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OPPORTUNITIES IN MEXICO: INDUSTRIAL AUTOMATION




 Department of Foreign Affairs and International Trade / Ministère des Affaires étrangères et du Commerce international
 Latin America & Caribbean Trade Division



M A R K E T P R O F I L E - M E X I C O

Market Profile – Mexico

Opportunities in Mexico: Industrial Automation was developed jointly by the Department of Foreign Affairs and International Trade (DFAIT) and Prospectus Inc. It was researched with collaboration from the Department of Industry and Caroline Vérut, Mexico City. This market profile was made possible through the support of the Toronto office of Baker & McKenzie.

This market profile is designed to provide an overview of the market for **Industrial Automation** in Mexico. Although efforts have been made to avoid errors and inaccuracies in this document, it is not intended to be used as the only source of market information on this sector. We encourage the reader to use this publication as one of several resources for commercial dealings with Mexico.

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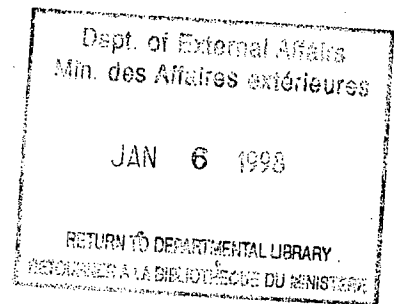
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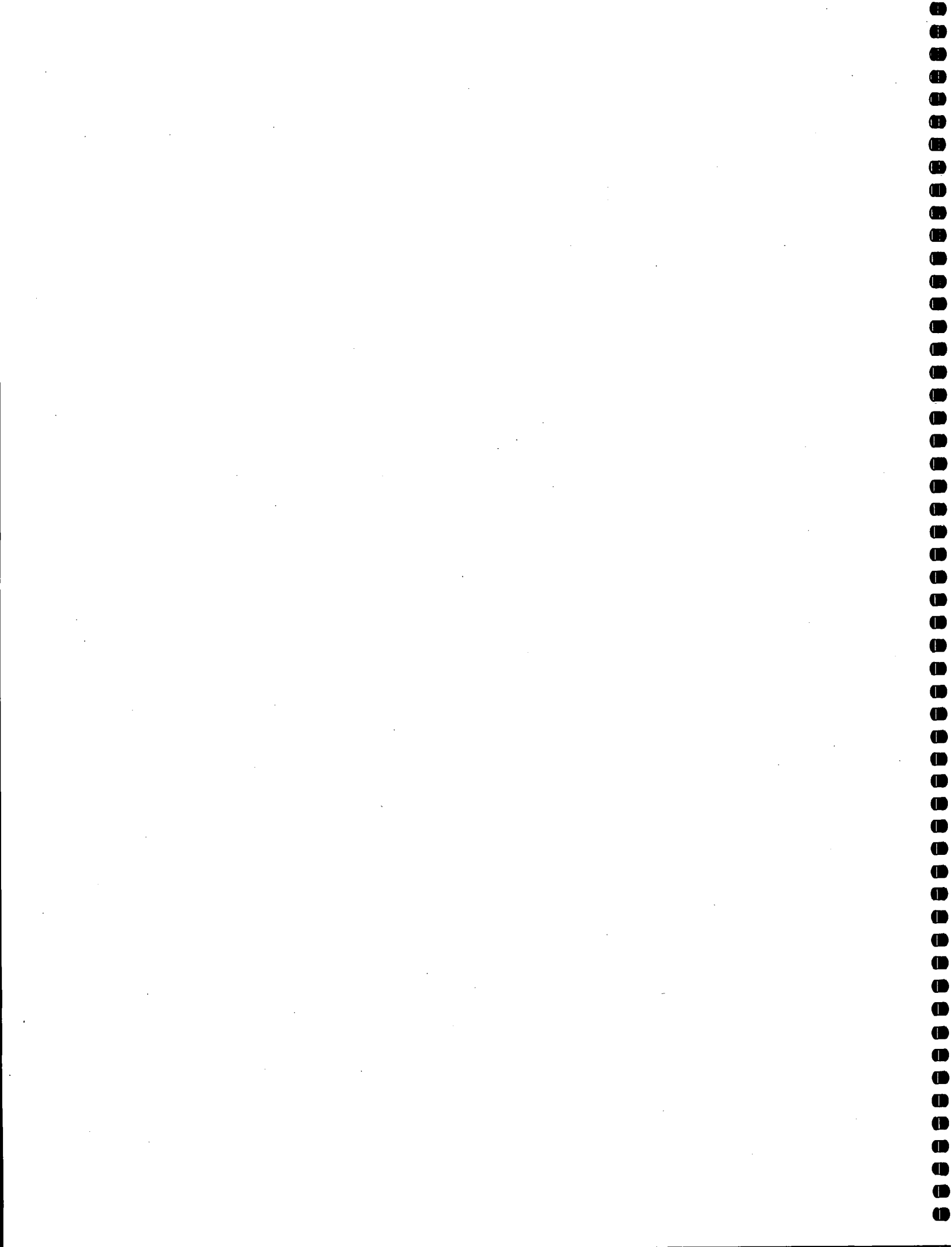
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OPPORTUNITIES IN MEXICO

INDUSTRIAL AUTOMATION

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Mexico



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The NAFTA expands Canada's free-trade area of 270 million people into a market of 360 million — a market larger than the population of the 15 countries of the European Union and one with a total North American output of \$7 trillion.

Mexico is Canada's most important trading partner in Latin America. Two-way merchandise trade with Mexico exceeded \$5.5 billion in 1994 and is expected to exceed \$7 billion by the end of the decade.

Canadian direct investment in Mexico is growing rapidly, increasing from \$452 million in 1992 to over \$1.2 billion in 1994.

This guide has been prepared with the problems inherent to the new exporter in mind. However, it is not exhaustive. The differing circumstances, interests and needs of individual companies will influence their strategies for the Mexican market.

Further assistance can be obtained by addressing requests to:

Department of Industry (DI) through the provincial International Trade Centres (see Where to Get Help) or to the InfoCentre at:

Tel: 1-800-267-8376 or (613) 944-4000
Fax: (613) 996-9709
FaxLink: (613) 944-4500

InfoCentre Bulletin Board (IBB):
1-800-628-1581 or (613) 944-1581

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MODERNIZING MEXICO'S MANUFACTURING INDUSTRY

The need to modernize or perish is expected to lead to a quick recovery for industrial automation products, in spite of Mexico's economic crisis.

Advanced manufacturing technologies (AMTs) are computer-controlled or microelectronics-based products and systems used in the design, scheduling, production, storage and distribution of manufactured products. They include "hard" technologies such as computer aided design (CAD), numerically controlled (NC) machine tools and robotics as well as "soft" technologies such as concurrent engineering and just-in-time (JIT) production. In Mexico, these technologies are referred to as "industrial automation" and they are in growing demand.

These technologies are mostly new to Mexico, but they are in growing demand. This is largely because of policies of trade liberalization, privatization and deregulation that the Mexican government has pursued over the last several years. Demand is all the stronger because Mexico has little investment in the previous generation of technology that might inhibit modernization. For example, in 1992 Mexico was estimated to have only about 15 computers for every 1,000 inhabitants. This compares with 150 in Canada and 250 in the United States at that time.

According to some estimates, the AMT market in Mexico has been growing at an annual rate of 25 percent over the past few years. This suggests major opportunities for Canadian providers of advanced manufacturing technology. Nonetheless, a scarcity of capital and the devalued peso will be important constraints on the growth of this market in the short term.

The Mexican manufacturing sector developed in a highly-protected environment. Government policies aggressively promoted import displacement. The economy was highly regulated, and a variety of other policies combined to discourage domestic competition. The result was an industrial structure characterized by a very large number of small family-controlled firms, combined with a group of much larger state-owned factories. Both types of producer were focused on the domestic market and were highly inefficient. Product distribution was handled by a complex network of intermediaries, and there was very little integration between producers.

Beginning in the late 1980s, the government began to reverse the industrial policies that created this structure. Mexico became a full member of the General Agreement on Tariffs and Trade (GATT) in 1988, and in the years that followed a wide variety of non-tariff barriers to trade were dismantled. In particular, in 1990, the "decrees" that formerly prevented the importation of most computer products were rescinded. The system of import permits was abandoned, and

foreign technology suppliers were allowed to supply the Mexican market solely through imports. Import duties were reduced to a maximum 20 percent, and they are now being phased out entirely under the North American Free Trade Agreement (NAFTA).

Mexican manufacturers, therefore, were faced with a dramatic increase in foreign competition at the same time that advanced manufacturing technologies became freely available. They are now under pressure to simultaneously increase product quality and customer service, while reducing costs.

The result has been rapid and sweeping industrial re-organization. This modernization trend has been inhibited to some extent by the fact that many small- to medium-sized, family-owned firms lack the capital needed to acquire new technology. State-owned companies were typically money-losers and dependent on government budgets for new investments.

These obstacles have been gradually overcome by two major developments. The first was a new government policy of privatization. During the six-year term of the Salinas administration, which ended in December 1994, US \$22 billion worth of state-owned businesses, including many manufacturing plants, were sold to private investors. The second development was increased industrial concentration. Mexican manufacturers began merging with each other or forming joint ventures with foreign firms. Relaxed foreign investment laws also led to a series of buyouts of Mexican companies by producers in other countries, including Canada. For example, in 1992 Bombardier acquired the government-owned *Constructora Nacional de Carros de Ferrocarril (Concarril)*, and Bombardier-Concarril is now the major supplier of rapid transit cars in Mexico.

The capital shortage was exacerbated by the abrupt devaluation of the peso in December 1994, and the economic crisis that followed. Annual interest rates in Mexico are now in the 50 percent range. On the other hand, the devaluation has had the effect of dramatically stimulating Mexican exports, at least for the firms which can become internationally competitive.

Mexican manufacturers, therefore, are faced with both the need to become internationally competitive and the need to minimize the capital investment involved. In the short- to medium-term, this means that the strongest demand will be for technologies that can be adapted to existing equipment. Partly for this reason, the term AMT is not generally known in Mexico. Rather, the focus is on what is known in Mexico as "industrial automation", which includes a range of technologies which are not necessarily as advanced as AMT. The application of computer technology to the planning and control of manufacturing processes is seen as separate from the acquisition of the associated numerically-controlled machine tools. In other words, industrial automation tends to be a less integrated process in Mexico than it is in Canada.

Industrial automation experts interviewed for this study noted that labour is relatively inexpensive in Mexico, and that it is usually cheaper to hire extra engineers and designers than to implement a fully-integrated CAD/CAM process. But, they add that other benefits of AMT, including quality control, increased flexibility and more flexible production runs, are driving an increased demand for this type of product. Also, many producers have been forced to acquire advanced technology in order to integrate their operations with those of foreign partners or customers.

Notwithstanding the economic crisis and capital shortage, the Mexican industrial automation market provides good opportunities for Canadian companies, particularly those that specialize in systems integration. The strongest need is for technologies that can increase productivity while taking maximum advantage of existing facilities. Opportunities for more advanced, fully-integrated systems exist, but are likely to develop fully only in the longer term.

GLOSSARY

The terminology used in the advanced manufacturing technology sector is very specialized. In addition, the terminology differs somewhat between Canada and Mexico. In general, Mexican industrial automation concepts are not as advanced as the equivalent AMT approaches in Canada. Canadian suppliers should be familiar with the Mexican usage of these terms. Because they are understood in Mexico, the following terms are used in this report.

CAD	Computer aided design	CAD is used to design parts and machine tools in the form of wireframe, surface and solid models. Cost considerations generally dictate the wireframe approach.
CAM	Computer aided manufacturing	CAM is usually understood to describe the manufacturing side of the CAD/CAM cycle. It involves programming numerically controlled machine tools. Some systems used in Mexico present an animation of tool motions to check tool paths.
CAE	Computer aided engineering	CAE technology in Mexico consists of software tools for analyzing the manufacturing process, especially the behaviour of materials and machine tools.
DNC	Direct numerical control	Computer control of machine tools.
CIM	Computer integrated manufacturing	A manufacturing model that stresses linkages between automation systems throughout the manufacturing process. Systems that follow the CIM model link plant operations including design, engineering and manufacturing processes, as well as inventory control.
MRP	Material resource planning	Integrated systems to manage materials and inventories involved in a manufacturing process.
ERP	Enterprise resource planning	Integrated planning applied throughout the enterprise, including human resources as well as distribution.

THE INDUSTRIAL AUTOMATION MARKET

Virtually all advanced automation equipment and most software is already imported. Mexican firms will need technological partnerships to stay competitive in consulting services.

There are no official statistics to demonstrate either the size of the industrial automation market or the degree of import penetration. Computer and related equipment is not identified by its intended use in the international trade statistics. Moreover, the very large service component involved in industrial automation is excluded from the trade data.

Informal estimates by knowledgeable observers place annual imports of industrial automation equipment and software at more than US \$400 million annually. One expert assessed the total industrial automation market, including services, at US \$700 million for 1994, and projected a drop to about US \$450 million in 1995. He predicted that annual growth would be in the 15 to 20 percent range beginning in 1996.

ESTIMATED INDUSTRIAL AUTOMATION MARKET SIZE, 1994

Component	US \$ millions
Computer software	40
Professional services	150
Support	80
Numerical control hardware	430
Total	700

The industrial automation specialists interviewed for this study were unanimous in the view that there are no domestic producers of advanced automation equipment in Mexico. There are very few software developers, and the small amount of domestic computer hardware made in Mexico is assembled from imported components. Local assembly makes it more practical to offer fast delivery on custom configurations.

On the other hand, many types of services are available from Mexican suppliers. This includes training and support, as well as systems integration. Many customers prefer to obtain their services from the equipment supplier. Most industrial automation equipment suppliers have Mexican subsidiaries and can provide support with a combination of local and imported resources.

The bulk of automation technology used in Mexico is imported from the United States or Germany. According to one estimate, those countries each have a 40 percent market share. France, Spain, Holland and Austria are also significant competitors. Except for robots, Japanese products have not been well-received in Mexico. Some of those interviewed suggested that this was the result of cultural differences between Japanese suppliers and Mexican buyers.

Some estimates put the American share much higher. This is possibly because some European products are sold by American companies and they are not necessarily identified with their country of origin. Examples of leading European brands include SAP (from Germany) and BaaN (from the Netherlands). Many Mexican firms purchased these products after having seeing them in the United States. The preference for U.S. suppliers is attributed to the fact that it is easy for Mexican customers to visit trade fairs and technology users in the U.S. to see how a system works. Also, applications that use languages other than Spanish or English are not well-received.

Several Canadian software products are available in Mexico, including those from Speedware and Cognos. Other Canadian products that were mentioned by those interviewed for this study were MOOPI, MAXIMA and DESCARTES. On the other hand, several experts said they were unaware of any Canadian products. Many of these products are imported directly from Canada, but others are bought from distributors and are not necessarily recognized by the buyer as Canadian. Nonetheless, Canadian industrial automation technology enjoys a very favourable reputation, even among those who are unaware of specific products.

Prior to the devaluation of the peso in December 1994, market growth for 1995 had been forecast by several experts at about 25 percent in real terms. However, now the market is expected to contract in 1995, even though automation products have not been as hard hit by the crisis as some other categories. For example, one major producer reported that its overall sales were down by 30 percent in the first four months of 1995, but that automation products had fallen off by only 18 percent.

Most observers are predicting a return to high growth rates in the range of 15 to 20 percent per year beginning in 1996. This prediction applies equally to the computer hardware, software and consulting components of the market. Services offer the best prospects for increased import penetration, because the Mexican industrial automation industry does not have enough well-trained professionals who can use the latest technologies to develop creative solutions. Partnerships with Mexican companies are an excellent vehicle for quickly entering this market.

These optimistic forecasts are based on expectations that the slump in 1995 will simply postpone projects. Most experts believe that the market will have to recover soon because the solutions are needed for survival. The companies capable of staying in the market are those that will adopt the new technologies while the others will tend to disappear.

CUSTOMERS

Customers for industrial automation products are found throughout the Mexican manufacturing sector. The most promising industries have been identified through interviews with industry observers in Mexico.

AUTOMOTIVE INDUSTRY

The automotive industry is the most highly automated sector in Mexico, and is also by far the largest user of robotics. The robots are mostly electro-mechanical, assembly, manipulating and parts-selecting robots. They have many applications in potentially dangerous processes such as assembling, welding and smelting. The artificial intelligence capabilities of robotics have not yet found widespread application.

Almost all of Mexico's automobile manufacturing is conducted by five companies: The "Big Three" of the United States (General Motors, Ford, and Chrysler); Germany's Volkswagen; and Nissan from Japan. For the most part, these companies manage their sourcing on a global basis. The major Mexican bus and truck manufacturers are Mercedes-Benz, *Diesel Nacional (DINA)* and *Mexicana de Autobuses (MASA)*. *DINA* has a technological partnership with Navistar International and recently merged with Motor Coach Industries International (MCII) based in Phoenix. *MASA* has a similar arrangement with Flexible, a U.S.-based bus producer. These companies are, therefore, unlikely to be shopping for industrial automation on the open market in Mexico.

On the other hand, the automotive parts industry is a more likely prospect. This industry is made of medium- to large-sized firms that supply the major original equipment manufacturers (OEMs). The industry consists of about 500 companies, employing some 165,000 people. About two-thirds of them are located in the Mexico City region with another 12 percent in Monterrey. Smaller automotive parts centres include Querétaro, Puebla, Toluca and Guadalajara.

Under Mexico's domestic content regulations, the parts companies enjoy a degree of protection from foreign competition, although this is diminishing under the North American Free Trade Agreement (NAFTA). Because these companies must meet the international quality standards of the major vehicle manufacturers, they are under pressure to adopt state-of-the-art automation technologies.

AUTO PARTS MANUFACTURERS USING ROBOTS

Parts company	Number of robots	Principal products
Autoteck	2	Metal parts for Volkswagen
Benteler	16	Tin and metal parts for Volkswagen
Cellulite	2	Automobile bearings
Egussa	1	Integrator for Fanuc Robotics
Ejes Tractivos	1	Shock absorber supports, and automobile and light truck transmissions
Fisher Guide	34	Instrument panels and parts for General Motors
Kantus Mexicana	1	Instrument panels for Nissan
Kelsey Hayes	2	Aluminum hubcaps
Kostal	4	Electric accessories
Metalsa	1	Manufacture of pick-up chassis
Pemsa	6	Pick-up bodies
RR Donnelly	2	Loading and unloading glass
Spicer	2	Auto parts
Tremec	5	Transmissions
TRW	12	Air bags
Velcon	15	Automobile drive shafts
Others	1	Automotive parts
TOTAL	107	

Sources: Asociación Mexicana de la Industria Automotriz (AMIA), Mexican Association of the Automobile Industry; Industria Nacional de Autopartes (INA), National Auto Parts Industry; and Asociación Mexicana de Distribuidores de Maquinaria (AMDIMA), Mexican Association of Machinery Distributors.

SALES OF LARGEST MEXICAN AUTO PARTS MANUFACTURERS, 1993

Company	N \$ million pesos
Unik, S.A. de C.V.	1,918,899
Central de Industrias, S.A. de C.V.	692,095
Cinfunsa, S.A. de C.V.	468,807
Transmisiones y Equipo Mecánicos, S.A. de C.V.	380,539
Nemak, S.A. de C.V.	254,213
Industria Automotriz, S.A. de C.V.	231,165
Grupo Echlin Automotriz, S.A. de C.V.	226,334
Eaton Ejes, S.A. de C.V.	210,727
Electro Optica, S.A. de C.V.	196,581
Aralmex, S.A. de C.V.	193,750
Motores Perkins, S.A. de C.V.	190,386
Moto Diesel Mexicana, S.A. de C.V.	141,302
Equipo Automotriz Hemex, S.A. de C.V.	96,018
Sistemas Eléctricos y Conmutadores, S.A. de C.V.	84,871
Kenfábrica, S.A. de C.V.	72,080
Super Diesel, S.A. de C.V.	57,010
Aislantes León, S.A. de C.V.	49,422
Min-Cer, S.A. de C.V.	45,331
Lunkomex, S.A. de C.V.	40,967
Industrias Metálicas Monterrey, S.A. de C.V.	40,690
Autopartes y Componentes, S.A. de C.V.	36,234
Crucetas Mexicanas, S.A. de C.V.	27,302
Componentes de Vehículos Recreativos, S.A. de C.V.	14,913

Source: *Expansión*, August 1994.

ELECTRICITY GENERATION AND DISTRIBUTION

The *Comisión Federal de Electricidad (CFE)*, Federal Electricity Commission, is a government-owned enterprise which has a monopoly on all publicly-distributed electricity in Mexico. The main automation product used by *CFE* is a system for controlling maintenance, parts distribution, vehicles and warehouse inventories. Control Data Systems Canada Ltd. is the *CFE's* principal supplier of this technology. The company also developed a national program for managing electrical service contracts, electricity bills, cuts and reconnections.

The *CFE's* distribution monopoly will not be affected by the recent moves towards privatization, but other policy changes have already led to a much larger role for the private sector in Mexico's electricity industry. A new electricity law, passed in December 1992, allows the generation of electricity for private use as long as surpluses are sold back to the *CFE*.

In addition, the *Secretaría de Energía (SE)*, Secretariat of Energy, issued a ten-year electricity plan in 1994 as part of the implementation of the revised electricity law. This plan provides for the construction of several new turnkey electrical generation projects, including some to be financed by leaseback and build-operate-transfer (BOT) arrangements. According to this plan, Mexico will require more than 8,000 megawatts of generating capacity from private sector sources by the year 2003.

The *SE* was disbanded under an executive decree dated December 28, 1994, and was replaced by a much smaller energy ministry. This is expected to give greater autonomy to the *CFE* and accelerate the trend to privately constructed and operated facilities. Two major contracts have already been let:

- *Samalayuca II*, which is located just outside Ciudad Juárez, will have a total production capacity of 700 megawatts generated in three separate thermoelectric units. The facility will be constructed at a cost of US \$650 million. The partners include the Mexican engineering and construction company, *Ingenieros Civiles Asociados (Grupo ICA)*; the engineering company Bechtel Enterprises; the giant multinational, General Electric; and the Texas-based utility, El Paso Natural Gas.
- *Mérida III* is a planned gas-fueled plant due to be launched sometime during 1995. The plant will burn natural gas and use residual fuel as backup. It will get its gas by pipeline from Ciudad Pemex. It will differ from *Samalayuca II* because private companies will be hired to manage and operate the facility after construction is completed. The electricity generated at the 440-megawatt plant would then be sold to the *CFE*. A number of foreign companies are included in the bidders list including four from Japan, three from the U.S., and one each from Germany, Canada, Spain and Brazil. In addition, most major Mexican engineering companies have also placed bids.

The *CFE* has identified 12 other future electricity generation facilities that may be opened to private participation.

METAL PRODUCTS

The Mexican metalworking industry has experienced a sustained slowdown since 1992 as a result of domestic recession and an inability to meet international quality standards. The revitalization of the industry, especially since the 1994 devaluation of the peso stimulated exports, depends heavily on its ability to bring its standards up to world levels. Industrial automation technology is a big part of the solution.

One of the main shortcomings of the Mexican metalworking industry is that many parts and accessories are still made with conventional machine tools. This results in unacceptable variations in quality. The industry is also under pressure to meet requirements of customers for just-in-time (JIT) deliveries and reliable service and maintenance programs.

SALES OF LARGEST MEXICAN METAL PRODUCTS MANUFACTURERS, 1993

Company	N \$ million pesos
Industrias Nacobre, S.A. de C.V.	1,555,769
Fábricas Monterrey, S.A. de C.V.	625,367
Galvak, S.A. de C.V.	517,160
Válvulas Urrea, S.A. de C.V.	273,146
Cinsa, S.A. de C.V.	186,154
Hysla División Alambres y Derivados, S.A. de C.V.	141,740
Herramientas Truper, S.A. de C.V.	105,681
Urrea Herramientas Profesionales, S.A. de C.V.	97,854
Ekco, S.A. de C.V.	85,960
Acero Porcelanizado, S.A. de C.V.	65,375
Mexicana de Laminación, S.A. de C.V.	45,025
Fabricaciones y Representaciones Industriales, S.A. de C.V.	44,122
Valco, S.A. de C.V.	41,066
Válvulas y Complementos, S.A. de C.V.	27,174
Ditemsa, S.A. de C.V.	25,360
Vitrocrista Cubiertos, S.A. de C.V.	23,629
Spirax Sarco Mexicana, S.A. de C.V.	19,417
Galvamet, S.A. de C.V.	18,045

Source: *Expansión*, August 1994.

PETROCHEMICALS

Petróleos Mexicanos (PEMEX), is the national oil company. It has a constitutional monopoly over the exploration, production and distribution of petroleum products. *PEMEX* is the world's third-largest oil and gas producer and, until recently, its monopoly included basic petrochemicals. Mexico's petrochemical sector is the 15th largest in the world.

The government recently passed legislation to allow *PEMEX's* petrochemical operations to be privatized. In March 1995, *PEMEX* director general Adrián Lajous Vargas announced that by early 1996, the company will sell 61 of its petrochemical plants. Fifty-seven of these have already been opened to the privatization process. Some of these plants use out-of-date technologies, and the lack of capital for needed modernization is one of the motivations for the move to privatization.

Therefore, the newly-privatized enterprises will be under intense pressure to modernize, since they will no longer enjoy guaranteed markets and prices. Foreign participation will be limited to 40 percent, so most of the new private companies are likely to be joint ventures between the large Mexican industrial groups such as *Grupo Industrial Alfa* and foreign firms. *Celanese Mexicana*, a subsidiary of Hoechst Celanese of Germany is also expected to be a major player. According to media reports Shell Oil, Chevron, Bayer and Conoco are also interested buyers.

PEMEX already has its own computer network covering all of Mexico. Since the petrochemical plants are closely integrated with gas and oil facilities which will remain in *PEMEX* hands, integration will likely be a major priority. *PEMEX* has 70 regional computer nodes with 300 minicomputers using UNIX platforms. In 1991, *PEMEX* installed a FDDI fibre optic network with a capacity of 100 megabits per second. It is used for institutional communication with and interconnection between different process control systems. *PEMEX* suppliers are regulated by the *Secretaría de Comercio y Fomento Industrial (SECOFI)*, *Dirección General de Normas*, Secretariat of Commerce and Industrial Development, Bureau of Standards, based on ISO 9000 standards.

Other leading petrochemical producers in Mexico include the following:

- *Grupo Industrial Alfa*, a conglomerate with more than US \$1 billion in annual sales. Its principal products are resins, fibres and intermediate chemicals.
- *Celulosa y Derivados*, has several chemical and petrochemical plants employing almost 9,000 people. Its main products are fibers, PVC resins, packaging materials and rubber chemicals.

- *DESC*, is a diversified Mexican conglomerate which participates in the petrochemical industry through *NOVUM* and *Grupo Industrias Resistol*. The latter firm is involved in a technology partnership with Monsanto of the U.S.
- *Grupo IDESA*, is a 100 percent Mexican-owned petrochemical company. It has five operating subsidiaries that produce carbon black, synthetic rubber and polystyrene.

PLASTICS

The plastics industry offers one of the most promising opportunities for industrial automation in Mexico. In particular, computer aided design (CAD), computer aided manufacturing (CAM) and computer aided engineering (CAE) have begun to gain wide acceptance for injection moulding. While CAD is used to design parts and machine tools, CAM is used mainly for numerical controlled machine programming. CAE involves a variety of techniques that can simulate injection plastics moulding, determine moulding conditions, and predict dimensional accuracy and performance of a finished product.

According to the *Asociación Nacional de las Industrias del Plástico (ANIPAC)*, National Association of the Plastics Industry, modernization of the industry has been gaining momentum, and will continue over a ten-year horizon. *ANIPAC* statistics show a sharp rise in imports of new plastics machinery: from US \$92 million in 1990, to US \$141 million in 1992, and to US \$232 million in 1994.

As in other sectors, capital shortages will constrain market growth in the short run, but the longer term outlook for plastics is excellent. The industry consists of about 3,000 firms, the vast majority of which operate without any advanced automation. In addition, per capita consumption of plastics is only one-quarter of the level in the U.S. For both reasons, sustained growth is expected in this market. Industry experts cited cassette boxes, furniture, telephone parts and toys as plastic products where automation technology has especially strong prospects.

SALES OF LARGEST MANUFACTURERS OF PLASTIC PRODUCTS, 1993

Company	N \$ million pesos
Plástico Bosco, S.A. de C.V.	85,930
Raychem Tecnologías, S.A. de C.V.	75,881
Altro, S.A. de C.V.	74,251
Viplásticos, S.A. de C.V.	56,009
Envases Cuautitlán, S.A.	49,140
Productos Industriales Potosí, S.A.	16,380
Tuboplast, S.A. de C.V.	11,712

Source: *Expansión*, August, 1994.

PROCESSED FOODS AND BEVERAGES

FOMENTO ECONOMICO MEXICANO (FEMSA)

FEMSA is a good example of how the larger Mexican firms are adapting to the new business environment. A unit of *Grupo VISA*, *FEMSA* is Mexico's second-largest brewer and the principal Coca-Cola bottler. With sales of US \$2.4 billion in 1993, and 37,000 employees, it is among the largest beverage companies in Latin America. It also operates 600,000 convenience stores throughout Mexico. In 1992, *FEMSA* sold 222 million cases of Coca-Cola, Sprite, Diet Coke and Fanta.

Typical of many food and beverage conglomerates, Monterrey-based *FEMSA* was founded as a family business, with roots dating back to the 1890s. In July 1994, Canada's John Labatt purchased a 22 percent share of the company.

FEMSA has its own R&D departments and is a leader in the use of CIM technologies. It has implemented a highly-integrated automation program, incorporating planning and forecasting, MRP, quality control and process automation. The *FEMSA* CIM program also includes robot-operated storage.

To stay competitive, other Mexican beverage companies are likely to follow *FEMSA's* example. Mexicans consume more carbonated beverages per capita than any country in the world, except the United States. Cadbury-Schweppes has recently purchased a major Mexican bottler, *Peñafiel*, and some American brands are moving in with aluminum.

The beverage industry is an exception to the general finding that computer integrated manufacturing (CIM) has not yet been adopted by Mexican companies. The Mexican beverage market, like its counterparts in Canada and the United States, is highly competitive. It is under intense pressure to increase production efficiency, maintain high quality standards, and minimize inventories.

Mexican beer is produced by major brewers such as *Cervecería Moctezuma*, *Grupo Modelo* and *Cervecería Cuauhtémoc*. The latter firm is part of the food, beverage and packaging conglomerate *Grupo Valores Industriales (VISA)*.

The food processing industry is also under pressure to modernize, especially in the packaging area. Mexican consumers have become more sophisticated and more aware of the types of products available in the United States. In general, procedures have not kept pace with the demand for attractively-packaged convenience products. The automation of warehousing and distribution systems is also on the rise, and has proven to be a strong competitive advantage for companies that have implemented it.

MAJOR EQUIPMENT PURCHASERS IN THE FOOD INDUSTRY

Andersen Clayton	<i>Clemente Jacques</i> canned and frozen vegetables; second largest producer of ketchup, vinegar and jams; hot sauces and chili under <i>La Gloria</i> label; <i>Pronto</i> syrups and honey; jello and desserts
Campbell's	Leader in canned soups and frozen vegetables; beans
Del Monte	Leader in ketchup production; major canner of vegetables
Del Fuerte	Major producer of vegetable and tomato sauce; chilis under <i>La Cumbre</i> label
Herdez	Leader with 40 percent of the hot sauce market; major producer of vinegar, fruit preserves; manufactures foreign brands under licence
Hongos de México	Major mushroom packer under the <i>Mont Blanc</i> label
Kraft	Large producer of mayonnaise, jams, cheese, jello, and wide variety of other
La Costeña	Leader in chili and hot sauces; also packaged beans, vinegar, olives, traditional Mexican dishes, fruit preserves, and honey

continued on next page

MAJOR EQUIPMENT PURCHASERS IN THE FOOD INDUSTRY

continued

Nestlé	Major producer of sauces (Maggi), soups and broths (Ramen, Maggi), beans, powdered milk with 50 percent of the market, coffee, breakfast cereals, chocolate drinks and confectionery
Productos de Maíz	Hellman's mayonnaise, and Knorr Suiza chicken broth
San Marcos	Second-largest chili producer; canned fruits
Ybarra	Large producer of oil, olives and mayonnaise

Source: Prospectus Inc. *Opportunities in Mexico: Food and Beverage Processing and Packaging Equipment*. Ottawa: Department of Foreign Affairs and International Trade, 1995.

HOME APPLIANCES

In 1993 the Mexican market for home appliances amounted to approximately US \$2.85 billion, of which about 80 percent are manufactured in Mexico. The majority of home appliance manufacturers are located in Mexico City. This industry is a good prospect for automation products for three reasons:

1. It is about 70 percent foreign owned. Foreign investors are more likely than Mexican family businesses to use the latest technology.
2. Mexico exports appliances to approximately 30 countries. Exported products must meet higher standards than are demanded by the domestic market.
3. The *Comisión Nacional para el Ahorro de la Energía (CONAE)*, National Energy Conservation Commission, recently issued a new *Norma Oficial Mexicana (NOM)*, official standard, based on the norms set by the U.S. Department of Energy. As a result, manufacturers in Mexico are currently allocating resources to bring their production in line with these new standards.

SALES OF LARGEST MEXICAN HOME APPLIANCE MANUFACTURERS, 1993

Company	N \$ million pesos
Supermatic, S.A. de C.V.	419,610
Estufas y Refrigeradores Nacionales, S.A. de C.V.	283,504
Internacional de Lavadoras, S.A. de C.V.	151,066
Crolls Mexicana, S.A. de C.V.	62,182

Source: *Expansión*, August, 1994.

COMPETITION

COMPUTER HARDWARE AND SOFTWARE PROVIDERS

Industrial automation technology is readily available in Mexico. In general, the same products that are available in Canada and the United States can also be obtained fairly quickly in Mexico. All of the computer hardware and about 90 percent of the software is imported, either from local representatives or distributors, or directly from abroad. According to one estimate, about 40 percent of this technology is directly imported by the end user.

Moreover, new products are generally available in Mexico as soon as they are released in other countries. An exception is Spanish-language software, which is usually translated after the English product is released. Many Mexican users are content to use the English versions.

A small amount of automation software is produced in Mexico, but there is no tradition of marketing generalized solutions or software. Typically, solutions are custom-developed for individual clients. Some distributors of particular software solutions adapt their package to a particular customer's needs. The large international companies have much more experience in developing generalized software. They are now developing full packages that can be interconnected and customized by the client.

Experts involved in the industrial automation industry in Mexico say that access to the latest technology is not a limitation. But they almost invariably comment that the nation lacks people who are skilled and creative enough to integrate the new technologies and develop effective solutions. Training beyond the acquisition of a first university degree is generally conducted on the job.

MOST POPULAR BRANDS FOR INDUSTRIAL AUTOMATION APPLICATIONS

Acer	Intergraph
CDC	SICAM
Compaq	Silicon Graphics
Digital Equipment Corporation	Sun Microsystems
Hewlett Packard	Unisys
IBM	Wang

Source: Interviews.

LEADING MANUFACTURERS OF NUMERICALLY CONTROLLED MACHINES

Asea Brown Boveri (ABB)	General Electric
Allen Bradley	Grupo Schneider
Bailey	Honeywell
CINCINATI MILACRON	MAZAK
EMCO	Mitsubishi
FANUK	Modicom
Fisher	OKUMA
Foxboro	Siemens

Source: Interviews.

CORPORATE PROFILE

DASOFT

Servicios de Diseño Asistido por Computadoras (DASOFT), specializes in computer aided design (CAD) services, mostly for mechanical design. The company is a leader of the *Asociación de Diseño Total por Computadora (ADTC)*, Association for Total Computer Aided Design, which has some 50 members.

A *DASOFT* executive said that computer integrated manufacturing (CIM) is currently no more than a concept in Mexico. In his view, interconnectivity problems are the main obstacle to fully-integrated applications. In particular, the technical and the administrative areas use different computer languages. He believes that the best route to CIM is a gradual step-by-step approach: "Products that can be run on high-end PCs have a vast potential. Companies capable of developing software and manufacturing solutions for PCs rather than workstations will be very successful."

MOST POPULAR DESIGN SOFTWARE

Company	Software
CAE	MoldFlow
AutoCad	NASTRAM
BRAVO 3	NISA DISPLAY
CADAM	Parametric Technology
CADKEY	PRO-ENGINEER from Parametric Corp.
CATIA from Dassault	PROCAD from TEXSOFT
Computer Vision	PRODSTAR, France
DESIGN from AUTODESK	PROENGINEER
EDS	SAP, handled in Mexico by IBM, Digital Equipment Corporation (DEC), Hewlett Packard (HP), and SUN
IBM	SDRS
IDEAS (or CEADS)	SYMIX
Intergraph	TRITON from BaaN, Netherlands
JD Edwards (handled exclusively by IBM)	UNIGRAPHICS
MFG PRO from QAD, U.S.	VERSACAD
University of Lyon, France	MODULE F

Source: Interviews.

MANUFACTURING CONTROL SOFTWARE

AUTOSURF by AUTOCAD	PATTRACE
AVALON	PRISM, for the processing industry
CAMAX	PROCAM
EUCLID, Switzerland	PROSURF
IDEAS	QAD
Level III	SAP
MAPICS	SMARTCAM
MARCAM	SSA
MASTERCAM	SYMIX
MFG-PRO, Manufacturing Pro, by QAD	TRITON (BaaN)
ORACLE	VARNETT, a Canadian MRP software

Source: Interviews.

ROBOT MANUFACTURERS

According to estimates from the U.S. Department of Commerce, there are some 950 robots in Mexico, the majority of which are used in the automotive and auto parts industries. The total market of robots for the automotive and auto parts industries was estimated at US \$24 million in 1994. About 300 are located in teaching institutes. Almost all of the robots in Mexico have been imported from other countries, although about 30 of them were built in Mexico.

MARKET SHARES OF ROBOT BRANDS USED IN THE AUTOMOTIVE INDUSTRY

Brand	Percentage share	Country of origin
FANUC	26.6	Japan
NACHI	3.7	Japan
Asea Brown Boveri (ABB)	5.7	Sweden
MOTOMAN	3.4	Japan
KAWASAKI	55.9	Japan
Cincinnati	1.1	United States
MILLER	0.2	United States
Unspecified	3.4	
Total	100.0	

Source: U.S. Department of Commerce, 1993.

SYSTEMS INTEGRATORS

While there is virtually no production of industrial automation hardware or software in Mexico, there is a significant group of local systems integrators. They include both university research centres and private consulting firms.

UNIVERSITY RESEARCH CENTRES

University research centres have played a major role in developing advanced technology applications in Mexican manufacturing. They developed the first industrial automation systems and assisted manufacturing firms to install practical applications. They are both users and developers of advanced technologies. Universities are usually the best systems integrators because they

CORPORATE PROFILE

INTERGRAPH DE MÉXICO

Intergraph de México is a 27 year-old multinational company that has been active in the Mexican market for 13 years. The company provides computer hardware and software for a number of industrial automation functions, including:

- computer modelling of mechanical parts using computers (computer aided design [CAD]);
- engineering analysis and testing for stress and function (computer aided engineering [CAE]);
- simulation of the manufacturing process, including the function of machining centres, mills/drills, lathes, forges, foundries and plastic injection (computer aided manufacturing [CAM]); and
- communication of tested designs to numerically-controlled equipment.

Intergraph lacks the administrative and financial components of the computer integrated manufacturing (CIM) model, and the company maintains strategic alliances with other suppliers to complete the process.

CIM is a relatively new phenomenon in Mexico, and *Intergraph* has had to educate its customers about both the need for and the use of these technologies. As one company executive put it: "Because of lower labour costs, it was usually cheaper to hire engineers, sketchers and other technical workers to do the work manually. As technology evolves, the equipment is becoming more competitive, and many firms are now turning to automated manufacturing technology (AMT)."

have access to a range of equipment and software and also to trained personnel. The fact that they are supported by the university means that they can be cost competitive. For these reasons, Mexican companies use the universities and research centres as R&D laboratories.

Computer hardware and software companies often provide universities with free products for evaluation. They also provide scholarships to students at the university. IBM led the way in this area. Fourteen years ago, it donated a complete laboratory, including a mainframe, workstations and CAEDS software to the *Universidad Nacional Autónoma de México (UNAM)*, National Autonomous University of Mexico. Technology suppliers also use universities to conduct demonstrations of their products and develop new applications.

NATIONAL AUTONOMOUS UNIVERSITY OF MEXICO

The *Universidad Nacional Autónoma de México (UNAM)*, National Autonomous University of Mexico, is home to the *Centro de Innovación Tecnológica (CIT)*, Centre for Technological Innovation. This is a technological development institution which channels industrial projects to the appropriate departments or faculty within *UNAM*. The *CIT* plays a coordinating role and does not carry out its own research projects.

The *CIT* coordinates all types of technological projects, and is intended to provide industrial clients with "one window" access to the university's facilities. If the particular research needs are beyond the university's capabilities, external consultants are contracted to provide the missing elements.

The *UNAM* has four computer aided design/computer aided manufacturing/computer aided engineering (CAD/CAM/CAE) centres. They can be approached directly or through the *CIT*:

- Laboratory of Computer Aided Mechanical Engineering
- Advanced Computation Laboratory, Faculty of Engineering
- Centre of Calculus, Faculty of Engineering
- Department of Academic Computing

CAD/CAM/CAE services are directed mainly to small- and medium-size companies which are unable to import or develop their own technologies. *UNAM* develops applications for industry on a turnkey basis and retains any patents generated. It also provides feasibility and training services. The contracting company is the exclusive user of the technology for four years. If the company does not use the technology, *UNAM* has the right to use it elsewhere.

CORPORATE PROFILE

HEWLETT PACKARD (HP)

Hewlett Packard's industrial automation products in Mexico focus on the following sectors:

- automotive (OEM's and autoparts);
- chemical and pharmaceutical;
- petroleum;
- processed foods and beverages; and
- metal-working industries.

The products themselves fall into three "levels". Level One involves process control and verification, usually for individual machines or plants. Level Two products deal with the management of all resources involved in physical production. At Level Three, manufacturing resource planning (MRP) and enterprise resource planning (ERP) are used to integrate all the information needed to plan production, such as estimates of demand, resource needs, distribution, and generation of work orders.

In Mexico many firms have systems for the lower levels, and others for the higher levels. Virtually none, however, are fully integrated within the computer integrated manufacturing (CIM) model. In order to provide a CIM solution, HP uses its own products along with third-party products. HP's own products are mostly hardware-based, and are assembled in Mexico from imported components.

For application software, HP usually forms technological alliances. These alliances are often made at the parent company level, since they frequently involve world-wide joint ventures.

According to a company spokesperson, HP stresses the concept of open systems capable of interconnecting different types of equipment based on common standards. He noted that although the technology is almost always imported, market-specific methodologies tend to be more locally developed. "Getting such a system started in Mexico is different than in other countries", he added. "It requires input from local project managers. Some projects have failed because they have been run by foreign project managers."

One of UNAM's showcase projects is a method of integrating personal computer based systems. They have been able to link together AUTOCAD and MASTERCAM and then pass on the results to a program called STORE for production planning. They have created a flexible manufacturing system with CIM philosophy at their laboratory, including robots, manipulators and several numerically controlled (NC) machine tools. Later they would like to add the material resource planning (MRP) aspect.

UNAM concentrates exclusively on design. Its product is a prototype, which must be manufactured elsewhere if additional units are required. Projects are headed by a project manager, teacher, researcher or laboratory staff, and staffed by students.

TECHNOLOGICAL INSTITUTE OF SUPERIOR STUDIES OF MONTERREY

The *Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)*, Technological Institute of Superior Studies of Monterrey, provides technology consulting services to Mexican companies through the *Centro de Sistemas Integrados de Manufactura*, Centre of Integrated Manufacturing Systems. This centre is entirely devoted to solving production automation problems. Its main areas of specialization include design of manufactured products, flexible automation, industrial materials, production engineering and manufacturing systems administration.

In April 1994, Sun Microsystems announced that it would set up a Latin American Technology Centre in cooperation with the Institute. The centre will consist of a robotic integrated manufacturing and assembly system, experimental robotic platforms, and a computerized teaching centre. The new facility will develop flexible robotic manufacturing systems. The solutions that Sun and the university plan to develop will run on Sun's RISC-based hardware under the Solaris operating system. The long-term objective is to speed up the design and manufacturing cycle.

NATIONAL POLYTECHNIC INSTITUTE

The *Instituto Politécnico Nacional (IPN)*, National Polytechnic Institute, is relatively specialized. It offers industrial consulting services and its expertise includes laser-beam technology. In addition, the IPN's Centre for Research and Advanced Studies is developing robot prototypes.

CORPORATE PROFILE

IBM DE MÉXICO

IBM de México has three broad product lines dealing with industrial automation:

- Design-related products and computer aided design (CAD), mostly focused on mechanical design for autoparts and automobile assemblers.
- Plant automation products that are regarded as facilitators of applications rather than products themselves.
- Services for the implementation of SAP, a German-made enterprise-wide software product. IBM is a worldwide partner of SAP.

IBM represents a number of industrial automation software products developed by other firms. In some cases, software is developed jointly between IBM and another company for specific use on IBM hardware. Other software products are developed independently by other firms and marketed exclusively by *IBM de México*.

The company's hardware products used in manufacturing automation include PCs, workstations and terminals, including both remote access and data collection terminals. The *IBM de México* plant in Guadalajara includes separate departments for software development, manufacturing consulting, and sales of equipment.

A manager from *IBM de México* said that the latest industrial automation technology is readily available in Mexico. "What is often lacking", he said, "is creative people who are able to integrate new technologies into complex solutions to provide a solution someone will buy."

OTHER RESEARCH CENTRES

The *Universidad de Puebla*, University of Puebla, maintains a very small research centre with a single software product which is an integrated circuit-frame editor. The *Universidad de Chihuahua*, University of Chihuahua, and the *Instituto Tecnológico de La Laguna*, La Laguna Technological Institute, are doing research in robotics.

SYSTEMS INTEGRATION CONSULTANTS

According to interviews with industry participants, there are anywhere from 15 to 20 firms in Mexico that provide systems integration services for industrial automation applications. The staff are mostly Mexican, although some consultants are brought in from abroad for specific needs or projects. Most of these firms have foreign partners. Typically, they are staffed by specialists who formerly have worked either for a university research centre or for one of the large foreign computer hardware firms.

Most of these firms provide automation hardware and software as well as services. Some firms concentrate on individual industries, but specialization is more typical according to discipline or type of solution offered. Reduced market growth since the devaluation is making specialization more difficult. Even where a firm is very strong in a particular industry or discipline, it will be forced to look for new niches in order to survive in the present environment.

Large-scale integrated systems based on the computer integrated manufacturing (CIM) model can be developed only by a handful of computer hardware suppliers. They include IBM, Hewlett Packard, EDS and Digital Equipment of Canada Ltd. Arthur Andersen Consulting was also mentioned by several observers as a major systems integrator. Some experts commented, however, that none of these companies is providing truly integrated systems that go all the way from production to manufacturing resource planning. Several Mexican companies which sell automation hardware offer more limited integration services that do not extend to the entire CIM model.

Some industry participants thought that the Canadian company, SHL Systemhouse, was active in this field. A company spokesperson in Mexico said, however, that they are not involved in manufacturing at the moment. Their strength in Mexico is in finance and financial institutions.

COMPANIES OFFERING LIMITED SYSTEMS INTEGRATION SERVICES

CORPORATE PROFILE

DIGITAL EQUIPMENT CORPORATION (DEC)

In Mexico, Digital Equipment Corporation does not sell DEC software applications. Instead, the company maintains a number of alliances with other software developers. They identify each client's needs and select the software they think is best suited to that company. They then package the project with DEC hardware, third-party software, DEC and third-party consulting and after-sales service.

Currently, DEC's strongest application is SAP R/3. This is a German-made software package. It is a complete, integrated package, designed to work within the client-server environment now widely used in Mexico. Since it is Windows-based, it is very user friendly. R/3 has become a standard among large companies, both in Mexico and abroad.

One DEC manufacturing consultant believes that Mexico needs more specialists in the area of distribution applications. "The market for consumer products" he noted, "is based on wide distribution, but most manufacturers still haven't applied high technology to that aspect of their operations."

Schneider	Honeywell
Foxboro	Fisher
Aupromaq	SCIA
Spin	Intetec
Microsip	Automatización y Modernización Industrial (AMI)
IPC	Softec
Intergraph	

Source: Interviews.

MANAGEMENT CONSULTANTS

The larger management consultants play a role in the development of industrial automation applications. While they do not provide technology, they often recommend appropriate technologies as part of their analytical services. In some cases, they recommend suppliers as well.

These are mostly large international firms. They include Price Waterhouse, Coopers & Lybrand, KPMG Peat Marwick, Ernst & Young and Deloitte & Touche. Arthur Andersen & Co. was the only one mentioned that apparently offers both management and technical consulting. However, a spokesperson said that the company does not offer its full international product line in Mexico.

PRODUCT TRENDS AND OPPORTUNITIES

Until Mexico's economy re-stabilizes, low-cost solutions that employ high-end PC hardware and show fast results will be the best prospects. In the longer term, fully-integrated technologies will gain wider acceptance.

The market for industrial automation has grown rapidly over the past few years, as Mexican companies struggle to modernize and maintain their competitive positions. Traditionally, low labour costs and protected markets led to a labour-intensive approach to design and production control. Recently, however, the influx of foreign competition, combined with the need to export, have added product quality and consistency to increased efficiency as reasons for automation. The high cost of capital is driving efforts to minimize inventory and streamline distribution. In addition, as the technology has evolved it has become less expensive and more powerful and, therefore, more cost-competitive.

CORPORATE PROFILE

GRUPO SPICER

Grupo Spicer is one of three major units of the *UNIC* group. It is primarily engaged in the production of truck and autoparts and has some 50 plants throughout Mexico.

Each division within *Spicer* is free to develop its own approach to automation, based on their own resources and needs. Each has applied solutions provided by the computer integrated manufacturing (CIM) model. *Spicer* has a centralized Technology Centre, but it deals mostly with direct numerical control for the construction of prototypes. Their new rapid prototyping system can develop prototypes in about eight months that used to take three years with manual methods.

As a rule, the decision to invest in prototypes or plant automation depends on the needs of foreign partners. In some cases, the partner already has the technology and a design and requires a modern production facility. In other cases, the partner requires new designs and prototypes for the local market.

An official of the *Spicer* Technology Centre said that the current economic environment is requiring companies "to become more competitive in terms of long-run strategic planning". He adds, however, that "image and fashion factors sometimes have just as much effect on demand".

For all of these reasons, industry experts predict that the market will continue to grow at a healthy rate, even though the economic crisis has drastically cut into the very rapid expansion of the past few years. They note that it is mainly the larger firms that are buying advanced systems. The small companies are not investing and many will not survive the current economic crisis.

The devaluation of the peso has dramatically increased the cost of capital, which was scarce even before the crisis. Annual interest rates are now in the 50 percent range. This has forced many companies to look for quick solutions. Normally, the automation of a plant is a long-term investment, but in today's economic environment, companies are worried about survival, so they have much shorter planning horizons.

Typically, Mexican firms begin to automate by purchasing financial or communications functions and then gradually move towards manufacturing elements. Mexican companies have generally been slow to understand the competitive advantages to be gained from automating the manufacturing process itself. Before the restructuring, new technology was applied mainly to the sales, distribution and administrative level. As observers put it, this happens because the top managers are usually most interested in financial solutions.

In many cases, advanced automation systems are implemented at the request of a manufacturer's customers. Ford, for example, requires suppliers to have computerized design systems because it allows the electronic communication of designs. Advanced systems are also necessary for just-in-time (JIT) delivery, which is increasingly being demanded by customers. For example, Vanity Fair Mills and Xerox have both recently implemented JIT in Mexico. According to published reports, this has been difficult to achieve in the Mexican environment due to language barriers, Mexico's slower-paced work environment and other obstacles. Nonetheless, it is now almost impossible to be a supplier to the large multinational manufacturers without the new computer aided design/computer aided manufacturing (CAD/CAM) technologies. This is also true for Mexican firms wishing to export.

Many Mexican manufacturers are not capable of adopting these new technologies because in the short term they usually create more problems than they solve. One manufacturer reported that it took three years to see the financial benefits from its investment, although it quickly gained a better image as a state-of-the-art supplier. For some companies, the desire to improve their image, and appear modern for marketing reasons, is the primary motivation for acquiring advanced automation technologies.

All of the experts interviewed for this study believed that the industrial automation market will continue to be dominated by imports. There are a few local companies that provide specific solutions for personal computers for small companies. But there are no local firms with the resources to provide integrated solutions to the large firms. It was noted that there would have to be a major technological change to enable small solution developers to provide competitive alternatives. Some observers believe that import penetration will rise as foreign service providers, such as systems integrators and trainers, begin entering the Mexican market.

BEST SALES PROSPECTS

- Interviews were conducted with a group of business leaders in the Mexican industrial automation sector. They were asked which equipment and services they considered to be the best prospects over the medium term. In general, they agreed that a trend towards computer integrated manufacturing (CIM) is only in its infancy in most industries. Many companies have automated parts of their operations, but few have gone all the way and integrated their process control and planning functions.
- The main exceptions are the automotive industry where entire systems have been imported under licence, and the beverage industry, which has a history of aggressive competition.
- The experts interviewed believe that there will be a gradual shift towards fully-integrated systems over the medium term. In the short run, however, they agree that smaller-scale projects with fast results will dominate the market.

AUTOMATION HARDWARE

- The full range of equipment control products includes presence sensors, programmable logic controllers (PLCs), starters, drives, intelligent sensors, and interfaces. There is particular demand for equipment that can be adapted to existing production machinery.

COMPUTER HARDWARE

- UNIX-based client-servers. These are now replacing larger computers as the standard for higher-end systems.
- Communications network products.

CORPORATE PROFILE

BERCLAIN AMERICA LATINA

Berclain is a subsidiary of the Quebec-based Berclain Group Inc. The Mexican subsidiary has three local partners. The Canadian parent provides technology and the local partners contribute knowledge of the Mexican market as well as contacts throughout the industry. Mexico provides a base for servicing customers throughout Latin America.

Berclain's most important product in Mexico is a software product called MOOPI, which is used for production management and tracking. According to the company, it assigns precise schedules to every resource in a factory. Berclain provides complete software packages as well as support, training and consulting.

According to a Berclain Mexican executive, the rapidity of the country's industrial restructuring took many companies by surprise. They did not initially realize the importance of automation technology to corporate survival in the new liberalized environment. As this executive put it, "At first, it was like trying to sell a parachute to somebody falling between the 97th and 45th floors of a building, who hasn't yet realized that he needs one".

CORPORATE PROFILE

ARTHUR ANDERSEN & COMPANY

Arthur Andersen & Company is a large consulting firm. In Mexico, it concentrates on two types of projects: engineering/business processes and systems integration/implementation.

Despite the fact that on the international front the company works with projects oriented towards the manufacturing process itself, these products are not part of their offerings in Mexico. In their view, there are not enough large manufacturing firms that are fully automated with numeric control machines and not many are developing advanced product design (computer aided design [CAD]).

For this reason, the company focusses on the administrative aspect of production. In particular, it is developing MRP applications, where the market involves larger sales of equipment, software, implementation, and support.

A manufacturing consultant employed by Arthur Andersen's Mexican office said that there is presently little complex product design going on in Mexico. "There are no local firms remotely capable of providing integrated solutions to the large international firms. The investments needed are too great and there are not enough trained and capable people to produce such complex developments."

DESIGN/ENGINEERING SOFTWARE

- Products that can be run on high-end personal computers (PCs) rather than workstations. The majority of companies have access to PCs but cannot afford workstations. Solutions in the US \$6,000 range will have the greatest potential.
- Computer aided design (CAD) software, especially products that build on an AUTOCAD base. For production, most companies start with CAD and then move on to computer aided engineering (CAE) and computer aided manufacturing (CAM) applications. Currently, AUTOCAD dominates the market for entry-level systems, reportedly because most engineers have pirated copies on their home computers and are thoroughly familiar with it.

MANUFACTURING SOFTWARE

- Material resource planning (MRP) solutions, especially SAP and related products. The new, user-friendly versions are in particular demand.
- Products at level II of the computer integrated manufacturing (CIM) model.

DISTRIBUTION APPLICATIONS

- Systems for managing distribution from manufacturer to end user.
- Electronic data interchange (EDI) products.
- Inventory management systems.
- Highly-replicable integrating solutions that can be applied easily to separate units in the production chain.

CONSULTING

- General technical services, including training.
- Systems integration services.

MARKET ENTRY STRATEGIES

A strong local presence, combined with better use of Mexican university resources, could help to overcome Canada's low profile in the industrial automation field.

There are several Canadian software tools available in Mexico. Speedware, Cognos and Berclain were mentioned in interviews as examples of Canadian companies offering products for manufacturing. Although they are not widely known in Mexico, these products enjoy a favourable reputation. Mexican observers believe that Canada's reputation for advanced technology has not been exploited by Canadian producers.

Interestingly, while some of the experts interviewed for this study said they were unaware of any Canadian products, they still had a very favourable impression of Canadian technology. Many Mexican students attend Canadian universities and learn of Canadian-developed technologies. They carry back a favourable impression, but Canadian products have not generally been aggressively presented in the Mexican market.

Canadian suppliers who have made sales visits to Mexico have left behind a generally good impression. The prevailing opinion is that Canadian suppliers are interested in Mexico and are more culturally compatible than many suppliers from the United States.

Industrial automation experts in Mexico often express surprise at the lack of presence of Canadian suppliers in the Mexican market, and believe that Canadian products would be well received if they were more persistently promoted. Some suggest participation in trade shows but others say that more specialized events at the Canadian Trade Centre in Mexico City would be more effective. It was pointed out, however, that for Canadian companies to compete with the worldwide corporations that presently serve the Mexican market, they will have to concentrate on market niches. MOOPI, a production management and tracking system, produced by Quebec-based Berclain was noted as an example.

DISTRIBUTION SYSTEMS

The distribution systems used for industrial automation products in Mexico are fairly direct, because there are relatively few buyers, and the largest clients dominate the market. This means that it is often feasible to deal directly with end users. The large multinational computer hardware and software companies operate subsidiaries in Mexico. Smaller companies, and those with less-sophisticated technologies tend to use agents and distributors. Distributors are more commonly used to sell "boxes" such as personal computers and basic software packages.

Most of the large manufacturers, including Hewlett Packard, IBM, Digital Equipment Corporation, Schneider and Allen Bradley all reported that they divide their sales efforts between direct sales and distributors. They tend to sell to the large office equipment manufacturers directly, and prefer to provide support directly for all types of client. Sun, on the other hand, sells mainly through distributors. Many distributors provide value-added such as software customization based on specific knowledge of particular industries or product niches. The big manufacturers also work with system integrators since they have contact with clients that need their products. One major automation equipment manufacturer reported that it sells about 25 percent of its products directly, 45 percent through distributors and 30 percent through systems integrators.

TECHNICAL SUPPORT

All of the large industrial automation suppliers have a local presence in Mexico and this is considered essential for both sales and after-sales service. It is also part of the ISO 9000 requirements.

After-sales service includes training in Spanish, technical support, software updates, preventive maintenance and warranty repairs. Buyers also demand ongoing access to spare parts. These elements are usually negotiated as part of the initial sale. Indeed, most experts say that the quality of the service package can be as important as the physical product in making the deal.

Usually the end user has in-house systems staff who can work out the easier solutions, but they rely heavily on suppliers or consultants for more sophisticated problems, especially during the early phases of implementation.

The technical complexity and high degree of specialization of industrial automation products means that well-qualified local support is essential. In general, there is a shortage of qualified technical personnel in Mexico and this makes it more difficult to enter the market. The limited pool of talent is concentrated at the universities, research centres, at a handful of solution developers and systems integrators. The more successful foreign suppliers are generally prepared to bring in experts from other countries when needed.

PRODUCT PROMOTION

Although the principal role of the universities' advanced manufacturing research centres is training in new technologies and the transmission of knowledge, these centres are also the place where Mexican industrialists turn to find solutions to their production problems. They therefore play a role in product promotion. Industrial automation providers from the United States, Japan, Germany, and other countries compete for the opportunity to test or demonstrate their equipment at these labs. Others send information on their products for the centres' libraries.

In the case of software, distributing the product to universities at reduced prices is another way of introducing a new product. One expert noted that one reason that AUTOCAD is so widely used is that there are a large number of engineers who know how to use it efficiently. This is because of the very large installed base, partly due to widespread piracy by individuals.

Automation solution developers and systems integrators in Mexico can also be approached. They may be interested in representing new products in Mexico. The more advanced companies already have exclusive arrangements with foreign suppliers, but small- to medium-sized companies may still be interested in partnerships with Canadian suppliers. Many of these companies employ graduates and train their personnel at the research centres. In some cases, their employees are Mexican graduates from the American and Canadian universities.

Another approach is to contact potential clients and industrial associations directly. Such initiatives should be carefully targetted. While almost all engineers and professionals in this field understand technical specifications in English, Spanish language promotional literature is strongly advised.

The *Cámara Nacional de la Industria de Transformación (CANACINTRA)*, National Chamber of Manufacturing Industry, is considered a good place to start.

Canadian suppliers might also approach Mexicans studying in related fields at Canadian universities to introduce them to their products. Many Mexicans attend university in Canada, and this is an untapped, if long-term, approach.

Participation in trade shows is an inexpensive means of making contacts and introducing products to the Mexican market. But several experts expressed the view that they do not find these shows very useful, because industrial automation products tend to be very specialized. Most agreed that the best opportunities of specialized products are at industrial shows directed to industries in which the exporter has particular expertise.

Whenever possible, working samples of the product should be displayed at trade shows or technical presentations. When this is not possible, a descriptive video in Spanish should be shown. Usually, trade shows include seminars where exhibitors can present technical innovations. This is an excellent medium provided that it reaches a targetted audience. Direct invitations to potential customers can help to ensure that the right people attend. If the presentation must be made in English, a copy with a translation of technical terms should be provided in advance to the translator.

Advertising in trade magazines can be effective for automation products. Many local manufacturers receive international magazines such as the one published by the American Association of Mechanical Engineers. In addition, *PC Semanal*, PC Weekly magazine, was mentioned by some buyers as another good advertising vehicle for computer-related products.

Trade missions put suppliers in contact with potential buyers, representatives and distributors on a one-to-one basis. The success of a mission depends on the quality of the interviews that are pre-arranged. This requires that mission organizers have a good understanding of the capabilities of participating companies, and a written summary should be prepared for this purpose.

FINDING A PARTNER

There is a very limited pool of industrial automation expertise in Mexico. Competition from other automation product suppliers makes it even more difficult to find representatives, distributors or joint venture partners. Nonetheless, a local presence is essential to compete successfully in this market. With rare exceptions, Mexican companies do not purchase advanced technology from companies which cannot provide after-sales service, training and maintenance through a local representative.

The main criteria for choosing a representative include established contacts, a communications compatibility, financial and organizational stability and knowledge of the market. The representative must also be capable of providing long-term service, technical support and training of the highest quality.

So far, Canada has not been perceived as an important supplier of advanced technology products in Mexico. This perception is changing as more information about Canada and its capabilities is disseminated as a result of the North American Free Trade Agreement (NAFTA). Canadians are generally known as technologically advanced and are respected for their business practices. Greater effort will be required to translate this favourable image into specific product opportunities.

THE REGULATORY ENVIRONMENT

There are no regulations that would interfere with the import of any Canadian industrial automation product into Mexico. Products, however, must meet the relevant labelling and quality-certification standards.

LABELLING

According to a decree published in March 1994, all products sold in Mexico must bear a label in Spanish prior to being imported to Mexico. Products subject to Mexico's *Normas Oficiales Mexicanas (NOMs)*, Mexican official standards, must also use the *NOM* logo specified in the *NOM*.

STANDARDS CERTIFICATION REQUIREMENTS

A decree of March 7, 1994 provides a list of products which are subject to *Normas Oficiales Mexicanas (NOMs)*, Mexican official standards. Beside each item is the applicable *NOM*. This list, however, is subject to frequent changes. Technically, the *NOMs* are binding on the Mexican importer rather than the Canadian exporter. The assistance of the exporter will be necessary to obtain the necessary certificate of compliance, but the importer should be asked to provide details of the latest regulations.

The North American Free Trade Agreement (NAFTA) provides that testing may be done at laboratories in any of the three countries. Mexico has four years from January 1, 1994 to comply; meanwhile, products must be tested in Mexico. They must comply with the applicable *NOM*. Only then will they be granted a certificate of compliance attesting to the fact that the product meets the applicable *NOM*.

INTELLECTUAL PROPERTY PROTECTION

Until recently, Mexico's intellectual property laws did not provide foreign technology owners with adequate protection. In particular, Mexican law traditionally treated franchise agreements as sales with strings attached, which they regarded as foreign interference. The 1982 Transfer of Technology Law gave the *Secretaría de Comercio y Fomento Industrial (SECOFI)*, Secretariat of Commerce and Industrial Development, authority to closely regulate all types of franchises and licensing arrangements for trade names. Intellectual property, such as trademarks and industrial secrets, were not adequately protected. For example, under the 1982 law, trademarks reverted to the franchisee at the end of the franchise agreement. The government began to change its policies in January 1990 by allowing foreign franchisors more control. Thirty-eight U.S. franchisors and about a dozen from other countries entered the market that year.

In June 1991, the *Ley de Fomento y Protección de la Propiedad Industrial*, Promotion and Protection of Industrial Property Law, went into effect. The new law recognized modern forms of trademark licensing, and all of the earlier restrictions were repealed. Industrial secrets and intellectual property are fully recognized in Mexican law. As in Canada, software piracy can still be a problem, but this is usually more troublesome in the case of software of value to individuals rather than corporations.

CANADIAN GOVERNMENT DEPARTMENTS AND SERVICES IN CANADA

DEPARTMENT OF FOREIGN AFFAIRS AND INTERNATIONAL TRADE (DFAIT)

DFAIT is the Canadian federal government department most directly responsible for trade development. The **InfoCentre** should be the first contact point for advice on how to start exporting. It provides information on export-related programs and services, acts as an entry point to DFAIT's trade information network, and can provide copies of specialized export publications and market information to interested companies.

InfoCentre

Tel.: 1-800-267-8376 or (613) 944-4000

Fax: (613) 996-9709

FaxLink: (613) 944-4500

InfoCentre Bulletin Board (IBB):

Tel: 1-800-628-1581 or (613) 944-1581

The Latin America and Caribbean Trade Division promotes trade with Mexico. There are several trade commissioners at the Embassy of Canada in Mexico City, as well as in the satellite offices in Monterrey and Guadalajara. Trade commissioners can provide a range of services including introducing Canadian companies to potential customers in Mexico, advising on marketing channels, assisting those wishing to participate in trade fairs, helping to identify suitable Mexican firms to act as agents, and compiling strategic business intelligence on potential foreign customers.

Latin America and Caribbean Trade Division

Department of Foreign Affairs and International Trade

Lester B. Pearson Building

125 Sussex Drive

Ottawa, ON K1A 0G2

Tel: (613) 996-5547

Fax: (613) 943-8806

INTERNATIONAL TRADE CENTRES

International Trade Centres have been established across the country as a convenient point of contact to support the exporting efforts of Canadian firms. Co-located with the regional offices of the Department of Industry (DI), the centres operate under the guidance of DFAIT and all have resident trade commissioners. They help companies determine whether or not they are ready to export, assist firms with market research and planning, provide access to government programs designed to promote exports, and arrange for assistance from the trade commissioners in Ottawa and trade officers abroad. Contact the International Trade Centre nearest you:

Newfoundland

International Trade Centre

P.O. Box 8950

Atlantic Place

215 Water Street

Suite 504

St. John's, NF A1B 3R9

Tel.: (709) 772-5511

Fax: (709) 772-2373

Prince Edward Island

International Trade Centre

P.O. Box 1115

Confederation Court Mall

134 Kent Street

Suite 400

Charlottetown, PE C1A 7M8

Tel.: (902) 566-7400

Fax: (902) 566-7450

Nova Scotia

International Trade Centre

P.O. Box 940, Station M

1801 Hollis Street

Halifax, NS B3J 2V9

Tel.: (902) 426-7540

Fax: (902) 426-2624

New Brunswick

International Trade Centre

1045 Main Street

Unit 103

Moncton, NB E1C 1H1

Tel.: (506) 851-6452

Fax: (506) 851-6429

Quebec International Trade Centre
5 Place Ville-Marie
Seventh Floor
Montreal, PQ H3B 2G2
Tel.: (514) 496-4636
Fax: (514) 283-8794

Ontario International Trade Centre
Dominion Public Building
1 Front St. West
Fourth Floor
Toronto, ON M5J 1A4
Tel.: (416) 973-5053
Fax: (416) 973-8161

Manitoba International Trade Centre
P.O. Box 981
330 Portage Avenue
Eighth Floor
Winnipeg, MB R3C 2V2
Tel.: (204) 983-6531
Fax: (204) 983-2187

Saskatchewan International Trade Centre
The S.J. Cohen Building
119-4th Avenue South
Suite 401
Saskatoon, SK S7K 5X2
Tel.: (306) 975-5315
Fax: (306) 975-5334

Alberta International Trade Centre
**Edmonton office is
also responsible for
Northwest Territories*
Canada Place
9700 Jasper Avenue
Room 540
Edmonton, AB T5J 4C3
Tel.: (403) 495-2944
Fax: (403) 495-4507

International Trade Centre
510-5th Street S.W.
Suite 1100
Calgary, AB T2P 3S2
Tel.: (403) 292-6660
Fax: (403) 292-4578

British Columbia International Trade Centre
**Vancouver office is also
responsible for the Yukon*
300 West Georgia Street
Suite 2000
Vancouver, BC V6B 6E1
Tel.: (604) 666-0434
Fax: (604) 666-8330

WORLD INFORMATION NETWORK FOR EXPORTS (WIN EXPORTS)

WIN Exports is a computer-based information system designed by DFAIT to help Canada's trade development officers abroad match foreign needs to Canadian capabilities. It provides users with information on the capabilities, experience and interests of more than 23,000 Canadian exporters. To register on WIN Exports, call (613) 996-5701, or fax 1-800-667-3802 or (613) 944-1078.

PROGRAM FOR EXPORT MARKET DEVELOPMENT (PEMD)

PEMD is DFAIT's primary export promotion program. It supports a variety of activities to help Canadian companies expand into export markets.

PEMD shares up to 50 percent of eligible expenses. Program financial assistance is a repayable contribution, not a grant, and must be approved in advance. Funded activities include:

- Market Development Strategies, which consist of a package of support for visits, trade fairs, and market support initiatives, under one umbrella of the company's marketing plan.
- New to Exporting Companies, which provides a vehicle for these companies to seek out individual export opportunities, either through a market identification visit or participation in an international trade fair.
- Capital Projects Bidding for specific projects outside Canada involving international competition/formal bidding procedures.
- Trade Association Activities undertaken by non-sales national trade or industry associations on behalf of their member companies.

Support is provided for certain types of government-planned activities, such as outgoing trade missions of Canadian business representatives and incoming missions to Canada of foreign business persons and officials who can influence export sales. For general information, call the InfoCentre at 1-800-267-8376. For applications for assistance, call the International Trade Centre nearest you.

INTERNATIONAL FINANCING

DFAIT helps Canadian exporters interested in pursuing multilateral business opportunities financed by international financing institutions (IFIs). Canadian exporters and trade associations can access market data, obtain a better understanding of the competition, and determine if an IFI-funded market opportunity is practical and worth pursuing. DFAIT can provide information and advice on the availability of Canadian government-funded assistance programs and can assist companies in developing effective export marketing. For further information, contact:

International Financing Division

Department of Foreign Affairs and International Trade
Lester B. Pearson Building
125 Sussex Drive
Ottawa, ON K1A 0G2
Tel.: (613) 995-7251
Fax: (613) 943-1100

TECHNOLOGY INFLOW PROGRAM (TIP)

Managed by DFAIT and delivered domestically by the National Research Council, TIP is designed to help Canadian companies locate, acquire and adopt foreign technologies by promoting international collaboration. The Department of Industry (DI) also helps in program promotion. TIP officers respond to requests to identify technology sources and opportunities for cooperation between Canadian and foreign firms. The Program also helps Canadian firms make exploratory visits abroad to identify and gain first-hand knowledge of relevant foreign technologies, as well as how to negotiate to acquire them. For information, call (613) 993-5326.

INVESTMENT DEVELOPMENT PROGRAM

The Investment and Technology Bureau (TID) promotes Canada as an attractive, competitive destination for business investment to potential foreign investors. It actively encourages investments that take the form of new plant and equipment, joint ventures or strategic partnerships. The Bureau is especially interested in attracting investment that introduces new technology into Canada, which is key to creating new jobs and economic opportunities. It also helps Canadian companies to find international investment partners and to access international sources of capital and technologies. TID provides support to the chief executive officers of Canadian subsidiaries of multinationals which are seeking

to attract manufacturing and R&D mandates to Canada. It also monitors and analyzes investment trends and perceptions of Canada as an investment site. TID works closely with the "geographic" branches of DFAIT and the investment counsellors at Canadian missions around the world, as well as with provincial and municipal authorities, and professional and business organizations. For more information, contact:

Investment and Technology Bureau (TID)

Department of Foreign Affairs and International Trade
Lester B. Pearson Building
125 Sussex Drive
Ottawa, ON K1A 0G2
Tel.: (613) 995-4128
Fax: (613) 995-9604

DEPARTMENT OF INDUSTRY (DI)

DI was created with a broad mandate to make Canada more competitive by fostering the growth of Canadian businesses, by promoting a fair and efficient marketplace for business and consumers, and by encouraging commercial ventures in scientific research and technology. In the area of small business, it has been given specific responsibility to:

- develop, implement and promote national policies to foster the international competitiveness of industry; the enhancement of industrial, scientific and technological development; and the improvement in both the productivity and efficiency of industry;
- promote the mobility of goods, services, and factors of production within Canada;
- develop and implement national policies to foster entrepreneurship and the start-up, growth and expansion of small businesses;
- develop and implement national policies and programs respecting industrial benefits from procurement of goods and services by the Government of Canada; and
- promote and provide support services for the marketing of Canadian goods, services and technology.

The regional offices of DI work directly with Canadian companies to promote industrial, scientific and technological development. They help clients recognize opportunities in a competitive international marketplace by providing services in the areas of business intelligence and information as well as trade and market development. DI also promotes and manages a portfolio of programs and services.

The following are areas in which DI regional offices have special competence:

- access to trade and technology intelligence and expertise;
- entry points to national and international networks;
- industry-sector knowledge base;
- co-location with International Trade Centres connected to DFAIT and Canadian posts abroad;
- client focus on emerging and threshold firms; and
- business intelligence.

For more information, call (613) 941-0222.

Advanced Manufacturing Technologies Directorate

Department of Industry
235 Queen Street
Tenth Floor, East Tower
Ottawa, ON K1A 0H5
Tel.: (613) 954-3249
Fax: (613) 941-2463

Business Service Centre

Department of Industry
235 Queen Street
First Floor, East Tower
Ottawa, ON K1A 0H5
Tel.: (613) 952-4782
Fax: (613) 957-7942

NAFTA Information Desk

Department of Industry
235 Queen Street
Fifth Floor, East Tower
Ottawa, ON K1A 0H5
Fax: (613) 952-0540

THE BUSINESS OPPORTUNITIES SOURCING SYSTEM (BOSS)

BOSS is a computerized databank that profiles over 25,000 Canadian companies. It lists basic information on products, services and operations of use to potential customers. The system was established in 1980 by the Department of Industry (DI) in cooperation with participating provincial governments. BOSS was originally established so that trade commissioners posted around the world by DFAIT could find Canadian companies that might be able to take advantage of foreign market opportunities. Today, more than 11,000 domestic and international subscribers use the system, not only to locate Canadian suppliers, but also to obtain market intelligence and identify market opportunities. The majority of subscribers are Canadian companies. For more information, call (613) 954-5031.

MARKET INTELLIGENCE SERVICE (MIS)

MIS provides Canadian businesses with detailed market information on a product-specific basis. The service assists Canadian companies in the exploitation of domestic, export, technology transfer and new manufacturing investment opportunities. The intelligence is used by Canadian businesses in decisions regarding manufacturing, product development, marketing and market expansion. A request for information can be custom-tailored to meet each client's particular need. Previously-published customized reports are also available on request. The database is updated quarterly and annually. MIS is offered free of charge by fax, letter or telephone. For more information, contact:

Strategic Information Branch

Department of Industry
235 Queen Street
First Floor, East Tower
Ottawa, ON K1A 0H5
Tel.: (613) 954-5031
Fax: (613) 954-1894

REVENUE CANADA

Revenue Canada, Customs Program Branch provides a NAFTA Help Desk telephone line with service available in Spanish. Revenue Canada publications and customs notices are available by calling or faxing the NAFTA Information Desk. For more information, contact:

NAFTA Spanish Help Desk
Tel.: (613) 941-0965

NAFTA Information Desk
Revenue Canada, Customs Programs Branch
191 Laurier Avenue West
Sixth Floor
Ottawa, ON K1A 0L5
Tel.: 1-800-661-6121, or (613) 941-0965
Fax: (613) 952-0022

CANADIAN INTERNATIONAL DEVELOPMENT AGENCY (CIDA)

An important possible source of financing for Canadian ventures in Mexico is the special fund available through CIDA under the Industrial Cooperation Program (CIDA/INC). This program provides financial contributions to stimulate Canadian private-sector involvement in developing countries by supporting long-term business relationships such as joint ventures and licensing arrangements. INC supports the development of linkages with the private sector in Mexico by encouraging Canadian enterprises to share their skills and experiences with partners in Mexico and other countries. A series of INC mechanisms help enterprises to establish mutually beneficial collaborative arrangements for the transfer of technology and the creation of employment in Mexico.

There are five INC mechanisms that help eligible Canadian firms to conduct studies and that provide professional guidance and advice to potential clients. Where a project involves environmental improvement, technology transfer, developmental assistance to women, job training or job creation, early contact with CIDA's Industrial Cooperation Division is suggested. An important CIDA criterion is that the project creates jobs in Mexico without threatening jobs in Canada. In fact, most CIDA-assisted projects have produced net increases in Canadian jobs. For more information, contact:

Industrial Cooperation Division
Canadian International Development Agency
200 Promenade du Portage
Hull, PQ K1A 0G4
Tel.: (819) 997-7905/7906
Fax: (819) 953-5024

ATLANTIC CANADA OPPORTUNITIES AGENCY (ACOA)

Atlantic Canadian companies seeking to develop exports to Mexico may be eligible for assistance from the ACOA. The Agency works in partnership with entrepreneurs from the Atlantic region to promote self-sustaining economic activity in Atlantic Canada.

ACOA provides support to businesses as they look to expand existing markets through the development of marketing plans. Efforts include monitoring trade opportunities arising from global economic change, communications efforts to promote the region, trade missions and associated activities, as well as better coordination with federal and provincial bodies that influence trade and investment opportunities. For more information, contact:

Atlantic Canada Opportunities Agency
Blue Cross Centre
644 Main Street
P.O. Box 6051
Moncton, NB E1C 9J8
Tel: 1-800-561-7862
Fax: (506) 851-7403

WESTERN ECONOMIC DIVERSIFICATION CANADA (WD)

WD is responsible for federal economic development activities in Western Canada. The Department works in partnership with the western provinces, business, industry associations and communities to stimulate the western Canadian economy.

WD's "New Directions" program will work to enhance the export position of western companies by boosting their competitiveness in domestic and global markets.

The Department no longer provides repayable loans to individual companies, but seeks new innovative partnerships within both the public and private sectors. These partnerships will address the needs of small- and medium-sized enterprises for information, business services and capital, particularly for high growth industries critical to Western Canada's economic diversification.

One of WD's new products focused on export development is the International Trade Personnel Program. This federal-provincial initiative links export-focused western firms with recent post-secondary graduates. The program accomplishes two important socio-economic goals: it gives companies the extra person-power they need to penetrate new markets, and it gives recent graduates valuable work experience. Under the new program, the length of export-development projects may vary from one to three years. Approved projects will be eligible for assistance ranging from \$7,500 for one year, to a maximum of \$37,500 per graduate. For more information, contact:

Western Economic Diversification Canada
 The Cargill Building
 240 Graham Avenue
 Suite 712
 P.O. Box 777
 Winnipeg, MB R3C 2L4
 Tel.: (204) 983-4472
 Fax: (204) 983-4694

EXPORT DEVELOPMENT CORPORATION (EDC)

EDC is a customer-driven, financial services corporation dedicated to helping Canadian businesses succeed in the global marketplace. EDC provides a wide range of risk management services, including insurance, financing and guarantees to Canadian exporters and their customers around the world.

EDC's products fall into four main categories:

- export credit insurance, covering short- and medium-term credits;
- performance-related guarantees and insurance, providing cover for exporters and financial institutions against calls on various performance bonds and obligations normally issued either by banks or surety companies;
- foreign investment insurance, providing political risk protection for Canadian investments abroad; and
- export financing, providing medium- and long-term export financing to foreign buyers of Canadian goods and services.

EDC has established relationships with leading commercial and public sector institutions in Mexico and Latin America. Exporters can call (613) 598-2860 for more information.

Smaller exporters, with annual export sales under Cdn \$1 million, should call the Emerging Exporter Team at 1-800-850-9626.

Exporters in the information technology sector can call EDC's Information Technologies Team at (613) 598-6891.

For information on the full range of EDC services, contact any of the following EDC offices:

Ottawa Export Development Corporation
 151 O'Connor Street
 Ottawa, ON K1A 1K3
 Tel.: (613) 598-2500
 Fax: (613) 237-2690

Vancouver Export Development Corporation
 One Bentall Centre
 505 Burrard Street
 Suite 1030
 Vancouver, BC V7X 1M5
 Tel.: (604) 666-6234
 Fax: (604) 666-7550

Calgary Export Development Corporation
 510-5th Street S.W.
 Suite 1030
 Calgary, AB T2P 3S2
 Tel.: (403) 292-6898
 Fax: (403) 292-6902

Winnipeg Export Development Corporation
 330 Portage Avenue
 Eighth Floor
 Winnipeg, MB R3C 0C4
 Tel.: (204) 983-5114
 Fax: (204) 983-2187

Toronto Export Development Corporation
 National Bank Building
 150 York Street
 Suite 810
 P.O. Box 810
 Toronto, ON M5H 3S5
 Tel.: (416) 973-6211
 Fax: (416) 862-1267

London
Export Development
Corporation
Talbot Centre
148 Fullarton Street
Suite 1512
London, ON N6A 5P3
Tel.: (519) 645-5828
Fax: (519) 645-5580

Montreal
Export Development
Corporation
Tour de la Bourse
800 Victoria Square
Suite 4520
P.O. Box 124
Montreal, PQ H4Z 1C3
Tel.: (514) 283-3013
Fax: (514) 878-9891

Halifax
Export Development
Corporation
Purdy's Wharf, Tower 2
1969 Upper Water Street
Suite 1410
Halifax, NS B3J 3R7
Tel.: (902) 429-0426
Fax: (902) 423-0881

NATIONAL RESEARCH COUNCIL (NRC)

Canadian companies hoping to succeed in the Mexican marketplace may require additional technology to improve their competitiveness. The NRC works with Canadian firms of all sizes to develop and apply technology for economic benefit. The Council manages the Industrial Research Assistance Program (IRAP), a national network for the diffusion and transfer of technology.

The IRAP network supports the process of developing, accessing, acquiring, implanting and using technology throughout Canadian industry. IRAP has been in existence for 50 years and has acquired a reputation as one of the most flexible and effective federal programs. IRAP takes advantage of an extensive network of more than 190 different locations within approximately 90 communities across Canada, including numerous provincial technology centres, the NRC's own laboratories and research institutes, federal government departments, and technology transfer offices in Canadian universities. For further information, contact:

Industrial Research Assistance Program
National Research Council
Montreal Road
Building M-55
Ottawa, ON K1A 0R6
Tel.: (613) 993-1770
Fax: (613) 952-1086

KEY CONTACTS IN CANADA

SPONSORING ORGANIZATIONS

BAKER & MCKENZIE

Baker & McKenzie is one of the largest international law firms with offices in 35 countries. They presently have four offices in Mexico, in the cities of Juárez, Mexico City, Monterrey and Tijuana. In addition to providing legal advice, the firm's offices in Canada and Mexico work to assist Canadian companies to find the right partner to enable them to establish or expand their activities in Mexico. For more information, contact:

Baker & McKenzie
Barristers & Solicitors
BCE Place
181 Bay Street
Suite 2100
Toronto, ON M5J 2T3
Tel.: (416) 865-6910/6903
Fax: (416) 863-6275

BUSINESS AND PROFESSIONAL ASSOCIATIONS

Machinery and Equipment Manufacturers' Association of Canada

116 Albert Street
Suite 701
Ottawa, ON K1P 5G3
Tel.: (613) 232-7213
Fax: (613) 232-7381

Association of Consulting Engineers of Canada

130 Albert Street
Suite 616
Ottawa, ON K1P 5G4
Tel.: (613) 236-0569
Fax: (613) 236-6193

Canadian Advanced Technology Association

388 Albert Street
2nd Floor
Ottawa, ON K1R 5B2
Tel.: (613) 236-6550
Fax: (613) 236-8189

The Canadian Council for the Americas

The Council is a non-profit organization formed in 1987 to promote business interests in Latin American as well as Caribbean countries. The CCA promotes events and programs targetted at expanding business and building networking contacts between Canada and the countries of the region.

The Canadian Council for the Americas

Executive Offices
145 Richmond Street West
Third Floor
Toronto, ON M5H 2L2
Tel.: (416) 367-4313
Fax: (416) 367-5460

Canadian Exporters' Association

99 Bank Street
Suite 250
Ottawa, ON K1P 6B9
Tel.: (613) 238-8888
Fax: (613) 563-9218

Canadian Manufacturers' Association

75 International Boulevard
Fourth Floor
Etobicoke, ON M9W 6L9
Tel.: (416) 798-8000
Fax: (416) 798-8050

The Canadian Chamber of Commerce

55 Metcalfe Street
Suite 1160
Ottawa, ON K1P 6N4
Tel.: (613) 238-4000
Fax: (613) 238-7643

Forum for International Trade Training Inc.

155 Queen Street
Suite 608
Ottawa, ON K1P 6L1
Tel.: (613) 230-3553
Fax: (613) 230-6808

Language Information Centre

240 Sparks Street RPO
Box 55011
Ottawa, ON K1P 1A1
Tel.: (613) 523-3510

Open Bidding Service

P.O. Box 22011
Ottawa, ON K1V 0W2
Tel.: 1-800-361-4637 or (613) 737-3374
Fax: (613) 737-3643

CANADIAN COMPANIES

Control Data Systems Canada Ltd.

1 Antares Drive
Suite 400
Nepean, ON K2E 8C4
Tel.: (613) 723-1174
Fax: (613) 225-7971

Digital Equipment of Canada Ltd.

100 Herzberg Road
Kanata, ON K2K 2A6
Tel.: (613) 592-5111
Fax: (613) 591-4375

SHL Systemhouse Inc.

50 O'Connor Street
Suite 501
Ottawa, ON K1P 6L2
Tel.: (613) 236-1428
Fax: (613) 236-2043

MEXICAN GOVERNMENT OFFICES IN CANADA

The Embassy of Mexico, Mexican Trade Commissioners in Canada, and Mexican consulates can provide assistance and guidance to Canadian companies in need of information about doing business in Mexico. For more information, contact:

Embassy of Mexico
45 O'Connor Street
Suite 1500
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Calgary, AB T2P 0M2
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México
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