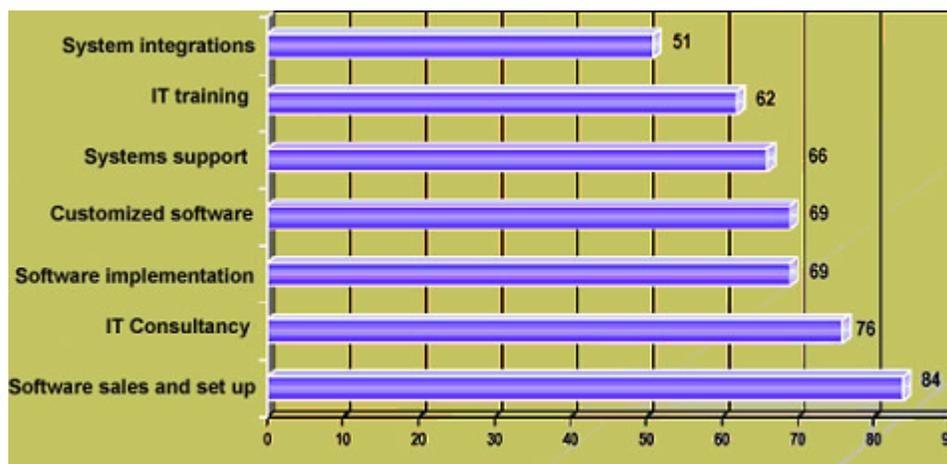
It could be achieved, however, if the country continues to apply strategies similar to those used in other countries, the Government is to roll out a project entitled Creation of International Colombian Companies of Software and Related Services, which is a public-private effort by: Digital Colombia Corporation (CCD); National Service of Apprenticeship (SENA); the Export Promotion Office (PROEXPORT); Sergio Arboleda University, and Universidad Piloto de Colombia, in collaboration with other agencies. The project also comes within the framework of one of the Government's broader priorities, which is to promote the creation of new companies and hence generate employment opportunities in the software industry and related services. Importantly, almost 41% of Colombian software companies are SMEs. While large corporations tend to hire consultant firms to meet their software needs, SMEs, with their limited resources, usually prefer domestically produced software, which is generating a growing demand for this type of service.

4. Related industries

Along with ICT growth, the services market has expanded significantly in recent years. These main segments of this market are the consultancy areas of implementation, operations administration (outsourcing), training and support. This area will grow as ICT use expands and becomes more integrated.

³ World Bank; Microsoft-Colombia.

FIGURE 1
MAIN SERVICES OFFERED BY SOFTWARE COMPANIES



Source: On the basis of information from the official website of the Colombian Federation of Software (FEDESOF), 2003, online <<http://www.fedesoft.org>>.

5. E-commerce

The Government has taken a number of steps to support the development of e-commerce in Colombia. One is the enactment of Law 529, also known as the Law on Electronic Commerce, which allows data messages to be recognized under the law. It also regulates e-commerce, creates certification agencies and allows digital signatures. The law confers the same contractual and legal validity on electronic data transfer as to hard copies. For a digital signature to be valid, it must be verifiable, controlled solely by the person using it and linked to the information or message being transferred. Certifying agencies (local or foreign) must be authorized by the Superintendence of Trade and Industry. These legal steps have been accompanied by a flat rate for Internet connection and the creation of an official body (CERTICAMARA) to certify the security of digital transactions.

Banks have been among the first Colombian enterprises to adopt ICT, by offering online client services. Bancolombia has been one of the driving forces behind e-commerce, creating online payment systems that are used by established companies with virtual stores on the Internet. All Colombian companies with more than 100 employees have an Internet connection, 87% have a website and 36% developing e-commerce solutions in the form of websites and extranets. This is reflected in the growth of e-commerce (Bogotá Chamber of Commerce).

Despite the progress made in recent years, the e-commerce market in the country is still incipient. A survey by the Chamber of Commerce shows that of 2,500 companies engaged in some type of commercial activity, 75% have access to the Internet, but only 20% use it for business-related activities and barely 9% for e-commerce.

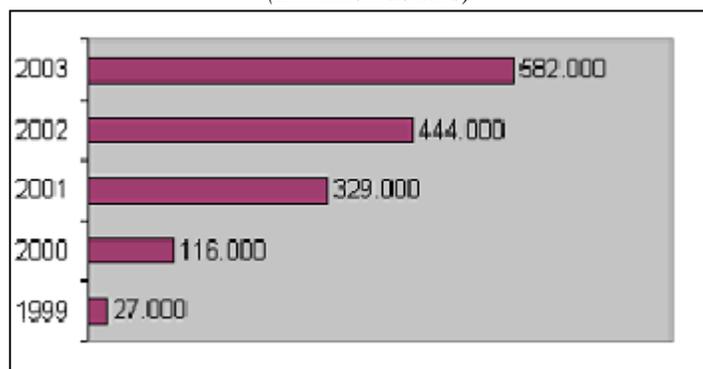
a) Business-to-consumer (B2C) commerce

Colombia is in a similar position to the rest of Latin America with regard to B2C commerce, in that interest in using new technology to purchase products and services is growing, but three main factors are slowing development. The first is a fear of conducting economic transactions with credit cards. Second, the products and services offered online are not competitively priced compared to traditional purchases. Third, services are expensive and delivery is poorly organized or unreliable.

b) Business-to-business (B2B) commerce

Efforts to create mechanisms to facilitate e-commerce have increased, as both the Government and the private sector are supporting major projects. Connectivity Agenda, CONFECAMARAS and the Bogotá Chamber of Commerce are developing a programme known as Prymeros, which is designed to help firms adopt viable trade models that use ICTs to meet specific needs. A 2001 estimate suggested that the number of e-commerce transactions would grow continuously at least up to 2003 (figure 2).

FIGURE 2
PROJECTION OF E-COMMERCE TRANSACTIONS IN COLOMBIA
(In million dollars)



Source: On the basis of information from the official site of eMarketer, 2001, online <<http://www.eMarketer.com>>.

TABLE 5
INTERNET SALES IN LATIN AMERICA, 2001
(In percentages)

Brazil	27.0
Argentina	21.0
Mexico	21.0
Chile	15.4
Venezuela	9.3
Colombia	6.2

Source: On the basis of information from the official site of eMarketer, 2001, online <<http://www.eMarketer.com>>.

C. ICT and e-commerce penetration by SMEs

The Government defines an SME as a company with 11 to 200 employees and assets of less than 5.3 billion pesos (US\$ 1.9 million) (Colombia, 2000). Table 6 gives the definitions of micro-, small and medium-sized enterprises by assets and number of employees. The concept of SME covers a wide range of firms, and Colombia's definition does not necessarily coincide with that of other countries in the region: a company defined as a micro-enterprise in one economy could be considered as a small or medium-sized company in another.

TABLE 6
CLASSIFICATION OF MICRO, SMALL AND MEDIUM-SIZED
ENTERPRISES UNDER LAW 590

Size	Assets (US\$)	Number of employees
Micro	< 66 000	< 10
Small	66 000 to 662 000	11 to 50
Medium	662 000 to 1 900 000	51 to 200

Source: On the basis of Colombia, Law 590, Bogotá, D.C., 10 July 2000.

Unfortunately, few data exist on the use of ICTs by SMEs in Colombia, notwithstanding serious data collection efforts in recent years. The National Statistics Administrative Department (DANE) takes periodic surveys of micro-enterprises and SMEs by sector (services, manufacturing and commerce). These surveys show that Internet use is increasing and that 90% of companies will soon be connected by dial-up or other types of access. Many SMEs do not yet have their own website, however. B2B commerce is increasing, although the use of online payment platforms is still being consolidated. Interestingly, the surveys also show that the manufacturing sector is the largest user of the Internet.

TABLE 7
SURVEY OF MICRO-ENTERPRISES AND SMES, BY SECTOR
(In percentage of companies)

Services	
Company website	14.8
Connected to Internet	65.0
Dedicated ICT staff	9.3
Services available through website	
Marketing of product to clients (B2C)	66.8
Marketing of product to industry	8.0
Online payments	3.2
Delivery and orders, online processing	11.7
Capacity to offer secure transactions	2.6
Other	34.3
Manufacturing	
Company website	25.67
Connected to Internet	70.11
Dedicated ICT staff	19.68
Services offered through website	
Marketing of product to clients (B2C)	51.78
Marketing of product to industry	15.85
Online payments	10.88
Delivery and orders, online processing	-
Capacity to offer secure transactions	-
Other	46.06
Commerce	
Company website	9.2
Connected to Internet	51.9
Dedicated ICT staff	24.7
Services offered through website	
Marketing of product to clients (B2C)	42.3
Marketing of product to industry	8.0
Online payments	7.8
Delivery and orders, online processing	7.8
Capacity to offer secure transactions	7.8
Other	10.5

Source: National Statistics Administrative Department (DANE), “Estadísticas e indicadores de los sectores manufacturero, servicios y commercial, tecnologías de la información y la comunicación”, Bogotá, D.C., July 2002.

A recent, more in-depth study conducted by Universidad de Los Andes, the Colombian Ministry of Trade and Connectivity Agenda reached the following conclusions:

- (i) The SMEs examined tend to outsource ICT support, which has proven a successful strategy in most cases. This trend has helped to scale down or do away with computing areas within SMEs, which often have only one or two professionals, since the development and sometimes the production of ICTs is contracted out to a third party.
- (ii) Boards of directors dominate decision-making and technical staff have little autonomy. Boards make decisions based on very little analysis, which otherwise might provide economic grounds for adopting ICTs.
- (iii) SMEs are fairly cautious about investing in ICTs.
- (iv) Companies are not aware of the potential impact on their business of ICTs, although they do recognize the benefits to some extent. They identify benefits in the areas of production and manufacturing in terms of reducing paperwork, improving management control and coordination, increasing flexibility, aiding decision making and improving communications with clients.

ICTs are very little used as sales or marketing tools in the commercial and marketing departments of SMEs.

Due to Colombia's economic situation in recent years, with a depressed domestic market forcing firms to compete in the global economy, many SMEs have become more export-oriented. This has obliged them to upgrade their technological infrastructure in order to communicate with foreign customers and interact more effectively with more technologically advanced clients.

II. SMEs in the ICT revolution

A. SMEs within the economy

Different studies show that the bulk of SMEs belong to the services and manufacturing sectors. Important segments within manufacturing are the clothing industry, leather working, metal mechanics and auto parts.

Table 8 shows SME-related indicators comparing Latin American countries to the United States, Canada and the European Union by total number of establishments, percentage of gross domestic product, job creation and share in total exports.

TABLE 8
MACROECONOMIC PARTICIPATION OF SMEs, 2001
(In percentages)

Country	Job creation	GDP	Total exports
Argentina	78.0	60.0	15.0 ^a
Brazil	63.0	20.0	9.0
Colombia	60.0	40.0	< 5.0
Chile	74.0	23.7	4.8 ^a
Mexico	78.0	69.0	2.0 ^a
El Salvador	25.0	15.0	
Peru	75.0	44.0	Nd
United States	52.0	55.0	11.0
Canada	Nd	57.0	10.6
Europe Union	70.0	60.0	40.0 ^b

Source: On the basis of information provided by Organization for Economic Co-operation and Development, Small and Medium-sized Enterprises (OECD), June 2000.

^a Kuwayama, 2001.

^b In Italy.

As table 8 shows, SMEs do not yet command a large share of total exports. This is especially true for SMEs in Latin American countries, as these firms have ventured onto the

international markets relatively recently. Colombia's market liberalization began in the late 1980s and early 1990s. Many companies went bankrupt or closed down around this time, but those that were more flexible adapted to the new circumstances. In general, SMEs have been relatively dynamic, especially since 1999.

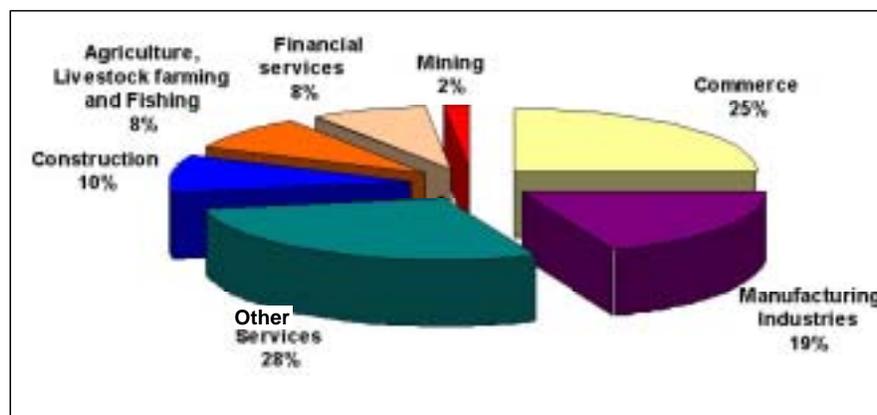
A breakdown by sector (table 9) shows that SMEs dominate manufacturing in Colombia, yet the services sector (particularly commerce) accounts for the largest number of micro-enterprises and SMEs, according to market-share estimates for 2001 by the National Association of Financial Institutions. In this respect, Colombia's SMEs are very similar to SMEs across the region.

TABLE 9
SHARE OF SMEs IN NATIONAL PRODUCTION, BY SECTOR, 2001
(In percentages)

Sector	Medium companies	Small companies	Total production by SMEs
Furniture and accessories	44.06	45.30	89.36
Leather industry and products	49.60	37.67	87.27
Food	52.76	21.48	74.24
Footwear and their parts	29.75	37.72	67.47
Plastic products	50.43	14.69	65.12
Wood industry and products	41.35	21.26	62.61
Metallic products	37.08	25.11	62.19
Garments dressing	32.42	27.59	60.01

Source: National Statistics Administrative Department (DANE), Encuesta Anual Manufacturera (EAM) 2001, Bogotá, D.C.

FIGURE 3
SECTORAL PARTICIPATION OF SMEs, 2001



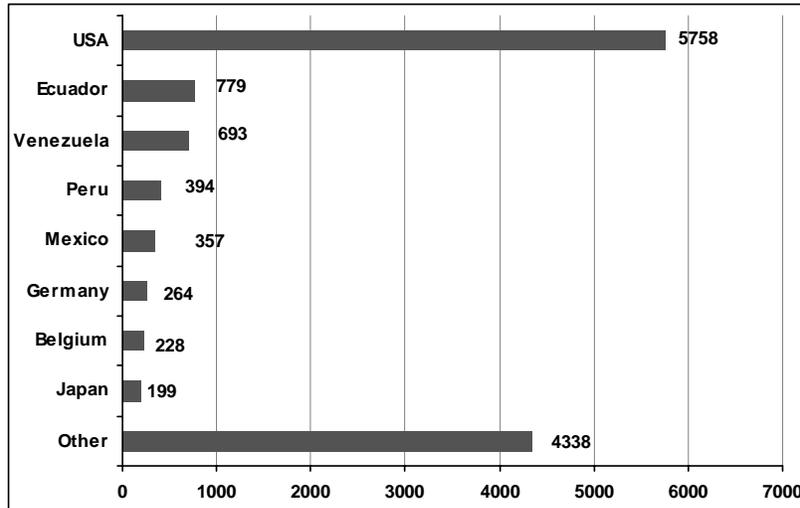
Source: On the basis of information provided by National Statistics Administrative Department (DANE), Bogotá, D.C., Central Bank, 2001.

- Overview of external markets

The United States is Colombia's largest export market, for large firms and SMEs alike, followed by neighbouring Andean countries and a number of European Union members. This export pattern explains Colombia's serious efforts to sign free trade agreements with the United States, the European Union and the Southern Cone countries (see figure 4). The main export

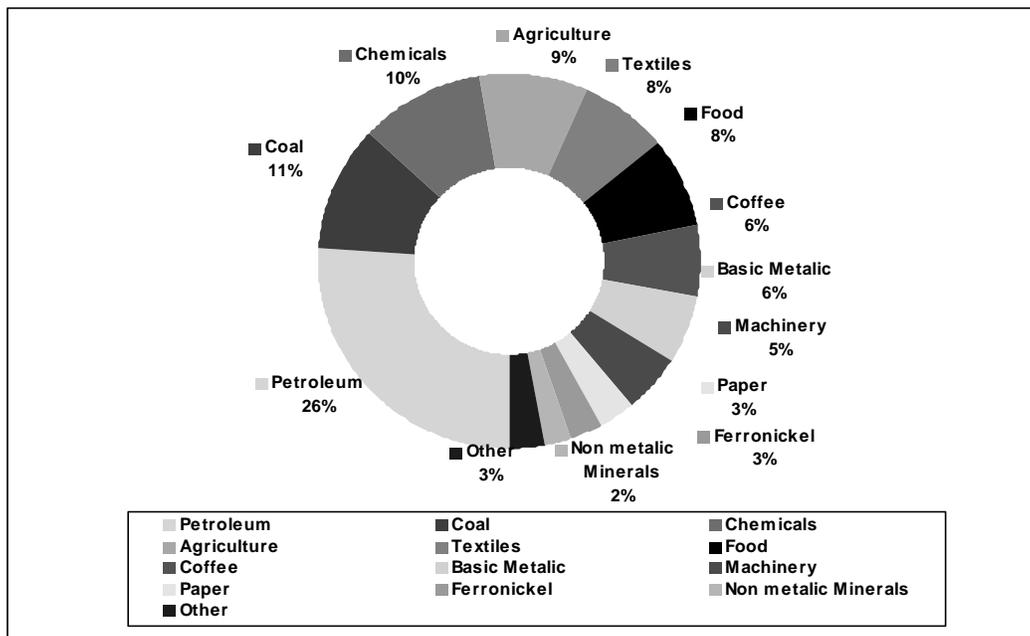
products are also a reflection of the main production sectors of the economy as a whole, dominated by petroleum and agribusiness (figure 5).

FIGURE 4
COLOMBIAN EXPORTS, BY COUNTRY, 2003
(Total US\$13.01 Billion)



Source: On the basis of information provided by National Statistics Administrative Department (DANE), Bogotá, D.C., Central Bank, 2001.

FIGURE 5
COLOMBIAN EXPORTS BY MAIN PRODUCTS, 2003

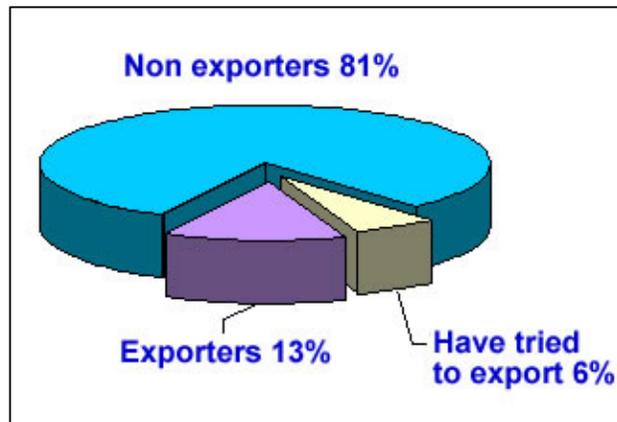


Source: On the basis of information provided by National Statistics Administrative Department (DANE), Bogotá, D.C., Central Bank, 2001.

B. SME performance in external markets

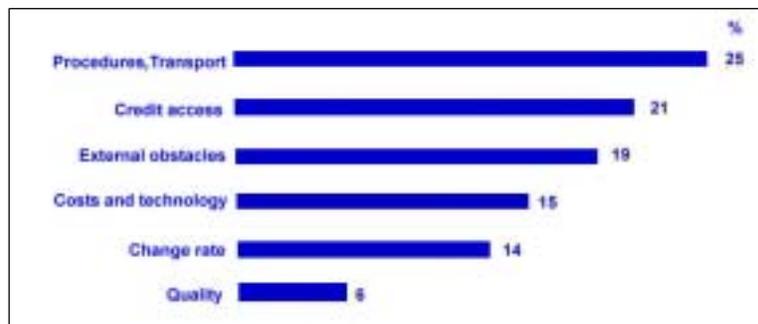
Diversifying and penetrating external markets are the two main goals for the creation and development of SMEs in Colombia. However, foreign trade remains quite difficult for SMEs. Figure 6 shows that only 13% of SMEs have experience in exporting their products. Studies (e.g. FEDESARROLLO, 2003) indicate that the main obstacles for exporting companies are overly complicated export procedures, high costs of domestic transport, lack of information on external markets, and the high cost of domestic and imported raw materials (see figure 7).

FIGURE 6
SME EXPORTS



Source: “La MIPYMES en Colombia: diagnóstico general y acceso a los servicios financieros”, María Angélica Arbeláez and Luis Alberto Zuleta, Foundation for Higher Education and Development (FEDESARROLLO), Bogotá, D.C., 2003.

FIGURE 7
OBSTACLES TO EXPORT



Source: “La MIPYMES en Colombia: diagnóstico general y acceso a los servicios financieros”, María Angélica Arbeláez and Luis Alberto Zuleta, Foundation for Higher Education and Development (FEDESARROLLO), Bogotá, D.C., 2003.

C. Case studies for e-commerce and supply chain management in SMEs

Three companies —Zebra Electrónica, Itansuca Ltda. and Sistema Integrado de Información para la Artesanía, or SIART— were selected as case studies. The selection criteria were that the firms must: (i) be SMEs; (ii) have made some headway in implementing ICTs; (iii) be exporting or have the potential to do so (identified by their EXPOPYME programme share); and (iv) be willing to participate in the study. The study focused on ICT and web page development and export orientation.

1. Zebra Electrónica

Zebra Electrónica, a Colombian manufacturer of electronic security products, was established in 1991 by four partners.⁴ Currently, it has 20 employees. Its product lines include systems to control the access of persons or vehicles to offices, plants and other locations, using proximity cards or biometric equipment, such as digital fingerprinting devices; software; electromagnets; interlock controls; power supplies; and other accessories. The company also provides technical support, installation and maintenance.

Zebra's exports increased in the last four years from almost zero to 11% of total sales, and are likely to continue growing. Export destinations include Ecuador, Costa Rica, Guatemala, the United States (Miami), Dominican Republic and Bolivarian Republic of Venezuela. Zebra imports a variety of components and original equipment manufacturer (OEM) products for assembly from the United States, Taiwan Province of China and the Hong Kong Special Administrative Region of China, mainly due to their low prices. These contracts are reported to be concluded over the Internet.

For more than five years, Zebra has been Colombia's leading supplier of electromagnets, and has expanded exports to Latin American markets. Initially, it exported only electromagnets, but more recently it has begun exporting its access control systems and proximity cards. These systems are developed by Zebra itself, making it a solid participant both in the local market and in exports in 2003.

The first product Zebra manufactured was a voltage regulator, of which it made 50 units before suspending production because of low profitability and excessive competition. Its early electromagnets were confined to the circular type. Later, the number of products increased and in 1993, Zebra began to produce power supplies, batteries and locks. In 2001, the firm began to develop an electromagnetic shear lock that could be used for swinging doors. It also obtained a quality assurance certificate under NTC-ISO 9002 standards, and opened an office in Medellín.

In 2002, Zebra set up a committee to develop new products and improve the market for them. The firm effected a radical change of its corporate image and placed more emphasis on market seeking overseas. Also in 2002, Zebra participated for the second time in the International Industrial Fair of Bogotá and opened a new branch in Cali.

In 2003, Zebra's development committee continued working. The research and development area was brought within the quality assurance system and the firm's certification was upgraded. That year Zebra embarked on a project to improve the production methods of its electromagnets and improve the overall and operational shape of the firm. It also renamed the Department of Installations and Maintenance as the Technical Department, to afford more

⁴ Sales are mainly to distributors (approximately 80%). There are approximately 450 distributors selling products to enterprises and consumers. Thirty such distributors account for 80% of Zebra's sales.

importance to technical support and client training. An assistant manager's position was also created, since the general manager would be frequently absent due to Zebra's new incursion into the Central American market. Also in 2003, Zebra was able to renew its quality assurance certification under ISO 9000:2000 standards.

a) ICT use in the company

The company's internal ICTs have been upgraded in step with its growth and development. They still fall short of an optimal level due to financial constraints, but the computers, software packages and applications have grown in number to reflect the needs of the company. Tools have been developed in Excel or Access for sales orders, budgeting, technical service, client records and other functions.

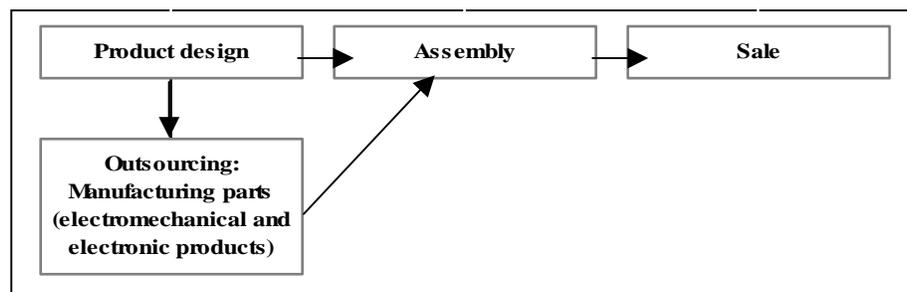
Zebra's size and production volume are not large enough to use automation processes. Also, the lack of economies of scale in production would prevent the company from making large investments in such processes.

The technology used for the products is based on different brands of microcontrollers. Technological development is focused mainly in two fields: electromechanical products and electronic products. The former (e.g. electromagnets for locks) is of a relatively low technological level; it is a simple mechanical and electrical process, using software such as AutoCAD and OrCAD (development software for printing circuits and simulating electronic functions). These are produced by third parties.

Electronic products (e.g. design of integrated circuits) are developed using OrCAD and other tools for microcontroller programming that form the basis for these products. Several parts are manufactured by third parties, but Zebra assembles the final product. The software incorporated into the products is designed by external programmers, systems engineers or electronic engineers who have experience in similar work. Zebra uses the following:

- Software:
Access Control, which permits administration of the entire access control system. It can be used to programme access schedules, and it keeps and files work.
- Hardware:
Access Control ZC500 and ZA200; keyboard Z100; locks; and a power supply. This is produced internally by the development department.

FIGURE 8
MANUFACTURING PROCESS OF ZEBRA ELECTRÓNICA



Source: On the basis of information from the official site of Zebra Electrónica, 2004, online <<http://www.zebraelectronica.com>>.

b) Outsourcing

Zebra uses outsourcing in the manufacturing process of several products. The company designs its own products and components, then the production of some parts is contracted out to third parties before the final product is assembled within the company. Zebra produces metallic pieces for the electromagnets in numeric controls, metallic boxes, injected plastic boxes, integrated circuits and other parts.

Procurement is the responsibility of a committee comprising the general manager and the finance, procurement and production managers. This committee is in constant contact with the commercial department for order upgrades. Zebra uses an Excel application to programme and control its budget. It tracks sales by vendor and by product, as well as costs, expenditures and cash flow. It also maintains a detailed sales budget.

Every year, the company invests between 5% and 7% of gross profits in technology. It has short- and long-term investment plans. Recently, it acquired Firmware tools for its microcontrollers.

Its technology portfolio is relatively broad, as every area of the company uses both specific and generic software. All the departments use Microsoft Office tools such as Word, Excel, PowerPoint and Access. In some situations, standard applications are used for specific functions. In the commercial department, for example, cost estimates, invoicing and client tracking are managed with Office tools. A program called Centaur is used for accounting purposes. The development department has the most extensive technology portfolio, and uses more specific tools. Specially designed tools in Excel or Access are used to control accounts receivable, client records, purchases and stocks of raw material. Other applications have been developed by third parties. The control of procurement and production inventories was developed in Delphi, a program used to develop databases and other applications. Zebra is not aware of any software that they would like to use but do not. If any such existed, it would probably be too far removed from their needs or capacity to acquire it.

c) Internet use

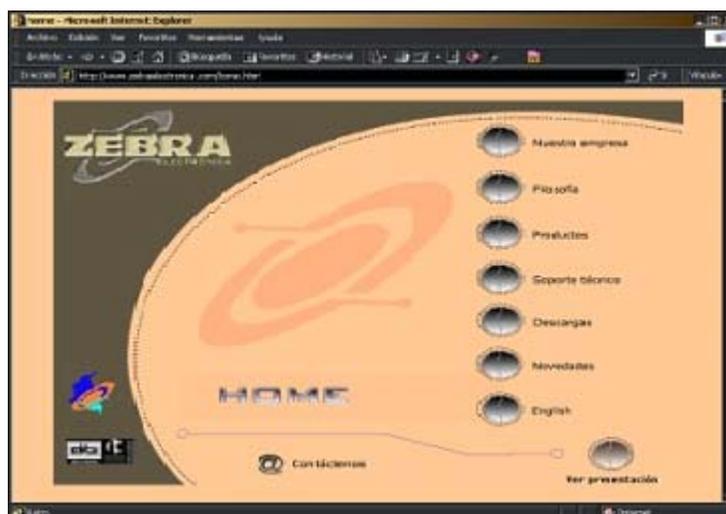
Initially Zebra installed an ISDN line, but it did not perform well and the company decided to use a conventional phone line instead. Recently, after analysing the alternatives of cable and ADSL, Zebra switched to an optical fibre connection with Cablenet. The sales, development, quality, human resources and management departments are interconnected via this system.

In 2001, Zebra developed its website as part of its export plan. Funding came from EXPOPYME, a Government export promotion programme for SMEs with a budget earmarked for website development in participating companies. Zebra hired Estudio Net Ltda. to design, develop and host the site. It has a contractual relationship with this company. The first website was designed and developed entirely by Estudio Net, but the second and third were made by Zebra itself. It has been upgraded almost every year, but too slowly to keep up with clients' needs. Zebra will try to improve this situation and make the website a genuinely useful business tool.

Currently, the website is still confined to information and support for clients. It has an e-mail link for customers to contact the company, and also provides technical information on the products, such as technical specifications, installation manuals, operating instructions and updated versions of software.

Clients have responded favourably to the website, generating interest and business, but the company is aware of the need to upgrade it to improve its control and operation. Zebra recognizes that the website has not been instrumental in closing business deals because it has not been updated and is not as attractive as it should be. It has served more as a reference and technical support tool.

FIGURE 9
NEW WEBSITE FOR ZEBRA ELECTRÓNICA



Source: Zebra Electrónica, 2004, online <<http://www.zebraelectronica.com>>.

d) Exports

Zebra joined EXPOPYME two and a half years ago, seeking to improve its training and export abilities. Although EXPOPYME has been important in financing several activities (including the website), the work within the company itself has been recognized as the driving force behind the export surge.

Through the electronics union (Asesel),⁵ Zebra receives support for presenting its projects to different entities for financing. Two of these projects merit further attention. Zebra submitted a project to the Andean Development Corporation, which was approved in the amount of almost US\$ 70,000. This will help several companies in the electronics sector to seek business opportunities in foreign markets, particularly Peru and Chile. Another project was presented to the Colombian Fund for Modernization and Technological Development of SMEs (FOMIPYME). This was approved in the amount of almost US\$ 120,000 and will allow participant companies to seek new markets and certify their products. Zebra does not currently have partnerships with foreign companies.

e) Marketing and publicity

Zebra has sought and found new clients nationwide and worldwide through phone directories, Internet databases and embassies, among other means. The company has worked in competition analysis, market options and prices. It is registered in PROEXPORT as a national manufacturer and its products bear a certificate of origin. It has also participated in fairs and conducted private training events and product presentations. With regard to publicity, Zebra has

⁵ More than a year ago, Asesel created a Centre of Technological Development for the electronic and computer science sectors and acquired updated tools for the development of new products. Unfortunately, it has not been easy for Zebra to use these applications in its product development, mainly because the tools that the company already has are more specific to their needs. However, Zebra used the centre for a continuous upgrading project with SENA sponsorship to change its electromagnet manufacturing process.

made printed and electronic catalogues, banners and other promotional items at fairs or events; it has also received press publicity and given interviews in specialized publications.

f) Summary of ICT use in Zebra Electrónica

Although ICTs have not been the most important factor in the recent development and evolution of the company, there is no denying their contribution to enhanced agility and flexibility, cost reduction and better communication and relationships with clients and suppliers. Despite Zebra's leading position in the domestic market (it has no local competitor), it is always looking for ways to improve its products and prices. ICTs will be a great support for the growth of the enterprise.

Zebra Electrónica has developed a product portfolio with a high technological content, which has helped to set it apart from competitors and expand its business into foreign markets. The increase in IT use has led to concrete and quantifiable results that are not necessarily unique to Zebra, but may be applied to other SMEs. These include, among others: identification of new suppliers, mainly in Asian markets; improvement of customer services, thanks to technical support through the website; increases in the number of potential client contacts both nationally and internationally, also through the website; improvements in communication with potential clients overseas; improvements in internal administrative and management processes; and control of accounts receivable, clients, production and procurement.

Reducing the Flash content of the website is recommended; it makes navigation very slow, especially when many users still have dial-up connections. The company also realizes that despite its export focus, the English version is very limited and should offer the same content as the Spanish version.

Zebra's experience with EXPOPYME has been quite positive, but the results were not what the company initially expected. EXPOPYME provided important training and valuable support for preparing and developing exports, but its follow-up was rather weak. Positive results so far may be attributed to Zebra's own initiatives and management.

2. Itansuca Ltda.

Itansuca Ltda. was founded in 1989 and is well known in Colombia as a leading innovator in consulting, design, auditing and procurement management for the energy sector as well as for general purpose industry, basic environmental care, construction, transport and communications. It employs 15 people with permanent contracts (in plants) and 70 people with contracts for technical and professional services. "Itansuca" is an indigenous Chibchas expression meaning "to make a change". Itansuca adopted this name to indicate the way the company faces the future in an ever-changing world; it tries to grow while keeping in mind the mystical aspect of work in relationships with clients, employees and society.

Itansuca has developed processes according to international standards and exported to Saudi Arabia, Guatemala, Nigeria, Peru, Ecuador and the Republic of Korea. The company does not import. Itansuca is certified under NTC-ISO 9001:2000, and has completed more than 500 projects.

In consulting, the company conducts studies that integrate technical, legal and financial matters to evaluate the viability and structure of projects in transport, commerce, basic supply, industrial production and resource exploitation. It also carries out studies for the Government and the private sector in energy production, allowing further resource optimization.

In design, Itansuca provides engineering specialization, organization, logistical support, quality systems and technological development. It guarantees conceptual, basic, detailed and high-level engineering that is functional and easy to operate and control. In auditing, thanks to its experience, technical background and management skills, Itansuca can run quality controls on various projects. When working on real estate developments, for example, Itansuca performs a carefully conducted qualified crew selection and puts in place a set of technical and administrative procedures.

Itansuca offers on-site support during project execution by establishing a technical office close to the facilities. This is useful for document control and creation and for modification of the structure as it is being built. Itansuca also handles technical requests, performs tests, produces service evaluations and prepares engineering dossiers and operating and maintenance manuals for publication.

In procurement management, Itansuca buys the materials and equipment needed for a project through a process that identifies the technical features and other specifications required as well as the potential providers and material prerequisites to complete the work. It then analyses the available options in the market from a technical and commercial standpoint. Afterwards, a purchase order is created and a fabrication process audited. The company then reviews proofs and releases them for shipment; and later manages transport and legal issues. Finally, equipment and materials are delivered to the site.

a) ICT use

Itansuca acquired computing and printing equipment in the early years of its existence, though it did not have an internal network or organization, much less a systems department. Over time, Itansuca's need to transfer information grew, and in 1996, the company installed its first wired infrastructure, server and plotter.⁶ It also hired systems staff. This enabled the company to transfer information and run internal e-mail. By 1999, Itansuca had Internet access (through Cablenet) throughout the company, and it acquired another plotter (a Hewlett Packard DesignJet 750C Plus). At that time, the company had about 20 computers and 15 printers, but additional printers and computers were rented when projects required.

The main problem in the early years of operation was the lack of a magnetic file handling policy. Employees saved both personal and working files to the hard disks of the computers that they were working on. When projects were finished, files were left there. This was a very sensitive situation for a company whose services included information management.

There were neither hardware inventories nor procedures to manage information resources. Also, the company was lax about storing software licenses that it had bought over the years, and some were lost. With high diskette rotation inside and outside the organization, viruses invaded its network. In 2000, databases were developed to help manage the computers and magnetic information. The company also pooled and classified the information stored in the computers as best as it could, although some project information was lost irretrievably as a result.

In 2001, Itansuca implemented quality assurance procedures for its hardware, software and NetWare management. An official project portfolio template was created, with a single information storage site for each project. Procedures were put in place for handling magnetic files, including backup requirements and maintenance of computing equipment. This was in fact part of the process of quality assurance certification that Itansuca obtained that year. As a result,

⁶ A Hewlett Packard Netserver LC II was acquired with Windows NT 4.0. Itansuca also purchased its first plotter (a Hewlett Packard DesignJet 600).

Itansuca stopped using floppy disks for all of its computers except management and systems department machines and instituted a virus-screening schedule. Thanks to this measure, no files have been lost to viruses in the last four years. In 2002, Itansuca changed its ISP temporarily to Super Cable, but on finding the service below expectations and the system unreliable, it switched back to Cablenet.

In late 2002, Itansuca acquired its own headquarters (its current location) and installed a certified wired network. Itansuca also acquired an additional switch; it currently has two switches and three hubs, both from 3Com. In 2003, Itansuca bought a Compaq Proliant ML350G3 server with a SCSI hard disk and tape backup unit. The company now owns 40 computers, but continues to rent others when the project load requires.

To manage its hardware and software, Itansuca has developed eight user profiles that define each employee's hardware and software needs. For instance, Profile 1 reflects the needs of Itansuca's designers and, besides the operating system; their machines have only AutoCad. Not all the profiles have direct Internet access, nor does everyone have a company email account.

Since not all users have all of the software installed on their computers, the systems department has a service room with three computers containing the software required for specific tasks, as well as a scanner. The profile system considerably reduces the number of times a given piece of software is installed in the organization's network, and due to network stability, it is working perfectly.

Printing, plotting and photocopying services and library management have been centralized at the new headquarters, in what is called the Documentation Centre. There are two plotters connected through Jet Direct, a Hewlett Packard LaserJet 2200DN printer connected directly to the network and a multi-functional Hewlett Packard OfficeJet G85 printer connected to a computer.

b) E-mail problems

E-mail problems began in July 2003 when a firewall installed in the external mail server blocked all of Itansuca's communications for a time. Itansuca finally installed Outlook 2000 and used Cablenet's outgoing mail server to authenticate accounts. This solved the initial problem — the mail could be used— but it created new ones: an Outlook 2000 license was required for every computer with external mail; Itansuca could not control the hosting status of the mail accounts; and the outgoing mail through Cablenet slowed the delivery of messages and created dependence on that server.

To solve these problems, the systems committee accepted a proposal from Quijano y Consultores, which was chosen over others mainly for financial reasons. The proposal anticipated using Linux to configure the internal mail and, since Itansuca already had a server, the investment was definitely smaller. However, the process hit a number of difficulties. Only one of the three problems (the need for Outlook 2000 licenses for every computer) was solved. Furthermore, technical problems arose with the installation of Windows NT and Proxy, due to the contractor's inexperience. Lastly, the system manager lacked control over the contract, and he did not raise the alarm when he saw irregularities in the execution of the process, which led to delays.

Quijano y Consultores correctly configured Itansuca's internal mail in February 2004. However, it did not advise Itansuca that the network configuration of each computer would have to be changed before the accounts could be used. Also, the systems manager prefers to obtain another opinion before configuring them himself.

It is necessary to hire an expert to solve the specific problem of internal mail accounts before configuring them in the computers. Once they are configured, there will be no need to

have Outlook licensed on all the company's computers. However, the problem of depending on Cablenet to host the external accounts and outgoing mail will only be solved when the mail server is housed within Itansuca itself, giving it absolute control over the accounts. There are several ways to do this. The main proposal presented involves the purchase of 20 new computers and a simple server to host Itansuca's mail accounts and website. The value of this server is equivalent to the value of the computers that are being acquired; it would be a replacement, not an addition.

c) Software

The company works on a Windows platform with an NT server and operating systems that range from Windows 95 to 2000 in the offices. It uses laptops with Windows XP to work outside headquarters. Itansuca uses Microsoft Office according to its user profiles, which basically use Word, Excel and Outlook. The company also developed databases in Access for handling inventory, software and magnetic or optical information, documents and data, curricula, staff time keeping and other administrative tasks, such as managing employees and subcontractors, systematizing certain accounting processes and controlling inventory for the Documentation Centre.

Engineering design uses AutoCAD 2000. Adobe Acrobat 5.0 is also used to save documents in PDF format and sometimes to protect them. Projects are carried out with Microsoft Project and Primavera Project Planner. Itansuca's accounting software and application suite were developed by MECOSOF, a Colombian firm. The company also has specific programs for engineering.

d) Procurement and investment plans

Procurement decisions and investment plans are executed according to Itansuca's strategic systems plan, which was implemented in 2002 and planned investments from 2003 to 2006.

In 2003, Itansuca planned a headquarters move, a computer upgrade, development of a costs subsystem and an update of its commercial subsystem and timing sheets. Of these activities, the first two and part of the third have been completed.

From 2004 to 2005, Itansuca plans to acquire a 48-point switch, a telephone plant and a new server; purchase 20 computers; complete the costs subsystem; and install a virtual answering machine.

At present, Itansuca uses Cablenet for Internet access at a monthly rate of approximately US\$ 250. Access is provided only through the service room and for personnel who have external mail accounts. The connection uses proxy software.

e) Website

Itansuca's first official website, set up in 2000, was designed and maintained by Estudio Net. Site hosting and external mail accounts were also contracted to this company. The site was used as a general company presentation, outlining its services and showcasing some of its completed projects. At the beginning of 2004, a new website was designed and developed by Inés Gecko and implemented in the framework of Itansuca's corporate image project. Estudio Net continued to host the site. The systems strategic plan projects this as interactive site for project information and consultation.

FIGURE 10
WEBSITE FOR ITANSUCA, 1999-2003



Source: Itansuca Ltda. <<http://www.itansuca.com>>

FIGURE 11
WEBSITE FOR ITANSUCA, 2004



Source: Itansuca Ltda. <<http://www.itansuca.com>>

f) Exports

The earlier projects were mainly consultancy work on pipeline design, mechanics, instrumentation and control for the gas and petroleum sectors. Until now, projects have followed on from business relations developed in Colombia. Itansuca has exported designs, but the company has no specific strategic export programme.

Like Zebra, Itansuca participated in EXPOPYME for a year. An export plan was developed in this framework, but it did not produce the expected results and was discontinued. The designated consultant did not have the experience or knowledge to meet Itansuca's needs. Although Itansuca withdrew from EXPOPYME, PROEXPORT has provided support for business agendas and scheduled meetings with prospective clients. The results have been positive for Itansuca's expansion into Ecuador and Venezuela, where it has subsidiaries.

Itansuca has not participated in business fairs or meetings because they are focused on tangible services or products. The company's business is more intangible and most of it is not classified by customs duty schedules.

g) Summary of the impact of ICT use in Itansuca

In Itansuca, in common with other SMEs, ICT development has been significant and directly linked to company growth. For this company, whose principal product is information, good management using a tool such as an official project file is vital.

Itansuca's systems department has developed a strategic plan to optimize information resources, software and hardware. This has generated important savings that have been channelled into upgrading systems equipment. The user profile concept was an adroit step, since it directly influences ICT resource optimization and efficiency. It has also helped to reduce the cost of acquiring software licenses, which represents one of the main obstacles to ICT development in SMEs.

In more general terms, ICT use by Itansuca has led to internal and external communications improvement; improved client relations and communications; better project follow-up; improvement of project file handling and storage; export growth through e-mail use; lower communication costs; optimization of information resources and software purchases; improvement of data security; and better internal administrative and management processes. These benefits are by no means specific to Itansuca, however.

Itansuca's ICT experience has not been problem-free, however. Website use has been limited; it has been a general "goodwill" presentation device but not a marketing or communication tool. It has provided a general support locally and worldwide but has had little direct effect on sales.

Similarly to the first case study, in this case Itansuca's new web page has proved too heavy and slow due to the tendency of Colombian web designers to employ high Flash content. The company might have done better to consult the website supplier to update the site.

One of Itansuca's main ICT problems has been creating and maintaining a functional internal network and mail service. This problem clearly does commercial damage to the company, since communications and file transmission are centralized through e-mail. It is crucial to solve this problem, as many projects are conducted abroad. Moreover, the problem has arisen as a result of poor advice from the companies Itansuca consulted. At this point, communications between Itansuca and current software and hardware suppliers have failed. The systems department did not carry out thorough enough research or a cost-benefit analysis. It simply chose the cheapest proposal, which proved not to be as good an option as it should have been.

3. Artesanías de Colombia and SIART

Colombia's geographical diversity is massive. It is located between the Caribbean Sea and the Pacific Ocean, and crossed by the Andes Mountains. In the east of the country are the Amazon and the plains region, called llanos. Its territorial and climatic diversity have influenced its

population, which comprises many different groups that generate a wide variety of cultural and artistic expression, reflected in their crafts.

The crafts sector consists mainly of micro-enterprises and small companies, located in zones or populations with little access to ICTs. This, together with an increasing need for and interest in new markets and ways to create business, makes ICTs an important tool for these small entities.

a) National sales

The sales value reported by Artesanías de Colombia for 2003 was US\$ 896,880,000, a 16% increase on the previous year. Special sales to companies such as Pfizer Laboratories, GlaxoSmithKline, Bayer, FENALCO, Alpina, ICONTEC, Almacenes Brisa, the Colombian Navy, the Andean Development Corporation, as well as sales for special events, were the main market niches.

b) International sales

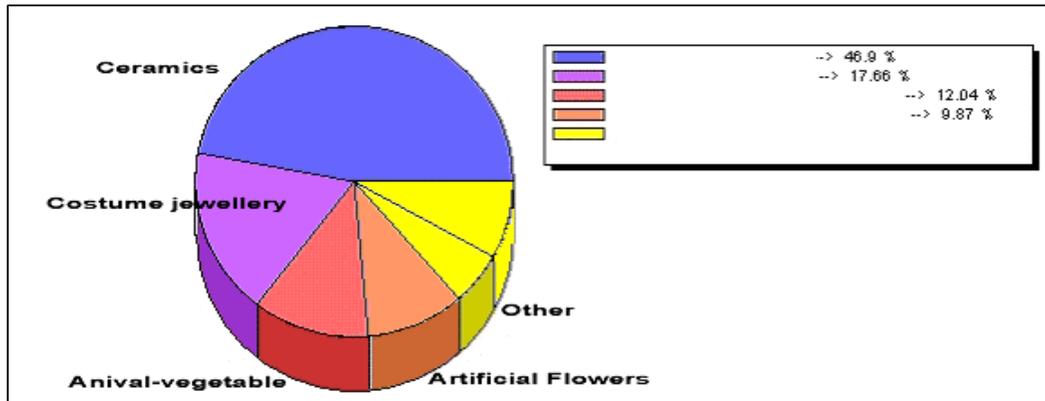
In 2003, exports totalled US\$ 270,068,000 (Artesanías de Colombia, 2003). The main export destinations were the United States, France, Dominican Republic, Switzerland, Italy, Australia and Curacao. The following tables and graphics provide export figures for Colombia's craft sector.

TABLE 10
VALUE OF EXPORTS FOR COLOMBIAN CRAFTS
(In US dollars)

Subsectors	FOB			Share (%)	FOB
	2001	2002	2003	2003	2004 Jan-Apr
Costume jewellery	4 977 776	5 322 562	5 529 960	17.66	1 934 410
Ceramic art	9 356 903	12 329 639	14 686 076	46.90	4 724 043
Basket manufacturing	85 000	139 936	251 741	0.80	69 900
Other manufactured decoration objects	1 816 628	1 889 836	1 687 957	5.39	511 718
Handmade lace	29	273	355	0.00	0
Statuettes	724 902	614 795	475 417	1.52	144 808
Artificial flowers	968 663	7 028 420	3 091 464	9.87	1 207 610
Jewellery	5 230	316	2 486	0.01	2 770
Blankets	1 463	144	46	0.00	69
Manufactured glass	183 013	269 826	80 249	0.26	20 878
Metal	264 942	263 059	520 488	1.66	227 464
Animal, vegetable and mineral products	1 951 829	2 435 404	3 770 172	12.04	1 456 159
Hats	139 876	140 070	160 523	0.51	104 248
Tapestry	44 156	67 760	63 143	0.20	9 475
Textiles	790 790	748 258	962 917	3.07	351 124
Braids and similar articles	58 439	15 549	32 911	0.11	21 723
Total	21 369 639	31 265 847	31 315 905	100.00	10 786 398

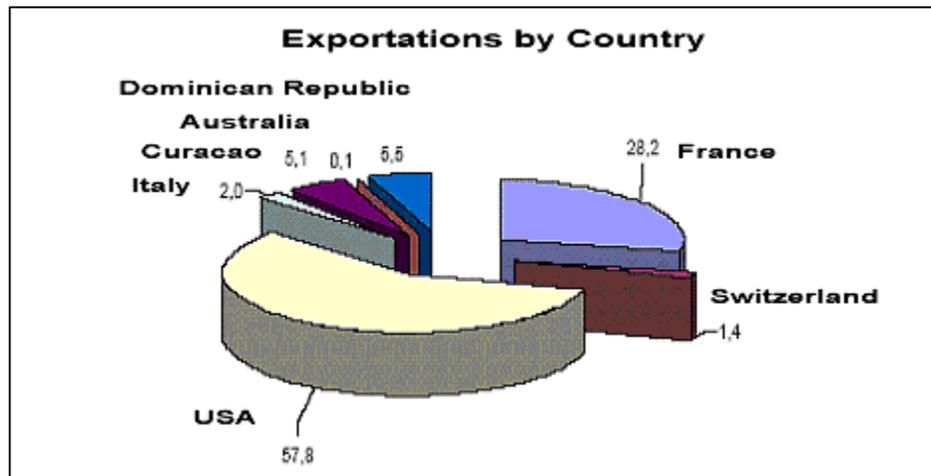
Source: National Administrative Department of Statistics (DANE), Virtual Catalogue INTELEXPORT. Calculations PROEXPORT, Bogotá, D.C.

FIGURE 12
SUBSECTORS' SHARE OF CRAFT SECTOR EXPORTS, 2003
TOTAL EXPORTS FOB – CRAFT SECTORS: US\$ 31,315,905



Source: National Administrative Department of Statistics (DANE), Virtual Catalogue INTELEXPORT. Calculations PROEXPORT, Bogotá, D.C.

FIGURE 13
CRAFTS EXPORTS BY COUNTRY



Source: On the basis of information provided by Export Promotion Office (PROEXPORT), Bogotá, D.C., 2003.

c) Artesanías de Colombia

Founded in 1964, Artesanías de Colombia is a public-private partnership venture belonging to the Ministry of Trade, Industry and Tourism. Its mission is to foster the competitiveness of the handicraft sector to improve the quality of life for artisan communities, preserve and recover Colombia’s cultural heritage and work towards environmental sustainability. To fulfil its mission, it works in strategic partnerships with the Government, regional and local organizations, private companies, foundations and international institutions.

As a government institution, it promotes development policies, leads and coordinates strategic plans and programmes and pools efforts with public and private institutions to invest physical, human and financial resources in the sector.

Economic and social development projects for the craft sector developed by Artesanías de Colombia include: Expoartesanías, La Plaza de Los Artesanos and Colombian Design Laboratories for Handicrafts and Small Firms. The goal of these programmes is to build a dynamic social sector that is both economically productive and culturally creative. In addition, the Artesanías de Colombia business centre offers services such as customs advice and intermediation, packaging, delivery and financial services.

d) Co-financing of projects for handicraft worker communities

Artesanías de Colombia bolsters the competitiveness of handicraft production locally, regionally and nationally by co-financing projects. These improve products and their positioning and image in specific segments of domestic and external markets. The main aim, as above, is to build up a dynamic and economically productive sector.

e) CENDAR

Artesanías de Colombia's Centre for Handicraft Research and Documentation (CENDAR) stores and publishes information about the craft workers' culture, managing a library of written material and videos. In storing and organizing documentation related to handicraft work, CENDAR affords preference to the information produced by Artesanías de Colombia. This is mainly specialized information on the cultural, socio-economic and production aspects of the handicraft sector, about 90% of which is unpublished, new material.

A feasibility study has been conducted regarding a systemic integration between CENDAR and the information centre at Artesanías de Colombia. In 2003, CENDAR received 5,367 in-house consultations and 522 via e-mail, from school pupils, college students, artisans, civil servants, traders and researchers.

f) Expoartesanías

One of the main ways to promote and sell crafts is through fairs and events. Expoartesanías is a programme organized under Artesanías de Colombia and linked to Corporación de Ferias, which is responsible for organizing trade fairs, and to Exposiciones Corferias S.A. Expoartesanías is the foremost national event for exhibiting, promoting and marketing handicraft work. Handicrafts are selected for the fair, with space reserved for current handicraft producers. Started in 1991 in Bogotá, it is held annually around Christmas time. The handicrafts on display reflect Colombia's ethnic and cultural diversity as well as that of other countries. In 2003, the fair reported sales of US\$ 3 million, a 14% increase over 2002, when sales were US\$ 2.7 million (Artesanías de Colombia, 2003).

g) Artisan census

Between 1992 and 1994, Artesanías de Colombia carried out a national economic census of the craftworker sector to establish meaningful statistics quantifying the sector and thus allowing for better policy formation. Some 58,800 people registered, who stated that they devoted more than 70% of their time, on average, to producing handicrafts. The census was conducted using sampling methods and covered those municipalities identified as being handicraft centres

and in which the population was known to be involved in the production and marketing of handicraft work.

This census is the first of its kind to be held in Colombia —and in Latin America— and therefore constitutes a major contribution to the identification and characterization of craft workers and handicraft communities. It is intended to provide a better understanding of a sector whose data are usually blurred and subsumed into the statistics of the manufacturing industry, and which is often unaccounted for in other national accounts and surveys (especially in cases where output is used partly for domestic consumption).

h) SIART: an information system for crafts

(i) Project background⁷

The project has been made possible thanks to a technical cooperation agreement between the Inter-American Development Bank (IDB) and Artesanías de Colombia. It promotes and supports the creation of an integral information system to stimulate the competitiveness and positioning of the Colombian artisanal sector in national and international markets.

At the height of the Internet boom at the end of the 1990s, IDB was engaged in supporting and financing information systems for micro-enterprises and SMEs. SIART had a Colombian predecessor in the form of Project IDB-Javeriana University, Technical Enterprise Attendance, which had begun in 1998. In April 2001, a feasibility study of the new project began (though it was delayed for a year and a half). Among other things, a nationwide survey was taken of artisans, in order to gauge their enthusiasm for the project; 60% of those interviewed showed great interest. IDB supports SIART with US\$ 250,000 and Artesanías de Colombia with US\$ 350,000.

(ii) Introduction

SIART, which translates as the Integrated System of Craft Information and Advice on the Internet, is the new portal of Artesanías de Colombia. It aims to be a point of contact between traders and artisans, providing information on the craft sector, supporting its development and improving the sector's competitiveness and position in international markets. It also aims to advise artisans and traders improve productivity and quality and broaden the market for handicrafts.

SIART activities were built up around training staff in the companies involved, and especially the artisans themselves, to use computers and related technology. The intention was to create synergies between production and design. Information was gathered for the system, while equipment, accessories and services for the technical operation of the project were acquired.

In Artesanías de Colombia, 110 people, including designers, became qualified to use SIART. The aim was to establish responsibilities within each company for entering information into the system and training staff to operate the site's virtual tools. Through SIART, design centres in Bogotá, Pasto and Armenia have granted 230 qualifications to artisans. Meanwhile, Expoartesanías held several workshops in which 51 people were trained to use the system. They will now work with consultants and designers. SENA has also offered qualifications for craft

⁷ The main objectives are: to stimulate the positioning of the craft sector in national and international markets; to inform buyers and dealers about the exportable supply and demand for artisanal production; to facilitate and reliably match supply and demand among artisans, traders and organizations, by registration of users; to strengthen the operating infrastructure of the Colombian Centres of Design of Artesanías de Colombia and to consolidate them as modern hubs for advice and technical assistance for artisans through the Internet.

production and marketing. In addition, an agreement is being prepared with the Chamber of Commerce to create new qualification workshops on Internet and ICT use.

An agreement with the Ministry of Communications was also reached to ensure nationwide coverage of the system, so that artisans in all regions could use SIART and receive advice through the 500 Telecentros created in populated areas and municipalities by the Connectivity Agenda and COMPARTEL.

(iii) Design and improving competitiveness

The design of SIART opens up a virtual space to help artisans to produce better crafts, offering advertising, information and other services with programmes and innovative strategies through the Internet. A team of SIART designers also advises on product development, image, packaging and exhibition; evaluates products; and informs potential consumers about production techniques, trends and events.

SIART offers artisans the following services: design advice, for which artisans can be in constant and easy communication with designers; product assessment (available to artisans anywhere in Colombia over the Internet) for participation in fairs and catalogues and the preparation of goods for export; classified advertisements, a contacts directory, and a virtual library; and specialized information about requirements for the artisanal sector, researched and organized to allow users to find real answers to their questions. Active SIART users are registered and affiliated with the system in order to be able to use all the tools and services it has to offer. Also through SIART, artisans, traders, dealers and organizations related to the sector can receive advice and assessments, participate in forums and workshops and access specialized information. By aiding the optimization of the processes, production, design and commercialization of Colombian artisans, SIART extends the artisans' abilities to sell their crafts throughout the world.

The fundamental product of SIART is its specialized and updated information. It contains directories of artisans, traders, public and private organizations and other active users of the system; specialized content about commercialization, development, environment, business opportunities, production and raw materials, as well as information about the Centre of Design for the Crafts in Bogotá and Craft Design Laboratories in Pasto and Armenia; interactive tools for SIART users, such as forums, a glossary and a virtual library; information for the public about SIART, Artesanías de Colombia, hiring processes, purchases and presentation of projects, procedures for accessing international markets, an economic census of the sector, financial services available to the sector and information about the competitiveness of Colombian artisanal production; and information about artisan events and fairs, craft design contests, projects and programmes for the development of the sector, news, and trends.

SIART also offers design advice, packing, exhibition, portfolio and image development and commercial services; classified advertisements, a product catalogue and online sales; product assessment to participate in fairs, be part of the commercial catalogue or prepare for export; and training programmes through workshops and chats about navigating the Internet as well as using SIART and its technical programmes for product development, image editing, computer design and commercialization. The workshops are sponsored by the chambers of commerce and SENA. These services are provided in SIART offices, located in the Plaza de Artesanos, the Craft Design Centre and SMEs in Bogotá and the Craft Design Laboratories and SMEs in the cities of Pasto and Armenia.

(iv) Access to SIART

Apart from the Craft Design Centre and SMEs in the city of Bogotá and the Craft Design Laboratories and SMEs in Armenia and Pasto, SIART can be accessed through its website (www.artesaniasdecolombia.com). As most artisans live in small populations far from the main

cities, Internet access is provided in community Internet centres. These are part of the COMPARTEL programme, which is conducted in the framework of the Connectivity Agenda. COMPARTEL is present in 670 Colombian municipalities with less than 8,000 inhabitants and is focusing its efforts on artisan localities.

(v) *E-commerce*

One of the objectives of SIART is to offer a platform for sales and e-commerce through its website. Such a franchise already exists in the United States, but in Colombia it has not yet been implemented.

Crafts are not easy to sell through the Internet, because consumers like to touch or try on products before buying them. SIART takes this and other important factors for e-commerce success with crafts into account. In each case, it has established the following considerations:

- (a) To limit the number of products. Before attempting to sell a product, factors such as availability, price and presentation must be considered. A number between 20 and 30 available products might be appropriate to begin sales.
- (b) To improve logistics. One of the main problems of e-commerce in Colombia is shipping, because high prices and slow delivery make e-commerce less competitive than traditional sales. The delivery price often exceeds the value of the product. Also long delivery times may not justify an online purchase.
- (c) Packaging. Packaging must be adapted to the product and in many cases protect it. There is little experience in this field and it is necessary to research packaging that is both good quality and economical.
- (d) Organization of artisans. Chains of artisans must be organized enough to supply orders made through the Internet.

It is hoped that SIART will be able to improve these factors and begin Internet sales in the medium term.

FIGURE 14
NEW WEBSITE FOR ARTESANÍAS DE COLOMBIA, OCTOBER 2003



Source: Artesanías de Colombia S.A. (2003), Ministerio de Comercio, Industria y Turismo, Management Report <<http://www.artesantiasdecolombia.com.co/>>.

(vi) Website description

Artesanías de Colombia's new website was implemented in October 2003. It has a full Spanish version and a smaller English version. As mentioned above, its main users are artisans, suppliers; craft trade companies and foreign buyers. One of its most important components is its commercial catalogue, which has product information classified by categories (e.g. ceramics, fibres, wood, indigenous goods, textiles) and suggested locations for use or display (e.g. bedroom, garden, living room). The ultimate aim of the catalogue is to be a virtual store for the products on offer. It is a dynamic site, with updates on news related to the sector and surveys. An internal search engine allows a registered user to obtain specific data on artisans, traders and suppliers.

In the website's gallery, artisans can publish photographs and descriptions of their products. In this way, artisans engage with ICTs and promote their crafts. To get into the gallery, the artisans must send reviews and photos of their products. If they are approved by SIART, they are published in the gallery. Commercial contacts outside Colombia have already been made through this section. Products are also promoted in the classified section, where users can publish offers of or requests for products. In addition to these interactive sections, the site has general information on SIART, Artesanías de Colombia, fairs and events, related organizations and other projects. There is also a space for chat and forums, which is not in operation yet. The website is still being developed; it is expected to be complete by 2005. SIART maintains a user database and gathers statistics on the site, which, are summarized in the following tables.

TABLE 11
PERCENTAGE OF VISITS TO SELECTED SIART PAGES
(Total visitors = 1503/month)

Page	Percentage
Gallery	33
Product catalogue	31
Design contest	9
Fairs and other information	27

Source: Prepared by the author.

TABLE 12
DISTRIBUTION OF REGISTERED USERS

Type of user	Number	Percentage
Artisans	785	44
Traders	219	12
Suppliers	78	4
Related entities	721	40
Total	1 803	100

Source: Prepared by the author.

TABLE 13
DISTRIBUTION OF ARTISANS
(Percentages by department)

Ranking	City	Percentage
1	Bogotá	42
2	Nariño	13
3	Eje Cafetero	8
4	Cauca	6
5	Choco	6
6	Magdalena	4
7	Bolívar	4
8	Huila	3
9	Santander	3
10	Cundinamarca	3
11	Boyacá	3
12	Sucre	2
13	Antioquia	2

Source: Prepared by the author.

TABLE 14
DISTRIBUTION OF ARTISANS
(Percentages by geographical area)

Cundinamarca and Boyacá	48
Cauca and Nariño	19
Viejos Caldas and Antioquia	10
Northern Area	10

Source: Prepared by the author.

TABLE 15
URBAN AND RURAL ARTISANS
(In percentages)

Urban	87
Rural	13

Source: Prepared by the author.

TABLE 16
CONTACTS MADE THROUGH THE INTERNET (BY SECTION)

Ranking	Section	Percentage
1	Crafts	16
2	Design advice	1
3	Catalogue	6
4	Commercial	20
5	Design aids	9
6	Documentation	11
7	Expoartesanías	6
8	Fairs and Events	6
9	Inf. Artisan Sector	15
10	Other	11
Total enquiries		~141/month (~35/weekly)

Source: Prepared by the author.

The SIART site was developed by a private Colombian company with a great deal of experience, using ASP (VbScript and JavaScript) programming. At the start of the project, it was decided to develop the databases using Oracle, which later became a major difficulty because of its complexity, hosting costs and need for specialized (and therefore expensive) human resources.

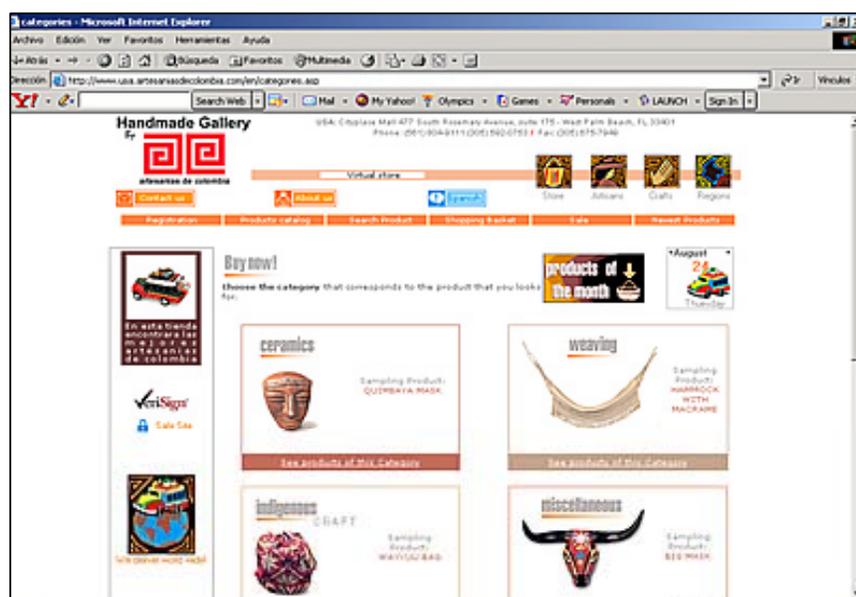
SIART is staffed by a coordinator, a social communicator and three designers, but the different sections of the site are updated by civil servants who work with Artesanías de Colombia, not with SIART. This has caused update delays, which clearly undermine the site's ability to promote its artisans.

SIART has pursued a number of different strategies to promote the site. One is mailing. SIART publishes two types of electronic bulletins: internal, aimed at employees of SIART and Artesanías de Colombia, and external, for the artisan sector and general public. The external bulletins are La Gaceta Artesanal, Expoartesanías and Plaza de Los Artesanos; these are sent periodically to registered users and other interested parties. Considering that the users are mainly artisans, promotion cannot be through electronic means alone. Workshops, events and fairs are essential to bring artisans into the system.

i) Colombian crafts and e-commerce in the United States

One of Artesanías de Colombia's strategies has been to position itself in the North American market as the main trader of Colombian crafts. It opened a distribution centre in the United States, showcasing the latest trends in craft design. Handmade Gallery, a company owned by a Colombian established in the United States, has the franchise license; Artesanías de Colombia provides the brand and the expertise in international marketing of crafts; and PROEXPORT provides assistance with exporting crafts from Colombia to specialized buyers in the United States. The centre also organizes events, such as showrooms, in coordination with the PROEXPORT office in Miami.

FIGURE 15
UNITED STATES ARTESANÍAS DE COLOMBIA WEBSITE



Source: Artesanías de Colombia S.A. (2003), Ministerio de Comercio, Industria y Turismo, Management Report <<http://www.artesaniadecolombia.com.co/>>.

Within this initiative,⁸ the website is clearly the means of providing an e-commerce option for customers in the United States. The potential clients of the site are not only North Americans. Many are Colombians and other Spanish-speakers living in the United States, which is a very important reason for the site to have a full Spanish version.

j) Recommendations and considerations

SIART is still in a phase of development and consolidation, and the portal has not yet been completed.

The implementation of e-commerce is essential, as users expect it when they browse the website. Online sales can generate income to continue the project after 2005, when IDB financing ends. Site administration and content updates should also improve. It would be better to centralize these processes and end the dependence on staff not tied directly to SIART. Contents updating is necessary to expand the system and position it commercially.

SIART has several competitive advantages that it should build on. One is the fact that it is the only information and advice system for the craft sector in Colombia on the Internet. Furthermore, it has institutional and Government support, as well as short-term IDB support.

It may be advisable to change the organization's name, as SIART is a frequently used abbreviation and could be easily confused with other organizations and websites. It would be also better to register a shorter domain name that is easier to remember. The present domain, <artesanasdecolombia.com>, is very long, especially considering that many users do not speak Spanish. Replacing Oracle databases with simpler and more economical ones should be studied as well. SIART does not need such a robust database.

Considering the system's main beneficiary users group —artisans with less formal education and access to technology— training in ICTs and exporting is a high priority. To increase use of the system, SIART should set up a strategy to provide advanced training courses in the use of computers and the Internet, as well as training in international marketing and technical standards. Support from EXPOPYME, chambers of commerce, universities and private companies will be crucial. In addition, workshops or training sessions should be held in the towns or communities where the artisans live, rather than requiring them to undertake long, expensive journeys. Approaching private companies and searching for sponsorship agreements is important to reduce the dependence on the resources of governments and international organizations.

D. Summary of ICT use in SMEs

In summarizing the three cases studied in this paper and others published recently, the following conclusions may be reached.

Though they have helped businesses form agendas and participate in international fairs, the existing government policies for promoting exports in the SME sector, such as EXPOPYME, have not had much impact on exports. This has been due partly to problems with consultants with

⁸ This website is divided into three parts. First is the virtual store, where products are organized by category, like in the Colombian portal. Within each category—for example, ceramics—is a list of references with photos, descriptions and prices. It also has a shopping cart option for placing orders through a secure server. Second are crafts, with information and descriptions of different types of Colombian crafts. Third are regions, with information on Colombia and its different geographic regions, emphasizing cultural and tourist aspects as well as the crafts from each place.

insufficient knowledge of ICTs and who develop export plans that are difficult to implement or unrealistic for their companies or their markets.

Export programmes have not focused on the use of ICTs for export sectors, although this should change with the implementation of the Prymeros programme, which focuses on precisely this objective. Good results are expected for 2004. Although companies clearly realize the importance and benefits of ICTs, programmes are still directed at administrative and production processes rather than national or international sales, marketing and distribution. Websites remain informative only and lack e-commerce tools.

The companies do not have systems to measure the impact of ICT use in administrative, production or commercial processes. This either results in underinvestment in ICTs or is used as a justification for not investing at all.

The Government should therefore afford greater emphasis to the technological aspect of its export promotion programmes. Also, participating companies and universities should pay more attention to this subject and produce better-trained consultants.

III. Government policies for SMEs, ICTs, and international trade

A. ICT policy and Colombia's development strategy

The most important initiatives aimed at fomenting ICT use were established in the mid-1990s. Early in 1997, the National Council of Computer Sciences was created, composed of representatives from Government and the private sector. In April 1997, the Council published its Guidelines for National Policies on Computer Science. Although clear commitments were drawn up in the document for each of the involved sectors, implementation has been slow.

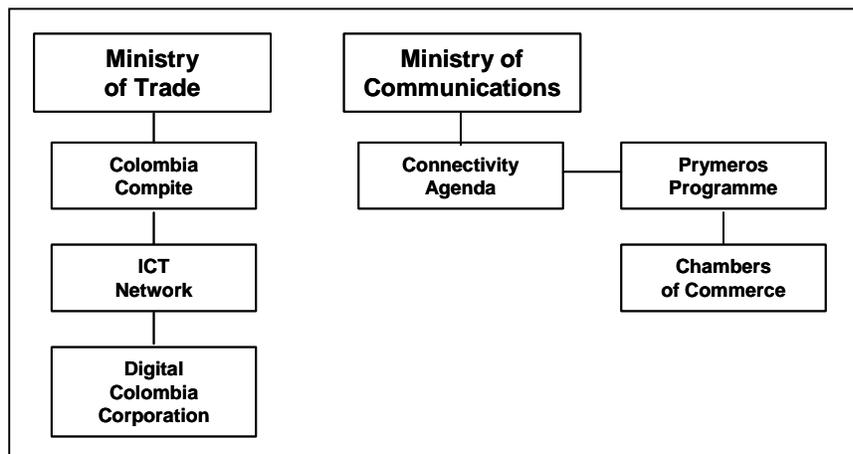
Some months later, the Permanent Forum of High Technology presented to the Council a document entitled Basis for a National Policy of Computer Science, Thematic Analysis, a compliment to the Council's previous document. This study analyses several sectors of the national economy. Their main findings and conclusions are included in the document of the Ministerio de Comunicaciones (2000).⁹

The national plan for development for the period 1998-2002, entitled Change for peace-building, sets out five government objectives for telecommunications. Among these are to help the sector to increase its productivity and competitiveness, and to consolidate the decentralization process proposed in the new development model.

The development and execution of government policies for ICTs is undertaken within the framework of the Connectivity Agenda. The Ministry of Trade also plays an important role, since it works with the commercial sector, domestic development and export promotion. Other ministries and agencies also have ICT initiatives that are generally framed within the strategies of the Connectivity Agenda.

⁹ The National Council of Economic and Social Policies (Consejo Nacional de Política Económica y Social (CONPES)), is the highest-level national authority of planning and acts as an advisory body to the Government in all aspects of domestic economic and social development. CONPES coordinates and guides the agencies responsible for economic and social development within the Government, through the study and approval of documents on the development of general policies that are presented in session.

FIGURE 16
ICT STRUCTURE IN THE COLOMBIAN GOVERNMENT



Source: Prepared by the author.

B. E-government, SMEs and trade promotion

1. Connectivity Agenda

The Connectivity Agenda is a Ministry of Communications programme for increasing and broadening ICT use as a dynamic tool for domestic, social and economic development. The programme is aimed at citizens, firms and public administration. The functions and strategies of the Connectivity Agenda are set out in Ministerio de Comunicaciones (2000).

In 2004 alone, Connectivity Agenda devoted 30 billion pesos (more than US\$ 10 million) to an online service for the Government. This included building a platform for a portal to services; developing an electronic system of online payments for the public sector; endowing territorial entities with management technology; implementing an integral system of e-procurement; creating a government intranet to help citizens access government services; instituting a centralized system of consultation information to help prosecute money laundering; and organizing a national university broadband network.

The two main indicators to measure the digital divide in Colombia (as in any other developing country) are penetration of computer use and ownership and Internet access. Connectivity Agenda measures computer penetration as the number of computers for every 100 inhabitants. Its goal is to reach a penetration of 14.28% by the end of 2006, up from 4.21% in December 2001. Internet access is measured by the number of Internet users for every 100 inhabitants; the goal is to reach 9.97% at the end of 2006, as opposed to 2.69% in December 2001.

2. Connectivity Agenda action plan for 2004

The priorities of the Connectivity Agenda action plan for 2004 (Ministerio de Comunicaciones, 2004) are:

(a) Government online:

At <www.gobiernoenlinea.gov.co> ICTs should improve the efficiency and transparency of public administration, helping public entities to simplify, integrate and create useful documents for public administrators, citizens and enterprise managers. Goals for 2004:

- To identify public administration documents to be used online.
- To implement the platform with an initial range of 20 online documents.

(b) Online payments:

The public sector should develop and implement an online system to receive payments from individuals and companies for any documents or services that the Government provides. The regulations for such a system were to be defined in 2004.

(c) Online Government nationwide:

Territorial agencies were to gain access to technology to improve their administrative capacity and document management.

(d) Integral System of Electronic Procurement:

As set out in document CONPES 3249 (2003), the public sector was to develop an integral system for electronic procurement. In the initial phase, efforts focused on a single procurement portal (www.contratos.gov.co) for upgraded information, execution indicators for public agencies, response to complaints and corruption accusations and, in general, good service to citizens.

The Integral system of electronic procurement implemented in the framework of Connectivity Agenda uses ICT not only to provide information on contractual activity, but to support the administration of contracts for all domestic public agencies, making public procurement more efficient and transparent.

The system of electronic procurement should interact directly with enterprise managers and citizens who want to offer goods and services to the State—facilitating the development of e-commerce within the country.

(e) Government intranet:

An intranet was planned to allow the flow and exchange of information (data, voice and images) among state agencies and between the State and citizens seeking to access government services online. With a view to this, the project will need: a standard communication interface for all government processes and institutional information systems; a data centre and basic interaction services for officeholders; and a citizen response and service centre. The development and implementation of the components of this project should begin in 2004 and continue through the first semester of 2005.

(f) Centralized System of Information Consultations:

The Connectivity Agenda, together with the Unit of Information and Financial Analysis (UIAF), is to develop a system for the exchange of financial information. This system, called the Centralized System of Information Consultations (SCCI), will aid UIAF, the police intelligence department, customs and other entities involved in prosecuting the laundering of money and other assets. Development of the system should begin in 2004 and continue through the first semester of 2005.

(g) National University Network:

The network should connect several cities in a broadband network that allows the efficient exchange of information among universities and investigation centres and gives Colombia access to high-speed international academic networks. The universities that have spearheaded these networks in Cali, Medellín, Manizales, Barranquilla and Bucaramanga participate in the project.

Thus far, the Connectivity Agenda action plan has resulted in 201 Government agencies participating and having a presence on the Internet. About 300 more, from regional governments to the legislative and judicial sector, have joined the effort of their

own accord. Congress is discussing a bill to unify all the agencies involved under the same online government system. It is expected that all these projects will be on stream by June 2005.

(h) Rationalization and Automatization Proceedings Programme (PRAT):

A study by the Public Functions Department concluded that citizens and businesses have to conduct 2,676 different types of transaction to work with the Government. The worst affected sectors are social protection and health, education, foreign trade and housing. A decree, which is waiting to be signed by ministers, will adopt a single form and allow investment certifications to be consulted electronically. It also creates a virtual commercial window for foreign trade, with a single inspection at ports and airports.

This single foreign trade form will be implemented beginning 1 January 2005, consolidating 35 export and import documents into one form and reducing processing time from 20 days to just two. Twelve organizations related to foreign trade will be integrated online: the Ministries of Commerce, Industry and Tourism, Transport, Environment, Social Protection, Agriculture and Defence, as well as the Colombian Agricultural Institute (ICA), the National Institute for Food and Pharmaceutical Control (INVIMA), the Colombian Rural Development Institute (INCODER), the Colombian Institute of Geology and Mining (INGEOMINAS), the Superintendence of Trade and Industry and the Superintendence of Oversight and Security.

Several studies show that more paperwork is required to do business in Colombia than in many other countries. According to the International Development Centre, Colombia has the fourth-highest level of business start-up paperwork in Latin America, requiring a total of 17 documents. A company manager must process 594 documents—including 164 licenses and permits, 119 business start-up registrations and creation and 67 are other proceedings.

3. Electronic documents

Connectivity Agenda is working on implementing electronic documents, both in-house and from information centres called Community Access Points (PACOs). PACOs will be installed in every department capital and in middle-sized cities. They will be connected by broadband to the state information network. Other municipalities will have the same services through the COMPARTEL programme.

This transformation is guided by a number of principles: unnecessary documents should be eliminated; citizens should not be asked for information that the Government already possesses; documents should be rationalized to do away with unnecessary steps or requirements; information exchanges between government entities should be secure; and lastly, public administrators should adopt better practices and standards for implementing frequent tasks and seek economies of scale in contracts.

A number of considerations are warranted by the main strategies implemented by the Government and Connectivity Agenda regarding SMEs and ICTs.

4. Online enterprises

Projects are focused on two issues: implementing technological tools to enhance competitiveness and productivity, and creating incentives to increase ICT use and adopt e-commerce tools. The projects can be broken down as follows:

- (a) **Prymeros:**
To expand Internet use by businesses and support the implementation of e-commerce tools for registered SMEs. This project is currently being developed.
- (b) **Incentives for technological innovation in SMEs:**
To co-finance programmes, projects or activities that contribute to using technology to improve the competitiveness and productivity of micro-enterprises and small and medium-sized enterprises.
- (c) **Quality standards and certification:**
To finance 50% of companies' spending on training, consultancy and certification. Companies are selected for this programme, supported by SENA.
- (d) **Implementation of barcodes and electronic data interchange (EDI):**
To help companies optimize and accelerate processes of identification, receipt, packaging, selection and dispatch of goods.
- (e) **Agribusiness clusters:**
To support Colombian agro-industry, facilitate better use of technology, make production processes more efficient and move national products closer to international markets.

C. Promoting a national industry for ICTs

By 2010, Colombia hopes to be actively developing a knowledge-based sector, with intensive ICT use in education, industry and Government, and to optimize activities and raise them to the quality and efficiency standards of developed nations. It also would like to see all citizens have access to and actively use ICTs. Lastly, it wishes to have an ICT industry that places Colombia among the world's top five exporters of software and other technology. To develop the third element of this vision, a strategy of promoting a national ICT industry seeks to create favourable environments for its development.

Such a strategy should consider the following: fomenting ICT research through the Digital Nations Project; consolidating and identifying possible levels of supply of ICT products; analysing demand; understanding ICT industry merchandising and financing; dealing with multinational companies to establish development centres within the country; and strengthening Colombia's existing software industry. Specific activities may include, for instance, a Portocolombia portal with an information system showing the products ICT companies offer; a study for the creation of a virtual free zone, generating new employment opportunities and enterprise development by using IT; creating incubator enterprises and software companies; promoting technology parks; and improving existing mechanisms for the creation of IT enterprises, technological development centres and free zones.

1. Promoting ICT use in SMEs

With 40% of GDP, SMEs are a fundamental part of the local economy, and both Government and private trade entities have begun to develop strategies to foment the use of ICTs in the SME sector. As seen with the Connectivity Agenda, national policies for broadening ICT use rest mainly within the public sector, as the Government develops websites, online payment systems, e-procurement and an intranet. This leaves out the SMEs; they are covered by the Prymeros project, which is becoming the main instrument to expand Internet use and support the implementation of e-commerce.

a) Prymeros

Prymeros is an initiative of the Colombian Confederation of Chambers of Commerce (CONFECÁMARAS), IDB (Technical Cooperation No. 7978-CO) and Connectivity Agenda, operating jointly nationwide with the Chambers of Commerce of Barranquilla, Bogotá, Bucaramanga, Cali, Cartagena, Manizales and Medellín. Connectivity Agenda funds 25% of the programme, while the IDB contributes 50%. The remaining 25% is financed by CONFECÁMARAS and the seven Chambers of Commerce. It is the Government's largest ICT initiative and practically the only one aimed at the SME sector in Colombia.

The Prymeros programme aims to help improve the competitiveness of Colombian SMEs through services and technological solutions for e-commerce. By September 2004, 2,559 companies entered Prymeros, of which 750 have been analysed, that is, they are assigned an expert consultant in e-commerce as well as traditional management consultancy, who assists in implementing e-commerce technology by assessing the needs of managers and outlining a proposal that then serves as an input for the last phase: action plan implementation.¹⁰ Prymeros hopes to make 2,100 companies aware of the benefits of ICT use and e-commerce, assign an analytical consultant to more than 20 business communities and implement e-commerce action plans in at least 15 businesses by the end of 2004.

b) Mode of operation for Prymeros

As mentioned earlier, Prymeros (<http://www.prymeros.com.>), offers SMEs sensitization to e-commerce, individual and collective diagnostic consultants and technology implementation. The Chambers of Commerce help Prymeros reach across the country and coordinate activities in their respective jurisdictions. First, each Chamber of Commerce summons its members to workshops for e-commerce awareness-raising for SMEs. Surveys by location analyse technological infrastructure and relationships between customers and suppliers, identifying companies in which Prymeros can have the greatest impact. These companies are invited to join the programme and, grouped together by Chamber of Commerce, they form business communities. Companies then perform an individual self-diagnosis, using a tool developed by Prymeros. The enterprise manager reviews the self-diagnosis and a consultant evaluates the results.

The self-diagnosis helps determine the situation of the company in different administration areas, emphasizing the formalization of processes to help the firm implement the ICT services it needs.

2. Other initiatives to promote ICTs

The private sector also has high expectations for the business opportunities that ICTs represent for SMEs. The large size of the sector and shallow penetration of certain technologies make it a very attractive market.

Trade associations and other private entities are other important forces driving the use of ICTs. Their drawing power and access to national and international lines of credit (e.g. IDB, World Bank) allow them to lead these projects, which would be difficult for companies to do on their own.

¹⁰ Analyses are taking place in Medellín with the business communities of underwear, construction, fruits, dairy, tourism and forestry; in Cartagena, with the metal working communities, navy and auto parts; in Cali, with health, leather and clothing; in Manizales, with the tourist industry; in Bucaramanga, with the poultry, clothing and supplying sectors; and in Bogotá, the clothing and pharmaceutical clusters.

Public services such as Telecom, EPM and ETB have already developed commercial strategies for SMEs, offering connectivity packages appropriate to their needs. These packages include fixed and mobile telephony, Internet and call centre services.

a) Chambers of Commerce

The main Chambers of Commerce in Colombia have departments for ICT support, helping companies to incorporate computer technology into their work through a number of different services and programmes. Affiliated companies can connect to the Internet and develop websites through them. Meanwhile, CERTICAMARA allows the certification of digital signatures, and Prymeros, as mentioned above, offers advice on Internet use and e-commerce for SMEs.

b) CERTICÁMARA

To support the development of e-business in Colombia and create a legal framework that gives companies security, in 1999 the Chambers of Commerce promoted Law 527 on e-commerce. As experts in corporate certification and legal matters, the Chambers of Commerce of Bogotá, Medellín, Cali, Bucaramanga and Cúcuta, along with CONFECAMARAS, created the first agency for digital certification. This agency, called CERTICAMARA, is controlled by the Superintendence of Trade and Industry and meets the highest technological and security standards.

CERTICAMARA offers security in Colombia for transactions, communications and electronic operations over the Internet through digital certificates backed by the law. For SMEs, CERTICAMARA generates trust in using electronic media to carry out commercial operations.

D. Policies to support SMEs

Other policies aimed at SMEs involve export promotion, trade facilitation, FDI promotion and business promotion through new business incubation and entrepreneurial support.

1. Export promotion

With the inauguration of President Álvaro Uribe in 2002, the Ministry of Foreign Trade and the Ministry of Development were fused to form the Ministry of Trade, Industry and Tourism. It is responsible for developing export promotion policies, bearing in mind the recommendations of the Foreign Trade Council, the Foreign Trade Bank (BANCOLDEX) and PROEXPORT.

According to PROEXPORT, Colombia is not within the list of the world's top 50 exporters, figuring below Hungary and Algeria. Exports account for only 12.2% of GDP—a small share compared to Spain (18.2%), Mexico (18.3%), Chile (22%) and Korea (27.8%).

In January 1991, the Colombian Congress issued Law 7, establishing a regulatory framework for foreign trade. It also created the Ministry of Foreign Trade and BANCOLDEX; defined export free zones as instruments for export promotion; maintained the Certificate of Tributary Reimbursement (CERT); and determined the composition and functions of the Council on Foreign Trade (CSCE). All told, Law 7 formalized the importance of international trade as an engine for growth.

CSCE advises the Government on foreign trade and defines aspects of trade policy. The council consists of the President, ministers of commerce, property, agriculture and mines, and managers of the Bank of the Republic and the National Department of Planning.

More specifically for the SME sector, in 1999 the Government devised a Strategic Exporter Plan (PEE) that provides a roadmap to 2009 to strengthen Colombian production and its international market orientation. PEE aims to duplicate and diversify non-traditional exports, in which EXPOPYME plays an important role. Designed and coordinated by PROEXPORT, EXPOPYME seeks to successfully and permanently position SME exports to meet and adapt to world demands.

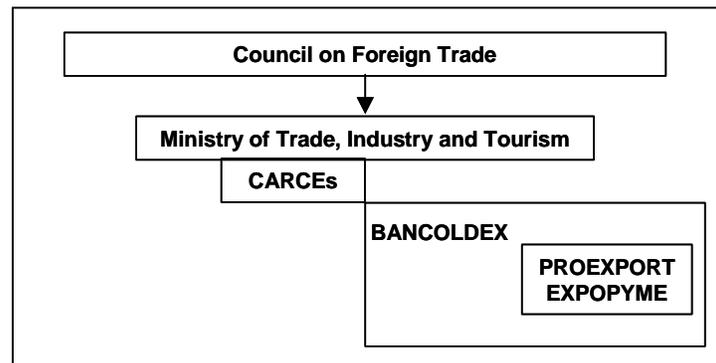
2. Instruments of export promotion

A broad range of instruments is available to Colombian exporters to promote their products and help them compete in international markets. These are:

Vallejo Plan: Allows industrialists to bring raw materials, intermediate goods, capital and spare parts into the country totally or partially tax-exempt if they are used to produce goods or services for export. WTO has authorized the plan until the end of 2006.

Duty-free zones: There are currently nine duty-free zones in Colombia: Barranquilla, Bogota, Candelaria, Cartagena, Cúcuta, Pacific, Palmaseca, Rionegro and Santa Marta. Another, Ciudadela Salud is under construction in Bogotá. According to the chambers of commerce in duty-free zones, industrial exports from such zones amounted to US\$ 528.6 million in 2001, or 9.3% of industrial exports. Industrial production in duty-free zones continued to grow, reaching US\$ 695.4 million in 2003. In 2001, the most important markets for the industrial sector were the Andean Community (43%), the United States (15%) and the European Union (21%). Sales to these markets have been concentrated in textile preparations and food. Other sectors with smaller shares, such as the metallurgy, chemical and pharmaceutical, plastics and services sectors, have grown strongly, contributing to increases in the overall exports of duty-free zones. Exports to the European Union of services to industrial users in telecoms, equipment and software repair continue to rise.

FIGURE 17
STRUCTURE OF COLOMBIA'S EXPORT SECTOR



Source: Prepared by the author.

(a) **BANCOLDEX:**

The Bank seeks to ease liquidity constraints for export companies, not only for the producer and exporter, but also for foreign consumers. The statutes of the Bank also allow it to finance projects associated with physical infrastructure for exporters.

(b) **PROEXPORT:**

This export promotion fund develops promotion programmes for Colombian exportable goods. Resources are administered through the Foreign Trade Board (FIDUCOLDEX).

Foreign trade policy is based on supporting the internationalization of Colombian companies through sub-regional hemispheric integration — that is, by strengthening the Andean Community and negotiating other free trade agreements. Recently the Council on Foreign Trade presented a new programme that promotes trade with the European Union, Canada, Panama, Japan, India, CARICOM, the Central American Common Market, China, Republic of Korea, the Russian Federation, Thailand, Singapore and Malaysia.

3. PROEXPORT

PROEXPORT (www.proexport.com.countries), is a government agency responsible for the commercial promotion of Colombia's non-traditional exports. It offers international marketing support and advice to Colombian businesses through services to help design and implement export strategies.

It promotes the effective incorporation of Colombian companies into international markets through identification of market opportunities; design of strategies for market penetration; internationalization of firms; help to design action plans; and specialized services for foreign companies interested in acquiring Colombian goods and services.¹¹

PROEXPORT functions are divided in two areas: non-financial promotion, executed by PROEXPORT, and financial support, executed by BANCOLDEX. As mentioned earlier, BANCOLDEX, created in 1991, is a credit bank linked to the Ministry of Foreign Trade (since 2002, the Ministry of Trade, Industry and Tourism).

Since its creation, one of the main objectives of PROEXPORT has been to maintain a portal with updated trade information for both Colombian exporters and foreign importers. It is one of the most complete information sites and has contributed to creating a better-informed Colombian business sector. Its portal (www.proexport.com.co), contains data on trade opportunities, a directory of Colombian exporters and a section called INTELEXPORT with information about foreign trade, aimed at helping identify market niches for Colombian products in other countries. INTELEXPORT also monitors trends in international markets, Colombian exports and the identification of potentially exportable products, as well as the latest foreign trade news.

4. EXPOPYME

EXPOPYME is a programme offering SMEs tools and advice to create an export culture and boost their own exports. It came out of an agreement among national institutions working in foreign trade promotion: the Ministry of Trade, Industry and Tourism, PROEXPORT, the

¹¹ Its general objectives are: to strengthen, in the short and medium terms, Colombian sales, goods and services in the international markets, offering firms a portfolio of high-quality services; to maximize efficiency in the uses of PROEXPORT national and international network offices; to build partnerships with private and public national and international agencies that work to increase the availability of resources to support business initiatives.

Colombian Association of Manufacturers (ACOPI), BANCOLDEX, CONFECÁMARAS and a number of guilds and universities.¹² The programme has assisted 2,107 SMEs in the last five years nationwide in training, development of export plans and, in some cases, tutoring in exporting to target markets.¹³ EXPOPYME deals with companies in all sectors of the economy and all kinds of companies in the craft sector. It also runs a diploma course on managing change to help businesses learn to devise export plans.

Exports undertaken within EXPOPYME increased from US\$ 67 million in 2000 to US\$ 117 million in 2003.¹⁴ The United States was the main market, with a 32% increase in exports in 2003. Other important destinations were Ecuador, Mexico, Panama and Costa Rica. In the first two months of 2004, companies in EXPOPYME exported goods and services worth US\$ 17 million, the main origins being Bogotá, Medellín, Cali and Bucaramanga.

The programme has a budget for developing websites for participating companies. However, the amount is very small for the tasks of developing e-commerce applications and dynamic pages. ICT use in the companies is very limited and it has not been one of the main focuses of EXPOPYME, partly due to consultants' and universities' inexperience in this field.

5. CARCEs

Regional Foreign Trade Advisory Committees (CARCEs) were created in 1991 as virtual committees comprising the private and public sectors, universities and Colombian regional research centres. They form a connection between the regional and national governments to promote export culture, growth and research. CARCEs aim to develop systemic competitiveness through activities that orient each region towards international markets. The Committees also serve as liaisons between the regional and national governments, helping to develop a strategic plan appropriate to each region's export potential.

CARCEs have two main areas to develop: competitiveness and export culture. Both are framed in a strategic regional exporter plan that should coherently reflect the national strategic exporter plan.

E. Facilitating trade

Some aspects of trade facilitation in Colombia have been discussed, such as the Connectivity Agenda projects, which make export and import procedures easier.

The accession of Colombia into free trade agreements such as FTAA and the Andean Trade Preference Act are also facilitating ICT use in ways that boost trade.

1. Ports

ICTs have already been incorporated into Colombia's main port of Cartagena. The Cartagena port company has set up a website through which users will be able to access complete and real-time

¹² Additionally CARCEs, SENA and FOMIPYME support the implementation of the programme nationwide.

¹³ The programme seeks to promote new product development, productive processes and management methods for export, through methodologies and supporting instruments designed by the programme. Companies in the programme receive training for export and make an exporter plan and chart to define where they will send exports and how to access State support.

¹⁴ PROEXPORT, EXPOPYME programme.

information on movements and processes in the port—making Cartagena’s foreign trade administration more efficient.

The port company has also made major improvements to its physical infrastructure with the acquisition of six modern cranes, at a cost of US\$ 15 million, and improvements to wharfs, information systems and staff training costing US\$ 85 million.

2. Airports

As of 2004, the main international airport, El Dorado, in Bogotá has been privately managed. The firms concerned are to build a new runway and control tower, expand the terminal, and upgrade loading areas, hallways and parking. The project will take an investment of over US\$ 900 million.

3. Roads

Colombia has recently stepped up investment in transport infrastructure, by means of an aggressive concession scheme. These investments will facilitate future service and logistics development.

TABLE 17
MAIN INDICATORS OF TRANSPORT INFRASTRUCTURE, 2002

Road density	<i>(km/km²)</i>	0.10
National road network	<i>(km)</i>	15 916
Air traffic	<i>(passengers)</i>	10 615 720
Railways	<i>(km)</i>	3 140

Source: Coinvertir, Foreign Investment Report, Bogotá, D.C., 2003.

4. Intellectual property

Colombia’s protection of intellectual property rights has improved but does not yet meet the protection standards of WTO. Colombia has ratified but not yet fully implemented the provisions of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

F. Foreign investment

Investment climate improvements have focused on the elimination of legislative barriers and the creation of incentives to attract larger investment flows. With inflows of US\$ 2.03 billion, Colombia is the second-largest foreign direct investment destination in South America after Brazil (UNCTAD, 2003).

- Coinvertir

Coinvertir (2004), is a joint, privately owned, non-profit venture created in 1992 to promote and facilitate the development and consolidation of foreign investment initiatives in Colombia. Promotion activities have included support to specific sectors and projects. From 1993 to 1997, Coinvertir engaged in promotion of the software, plastics and clothing sectors. Since 1997, promotion efforts have focused on strategic projects with a major potential impact on the country’s economy.

In 2003, foreign investment grew by 68% compared to the same period in 2002, from US\$ 1.1 billion to US\$ 1.85 billion, mainly due to the good performance of foreign portfolio investment (FPI), which grew 109%, moving from an outflow of US\$ 1.01 billion to US\$ 87 million. On the other hand, foreign direct investment (FDI) decreased from just under US\$ 2.12 billion to US\$ 1.76 billion, a drop of 17%.

The fourth quarter showed a slight decline in foreign investment compared to the same period of the previous year, moving from US\$ 751 million to US\$ 697 million, a decrease of 7%. This drop was caused by a 22% reduction in FDI, from US\$ 430 million to US\$ 336 million, offset by growth in FPI, which was up by 12% on the previous year, from US\$ 320 million to US\$ 361 million.

Between the third and fourth quarters, FPI increased by 333%, from US\$ 83 million to US\$ 361 million. This growth offset a 42% drop in FDI inflows, which decreased from US\$ 579 million to US\$ 336 million. As a result, foreign investment grew by 5%, from US\$ 662 million to \$ 697 million.

TABLE 18
FOREIGN DIRECT INVESTMENT, BY SECTOR
(In millions of dollars)

	2001		2002				2003				2002-2003 ^a		
	US\$	%	IV	Total	III	IV	Total	%					
	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%	%
FDI	2 525	100	430	100	2 115	100	579	100	336	100	1 762	100	-17
Petroleum sector	521	21	29	7	424	20	121	21	17	5	312	18	-26
Mining/quarrying incl. coal	524	21	140	33	466	22	138	24	162	48	553	31	19
Manufacturing industry	244	10	108	25	314	15	114	20	65	19	314	18	0
Financial establishments	560	22	114	26	293	14	78	14	77	23	260	15	-11
Commerce-restaurants-hotels	205	8	36	8	116	5	67	12	38	11	209	12	80
Power, gas and water	-71	-3	13	3	135	6	31	5	6	2	65	4	-52
Community services	30	1	-7	-2	31	1	9	2	25	7	49	3	60
Transp-storage-communic.	416	16	-4	-1	345	16	13	2	-74	-22	-52	-3	-115
Construction	84	3	-1	0	-4	0	2	0	17	5	38	2	993
Agric-Hunt-Forestry-Fishing	12	0	2	0	-5	0	4	1	5	1	16	1	411

Source: Colombian Central Bank, Balance of Payments, Bogotá, D.C., December 2003.

^a Annual variation.

G. Business promotion

1. Incubation

Efforts to incubate industries in Colombia are focused mainly on creating technology-based companies. The Colombian Institute for Science and Technology Development (COLCIENCIAS) is one of the driving forces behind incubation, with the founding of the National System of Innovation. Enterprise incubators from Antioquia and the Innovar Corporation from Bogotá are some of its most important members.

The number of incubators in Colombia rose from four in 2000 to 13 in 2004, and is likely to increase to 28. In the first six months of 2004, under the incubator scheme, 91 companies were created, with over 800 jobs and sales in excess of US\$ 2.5 million (Innovar).

SENA also supports the creation of incubators. Law 344 of 1996 requires an incubator to devote 20% of its resources to innovation activities and technological development. A total of 263 new companies in different productive sectors were created in 2003, thanks to the 18 incubators of technology-based companies associated with SENA. These generated 2,260 jobs and reported a total of US\$ 9 million in sales. The Government invested US\$ 5 million in the process in 2003. For 2004, SENA had an investment budget of US\$ 3 million (SENA, 2004).

2. Entrepreneurship

Many strategies to improve a company's competitiveness involve networking and partnering with complementary firms. Factors such as reducing costs, increasing productivity, forging strategic partnerships and creating productive chains or clusters have become vital in the last thirty years to allow enterprises to grow and expand successfully, in step with technological, political, economic and marketing changes.

In the 1990s, economic liberalization triggered a profound crisis for SMEs that were not prepared to compete with multinational and other companies that set up operations in Colombia or exported to it. In this context, the Colombian Association of Manufacturers (ACOPI) created the PRODES programme, based on successful partnership experiences in countries such as Spain, Italy and Chile.

PRODES now has almost 500 affiliated enterprises employing nearly 10,000 workers, with total annual sales of around US\$ 150 million. The fifty PRODES groups are distributed in the 18 largest cities, including the main department capitals and some middle-sized cities.²³

Other interesting initiatives are the regional centres and chains of productivity supported by the Ministry Trade, Industry and Tourism and international agencies such as ECLAC, UNDP and CAF. These programmes focus on different departments in Colombia and are directed at key sectors of the economy, generally micro-enterprises and small companies in the leather, confection, electronic, software and agriculture industries.

Training programmes have helped create enterprise networks and entrepreneurship. In addition, a programme to promote productivity and competitiveness through creative use of ICTs has been formed in the framework of the national productivity and competitiveness policy coordinated by the Ministry of Trade and Industry.

The projects underway include one entitled "Strengthening the Competitiveness of the Production Chains through the Creative Use of the ICTs: Support to the Agroindustrial Production Chains". It seeks to develop ICT use as a strategic instrument to strengthen the competitiveness of production chains or clusters in diverse regions of the country. This project grew out of a strategic alliance among Digital Colombia Corporation, Connectivity Agenda, the Ministry of Agriculture and different chambers of commerce, as well as Sergio Arboleda University, Universidad de los Andes and Universidad Piloto de Colombia.

The project in fact consists of three regional projects in three departments of Colombia: Bogotá and Cundinamarca agroindustrial mega-project; Support for agroindustrial production chains in the Valle del Cauca and coffee-growing belt; and Support to the chains of agroindustrial production in Antioquía and the Northwest.

3. Technological Development Centres

The technological development centres (CDTs) are specialized units that generate and disseminate knowledge and technical support. They are part of the National Innovation System. The CDT network is composed of 50 centres in the sectors of mining and energy, agriculture, industry, services and new technologies. The centres offer such services as business modernization

and management; innovation and technological development projects; technological services; information, technical assistance and quality management; and specialized training.

H. Special measures to bridge the digital divide

1. COMPARTEL

To equip remote communities of limited resources with adequate telecoms infrastructure, the Ministry of Communications has designed COMPARTEL programmes for rural community telephony, social Internet, and broadband connectivity for public institutions. Before COMPARTEL, only the major cities in Colombia had Internet access, and ICT rates are still prohibitively high for low-income users.

2. Telecentros

Inhabitants of Colombian municipalities have Internet access through Telecentros, thanks to the social Internet COMPARTEL programme, which is overseen by the Ministry of Communications and the National Development Fund (FONADE). Telecentros have been in operation since 2000.

a) Stages of social Internet COMPARTEL

Social Internet COMPARTEL was developed in three independent stages. In the first, 670 Telecentros were set up in municipalities with an urban population of under 8,000. In the second, 270 Telecentros were set up in municipalities of over 10,000 inhabitants. In the third stage, which is still underway, 500 Telecentros are planned for municipalities not covered in the previous phases. Plans also exist to extend the service to centres with over 1,700 inhabitants. When the project is complete, all the regions of the country should have Telecentros equipped with modern communications technology, to be used by communities as virtual libraries and as a driver for new employment and trade opportunities.

b) Telecentros by population

Community Access Centres were set up according to the size of the town concerned. Tables 19 and 20 show how they were structured.

TABLE 19
SPECIFICATIONS OF TELECENTROS

Centre	COMPARTEL point with Internet access	Type B	Type C
Population of the municipality or department capital (<i>inhabitants</i>)	< 8 000	10 000 to 200 000	> 200 000
Centres (<i>number of</i>)	670	235	35
Basic equipment	2 computers 1 printer 1 facsimile 1 telephone	6 computers 1 colour printer 1 printer 1 facsimile 1 scanner 2 public telephones 1 video camera	12 computers 1 colour printer 1 black and white printer 1 facsimile 1 scanner 2 public telephones 1 video camera

Source: Prepared by the author.

The following centres were established for the third phase:

TABLE 20
TYPES OF TELECENTROS

Telecentro	Type A	Type B	Internet type
Lines in cabin with terminal	4	6	2
Basic equipment	6 computers 1 computer for administration 1 black and white printer 1 facsimile 1 color scanner 1 web camera	6 computers 1 computer for administration 1 black and white printer 1 facsimile 1 color scanner 1 web camera	6 computers 1 computer for administration 1 black and white printer 1 facsimile 1 color scanner 1 web camera
Training room	1 Television 1 VHS 1 computer 1 table 20 chairs	1 Television 1 VHS 1 computer 1 table 20 chairs	1 Television 1 VHS 1 computer 1 table 20 chairs
Public telephones	2 exterior 3 institutional at municipalities with less than 20 lines.	6 exterior 3 institutional at municipalities with less than 20 lines.	-

Source: Prepared by the author.

3. Credits

Lack of financial resources prevents many SMEs from obtaining new technology. Law MIPYME (10 July 2000) and FOMIPYME offer the possibility of financial support for SMEs to modernize and innovate.

FOMIPYME, the Colombian Fund for Modernization and Technological Development of SMEs, allocates more than US\$ 7 million per year to these projects.

4. Training

ICT training programs in Colombia are not making significant progress; this vital factor explains why Colombia lags behind other countries in this regard.

However, several initiatives focus specifically on ICT training for SMEs. EXPOPYME has specific training modules in using the Internet to penetrate international markets, and has sessions that give participants the theoretical foundation for strategic thinking regarding ICTs.

a) Universities

Some universities already have information technology courses: Universidad de La Sabana, Universidad Javeriana Cali, Icesi Cali and Universidad de Los Andes. The courses specialize in trade or e-business, but specific career paths and masters degrees have not yet been developed.

b) SENA

To introduce ICT to companies, the SENA strategic plan includes projects on such topics as bar code implementation and electronic document transmission, to contribute to domestic technological development. The amplified effect of an entity like SENA will provide invaluable support in disseminating ICT use.

c) Project Cumbre

Project Cumbre, a Connectivity Agenda training project, offers ICT professionals scholarships in graduate degree programmes to prepare them to head up ICT projects and help Colombian ICT industries to operate in international markets. The project is directed at engineers working in the areas of systems, computer science, hardware, telematics, electronics, information system, telecoms and other related professions.

5. Regional networks

The TIPS south-south cooperation network is among the largest networks for SMEs in Latin America. TIPS has been run since 1986 by the International Devnet Association from its operational base in Uruguay. It has 19 national offices in Latin America and 44 in Asia, Africa and Europe.

UNDP created TIPS with the endorsement of the Italian Government. It has received support from the European Commission and the Governments of Austria and the Netherlands, and has agreements with governments and business organizations in the region. European Commission support through the AL-INVEST Program has been crucial to the development of the Latin American network.

TIPS connects orders directly from and to companies, particularly micro-enterprises and SMEs. It processes requests and offers for products and services, transfers technology, contracts services, compares alternatives, and helps plan and improve management capacity and competitiveness. More than 300,000 companies use TIPS annually. Users can browse trade opportunities classified in 18 different categories, ranging from agro-industry to textiles or pharmaceuticals.

Devnet also runs the ALPYMES programme (<http://www.alpymes.net>) in 18 Latin American countries, supported by the European Commission and UNDP. The objective of ALPYMES is to make the Internet and e-commerce affordable for SMEs in the region, providing specific information services on business opportunities through a permanent presence on the Internet. The TIPS project has spread to Asia with specific portals for the Philippines, Bangladesh, Nepal and Sri Lanka (<http://www.tips.org.uy/SPA/redirec/tipsasia.asp>) as well as China (<http://www.tips.org.uy/SPA/redirec/tipschina.asp>).

I. Websites in Colombia

There are no known regional or interregional networks for SMEs in Colombia, though some websites do focus on SMEs, ICTs and international trade.

The Colombian government portal (www.gobiernoenlinea.gov.co) gives Colombians access to all public sector web pages.

Other sites have also been developed, most of them private but some through private and public sector partnerships:

- The Colombian Production Centres Network (<http://www.cnp.org.co/rccp/home/index.php>), now links nine centres and institutions and is coordinated by the National Production Centre. Website users can browse information on the different members and projects underway.
- Colombiaproductiva.com (<http://www.colombiaproductiva.com/colombiaproductiva/site/index.php>), is related to the Colombian Production Centres Network. Articles are available for consultation on productivity, successful cases, statistical studies and information on technological innovation.
- Launched in February 2002, INFOPYME (www.infopyme.com.co) is the first specialized BBS for SMEs in Colombia, and more than 20,000 form an online community at this site. It has regularly updated information, which registered users can receive in the form of daily e-mails.
- ACOPI Bogotá's website (<http://www.pymexport.com.co/>) is a portal where firms can offer and request products and services. PYMEXPORT is a B2B platform that stores information on the demand generated by clusters in different sectors and allows interaction between businesses and the external market. The platform can be used to prepare for business conferences, meetings, fair displays and other commercial activities.
- The Colombian Socio-economic and Technological Research Corporation (CISNET) (<http://www.cinset.org.co/>) is a non-profit company set up in 1987 to implement environmental, social, economic and technological projects for SME promotion.
- Gerencia IT (<http://www.gerenciait.com>) is an online magazine with articles, opinions, events and interviews. It has a section for registered members.
- Gestipolis.com (<http://www.gestipolis.com/>) is aimed at entrepreneurs with business news, human resources articles for business management and information on legislation, marketing, sales and ICTs.
- BusinessCol Ltda. (<http://www.businesscol.com/>) is an independent company located in Bogotá that specializes in Internet services and materials for entrepreneurs. Subscribers get a monthly electronic bulletin with information for SMEs.
- Sergio Arboleda University (<http://www.usergioarboleda.edu.co/pymes/>) has a guide to SME exporters in Colombia, which was developed by its international trade faculty as part of a programme of consultation and research in SME trade. Sponsored by the Government and export promotion institutions, it aims to find a sustainable e-commerce model for Colombian SMEs based on educational and Internet communication strategies.
- Avanza (<http://www.avanza.org.co/>) is an interactive portal supported by the Development Gateway Foundation (DGF) as

part of the Country Gateway programme. It promotes ICT application for sustainable development and local poverty reduction.

- Begun in 2002, Digital Colombia Corporation (CCD) (<http://www.colombiadigital.net/index.php>) is a non-profit corporation aiming to promote and develop creative and innovative projects that use IT to contribute to the well-being of Colombian society and to the sustainable development of the country. It is a member of the International Corporation of Digital Nations, a group of institutions in different countries that work to promote research, technological development and innovation promotion through ICT pilot projects. The Massachusetts Institute of Technology (MIT) Media Lab coordinates this corporation.
- The website of the Bogotá Chamber of Commerce (www.empresario.com.co) is aimed at businesspeople and seeks to promote the use of ICT and e-commerce. It has sections on foreign trade and trade opportunities as well as information on the Bogotá Chamber of Commerce. Registered users have access to more detailed and specialized information.
- The website of the Colombian Association of Manufacturers belongs to the presidency of ACOPI (<http://www.acopi.org.co>). It contains information on the SME sector, legislation, and financing sources. Much more information might be expected in the future, considering the importance of this organization.
- The National Federation of Retailers (FENALCO) website (www.fenalco.com.co) presents information on the union and news related to its activities and events.
- FUNDES Colombia (www.fundes.org, <http://www.mipyme.com/>) is part of a portal organized by the different countries where FUNDES is located. Each site offers information about FUNDES services, as well as useful tools aimed at micro-enterprises and SMEs that help them to take advantage of ICTs. Users must be registered.
- The official website of the Colombian Software Federation (FEDESOFTE) (<http://www.fedesoft.org>) might be expected to provide more information, but many of the links are non operational.
- Misión PYME (<http://www.misionpyme.com>) is a new online magazine with articles for SMEs. One section is devoted to ICTs, others to business opportunities.
- The Colombian Institute of Technical Standards of Certification (ICONTEC) (<http://www.icontec.org.co/homemember.asp>) offers information on news, standardization and certification. Its most interesting section is its standards catalogue, which allows users to buy online publications of standards classified by economic sectors (e.g. agriculture, electronics).
- Evaluamos (<http://www.evaluamos.com/home.aspx>) is an informative website run by journalists who cover the computer science sector aimed at SMEs and IT professionals. The focus of the site is evaluation, but it also contains news, advice, interviews and information on new products. Subjects include hardware, software, the Internet, news, fairs, seminars and meetings of the sector.

- The online version of Portafolio newspaper, the country's largest daily newspaper (<http://www.portafolio.com.co>) specializes in business and the economy. It has a special section with technology news, especially referring to the Internet.
- La Nota (<http://lanota.com.co/noticias/>) is a major economic publication with specific information on a number of Latin American countries. It also has a directory of companies and sectors, and the Marketplace, where companies can publish and advertise their products.
- La Republica (<http://www.larepublica.com.co>) is one of Colombia's leading economic and business newspapers. The website has a section devoted to SMEs, with articles of interest, advice and a "SMEs in action" section.
- Todo Uno (<http://www.todo1.com>) is a partnership of independent banks that are leaders in their respective markets: Mercantil Servicios Financieros in Venezuela, Bancolombia and Conavi in Colombia and Banco Del Pichincha in Ecuador. These international financial institutions collaborate to benefit from economies of scale resulting from joint investment in developing new technologies and value added products.
Todo Uno seeks the development and implementation of Internet- and technology-based services and financial products, such as online personal and corporate banking, mobile banking, e-procurement solutions and digital payment methods. The portal has separate modes of access for individuals and companies.
- IBC Solutions (<http://www.ibc-solutions.com/>), which belongs to the Carvajal group, began operations in Colombia in 1994 as the services operator of EDI Added Value and the community developer for e-commerce. Its purpose is to help large chains and their suppliers to improve their communications and be more competitive in the global market. It has developed various e-commerce communities and marketplaces in Colombia, Ecuador and Venezuela.
- Pagosonline Ltda. created an online facility (www.pagosonline.net) to offer payment mechanisms to vendors and buyers conducting commercial transactions over the Internet. Pagosonline.net allows companies to receive and manage payments online, reducing time and costs. It is allied with the major Colombian banks as well as credit card companies.
- The Colombian Telecommunications Research Centre (CINTEL) (<http://www.cintel.org.co>) is a private, non-profit corporation that has been in operation since 1993. It currently has 23 shareholders representing the largest companies in the telecoms business in Colombia: local, long distance and wireless service operators, telecoms solutions providers, universities and government institutions. The Minister of Communications chairs its board of directors.
The CINTEL website offers information about the status of telecommunications and forecasting, including studies carried out by the Centre, virtual forums and a weekly electronic mail bulletin (NOTICINTEL), which compiles news in the sector. CINTEL also publishes Colombian Telecommunications Magazine (RCT), an accredited specialized magazine, which contributes to the assimilation and popularization of new technologies and services.

IV. Conclusion

SMEs in Colombia, like those in most of Latin American countries, are the driving force of the economy. They generate more than 60% of employment nationwide and represent 92% of commercial establishments and 40% of the country's total GDP. However, their exports do not exceed 20% of the national total. This shows their importance and great potential for future growth.

The Government has been developing plans and export programmes such as PEE and EXPOPME, both of which are coordinated by PROEXPORT. Fortunately, these strategies continue despite changes in governments.

Although, as explained in this document, results have been positive and the level of exports has been rising, Colombia still accounts for only 0.2% of world exports. According to WTO, Colombia ranks 54th in the world in export levels.

However, opportunities for new business, employment generation and wealth creation are being generated by integration agreements such as FTAA, free trade agreements with the United States and the European Union, and regional preference systems such as the Andean Community (CAN) and MERCOSUR.

SMEs should adopt new strategies to face these emerging challenges and competition, not only in the sphere of trade and production, but also in the use of technology. On this depend their success and survival.

Recent studies on SME exports and ICT use agree that current use of ICT is limited by access difficulties. This means a lack of information on business opportunities and regulations to adapt products to international requirements, as well as lack of skills in export processes. All this is a challenge to the competitiveness of Colombian companies.

In general, though, government investment and the expansion of ICT services on offer from both the public and private sector create a favourable context for computer science, technology and communications programmes.

There are two main fields in which the use of ICTs is most prevalent. First is the government sector and Connectivity Agenda, which is described at length in this report. This initiative, among other things, promotes ICT use among government agencies and facilitates public access to official information, transactions and proceedings. Second, the Ministry of

Education is introducing new technologies and e-learning that will increase the number of people with knowledge of ICTs. Government policies aimed at the private sector must be oriented to stimulating technological innovations and export promotion, which are the basis for business development in the country.

Internet and other ICT use is still very limited, usually confined to e-mail and basic website use of little added value; their most significant benefits are contacts generated by e-mail and limited information available on products and services. E-commerce is still being consolidated. Entrepreneurs do not usually see it as a short-term goal, or as a marketing or commercialization tool. B2B use is becoming common, but not B2C. Entrepreneurs do see technology as an investment, but more as a way to reduce costs than to generate business opportunities with greater added value. The impact of ICTs within companies is difficult to quantify, mainly because they do not measure their own levels of technology use.

Another factor in limited proliferation of new technology has been the lack of information and professional advisory capacity in implementing ICTs within companies.

Technology is usually appreciated and recognized only in production, plant operations, automation and manufacturing processes, where it is easier to measure its impact. In administrative and especially commercial fields, it is not easy to find studies and results that demonstrate to managers the importance of making technological improvements.

Therefore, quantifying ICT impact, offering the advice and support of experts and introducing methodologies applicable to SMEs will be decisive in helping entrepreneurs choose among the technological alternatives available. It will also allow them to understand more clearly the subsequent value and benefits of ICT for their businesses.

To sum up, good initiatives have been put in place to improve ICT use and increase SME exports, but lack of access to financing, qualifications and human resources still results in conservative and limited application. Added to this is the slow development of public infrastructure, which has also played a role in delaying the introduction of ICT in SMEs.

V. Recommendations

A. Coordinate and unify policies and support services for SMEs

Despite the emergence of many organizations —private, public and mixed— that support SMEs in Colombia, in some cases an oversupply of business services has been generated. Disorganization and lack of coordination among these organizations confuse businesses, who often do not know where to go for advice or support. CAF has already noticed this problem, pointing out that lack of knowledge about which programmes they are eligible for “is an obstacle to the businessperson andto competitiveness”.

The internal disorganization of trade and business organizations is also an obstacle, and they are tending to become more political organizations than real support institutions.

Government and business associations and organizations should organize and standardize criteria for the formation of common policies on SMEs. The creation of a single agency to unite and coordinate all these efforts would be a very important step.

B. Internationalization

The common policies of the Government and SME organizations should aim to turn SMEs into SMEXs, that is, exporting companies. It is fundamental to promote the internationalization of SMEs through wider coverage and improvement of programmes like EXPOPYME. In this respect, it is important to facilitate and improve access to information on business opportunities and to create new networks and intra- and interregional information systems. Making export processes and documents easier and more flexible through PACOS and the unification of trade organizations is another vital area of public policy. Use of ICTs in Colombian companies will permit the generation of competitive advantages and points of differentiation for international negotiations.

C. Provide credit

SMEs find that one of the main obstacles to growth is their limited access to long-term credit to upgrade infrastructure and productive capacity. The financial sector releases resources only for immediate cash flow or short-term credit; it must be paid back within a year, reducing the possibility of buying technology. A properly structured business loan plan needs longer terms to amortize the acquisition of long-term assets. Also, evaluation criteria and financing documents and processes should be standardized to unify credit lines for SMEs.

D. Provide training

It is important to promote training and academic programmes in Internet use, not only as work and consultation tools, but also as a study subject for high school degrees.

The workshops that are being held to help SMEs internationalize should include the implementation of ISO 9002 and ISO 14000 standards to make companies stronger and more competitive in international markets.

Training and qualification workshops offered by universities, SENA and related agencies must also be made financially accessible for SMEs through credit lines. At present, different entities offer loans at higher costs than SMEs can afford. Additionally, these activities should be tax-deductible, or SMEs should qualify for other types of fiscal benefits that would make these initiatives more attractive and frequent.

It is crucial to promote bilingualism through compulsory education in English in high school courses. Bilingual education has become more common in private schools, but it must be a priority of the Ministry of Education to introduce it in public schools as well. International trade and Internet transactions are conducted in English.

E. Reorient ICT use

It would be beneficial to shift the focus of ICT use within companies. At present, ICT use is focused on production and administration. More emphasis should be placed on the use of new technology in commercial areas: sales, customer care and marketing.

Fiscal incentives should be put in place to encourage the use of e-commerce in exports and other commercial activities and to facilitate access to e-payment systems and transportation services. In this way, service companies could offer more competitive rates, making their use more attractive.

F. Build partnerships

It is vital to promote the creation of business networks to reduce production and commercial costs. This will make SMEs more competitive. Internet use to improve supply chains between SMEs and large companies is also an area for policy discussion.

G. Create interregional networks

In addition to negotiating free trade agreements, it is also essential to create regional networks (e.g. within the Americas or Andean zone) and interregional associations (e.g. between Latin America and Asia) that improve access to information about business opportunities, technological interchange, export processes, tariffs or costs of transportation and e-learning.

Portals should be informative as well as interactive; they should be marketplaces that allow participating companies to conduct commercial transactions directly with each other, avoiding third-party mediation. Also, the different government information systems should be interconnected to simplify e-procurement and bidding.

Lastly, a technological infrastructure should provide business support in the form of offices and experts in international trade and ICTs for all the participating countries, in this case in Latin America and Asia.

The creation of such a network could be facilitated by tapping into the know-how and infrastructure of existing networks, such as TIPS, which has more than ten years of experience in Latin America and Asia. This is worth consideration by the Forum for East Asia-Latin America Cooperation (FEALAC) and its constituent governments, should they decide to go ahead with such a venture.

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