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**THE EMERGENCE OF SUCCESSFUL  
EXPORT ACTIVITIES IN MEXICO:  
THREE CASE STUDIES**

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## Abstract<sup>1</sup>

This paper consists of three case studies of the emergence of three successful export activities in Mexico: avocado production, the manufacture of catheters, and call center outsourcing. Each case study discusses how companies, associations, and governments at various levels have addressed market failures and facilitated the provision of public goods necessary for each activity. The case studies additionally profile first movers in each activity and describe the positive externalities they provide to imitators, particularly diffusion of export knowledge. Also included in each case study is a counterfactual case of a less successful activity (mango production, stem cell banking, and other types of business process outsourcing, respectively) and a section on policy implications.

**JEL Classifications:** H41, L26, L65, L84, Q13

**Keywords:** Agriculture, Exports, Manufacturing, Services, Mexico.

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<sup>1</sup> Research assistants Judith Garza, Mario Rivas, and Karina Ramírez contributed to this document.

# **I. Avocados**

## ***1) Introduction***

The presence of avocados in the world market has been growing steadily in the past two decades, and it is no longer considered an exotic fruit but part of the everyday diet of many countries. This trend has been reinforced by the increasing popularity of natural products. Avocado, sold mainly as a fresh fruit, is the main ingredient of guacamole, which is used in salads and dips. Consumption of avocados is recommended to assist in lowering cholesterol, and processed avocado oil is used in the pharmaceutical and cosmetics industries. Worldwide, Mexico is the largest grower and consumer of avocados, and more recently the largest exporter of avocados. According to the 2006 *World Trade Atlas*, Mexican exports increased from less than a million dollars in 1985, to \$34.5 million in 1995, and \$407.6 million in 2005.

This study uses two methods to explore how avocados emerged as a new, successful export activity in Mexico. It specifies how Mexican companies, local associations, and governments dealt with market failures (externalities, coordination failures, and the existence of public goods); and compares the case of avocados with a counterfactual case. The study first explains the logistics of initial avocado exports, identifying the main problems and uncertainties confronting the first exporters, or *first movers*. Second, the study analyzes the solutions provided by the *first movers* that might have provoked positive externalities (promotion of country brand-name, identification of transport requirements, and so on), facilitating the entrance of newcomers or *imitators*. The study pays special attention to the diffusion of export know-how to *imitators*. Third, it points out the roles of local associations and governments in dealing with both the existence of public goods (setting up a disease-free region) and coordination failures, such as noncompliance with certification procedures in the production and export stages.

Lastly, to emphasize the lessons provided by successful export activities of avocados, the study compares the avocado experience with a counterfactual case. As several of the avocado producers and exporters had already tried unsuccessfully to export mangoes, this product was selected as the opposing scenario. Fieldwork took place mainly in the avocado producing state of Michoacán, in central Mexico, between August 2006 and January 2007, and open-ended interviews were conducted with local producers, exporters, heads of nongovernmental organizations, government officials, and one industry consultant.

## 2) *Avocados and the State of Michoacán: A Fresh Marriage*

The avocado is a fruit that belongs to the family of Lauraceas and the species *Persea gratissima* or *Persea Americana* Mill. The oldest evidence of avocados (*Persea americana*) in Mexico was found in a cave located in Coxcatlán, Puebla, Mexico that dated from 10,000 B.C. In colonial times, the Spaniards introduced the avocado to the rest of America and to European countries. During 1950 to 1970, avocado producers in Mexico began planting diverse avocado varieties, such as Fuerte, Bacon, Rincon, Criollo, and Zutano.<sup>2</sup> Perhaps the most important feature of the plant is that the fruit does not mature on the tree. Avocados will be ready to be consumed one or two weeks after being cut, and they can remain unspoiled on the tree anywhere from four to six months. The tree acts as a natural warehouse (Paz, interview, 11/27/06).

The State of Michoacán offers some comparative advantages for the cultivation of avocados, such as climate and soil features that allow the trees to produce all year long. A belt across the state possesses the bioclimatic requirements needed for raising avocados. Michoacán's avocado belt (86,000 hectares) is located on a volcanic area, 1,600 meters above sea level, across 20 municipalities, the largest one being Uruapan, Michoacán. This belt contains volcanic soil, which is deep, clay-like earth rich in organic substances, and most importantly rich in iron, aluminum, and potassium. The belt also has the correct level of humidity and an adequate climate for harvesting avocados. Avocado production requires a great deal of water. In Michoacán, where only about half the orchards have irrigation systems, abundant rainfall gives Mexican producers an advantage in lower water costs compared with other countries. In the areas visited, the orchards required relatively little maintenance, the fruit withstood neglect, and the trees continued to produce.

Michoacán avocado producers benefited early on from genetically *improved* varieties, which are rich in taste and resistant to disease and extreme weather. In the mid-1950s, a small group of entrepreneurs established the first nurseries of improved avocado varieties, including

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<sup>2</sup> In fact, there are more than 500 varieties of avocados but just a few of them have commercial importance today. The variety "Hass" is the most well-known due to its trade qualities; in particular, its ripening point lasts longer compared with the other varieties. Avocados have a thick, rough, and bright green peel, varying to dark green, almost black depending on the ripening point. The pulp is pale green colored and creamy textured; according to the National Institute of Nutrition in Mexico, this product is of high nutritional value, has significant quantities of vitamins like A, C, D, E, K, and part of the B complex that turns it into a 100 percent nutritive fruit. Medical researchers assert that avocados potentially reduce cholesterol due to the amount of fat they contain, which is 20 to 30 percent, depending on the degree of ripeness, and mainly because of the unsaturated fats they contain. Experts in nutrition and diet claim that the consumption of avocados prevents cardio and circulatory diseases by reducing excess fat in the blood.

Fuerte, in the town of Uruapan. During this time, Mr. Hass developed a stronger avocado variety from Guatemalan trees, whose fruits lasted longer and were more resistant to disease (Vega Esquivel, interview, 12/5/06). Hass and Fuerte plants were taken to California, where their cold weather resistance increased. In 1957, the Uruapan nursery owners introduced these improved varieties to the region of Michoacán and they continue to be improved. For example, Leopoldo Vega, an Uruapan grower, imported 5,000 plants from California and created 25,000 more plants (Vega Esquivel, interview, 12/5/06). Michoacán producers then had access to improved avocado varieties. Due to the positive reaction of the Hass variety to Michoacán weather, many local producers began to move from Fuerte and native varieties to the improved Hass variety. Half a million plants were produced and sold in Mexico during this time (Vega Esquivel, interview, 12/5/06).

In 1963, the state of Michoacán set up commercial nurseries containing the Hass variety with potential production of 18,000 to 20,000 certified plants from Santa Paula, California. By 1965, the Michoacán State Forest Commission had begun to produce nurseries for fruit trees, including the Hass avocado, offering free trees to peasant producers in rural communities throughout Michoacán. As a result, the Hass variety became a strong competitor against the Fuerte and Criollo varieties for the national market. The genetically improved variety, which was resistant to disease and extreme weather, had been developed by Mr. Hass and improved by producers in California and Uruapan. From an economic point of view, they had created a public good whose benefits spread over the state of Michoacán through the action of private and public institutions.

By the late 1960s, Mexican consumer preferences were shifting slowly toward Hass, providing the consumer demand that resulted in a dramatic expansion in Hass avocado orchards in Michoacán. The cultivation area increased from 3,700 hectares in 1970 to 80,000 hectares in 2003. Production increased from 40,000 tons to one million tons in the same period. With this planting increase, Mexico became the world's largest avocado grower and consumer.

The avocado boom was known regionally as the time of "green gold," and had its first peak in the mid-1980s. This situation effected an important change: the producers with larger farms gradually replaced coffee, banana, lemon, mango, and guava plantations with avocados. At the beginning of the 1980s, new industries developed alongside the cultivation of avocado, such as professional pickers, packing plants for fresh avocados, manufacturing of avocado products

such guacamole paste and avocado oil, and avocado exporters. Today, avocado production represents 62 percent of agricultural production in Michoacán. According to 2003 figures, avocado production generates 47,000 direct jobs, 70,000 seasonal jobs, and 187,000 indirect permanent jobs.<sup>3</sup>

As a recap, Michoacán producers enjoyed the following set of preconditions that paved the way for the development of the industry: the proper climate and soil conditions for raising avocados, a genetically improved variety resistant to disease and extreme weather and whose fruit can remain on the tree ready to be picked anywhere from four to six months, a large pool of producers that obtained access to said avocado variety through private and public efforts, and a large domestic market capable of absorbing the avocado production all year long.

**Figure 1. Mexico's Avocado Exports, 1972-97  
(Metric tons)**

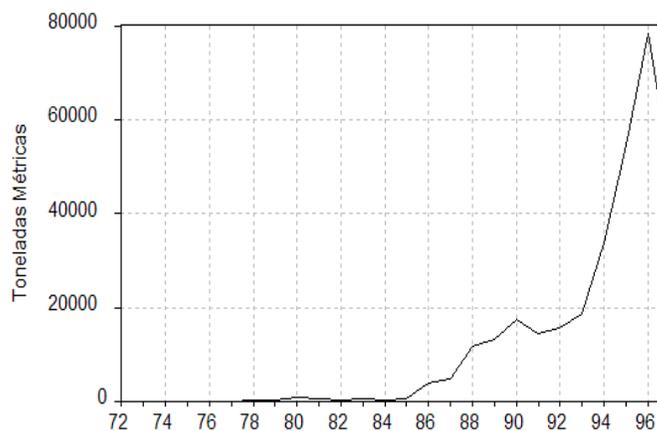


Figura 1. Exportaciones Totales de Aguacate de México, 1972-1997.

Source: [http://www.avocadosource.com/WAC4/WAC4\\_p393.htm](http://www.avocadosource.com/WAC4/WAC4_p393.htm) and Contreras-Castillo (1999).

### **3) The Global Market and the Production Chain**

World-wide avocado production in 2001 was valued at US\$ 2,650 million (FAOSTAT, 2001). Approximately 63 percent of this production is concentrated in six countries: Mexico, the United States, Colombia, Indonesia, Chile, and the Dominican Republic (FAOSTAT, 2000). Peru and New Zealand have recently entered the market. Mexico is the main grower, with its share

<sup>3</sup> See <http://www.aproam.com/>. Indirect jobs relate to packing, transport, sales, and technical services.

representing 35.3 percent of the total production in 2001, or 89,300 tons. Mexico is followed by Chile with 56,200 tons, and South Africa with 45,600 tons in 2000 (FAOSTAT, 2000).

Mexico is also the main consumer of avocados in the world, with annual consumption of around 817,000 tons, followed by the United States with 296,000 tons. France and the United States are the main importers (10,500 tons and 78,000 tons, respectively). The Japanese market is becoming increasingly significant (see Table 1). The normal transport of avocados is by sea, which allows low transportation costs and good quality.<sup>4</sup> In Mexico, there are 21,511 producers, 279 packing plants and traders for the domestic market, more than 50 packing plants/exporters, and 14 industrialists that process the avocados into guacamole, pulp, halves, frozen products, beverages, and non-refined oil.

**Table 1.**  
**Avocado Production, Exports, Imports, and Consumption by Country, 2004**  
**(Thousands of tons)**

Country	Production	Exports	Imports	Consumption
Mexico	987.00	142.25	2.62	740.36
United States	162.72	9.65	155.61	295.80
France	0.07	13.79	104.41	74.00
Japan	0	0	30.49	27.08
Chile	160.00	121.60	1.07	18.05
South Africa	56.16	30.70	1.15	24.33

*Source:* Authors' calculations based on data from FAOSTAT (2007).

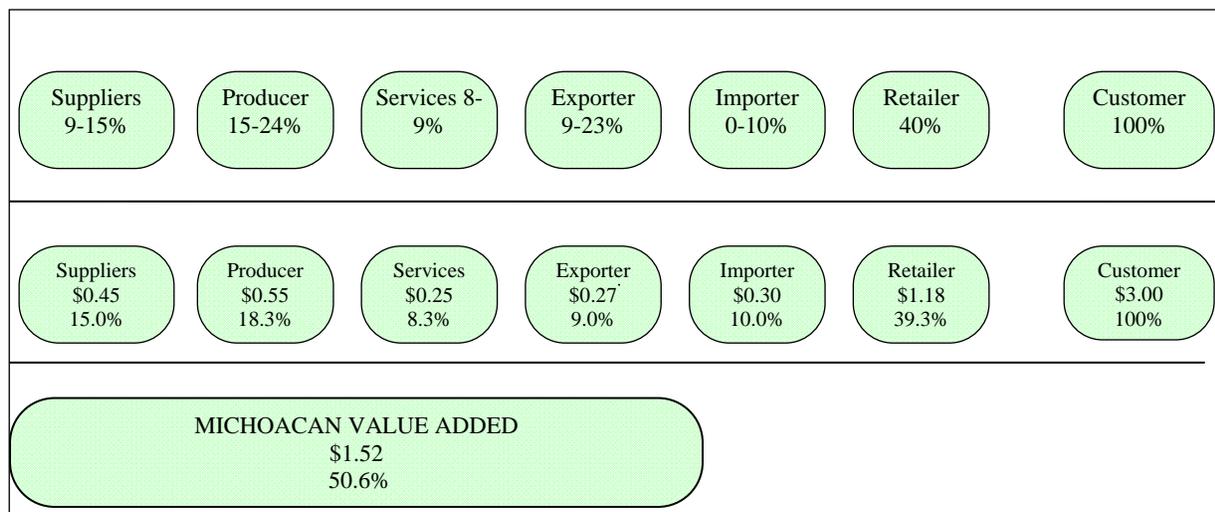
Figure 2 shows the traditional production and export chain from planting and other production costs through final sale to the customer. For example in the United States, according to Figure 2, the final customer pays one dollar per avocado, or \$3.00 per kilogram. Of this, \$1.18 goes to the retailer or supermarket (40 percent); \$0.30 (10 percent) to the importer; \$0.31 (10 percent) to the exporter or packing plant; \$0.21 (7 percent) to services such as APEAM-USDA (U.S. Department of Agriculture) certification and promotion fees, professional fruit

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<sup>4</sup> For the varieties Hass and Fuerte for example, sea transportation is recommended in refrigerated containers cooled at 5 to 6° C, with controlled atmosphere, with a transit time of 22-24 days. Air transportation of avocados is profitable only in exceptional cases, for example when demand is high in an under-supplied market (Agexpront 2004).

harvesting services, and transportation costs; \$0.55 (18 percent) to the producer; and \$0.45 (15 percent) to other production costs such as planting, irrigation, fertilizers, and so on. In this traditional chain, Mexico's value added sums to \$1.52/kilogram, or 50 percent of the final value.

**Figure 2.**  
**Value Added at Each Stage of Production and Export**  
**(Percent and dollars per kilogram)**



Source: Authors' calculations.

The grower seems to be well positioned in the chain. At the moment, the producer sets the minimum he is willing to receive per kilogram, or \$1.00/kilogram, which includes *other production costs* varying anywhere from \$0.27 to \$0.45 per kilogram. That is, the producer can potentially receive between 18 and 24 percent of the final value of the product. The producer, however, can be forced by the exporter or packing plant to pay APEAM-USDA certification and promotion fees of \$0.11/kilogram. In this case, the producer's revenue will vary between 15 percent (high production costs and full certification fee) and 24 percent (low production costs and no certification fee) of the final value (see Figure 2).

It appears that the exporter or packing plant depends heavily on its negotiating power over the producer and the importer. A weak exporter will receive about 10 percent of the final value (paying the full certification fee and facing a strong importer), without taking into account the operation costs of the packing plant. A stronger exporter with increased bargaining power might double its income to as much as 20 percent (facing no certification fee and a weaker

importer). If the exporter is capable of selling directly to retailers, such as commercial houses in the United States, its income might rise to 26 percent. According to these figures, four additional observations can be drawn from Figure 2.

- Growers appear to realize extra-ordinary profits. The control over supply they have been obtained through the Juntas and Committees of Sanidad Vegetal has given them some market power.
- Producers are unable to become exporters because their only option would be to negotiate with the importer. Having spent most of their time in the field, it is unlikely that producers would be able to negotiate a good deal in the international markets. Obtaining the minimum 10 percent generally paid to exporters may not be sufficient to pay for the operating costs of the packing plant if the producer is not an efficient industrialist. In addition, growers own small lots; they need to team together with other growers for packing and transporting the fruit abroad (Paz, interview, 11/27/06). Furthermore, one particular grower only harvests certain sizes of fruit, at certain periods of the year, while the market needs constant supplies of all different sizes (Paz, interview, 11/27/06).
- Exporters with strong connections in the final market can avoid the importer and even negotiate a good deal with the retailer, which secures the exporter at least 24 percent of the final value. Perhaps for this reason, 80 percent of exports to the United States are conducted by U.S. multinational corporations such as *Calavo*, *Mission*, *West Pak*, *Freshfruit*, and *Delmonte*.
- Exporters need volume to survive; they seem to be squeezed between powerful U.S. retailers and organized local producers.

#### **4) *First Movers and Imitators***

##### **4.1 *First Mover: The Purepecha Group's Early Start***

The first avocado exports were conducted by Don Leopoldo Vega, owner of the Purepecha Group, in 1970. Don Leopoldo, born in 1935, came from a family of agricultural producers (wheat, corn, and beans) and cattle raisers. When he was a child, the family farm had several avocado trees that were used to provide shade for the coffee plants. When he was 16 years old,

Don Leopoldo began working for a firm in which his uncle was a partner, *Limonos de Michoacán*, farming melons, watermelons, and cotton. In the early 1960s, he started the Purepecha Group, farming avocados with improved varieties (see Section 2). He started his own avocado nursery and in 1962 and 1965, he planted Fuerte and Hass avocado varieties. Later, Don Leopoldo set up operation of the first mechanical packing equipment in the region, which was acquired from the agricultural state of Sinaloa. Before 1970, he sent the first avocado samples to Europe by plane, and in October 1970, he sent two containers to Rotterdam by ship (Vega, interview, 12/5/06).

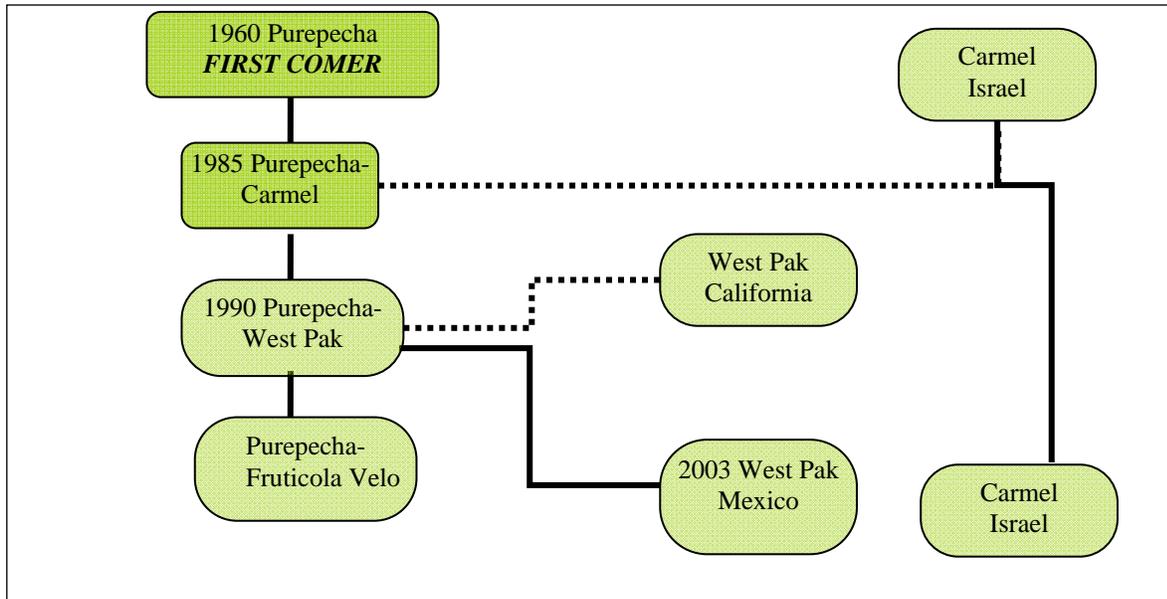
Don Leopoldo made his initial export contacts through the Instituto Mexicano de Comercio Exterior (IMCE), the Mexican Export Promotion Bank now called Bancomext. IMCE covered 50 percent of an exporter's promotion expenses abroad. Technical assistance and production loans were granted at discounted rates by FIRA, the Central Bank's branch for agricultural support (see the role of development banks in Section 6). The logistics of the Purepecha Group's first shipment were made by Mr. Adalberto Palma, assistant to Agustín Legorreta, the president of the largest Mexican bank, Banamex, and a friend of Don Leopoldo. One container was sent from Veracruz port into the Gulf of Mexico and the other a week later from Houston, Texas, perhaps to diversify the risk. Both containers arrived at the same time in Rotterdam. Although the client was located in Paris, Don Leopoldo saw the opportunity to sell the fruit at auction in Rotterdam at \$2.00 per kilogram more than the price agreed with the client in France (Vega, interview, 12/5/06).

From 1971 until the peso devaluation in 1976, Don Leopoldo exported avocados to France. The 1976 devaluation, however, hindered avocado exports because the federal government maintained strict control of peso-dollar exchanges. Don Leopoldo was required to sell the dollars obtained through exports to the Mexican government at a discounted price, only to re-purchase them at a higher price in order to make the payment to the shipping firm. Devaluation and currency controls stopped Don Leopold's exports (Vega, interview, 12/5/06).

The real export incentive for Don Leopoldo came in 1985 when, after a long period of failed attempts to export fresh flowers to the United States, he received full support from the Israeli Agrexco Corporation to conduct avocado exports throughout Europe. The contact came through an Israeli engineer who visited Mexico to obtain information and seeds for plants that could grow in dry and salty soil. He met with Mr. Sánchez Collín, former governor of the state of

Mexico and founder of the research institute of the same name, who in turn introduced him to Don Leopoldo (see the development of the Hass avocado variety in Section 2). After helping the Israeli engineer, Don Leopoldo obtained marketing assistance and information about clients in Europe, which helped to increase exports considerably (Vega, interview, 12/5/06).

**Figure 3. Purepecha’s Export Associations, 1970-2006**



Source: Authors.

The Purepecha Group never worked with partners and did not belong to business associations. It only embarked on agreements in which “all parties had something to win, including the workers” (Vega, interview, 12/5/06). The Carmel-Purepecha agreement was probably successful because avocado production in Israel and Mexico is complementary. Israel’s avocado trees hit peak production from October to April, with Hass going from December to April and ending right when Mexico’s production starts. In 1990, the Purepecha Group established another business agreement with a foreign corporation, *West Pak*, a firm based in California that bought avocados in Mexico to be sold in Europe and Japan (Paz, interview, 9/5/06).

The main objective of the Purepecha Group was not to export, but to sell to the local market (Vega, interview, 12/5/2005). Due to the size of the Mexican market (see Table 1), the main goal of the Purepecha Group was to capture the Monterrey and Mexico City markets. Its

first promotion campaign was carried out in the 1970s through what was then the only commercial chain at the time, *Comercial Mexicana*; it was followed by television advertising on the popular Raúl Velazco Show on Channel 8 (Vega, interview, 12/5/06).

Don Leopoldo's son, Ricardo, continues with the family business. He holds engineering and MBA degrees and represents the second generation, which is taking over the avocado business. With the Purepecha Group being both an exporting and a producing company, Ricardo defends the exporters' perspective, while his father does the same for the producers. For Ricardo, producers should focus on maximizing annual income per hectare and not maximizing price per kilogram. He believes producers are inefficient because farms in Michoacán have yields of 9-10 ton/ha (the best farm in Uruapan reaches 25 ton/ha), while in other countries yields are 40 ton/ha. For him, Michoacán producers are even falling behind in quality.

Because producers in Michoacán are not competitive in price, yield, or quality, Ricardo's explanation of the avocado's success is based only on comparative advantage. In addition, he believes that this advantage will soon expire as new producers in Chile, South Africa, Peru, Australia, and New Zealand take over the market. He even predicts that Mexican exports to the United States will only last at most eight years. That is perhaps why Ricardo decided to diversify into other products, such as papayas, star fruit, and berries. These products, which are managed through Fruticola Velo, a subsidiary of the Purepecha Group, are easy to finance, provide short-term revenue, and—together with avocados—provide clients with a package of products. Clients appreciate this service because they prefer to deal with fewer suppliers (Vega, interview, 8/23/06).

#### ***4.2. First Mover: Socopaum's Trial-and-Error Strategy***

Founded in 1977 by a group of 30 producers, the cooperative Socopaum's main objective was to break the informal monopsony created by local buyers who had until that point artificially kept avocado prices down. After having succeeded in stabilizing prices that were 20-30 percent higher, Socopaum received an unexpected visit from Agrexco, a public-private Israeli consortium that decided to supply its European clients with Mexican avocados. Israel had suffered from extreme heat that year and it had lost 80 percent of the avocado crop. Striving to maintain their client bases, Israeli firms such as Agrexco and Hillroom were looking for suppliers in Mexico. However, they were surprised to encounter the austere packing systems and

plant facilities of Mexican avocado producers, who did not even possess cold rooms for the fruit. Hillroom made an unsuccessful export attempt and Agrexco cancelled the project, giving up the idea of transporting Mexican avocados to Europe in jumbo jets.

Intrigued by the idea of exporting avocados to Europe, Socopaum members found a Spanish importer with clients in France, *Pascual Hermanos*. Originally from Valencia, the Pascual brothers had experience handling citrus, such as oranges and lemons, and they were willing to try something new. In November 1980, Socopaum successfully exported two containers to Europe. Perhaps it was good luck, but with the cold weather, the high quality of the avocados, and the right moment in the year, Socopaum sold the fruit at higher prices than expected (Illsley, interview, 12/6/06). Socopaum members decided to begin exporting in part because of Europe's high demand, and in part because they were interested in diversifying their customer base. A 1977 forecast study made by FIRA, the Central Bank's agricultural arm, predicted a fall in domestic prices due to the increasing number of avocado farms in Mexico (Illsley, interview, 12/6/06). Both the optimistic news brought by the Israeli firms regarding Europe's avocado demand, and a pessimistic study of the domestic market triggered Socopaum's exports.

Tempted by the early success, Socopaum members sent 18 containers (540 tons) to France between January and February of the following year. Unfortunately, the operation was a failure. *Pascual Hermanos*, who had limited experience handling avocados, tried to speculate with the fruit and lost it due to improper storage, there were already avocados from Israel and Spain in the market, or the fruit in the 18 containers just did not arrive well (Illsley, interview, 12/6/06). According to Ramón Paz, an industry consultant and former exporter (Paz, interview, 9/5/06), early avocado exporters had three major difficulties when exporting to Europe. First, the fruit had to arrive fresh to the European consumer, after being shipped from the west coast of Mexico, through the Panama Canal, and across the Atlantic Ocean, without using temperature-controlled facilities (the whole operation took 17-18 days versus 5-6 days when shipped from Israel). Second, some technical difficulties had not yet been resolved, such as the black spots that appear on the fruit due to cold weather during transportation. Lastly, new Mexican exporters had no experience negotiating fixed price contracts with European importers, who prefer to sell "on

consignment.” Adapting their strategy to the local market circumstances frequently resulted in large losses for the Mexican firms.<sup>5</sup>

After the failure, Socopaum decided to establish a committee to research the necessary elements to ensure they would be well prepared for exporting. The committee was formed by three of its most active members: Salvador García, Adolfo Barragán, and Carlos Illsley (Illsley, interview, 12/6/06). Both Salvador and Adolfo’s families were in the agro business. Salvador’s family came from Zamora, Michoacán where they cultivated and exported strawberries. Salvador was part of the third generation of strawberry producers (Paz, interview, 9/5/06). He had immigrated to Uruapan (a three-hour drive from Zamora) to start an avocado farm. Adolfo’s family was also from Michoacán. They cultivated melons in Apatzingan, Michoacán and pineapples in the state of Oaxaca (Paz, interview, 9/5/06).

Carlos’ background was a little different. Although he was born in Michoacán and attended school in Uruapan with sons and daughters of avocado producers, he spoke perfect English, had traveled extensively, and maintained a rich network of international contacts (Paz, interview, 9/5/06). Carlos’ father, an American economist and World War II veteran, was interested in the development of local firms in China and Mongolia. He retired in Mexico and acquired an avocado farm in 1964. Carlos’ mother, an American free thinker of the 1960s, was interested in Mexican local customs and traditions. She and her husband set up a cooperative in Uruapan to run an 1880s textile plant, saving it from being demolished. In 1974, Carlos bought a commercial avocado farm and joined the group of producers.

While conducting the review of how to prepare Socopaum for exporting, Carlos met an Israeli engineer who came to town with a Colombian delegation working on Michoacán’s fresh-flowers-for-export project. The engineer provided him with the business information of a firm that had set up several avocado packing plants in Israel. Representatives of the Israeli firm visited Mexico, and after meeting with the committee, they struck a \$25,000 deal to acquire a business plan with plant specifications and machinery. When the plan was presented to Socopaum members, the businessmen believed the project was too costly and voted against the deal. At that point, Salvador, Adolfo, and Carlos committed to conduct the task by themselves,

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<sup>5</sup> In the European market, 85 percent of the fruit and vegetable commerce is carried out on consignment. European importers sell the merchandise under the shipper’s account, and the producer’s final payment reflects product quality and market conditions at the time of the purchase. The importer then deducts 8-10 percent commission, as well as transport costs, tariffs, customs inspection costs, taxes, and so on, diminishing the final amount for the exporter (Paz, interview, 9/5/06).

and headed to Israel to research Israeli packing plants and their avocado export operations (Ilsley, interview, 12/6/06).

What the three men learned in Israel ultimately shaped Michoacán's avocado industry. Among the major innovations observed were (Ilsley, interview, 12/6/06):

- Packing machinery that selected avocados by weight, with electronic scales, and classified each individual avocado. Up to this time, Michoacán's packing plants had relied on experienced female workers who selected and classified the fruit without using scales (Paz, interview, 9/5/06).
- Pre-cooling and cooling systems to maintain the temperature of the fruit constant from immediately after packing to the moment it reached the client. Although the trip from Israel to Europe by sea lasted at most six days, the cooling systems could maintain the fruit's condition much longer, which was ideal for trips across the Atlantic Ocean.
- Harvest systems for collecting the fruit on site. The procedure allowed the labor force to be concentrated in the harvesting process rather than in the handling of it. The fruit in Israel was collected in half-ton containers, which were manipulated by lift trucks. The fruit was indeed preserved in better condition than with the 20 to 30-kilogram plastic boxes used at the time in Mexico. When the Mexican plastic boxes were stacked on top of one another, they crushed the fruit, and the plastic boxes were easily stolen.
- Statistical analysis on the historical production of each avocado plot. Past records were kept for each farm along with the most recent production forecasts.

Salvador, Adolfo, and Carlos covered the initial investment for the business plan to set up a packing plant with modern machinery. On their return to Mexico, they decided to pursue the export project. The total necessary investment reached \$2.8 million, which required that they establish a new firm and invite new investors. Unfortunately, the 1982 debt crisis and devaluation put a halt to the project. Four years later, Adolfo and Carlos founded their own separate firm, called *Agrifrut* (Salvador had already left the group, see next section) (Ilsley, interview, 12/6/06).

Adolfo and Carlos invited two new partners into the new enterprise: Jorge Fernández and Pascual Gally. Jorge's entrance was indirect. He was first hired to construct the packing plant, and then he became a partner when Adolfo failed to remunerate him for the construction and offered him stock instead. This carried several repercussions for the new firm because Jorge, a civil engineer and construction contractor, lacked experience in the avocado industry. Other potential partners canceled their contribution when Jorge became a partner. Carlos introduced the project to Pascual, a Swiss engineer who was in the region because of the fresh-flower-to-export project. Pascual liked the avocado business plan and joined the group, providing fresh capital and new marketing channels in Europe. In Switzerland, his family had import-export enterprises (Illsley, interview, 12/6/06).

In 1987, the firm *Agrifrut* began operations with the first exporter, Carlos Illsley, and the two newcomers, Jorge and Pascual. *Agrifrut* acquired the Israeli business strategy and equipment as planned. Pascual Gally opened an importing firm in Switzerland, *Sunfresh*, to buy avocados from *Agrifrut* (Illsley, interview, 12/6/06). *Sunfresh* would then re-sell the fruit to other Gally family enterprises. For the partners, *Sunfresh* represented an additional cost because it only received the fruit; but *Sunfresh* was indeed selling 26 avocado containers (520 tons) per week throughout Europe (Illsley, interview, 12/6/06). When Carlos and Pascual left the firm, Jorge took over *Agrifrut*, and remains its chief executive officer (Paz, interview, 9/5/06).

For *Agrifrut*, the avocado business learning curve was laborious (Fernández, interview, 8/21/06; Illsley, interview, 12/6/06). There were a number of unknown skills to be mastered:

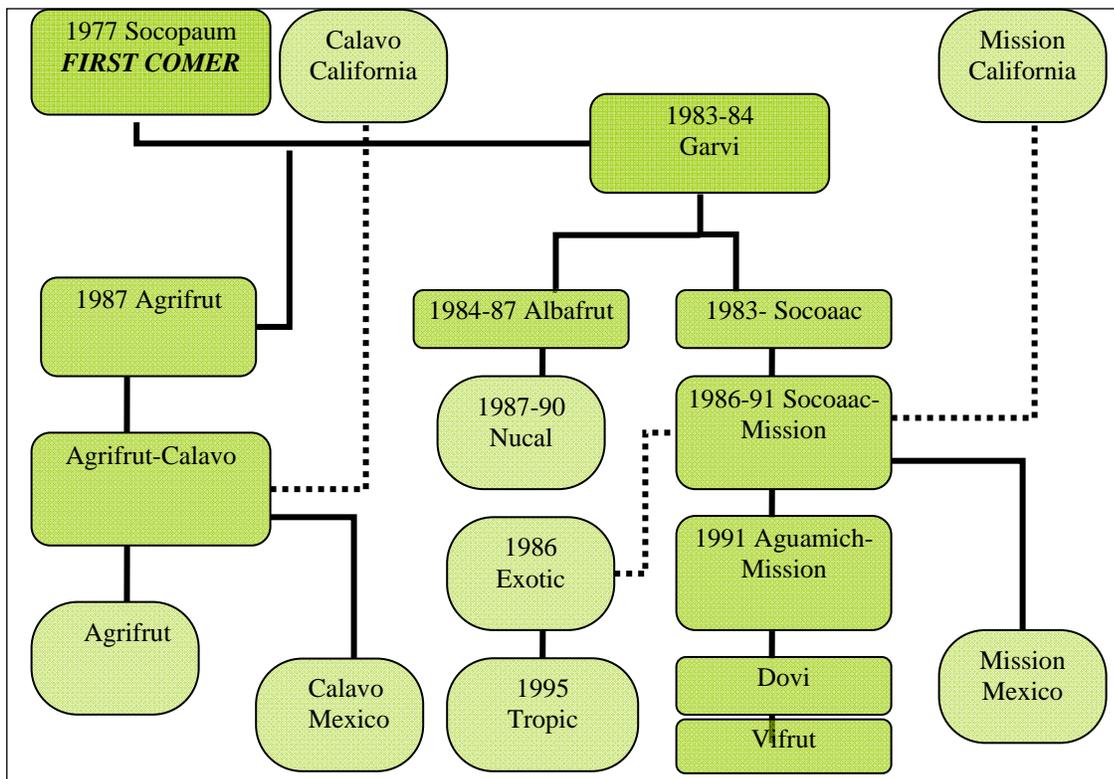
- Learn how to make the pallets of boxes
- Learn the cooling process
- Determine how to transport the fruit by sea for 18 days
- Deal with technical problems (black spots on the fruit, which was still not solved, although it is now preventable)
- Reach the distribution platforms of clients
- Learn about product presentation (4-kilogram boxes, such as in South Africa)
- Deal with being a one-product supplier versus selling several products
- Take the price of the fruit when containers reached Europe

- Work with the structure of the firm (partners with different backgrounds and interests).

5) *Imitators Go after the Feast: Garvi, Socoac, Aguamich, Dovi, Vifrut...*

Right before the trip to Israel, Salvador García de Alba invited his friend Antonio Villaseñor to join to group. Antonio, who would become a large exporter himself, did not have experience in agro business; he ran a furniture store, but possessed good business sense. Although Antonio did not attend the business mission to Israel, he covered his share of the cost in order to buy into the business (Villaseñor, interview, 12/5/06). Due to differing interests, Antonio and Salvador split from the rest of the group. Antonio and Salvador then founded the *Garvi* firm and adopted the business plan to set up a packing plant (Villaseñor, interview, 12/5/06).

**Figure 4. Socopaum and Its Followers, 1997-2006**



Source: Authors.

*Garvi* was the first modern packing plant set up in the state of Michoacán intended principally for exports (Fernandez, interview, 8/21/06).<sup>6</sup> *Garvi* owners, who even set up their own brand, *Garvi*, exported the fruit to the *Socopaum* former client, *Pascual Hermanos* in France.<sup>7</sup> José María Pascual came to Mexico and personally supervised the operations (Villaseñor, interview, 12/5/06). However, the firm experienced some problems with the shipments. Although some arrived well, others did not. The main technical problem seemed to be the previously mentioned black spots that appeared on the fruit when humidity and temperature changed (Paz, interview, 9/5/06). Other reasons might have included Pascual's lack of experience in selling avocados on consignment (Villaseñor, interview, 12/5/06). The losses were too heavy to be handled by two people. As a result, *Garvi* closed down a year later, in 1984. Salvador kept title to the land and the building, and started a third firm named *Albafrut*. Antonio kept the machinery and joined the *Socoaac* Cooperative (Antonio Villaseñor, interview, 12/5/06).

Salvador's newest firm, *Albafrut*, came to a tragic end. After 3 years of operation, the firm was bought by Jewish Iraqis established in Switzerland. Mr. Sushnani, an Israeli technician, and Mr. Abraham Cohen, a retired general, ran the new firm, which they renamed *Nucal*, or New California. In 1990, one member of the board, who was personally involved in the Iran-Contras scandal, died in a plane crash. This episode was known internationally as the "Guacamolegate." The firm did not pay its debts and ultimately the plant was turned over to the workers and creditors, mainly avocado growers (Paz, interview, 9/5/06).

Antonio's new venture ran with better luck. *Socoaac* (Sociedad Cooperativa de Agricultores de Aguacate del Cupatitzio) was formed by a group of 20 new producers in 1983. The following year, Antonio Villaseñor joined the group and sold them the machinery acquired in Israel. *Socoaac* bought it through a credit from Bancomer, a commercial private bank. The same year *Socoaac* became a limited liability corporation, a private rural firm, and Antonio sold his furniture store to obtain *Socoaac* stocks. Antonio became the firm's general manager and by 1985, *Socoaac* began to sell avocados in the domestic market. In 1986, *Socoaac* received a visit from *Mission*, a California-based avocado corporation that was interested in indirectly exporting

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<sup>6</sup> Another packing plant, *La Tarazca*, started operating near Morelia, the state capital. It was even inaugurated by the then state governor and former presidential candidate Cuauhtemoc Cárdenas. *La Tarazca* did not export because the domestic market was rather strong; all production was sold domestically (Antonio Villaseñor, interview, 12/5/06).

<sup>7</sup> *Pascual Hermanos* was later sold to *Chiquita* (Paz, interview, 9/5/06).

Mexican avocados. *Socooac-Mission* exported avocados to Rotterdam to a new firm called *Exotic*, run by Francois Teistre, a former fruit dealer in a French corporation with experience handling avocados from Israel. *Socooac-Mission* shipments increased from 1-3 containers per week (20-60 tons) to 3-6 containers per week (60-120 tons). Six months later, *Socooac-Mission* started exporting one container per week to Japan (Villaseñor, interview, 12/5/06).

The relationship with *Mission* formalized and expanded *Socooac's* knowledge of the packing and exporting processes. Although Antonio felt that a significant amount had been learned from *Pascual Hermanos* (the Spanish importer that managed citrus), they learned the specifics of the business from *Mission* (see below). The diffusion of knowledge was carried out through *Mission's* local manager, Ezequiel García, who was working full-time in the operations section of *Socooac's* packing plant. When Ezequiel encountered doubts or questions on any specific issued, he would forward the question directly to *Mission's* headquarters in California (Villaseñor, interview, 12/5/06). Thanks to Ezequiel's follow-up, dramatic improvements were implemented in *Mission's* Mexico plant. These included:

- Changing harvesting tools to improve quality
- Establishing uniform weight ranks for the avocados
- Using waxed boxes that repeal humidity
- Affixing plastic corners to secure the boxes in the pallets
- Utilizing precise wood platforms for pallet bases
- Storing fruit in cold rooms after packing it and not after harvesting it
- Maintaining cold rooms at a specific temperature during the cooling stage
- Negotiating fixed price contracts with importers.

*Mission* also bought avocados from *San Lorenzo*, which was owned by Don Joaquín Barragán, a local grower who also became an exporter (*Frutas del Sol* in Tinguindín). *Mission* also bought fruit from Don Joaquin's nephew, Mario Rivas (*Global Frut*). The fruit from these packing plants was then exported to Japan (Paz, interview, 9/5/06). Mario also sold fruit to *Fresh Directions*, another Californian-based firm (Rivas, interview, 8/21/06). Today Mario is the largest exporter to Japan. According to Mario Rivas, he learned from *Mission* and *Fresh Directions* practically the same business specifics as those mentioned by Antonio, *Socooac's*

general manager. The California-based corporations acted as disseminators of production and export knowledge.<sup>8</sup>

By 1991, after eight years in operation, *Socoaac* had proven to be a sustainable firm, and the partners decided to make it a fully private corporation, changing its name to *Aguamich*,<sup>9</sup> S.A. de C.V. (Villaseñor, interview, 12/5/06). With sales booming, the partners, mainly avocado producers, became more interested in becoming involved in management decisions. For example, they felt they should be included in setting the price at which *Aguamich* would buy the avocados from their own farms. Not being a producer himself, Antonio (now *Aguamich* general manager) did not understand why it would be necessary for *Aguamich* to pay a higher price when the same product could have been supplied by other producers in the region at a lower price. As a result, Antonio left the company in 1993, only to found another new one, *Fruticola Dovi*, S.A. de C.V., with the Doddoli family (Villaseñor, interview, 12/5/06). *Aguamich* had financial problems; it remains closed (Villaseñor Jr., interview, 12/5/06).

The Doddoli family owned sawmills and managed the harvesting services of pine tree plantations. It got involved in the avocado industry through farms, packing plants, harvesting services, and guacamole exports. In fact, two Doddoli brothers eventually became Antonio's brothers-in-law. Therefore, the new firm, *Dovi* (owned 75 percent by the Doddoli's and 25 percent by Antonio) was a family business. *Dovi* operated for only two years because tensions emerged between the producer family, which was interested in selling fruit to *Dovi* at a high price, and Antonio's commercial interest in buying fruit from local producers at lower prices and better quality (Villaseñor, interview, 12/5/06).

In 1995, Antonio left *Dovi* to start a new firm, *Vifrut*, this time with his own sons and no producers. Antonio Villaseñor, Jr. moved to Paris to run *Vifrut's* marketing operations from there. That year, *Vifrut* was exporting 10 containers (200 tons) per week to France, England, Sweden, and Spain, and one to Canada (Villaseñor, interview, 12/5/06).<sup>10</sup> However, the market conditions for fruit in Europe quickly and radically changed. The Eurogap norm required that farms exporting products to Europe comply with a set of food security, innocuous, ecological, and social security regulations (Villaseñor, Jr., interview, 12/5/06). Some of these norms in fact

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<sup>8</sup> As in the *Socoaac-Mission* experience, *Agrifruit* developed a relationship with *Calavo*, the largest avocado corporation in California, *Agrifruit-Calavo*.

<sup>9</sup> Aguacates Michoacanos.

<sup>10</sup> In 2005, *Vifrut* even exported avocados to Chile (Villaseñor, interview, 12/5/06).

depended on the will of the grower and not of the packing plants or exporters. In addition to these tougher regulations, newcomers entered the avocado market. Peru, Chile, Spain, Israel, South Africa, Kenya, Algeria, and Turkey all became competitors for *Vifrut*. For these reasons, and because the North American Free Trade Agreement (NAFTA) opened the U.S. market to Mexican avocados in 1997, *Vifrut* decided to supply the fruit exclusively to North American markets. Today, *Vifrut* exports 15-20 containers (300-400 tons) per week to the United States (Villaseñor, interview, 12/5/06).

## **6) Exporters Conquer Other Markets: Japan, the United States, and Korea**

### **6.1. Grabbing the Neighbor's Treasure: The Highly Valued Japanese Market**

The introduction of a new fruit to an Asian market, a rather difficult task, was originally conducted in the 1980s by a group of California (U.S.) producers and packers organized through a consortium called *Avocal* (Paz, interview, 9/5/06). They supplied Japan with California avocados from April to August and, several years later, with Mexican avocados during the off season, from August to March.

When California suffered from cold weather, its companies turned to Mexican packing plants that could provide fresh avocados throughout the year. That is, Mexican packing became a *maquila* industry in which packing plants bought the fruit and selected, harvested, packed, and shipped it through *Avocal* to customers of Mexican packers: *Calavo*, *Mission*, *Index*, and so on. The operation was carried out according to the technical and phytosanitary specifications provided by the buyer and the Japanese importer.<sup>11</sup> The Japanese consumer preferred Mexican avocados to California avocados. After this, all avocados shipped to Japan by Californian (and Mexican) producers came from Mexico. Producers in California faced no difficulty in selling their fruit in the protected and expanding U.S. domestic market. The avocados were exported by the Mexican subsidiaries of the California companies (*Mission* and *Calavo*), as well as by some newcomers supported by foreign investment (Fresh Directions). Fresh Directions Mexicana was the first company to export Mexican avocados to Japan on a year-round basis, in the 1998-99 season.

One of these *maquila* packing plants, *Global Frut*, which had previous experience exporting to Canada and France, obtained information from the Mexican shipping company

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<sup>11</sup> Regulations were not high because there are no avocado growers in Japan.

TMM about a Japanese importer who was seeking Mexican suppliers of avocados. Rivas, the owner of Global Frut, the main exporter to Japan, found the Japanese market lucrative, and wanted to expand his operation beyond the constraints of the highly competitive domestic market (Rivas, interview, 8/21/06). Having learned about “quality parameters and the ways to handle and pack the fruit” from its *maquila* operations for the Californian firms *Mission* and *Fresh Directions*, *Global Frut* started shipping avocados directly to Japan (Rivas, interview, 8/21/06). Soon, Rivas established a commercial relationship with a second Japanese importer that he met at an agricultural trade fair. Today, Rivas is the main avocado exporter to Japan (Rivas, interview, 8/21/06).<sup>12</sup>

From a logistical standpoint, exporting fresh avocados to Japan was not at all different from exporting them to Europe; the transit time to Japan from the West Mexican shore is shorter. The Japanese market has few importers who tend to be loyal to their suppliers and are dedicated to building long-term relationships with both the supplier and wholesalers in Japan. In a way, exporting to Japan represents a more stable business compared with exporting to France, for example. The challenging aspect of engaging in business in Japan was to understand what Japanese buyers wanted; “the way they think, they way they act, how they make decisions” (Rivas, interview, 8/21/06). Other difficulties included securing the selling price a week before harvesting the fruit. Since most packing plants do not grow the avocados they export (or if they do, the quantity represents less than 10 percent of their export operations), securing an export price before buying the product from local producers represents a risk that, in this case, *Global Frut* is taking.<sup>13</sup> Lastly, Japanese consumers demand better presentation of the fruit. They accept no dark spots or any other alteration (Rivas, interview, 8/21/06). The followers incorporated these procedures within their own processes. The Japanese market quickly became the second most important market for Mexico (2,270 tons in the 2003-04 season) (Salazar et al., 2004).

## ***6.2. Breaking into the Impossible: The U.S. Market***

In Michoacán, the primary harvest season is October to February, although production is year-round. Therefore, there exists some complementarity between the Mexican and U.S. production cycles; the peak season in California and Florida is usually from March to August. However,

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<sup>12</sup> Today Rivas exports 7-8 containers to Japan per week (Rivas, interview, 8/21/06). That is about 23,000 tons per year or about \$35-40 million in annual exports.

<sup>13</sup> Nowadays, all exporters do the same, for all international markets (Paz, interview, 9/5/06).

Mexican avocados have traditionally faced great challenges in meeting U.S. standards of product quality and safety. In 1914, California avocado producers claimed that Mexican avocados were infested with various insects, particularly the avocado seed weevil, and the United States imposed the phytosanitary ban that prevented Mexican avocado exports into the U.S. market for the next 70 years (APROAM, web page). In the 1970s, continuing requests for import permits were submitted by Mexican producers. The detection of seed weevils during some of these surveys resulted in continuance of the prohibitory regulatory policy of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APROAM, web page).

According to the California Avocado Society, trade liberalization and the harmonization of sanitary and phytosanitary (SPS) measures have, over time, altered the backdrop against which governments examine animal and plant health issues as they relate to the movement of agricultural commodities across national boundaries (Bellamore, 2002). For most of the last century, the protection of plant health was maintained through a policy of pest exclusion. Beginning with trade liberalization in 1990, the rules have changed.

Debate over the North American Free Trade Agreement (NAFTA) in the late 1980s and early 1990s placed trade between the United States, Canada, and Mexico at the top of Mexico's national agenda. Although the primary goal was the phased removal of most tariffs by 2004, the legislation also provided the setting for the harmonization of sanitary and SPS measures between trading partners (Bellamore, 2002).

The California Avocado Society also states that NAFTA confirmed the right of each country to establish the level of SPS protection that it considers appropriate, provided that SPS measures are applied only to the extent necessary to achieve the chosen level of protection, and that they are applied in such a way that do not constitute discriminatory restrictions on trade (Bellamore, 2002). The members of NAFTA have also agreed to accept one another's SPS measures as equivalent, provided that the exporting country makes available scientific evidence that objectively demonstrates that its measures achieve the importing country's appropriate level of protection.

In addition, with the implementation of NAFTA, the U.S. government came under increased pressure to facilitate imports of agricultural commodities from Mexico and Canada. Maintaining an exclusionary policy had become untenable for the U.S. government. The

consequences of maintaining such a policy provoked claims from Mexico and Canada that the United States was not complying with the provisions of NAFTA (Bellamore, 2002).

The USDA's Animal and Plant Health Inspection Service (APHIS) is the primary government branch charged with implementing the phytosanitary provisions of NAFTA and other trade agreements. In May 1992, APHIS rejected a draft work plan prepared by Mexico for importing Hass avocados into the United States (Bellamore, 2002).

During 1992-93, Mexico sent three work plans requesting the importation of Mexican avocados into the United States. In July 1993, one of the proposals was approved. The entrance of Mexican avocados into Alaska was authorized under specified conditions (APROAM, web page). During the next two years, Mexico conducted further research and pest surveys. In June 1994, new data were submitted to the United States. The new work plan specifically requested that Mexico be allowed to ship to 19 northeastern states from October through February. On July 3, 1995, a proposal was published to allow the entrance of Hass avocado destined for certain U.S. states under additional phytosanitary requirements. The imports were restricted to the period of the months between November and February (APROAM, web page).

Avocado producers in California and Florida opposed the entrance of the Mexican avocados, arguing that the import was an intolerable risk of pests to the domestic avocado industry. Other producers in the United States demonstrated their concern when Mexico adopted similar restrictive regulations for products such as apples, peaches, wheat, and other agricultural products. It took an army of specialists (Mexican trade representatives and avocado association lobbyists hired by producers and packers) to overcome the U.S. avocado tariff barrier.

On July 15, 1997, Mexico and the United States signed an agreement in which avocado exports from the Mexican state of Michoacán were allowed into 19 U.S. states: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, West Virginia, Virginia, Ohio, Michigan, Wisconsin, Illinois, Indiana, and Kentucky. Imports into the District of Columbia were also permitted. Only imports from certain producers were allowed into these states, and only from November to February, when the cold temperature was sufficiently low to eliminate any pests that may have survived the phytosanitary control treatments. Later, the number of states permitting Mexican avocado imports increased to 32 (APROAM, web page). The price of avocados in approved states fell by between 8 and 41 percent, in comparison with the rest of the states in which the

decrease was between 1 and 3 percent (APROAM).<sup>14</sup> Exports of Hass avocados to the United States increased from 6,031 tons in the 1997-98 season to 42,607 tons in the 2003-04 season. The value of exports in 2003-04 was 93.7 million dollars (FAOSTAT, 2005).

With the opening of the U.S. market to the Mexican avocado, California-based avocado corporations sent their own packing operations to Michoacán. Some of these operations, such as *Mission*, were established well before the opening of the U.S. market; others, like *Calavo* and *West Pak*, already had Mexican subsidiaries, although they were not packers yet. The California-based corporations imported Mexican avocados into the United States using the distribution channels they already had in the country. Among the firms that set up locations in Mexico were *Calavo*, *Mission*, *Fresh Directions*, *West Pak*, and *Delmonte*. The establishment of large American corporations in Michoacán had several impacts in the region (Morales, interview, 8/21/06). First, the new plants provided approximately 2,000 jobs in the region.<sup>15</sup> Second, they benefited local producers by paying for the crops with cash on the same day of the operation. In contrast, local packing plants were paying with a lag of 7-14 days. Third, U.S. firms pressured local packing plants to improve their relationship with local producers to stabilize and secure the supply of the fruit. Lastly, they also subcontracted local packing plants to conduct *maquila* operations for them when their own packing plants reached full capacity (Morales, interview, 8/21/06).

How likely would it be that other Mexican states would be granted permission to export avocados into the United States? Producers would need to first comply with the norm NOM 066 FITO 2002, which is challenging if they do not cooperate with each other.<sup>16</sup> Other states do not pose a threat to Michoacán, which is by far the largest grower of avocados. With 84,000 hectares, Michoacán is followed by Nayarit (2,400 hectares) and Morelos (2,300 hectares) (Torres, interview, 8/22/06). In addition, setting up export operations destined for the United

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<sup>14</sup> Before NAFTA, the general tariff applied to avocados was 13.2 cents per kilogram. Then, with the agreement *Agricultura de la Ronda de Uruguay (AARU)*, tariffs were reduced to 11.22 cents per kilogram for a 6-year period beginning in 1995; due to NAFTA, this tariff was reduced for Mexican avocados too, but for a period of 10 years (Orden, 1994). Mexico loaded a tariff of 20 percent on avocado imports. Under NAFTA, the tariff has been eliminated gradually over a period of 10 years. Canada does not impose tariffs on avocado imports because it does not produce them (Orden, 1994).

<sup>15</sup> However, many of the workers come from Mexican owned packing plants currently in operation or from the ones that went bankrupt (Paz, interview, 9/5/06).

<sup>16</sup> To eliminate disease, growers need to set up a coordinated plan because if one plot is not treated, the disease will spread again. For one plot, it takes at least three years to clean up; when there is no coordination among the owners of the plots next to it, it might never comply with the norm (Torres, interview, 8/22/06).

States requires time. For example, it would take at least four years for a new grower who buys land and plants avocado plants, to export to the United States. Trees do not provide fruit until their third or fourth year, and the certification process takes more than a year (Torres, interview, 8/22/06).

The process of approval to export avocados to the United States is the following. First, officials from Juntas Locales (a public-private local sanitary association, established according to Mexico's phytosanitary law) inspects and approves the farm. Second, officials from USDA do the same. Third, to prevent the farm from obtaining and spreading disease, producers are required to adhere to culturally foreign activities such as picking up the fruits that fall onto the ground, removing all the dry branches from the trees, and keeping the trees clear of any other plants that grow in the wild. When the fruit is ready, producers request harvesting approval from Juntas Locales and the USDA officials. The Juntas are not supposed to "approve" harvesting; they are responsible for issuing documents for transporting the fruit harvested from orchards previously approved; however, they use this mechanism to control the actual volume of fruit harvested in the whole region (Torres, interview, 8/22/06). If the fruit goes to the United Kingdom, additional measures need to be taken, such as avoiding forbidden agrochemicals (e.g., ethyl-parathion) and passing inspections on social and legal compliance (Torres, interview, 8/22/06; Paz, interview, 9/5/06).

## **7) *Spin-offs: Guacamole, Avocado Oil, and the New Harvesting Industry***

### **7.1. *Guacamole***

Guacamole exports from Mexico began in the 1990s with the efforts of three multinational corporations, *Calavo*, *Avomex*, and *Simplot*, and one local grower, *Avomex* (Doddoli, interview, 8/22/06).

The original idea behind the production of guacamole was to add value to local agricultural products before exporting, taking advantage of the then low avocado prices. Because it is not necessary for avocados destined for guacamole to possess market presentation, or be a specific size, guacamole producers have access to avocados at lower prices than the packing business. Years earlier, the price for one kilogram of avocado was around U.S. \$0.10. By transforming the fresh fruit into guacamole paste (and sometimes also adding onions, peppers, and tomatoes), it could be sold frozen at a considerably higher price. Unfortunately, recently

avocado prices have increased to US\$1.40 per kilogram, while the price of guacamole has remained steady in the United States. As a result, guacamole producers face low margins and large fixed costs (Doddoli, interview, 8/22/06). Producing guacamole was attractive when exports of avocado fruit were forbidden, and when prices were low.

## ***7.2. Avocado Oil***

Regarding avocado oils, Mexican manufacturers have encountered mixed results. One of the first movers to export fresh avocados, Mr. Joaquín Barragán (who was also involved in several other business areas) also began manufacturing avocado oil, although he had yet to secure a buyer. He probably saw potential to place avocado oil in the cosmetics industry. As the containers of oil piled up, Mr. Barragán hired a French engineer, Mr. Charles Guillard (who was living in Mexico and who had recently made some shipments of fresh avocados to colleagues in France) to market the avocado oil in France (Guillard, interview, 8/23/06).

Mr. Guillard traveled to France but was unsuccessful in marketing the product. Months later, a French pharmaceutical corporation contacted him to buy avocado oil, but requested that it be produced differently (pressed, as opposed to mashed through centrifugation). The production of such oil demanded the establishment of an entirely new plant. The French engineer obtained investment funds and initiated the project. After several misunderstandings, he established his own plant to manufacture this particular avocado oil for the French pharmaceutical corporation (Guillard, interview, 8/23/06).

The French pharmaceutical corporation extracts a molecule from the pressed avocado oil that is then transformed into an active component of the medicine Piascledine, which is used to relieve arthritis pain. The corporation holds the patent for the extraction process as well as the patent to transform it into medicine (Guillard, interview, 8/23/06). The medicine is pending approval in the United States and Mexico. Large quantities of avocado oil will be required to produce sufficient Piascledine for the consumer market in the United States. The French engineer, with the support of the corporation, has established a production plant four times larger than the original plant in anticipation of future demand.

Why did the corporation support the manufacturing of avocado oil in Mexico as opposed to some other country? Previously, the corporation relied on a single avocado oil grower, based in South Africa. By owning two avocado growing operations based in geographically dispersed

locations, the corporation reduces the risk of a breakdown or an increase in price by the supplier. The producers are sufficiently distanced to prevent collusion, price setting, and acquisition of monopoly power. Both understand that the corporation is also the monopsony buyer. In sum, it is unlikely that another firm would begin manufacturing this medicine in the near future. Therefore, it is unlikely that imitators would set up additional plants to produce avocado oil for pharmaceutical use.

### ***7.3. Harvesting or Picking Firms***

As a last spin-off on avocado-related exports, some service businesses have been developed in Mexico. For example, there are new companies that specialize in the harvesting of avocados according to the size, color, and maturity of the fruit. That is, the workers only pick the type of avocados demanded by specific clients (smaller for Texas, larger for Japan, and so on). The rest are left on the tree to be picked in 2-3 months, when they are ready for export to other markets or domestic consumption.

These harvesting companies hire their own workers, train them, and group them in *cuadrillas* (crews) that are sent to the plantations to pick the fruit one by one off the trees. They are considered spin-offs from packing plant operations because the first harvesting companies were founded by former employees and family members of packing plants involved in exporting. The first harvesting firm was set up by Mr. Antonio Villaseñor. After Mr. Villaseñor began his harvesting company, the majority of the other packing plants also decided to subcontract their harvesting operations (Paz, interview, 9/5/06).

According to the president of the Harvesting Firms Association (SUMA), the success of a harvesting firm depends on the firm's knowledge of its clients, its understanding of where each specific avocado farm (and plot) is located within the region, and the expertise of its workers in selecting the fruits to harvest. The work is quite dangerous. People die each year, due primarily to falls from trees, touching a high voltage electrical cable, or traffic accidents while riding in the back of the fruit collection trucks. The danger is perhaps one of the reasons packing plants, especially long-standing companies and transnational corporations, hire harvesting firms. The packing plants avoid assuming responsibility for accidents during this part of the production chain. Today, this industry employs more than 5,000 people, who earn U.S. \$18-20 a day for six hours of work, which is 3-4 times the minimum wage (Doddoli, interview, 8/22/06).

### **8) *The Government Gets Its Act Together***

Government participation in the development of the avocado industry has taken place in five different areas: (1) production and distribution of avocado trees through CONAFRUT, the National Commission of Fruit Growing; (2) access to funds through the development banks FIRA and BANCOMEXT; (3) provision of a regulatory framework to control the use of pesticides and chemicals; (4) establishment of certification bodies such as the state committees and local Juntas de Sanidad Vegetal to ensure compliance with standards; and (5) active support through the NAFTA negotiations to open up the U.S. market.

Production and distribution of the new Hass variety of avocado were carried out by both a government agency, CONAFRUT, and private entrepreneurs in the 1960s (see Section 2). CONAFRUT's director, Dr. Sánchez-Colín, an agronomist and former governor of the state of Mexico, allocated resources to the improvement of plant varieties with potential for growth, which included avocados. CONAFRUT established its own commercial nurseries in the early 1960s with the support of the Sánchez-Colín Foundation, an agricultural research institute located in the state of Mexico. CONAFRUT and the foundation donated Hass avocado trees to help farmers obtain access to the Hass variety (Villaseñor, interview, 8/5/06).

Access to funds for both cultivation and international trade of avocados was provided by FIRA and BANCOMEXT (Paz, interview, 9/5/06; Vega, interview, 12/5/06). FIRA, a second-tier bank, is the agricultural development branch of Mexico's Central Bank. FIRA provides both the collateral and the funds to banks that lend to producers. FIRA provides business and technical assistance to producers to secure maximum returns on investment. BANCOMEXT, the import-export federal development bank, acts primarily in the promotion of Mexican products abroad in order to increase exports. This bank, which has offices in Mexican embassies, seeks potential clients abroad and assists Mexican exporters in developing commercial networks with these new contacts. Once the contract has been signed, BANCOMEXT provides a loan to exporters for business operations. Both FIRA and BANCOMEXT lend money to producers and exporters at reduced interest rates.

In terms of the regulatory framework, federal laws were to be administered under the Phytosanitary Law of Mexico, which also regulated production, pesticide use, and imports of agricultural chemicals. Specific articles in the legislation required producers to register their use of insecticides, herbicides, and fertilizers with the Ministry of Agriculture (SAGARPA). The

Phytosanitary Law established the legal and normative procedures for the standardization of avocado production in the industry. At the same time, the legislation provided some teeth for local and state authorities to enforce compliance with these standards through the issuance of mandatory certification permits for producers planning to sell their crops to local packing plants for export. Certification permits are currently issued only by the local Plant Health Boards and State Committees of Sanidad Vegetal, a public-private regulation agency set up under the supervision of the Federal Agricultural Ministry.

A Junta de Sanidad Vegetal (or Plant Health Board) is a local body formed by both producers and public agricultural officials. Decisions are made by consensus or majority vote. The boards are usually headed by a local grower, giving producers a real voice in the decision-making process. State committees are formed by a representative from each local board and public officials at the state level. The president of the committee is designated by the members of the 26 local boards (Perfino, interview, 8/22/06). The president is generally one of the producers in the region with leadership skills. The committee's budgetary resources are tapped from the producers themselves (40 percent), the Federal Agricultural Secretariat (30 percent), and the state government (30 percent) (Perfino, interview, 8/22/06).<sup>17</sup> Boards and committees monitor compliance with the phytosanitary standards. Their decisions and resolutions are official and binding. Thanks to the efforts of the juntas and committees, a large production area in Michoacán is now free of pests, an essential requirement to qualify the avocados grown there for export (Perfino, interview, 8/22/06).<sup>18</sup>

Although the phytosanitary regulations are overseen by the Agricultural Ministry, the Economics Ministry supervises compliance with export Norm 016 for avocados. Norm 016 establishes the quality standards for the fruit, including color, size, texture, and so on. Courses for certifying officials on Norm 016 have been given at a local university in Michoacán, where approximately 100 officials have been trained. In a political maneuver, the plant health boards and committees hired these officials to provide Norm 016 certification to their farms. Currently, the boards and committees manage both phytosanitary and Norm 016 certifications (Paz, interview, 11/27/06).

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<sup>17</sup> Each grower must pay for the cost of certification, which is currently around U.S. \$90 per hectare (Mendoza, interview, 12/4/06).

<sup>18</sup> The total area of the 12 municipalities declared pest-free by SAGARPA-USDA is 34,754.51 hectares (Comité Estatal 2006).

The elimination of pests in the avocado region of Michoacán was considered a striking success.<sup>19</sup> However, by regulating the weekly permits, which specify the name of the orchards and the quantity of tons that can be sold to packing plants for export, juntas and committees are in fact regulating supply. Packing companies, which are not represented in the plant health boards and committees, often complain that producers use these organizational bodies to reduce output and reach their target price-floor of \$1.00/kilogram. The producers, who do not feel pressured to sell the avocados quickly (because they can remain on the avocado tree for several months ready to be picked without spoiling), are willing to wait to harvest until the price is right. Ultimately, both the producers and packing companies agreed that despite their differences, regulating supply was not detrimental because prices have remained stable in the United States.

Boards and committees are not the only institutions charged with enforcing phytosanitary standards. As part of the NAFTA negotiations, the Mexican government allowed the USDA to establish an office in Michoacán to issue phytosanitary certifications to each container of avocados shipped to the United States.<sup>20</sup> This office manages a network of 30 USDA certification officials, each one assigned to a packing plant that exports fruit to the United States.<sup>21</sup> Instead of dealing individually with each grower and exporter, the USDA demanded the creation of a local Mexican organization that would handle the relationship and cover USDA personnel and certification expenses. Local producers and packing companies founded the Association of Producers and Exporters of Avocados from Michoacán, AC (APEAM) as well as a collection mechanism to pay for the certification services (Scheidt, interview, 8/21/06).

### **9) Local Organizations**

The Michoacán avocado industry has gone through a series of organizational periods. The first associations were founded by private land owners who sought to defend their property against government land re-distribution programs. Subsequently, the organizations began to play a role in federal and state politics. The organizations then evolved to confront the needs of the market and foreign trade, where producers, pickers, transporters, and packers needed to work together to

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<sup>19</sup> It would take at least two years for growers from another state, such as Jalisco or the state of Mexico, to eradicate pests after they began to follow the advice of Michoacán growers. Otherwise, the pest problem in these states would never be abated (Mendoza, interview, 12/4/06).

<sup>20</sup> This was not a new practice for the USDA, which had been running the USDA program for mangoes and citrus in Mexico since the 1980s (see the counterfactual section below) (Paz, interview, 11/27/06).

<sup>21</sup> USDA certification officials and board officials work side by side in the packing facilities (Paz, interview, 11/27/06).

eradicate pests and increase productivity. Specialized organizations were included to provide technical support. Lastly, in an effort to channel resources toward long-term projects, the federal government set up the *Sistema-Producto Comites* (Production-System Committees), an umbrella forum for supplier, grower, and exporter organizations to negotiate the direction of the industry.

Conflicts about the ownership of land arose in the 1940s when a volcanic eruption instigated the migration of native people out of certain areas. When they returned, they found their land occupied. Land ownership conflicts continued through the 1970s, especially during President Echeverría's land re-distribution programs. As a result, organizations were created to defend property from expropriation, communal redistribution, and *ejido* enlargements. In the 1970s, the majority of avocado orchards were privately owned. Therefore, most organizations created during that time in the avocado industry were producer associations, such as small property owner associations and local grower associations. Beyond defending property rights, these organizations took it upon themselves to conduct common purchases and set minimum prices for the fruit. The 1936 law of agricultural associations (*Ley de Asociaciones Agrícolas*) provided the legal framework for organizations to operate and belong to the social-political branch (CNOP) of the PRI, the party that governed Mexico for more than 70 years (Paz, interview, 11/27/06).

Local associations became a political target when former Michoacán PRI governor Cuauhtémoc Cárdenas Solórzano (1980-86) became the presidential candidate of an opposition leftist party, PRD. As Michoacán was the home state to Cuauhtémoc as well as his father (former president General Lázaro Cárdenas, who was famous for nationalizing the oil industry), *Cardenismo* had deep roots in the area. Concerned that local organizations would support the *Cardenista* platform, Luis Martínez Villicaña, the then PRI state governor (1986-88) and former Land Reform Minister, updated the *Unión Agrícola Estatal* in 1987 (Paz, interview, 11/27/06). The role of the State Agricultural Union was to eradicate *Cardenismo* ideals in rural Michoacán. Advised by a former avocado grower and exporter, Ramón Paz, the president of the Union, Guido Doddoli, set up among other things three committees: the Technical Research Committee (*Comité Técnico de Investigación*), for conducting applied research; the Foreign Trade Committee (*Comité de Comercio Exterior*), for dealing with foreign trade; and the Domestic Sales Committee (*Comité de Comercializadora Nacional*), for marketing avocados in the domestic market (Paz, interview, 11/27/06).

Although the original idea of controlling *Cardenismo* in Michoacán was not successful, the committees set the basis for the formation of independent associations, which were more interested in the development of the avocado industry.<sup>22</sup> The Technical Research Committee established an independent body, or *patronato*, to channel state resources toward avocado research. It coordinated activities with the then national institutes for agriculture, forestry, and livestock (currently merged into the INIFAP). INIFAP and *Fundación Sánchez-Colín*, which runs an avocado gene plasma bank (see Section 4), are today's main avocado research institutes in Mexico. The Foreign Trade Committee set up the first export association, ASEEAM, or *Asociación de Empresarios Exportadores de Aguacate de Michoacán* (see the role of ASEEAM below). Lastly, the Domestic Sales Committee tried to found an association similar to ASEAM, but the large number of packing companies for the domestic market did not see the need for it. By the late 1980s and early 1990s, however, the increasing market power of domestic supermarket chains and falling avocado prices hit producers hard. As a result, an independent association of packers for the domestic market, titled UDECAM (the Michoacán Avocado Packers' Union), was indeed formed<sup>23</sup> (Paz, interview, 11/27/06).

By the mid-1990s, the new PRI governor, Victor Manuel Ticono Rubi (1996-2002), believed the political growth of the PRD, the left national political party formed by Cuauhtémoc Cárdenas and others should be limited. The new governor “modernized” the 1936 Federal Law on Agricultural Associations, drafting Michoacán's own legislation for agricultural associations. The 1998 law forced rural firms in a municipality to join one association linked to a state-controlled umbrella organization.<sup>24</sup> The avocado industry in Michoacán, however, was already organized at the local level. In the municipality of Uruapan, there were four avocado producer associations. In addition, the 1984 Phytosanitary Law set up the local plant health boards and committees, where avocado producers, together with SAGARPA officials, issued phytosanitary permits (see Section 7). Consequently, the avocado associations registered at the federal level

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<sup>22</sup> Although Cuauhtémoc Cárdenas officially lost the 1988 presidential election against Carlos Salinas de Gortari, he obtained the majority of the votes in Michoacán. Luis Martínez Villicaña was then forced to step down ([http://es.wikipedia.org/wiki/Luis\\_Mart%C3%ADnez\\_Villica%C3%B1a](http://es.wikipedia.org/wiki/Luis_Mart%C3%ADnez_Villica%C3%B1a)).

<sup>23</sup> UDECAM, a 16-year-old packer's union based in Uruapan, has a membership of 61 (out of 325) state packing companies. In addition to providing loans for its members, UDECAM is a forum for packers to exchange information on quality improving methods, prices, payment periods, types of packing materials, and so on (Morales, interview 8/21/06).

<sup>24</sup> The idea was to set up one association for each product in each municipality (Paz, interview, 11/27/06). Growers of agricultural products, such as avocados, mangoes, and potatoes, established local associations (Mendoza, interview, 12/4/06).

with the state-controlled organism with the same name and the same members, such as in the case of AALPAUM, the Local Association of Avocado Producers of Uruapan, Michoacán<sup>25</sup> (Paz, interview, 11/27/06).

Again, the state's attempt to control local associations proved unsuccessful, but set in motion the development of an independent state avocado organization.<sup>26</sup> On September 27, 2004, the local avocado associations, more concerned with development of the industry than with politics, founded their own independent state umbrella commission, COMA, AC (Michoacán Avocado Commission). The idea was for associations to obtain their own resources, make their own decisions, and select their own members. For example, COMA is now working on a census of state growers that will be used to derive a yearly output and price forecast. In addition, it is working on setting up a collective brand and looking to market the brand at the national level, together with other organizations, such as PRO-AGUACATE. Even plant health boards and committees joined COMA.

When the NAFTA negotiations commenced, a more sophisticated grower and exporter organization was needed. The old ASEEAM, the association of packing-exporting companies that originated from the Foreign Trade Committee of *Unión Agrícola Estatal* (the State Agriculture Union), was a good candidate. Since its formation in 1987, ASEEAM had been working to reduce the cost of exporting by signing collective contracts with the shipping industry, negotiating discount prices with the carton providers, and obtaining preferential contracts for harvesting services (Paz, interview, 11/27/06). However, ASEEAM also attempted to create barriers to the entry of new avocado exporters (Paz, interview, 11/27/06). That is, ASEEAM represented exporters' interests, while leaving producers out, a situation difficult to accept for both state and agricultural ministry officials. It was determined that an entirely new organization should be set up, in which exporters held 75 percent of the vote and producers, 25 percent, to conduct NAFTA negotiations on behalf of the avocado industry. The new organization was named the *Avocado Commission* (Mendoza, interview, 12/4/06).

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<sup>25</sup> AALPAUM, a 40-year-old organization, was the second growers' organization to emerge in the state. One of the original objectives was to defend property rights during times of uncertainty. Nowadays, the 100-member association provides technical assistance (on plant nutrition and diseases) to its members and conducts common purchases of inputs (Torres, interview, 8/22/06).

<sup>26</sup> Lázaro Cárdenas Batel, a PRD member, son of Cuauhtémoc Cárdenas and grandson of General Lázaro Cárdenas, won the 1992 state election. Lázaro Cárdenas Batel is the current governor of the state of Michoacán (2002-08). As for the local associations representing a diversity of products, only 5 percent of them remain active (Mendoza, interview, 12/4/06).

When the NAFTA negotiations were finished, and the USDA demanded the formation of a local organization to deal with certification expenses (see Section 7), the *Avocado Commission* was the favored candidate. But producers still held only 25 percent of the votes and they demanded an even 50-50 representation. When the exporters denied their petition, the producers left the Commission (Mendoza, interview, 12/4/06). Facing a 9:00 am deadline the next day by which the organization was to be established, producers and exporters finally agreed (at 3:00 am) to create a new organization, APEAM, with a 50-50 voting representation for producers and exporters. APEAM was formed by two producers, Rito Mendoza and Gonzalo Moreno, and two exporters, Jorge Fernández Barragán (*Agrifrut*) and Ricardo Vega López, son of Don Leopoldo Vega (*Grupo Purépecha*). Most of the exporters that belonged to ASEEAM switched to APEAM (Paz, interview, 11/27/06). The exporters were able to impose an entrance fee for new exporters (\$160,000) as a contribution for what the organization had already accomplished (Paz, interview, 11/27/06).

As mentioned in the previous section, APEAM's main goal was to deal with the USDA on behalf of avocado producers and exporters, and to set up a collecting mechanism to pay for USDA permits (see Section 5). To pay for USDA certification documents, packing companies in Michoacán must provide APEAM \$0.06 per kilogram exported to the United States. Beyond covering the USDA's operating costs, APEAM provides the funding to promote consumption of Mexican avocados in the United States (television ads, trade fairs, tasting events, and so on). APEAM collects an extra \$0.05 per kilogram exported from their packing plant members for promotional purposes. (That is, APEAM collects in total \$0.11 per kilogram from packing plants to cover certification and promotion activities.) To date, APEAM has spent more than U.S. \$7.5 million on promotions (Scheidt, interview, 8/21/06).<sup>27</sup> Due to significantly increased exports, APEAM has a surplus of more than \$10 million (Paz, interview, 9/5/06). APEAM members are debating how to utilize their excess funds, and are contemplating investment in research and development rather than short-term spending (Paz, interview, 9/5/06).

Mexico's new federal agricultural policy includes the establishment of System-Product National Committees (*Comité Nacional Sistema-Producto*), or S-P Committees. These committees are a national forum to bring together representatives or associates of the firms

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<sup>27</sup> In addition, the federal government matched APEAM funds for promotion through ASERCA (SAGARPA). To date, the federal government has contributed a total of U.S. \$4.0 million (Mendoza, interview, 12/4/06).

involved in the production and marketing processes of specific products. S-P National Committees are formed by committees at the state level.<sup>28</sup> Committees at both the national and state levels are headed by government and non-government officials. For example, the avocado S-P National Committee brings together the avocado S-P State Committees from Michoacán, Nayarit, Puebla, Mexico, and Nuevo León.<sup>29</sup> Michoacán's avocado S-P State Committee, CESIPRO (*Comité Estatal del Sistema-Producto Aguacate*), brings together nurseries, producers, pickers, packers, transport companies, avocado-processing firms, business chambers, and other service providers. Michoacán accounts for 90 percent of the avocado business, as mentioned (Zamora, interview, 12/4/06; Mendoza, interview, 12/4/06).

The main goal of the S-P Committees is to map out the direction of the industry through a Strategic Plan. There is one Strategic Plan at the state level and one at the federal level. Any action must be laid out in the plans in order to gain support from the federal and state governments. This provides an incentive to all associations to meet and draw up short and long-term plans. The federal government grants up to U.S. \$45,450 annually over a period of three years to cover the costs of drafting the plans. So far, the avocado S-P Committees have identified 80 projects.<sup>30</sup> The S-P Committee strategy does have some shortcomings. First, the committees do not have legal status, and the decisions agreed upon are not enforceable (Zamora, interview, 12/4/06; Mendoza, interview, 12/4/06). Second, not all industry-related associations take part in the committees. For example, the National Association of Wholesale Markets, the National Association of Supermarkets and Department Stores (Walmart, Comercial Mexicana, HEB, and so on), and APEAM itself, that is the Association of Producers and Exporters of Avocado from Michoacán, are not members (Zamora, interview, 12/4/06; Mendoza, interview, 12/4/06). Lastly, key avocado exporters do not always agree with the resolutions of S-P Committees, such as on

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<sup>28</sup> In Michoacán there are S-P State Committees for products such as avocados, coconuts, mangoes, guavas, potatoes, strawberries, sorghum, wheat, and so on (Zamora, interview, 12/4/06; Mendoza, interview, 12/4/06).

<sup>29</sup> Avocado growers even founded a new association to represent them in the S-P National Committees: CONAPA, or *Consejo Nacional de Productores de Aguacate* (the National Board of Avocado Growers) (Zamora, interview, 12/4/06; Mendoza, interview, 12/4/06).

<sup>30</sup> Among the projects identified in the plans are: construction of cold room facilities; updating technology in nurseries; building new packing facilities; learning about how to maximize fruit production (with the support of Michoacán State University and Chapingo University); using different seeds, according to the climate and soil conditions; establishing integral pruning packages (smaller trees to reduce harvesting, watering, and spraying expenses); taking trips to Peru to identify potential competitors; publishing current research before it becomes obsolete; developing a database with types of climate and soil per orchard; creating mathematical forecasting models; and further supporting efforts to confront multinational corporations (business vision, improved production techniques, own brands, packing plants, and exports) (Zamora, interview, 12/4/06; Mendoza, interview, 12/4/06).

the construction of more packing plants and at times simply do not comprehend the benefits of an S-P policy (Vega, interview, 8/23/06).

Associations of producers, packing plants, and service providers have played a key role in the promotion and dissemination of information about exporting activities and other production issues. Some of these associations are: PRO-AGUACATE, SUMA (*Servicios Unidos en Materia Agrícola* – harvesting services); CESIPO (harvesting group); SOCOAAI (*Sociedad cooperativa Agrícola de Cupatitzio*); AMIMEX (*Aguacateros de Michoacán, México*); CONASIPRO; and UEAP, AC, *Unión de Empacadores de Aguacate de Peribán*.

### ***10) Counterfactual: Mangoes, Too Sweet, Too Cheap***

Most interviewers mentioned mangoes as the counterfactual case for avocados. Many interviewees mentioned attempting and failing to export mangoes. (Paz, interview, 9/5/06; Villaseñor, interview, 8/23/06; Perfino, interview, 8/22/06; Ortiz, interview, 12/4/06). Even the current president of the State Board of Plant Health (Comité Estatal de Sanidad Vegetal), Mr. José Luis Gallardo is transforming his company, Anguiano's Mango Plantations, into avocado orchards (Perfino, interview, 8/22/06). But why is it difficult for multinational corporations to succeed at exporting mangoes? Compared with avocados, mango exports seem to have failed because of their (1) short life; (2) dispersed producers; (3) lack of production controls; (4) the expensive infrastructure required for pest elimination; (5) unenforceable grower-exporter contracts; and (6) lack of industry organization.

Compared with the avocado, the short life of the mango makes the jobs of the producers and packing companies more difficult. Avocado trees can maintain fresh fruit up to six months once it is ready; mango trees hold the fruit for less than a week. Producers then have to be ready to sell the fruit to packing plants that in turn need to process it and sell it rapidly in international markets. They must accept the current price (Paz, interview, 9/5/06; Ortiz, interview, 12/4/06). Prices can easily drop as whole mango regions come into full production. In addition, Mexico's mango market is small, unlike its market for avocados, which makes it difficult for producers and packers to recover lost revenues by releasing surplus quantities into the market.<sup>31</sup>

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<sup>31</sup> A possible solution would be to find a way to keep mangoes fresh during the final export stages, before they reach the consumer; this is the case for kiwis and apples, which once harvested can be stored for months (Paz, interview, 11/21/04).

In contrast to avocados, there are several mango producing regions in Mexico. The main mango producers are the states of Nayarit, Guerrero, Colima, and Michoacán (Torres, interview, 8/22/06). The season starts in the southern states of Chiapas and Oaxaca and ends in Sinaloa in Central West Mexico. This means that packing plants in each region are only active two months per year, making investment in packing plants unprofitable, and pests hard to control. Some have attempted establishing their packing operations in a more central location, such as Guadalajara, with little success (Paz, interview, 9/5/06).

Avocado producers and exporters from Michoacán comply with norms, while mangoes that are produced in a diversity of regions lack operation and quality controls. While avocado production procedures have been standardized and pesticides and chemicals controlled, mango operations do not have standardized procedures that would secure the same quality levels throughout the harvesting months in each region and across plantations (Ortiz, interview, 12/4/06).

The most common mango disease that threatens exports is eliminated by treating the fruit with hot water, right at the packing plant (Paz, interview, 11/21/06). This process damages the fruit and adds sufficient additional cost to the packing companies' bottom line that it renders mango processing unprofitable. The cost of pest control efforts for mango production has been shared by producers (cleaning, pruning, and spraying) and packing companies (harvesting, transporting, and managing).

Multinational corporations, such as *Calavo*, have an annual business plan to follow, with specific export volumes to meet. *Calavo* found it difficult to comply with its mango export program because although agreements had been reached with producers, they often would not honor the contracts (Ortiz, interview, 12/4/06). In other words, contracts are not enforceable. For example, close to the harvest day, the grower would receive offers from outside (American) firms that would pay slightly above what *Calavo* had agreed for the purchase price in the contract. When *Calavo* would arrive to pick up the fruit, it would be gone. "Contract agreements in the Mexican countryside do not mean much." (Ortiz, interview, 12/4/06) In the case of avocados, an outside firm can not simply come, buy the product, and export it to the United States. Only packing companies certified by both the plant health boards and committees and the USDA are able to export. Regarding other markets, it is unlikely that French or Japanese buyers would show up at avocado orchards to buy the fruit. However, avocado producers are free to sell

the fruit to the domestic market when the price is right, where shortages can set the domestic price at higher levels than the international going rate.<sup>32</sup>

Mango producers are not as organized as avocado producers are. The producers do not even participate in EMEX, the mango organization that covers the expenses of the USDA inspectors (the equivalent of APEAM in the avocado industry). That is, “mango packing plants look out only for their own individual interest” (Perfino, interview, 8/22/06). For avocados, the organization of producers was essential, not only to eradicate pests and isolate the production region against potential phytosanitary threats, but also to keep prices stable.

Lastly, it seems that some mango producers and packers are involved in money laundering (Paz, interview, 9/5/06), buying the fruit at high prices and selling it cheap, eroding margins and making the mango business unattractive for potential new investors. In the avocado export industry, most producers and exporters know each other, and organizations such as APEAM are constantly monitoring the prices in the United States with representatives stationed there. If an exporter is selling at a lower price than the rest (dumping or money laundering), it will soon be detected.

### ***11) Conclusions and Policy Recommendations***

Michoacán’s soil, climate, and rainfall provide adequate conditions for avocado growing. Other Mexican states such as Puebla and Jalisco also grow avocados, but only Michoacán growers have been able to set up large-scale export operations. Today, Michoacán exports 90 percent of all avocado exports from Mexico and Mexican exports represent 40 percent of the world’s exports, or approximately \$400 million per year. Local growers obtain two-thirds of this sum and exporters and service providers (harvesting, sanitary fees, and transportation) the rest. Importers and retailers abroad generate another \$400 million a year in their home country. That is, nearly 50 percent of the final value added of avocados remains in Michoacán. In addition, this export activity has promoted the development of other services, such as harvesting and cold chain systems, and the development of other manufacturing activities, such as guacamole (avocado paste), avocado oil, and cosmetics.

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<sup>32</sup> Avocados in Monterrey, Mexico were sold to the final consumer at \$4.00/kg, while the price in Japan was \$3.00/kg during the same period. Monterrey even had to import avocados from California during fall 2006 (Ricardo Vega, interview, 8/23/06).

The first formal avocado exports from Mexico took place in 1970, when Don Leopoldo Vega, owner of *Purepecha Group* (a first mover), sent two containers (about 40 tons) to Rotterdam. This operation had little diffusion due to Don Leopoldo's policy of not having business partners. For this reason, the next exporters, which got involved ten years later, are also considered first movers. They were the members of the Socopaum cooperative, which started exporting to France in 1980. Their export motivation responded to: (1) a FIRA report that the local market would soon be saturated; (2) the 1983 fall of Israeli avocado production; (3) high prices in France and Rotterdam; and (4) because "it was fashionable." Contacts with both an Israeli exporter and an Israeli manufacturer of packing plants provided the means to learn about export markets and new technologies.

Initially, the dissemination of export know-how was conducted by Socopaum first movers, transnational corporations, and the workers themselves. Because first movers needed partners to set up modern packing plants (a nearly \$2 million investment), growers got together and formed cooperatives or associations, sometimes inviting friends or relatives from the region.<sup>33</sup> When the first movers formed new firms, export know-how was disseminated to their new partners. Associations with foreign firms (*Calavo, Mission, Fresh-Directions*) brought the discipline of quality control and the new harvesting and packing processes needed by local firms to go into large-scale operations. Lastly, local workers, who moved frequently from one company to another, knew how to select avocados, operate and fix American and Israeli machinery, and find orchards that had avocados with the features demanded by foreign clients.

The paper identified several market failures during the first export and dissemination processes. For example, several public goods were generated in the region, such as improved avocado varieties that were resistant to cold weather; regions in Michoacán that were declared disease-free and export certified; and a pool of workers who moved from company to company. Exporters enjoyed some positive externalities generated by the government, such as the free distribution of avocados in the 1960s, creating with time a diversity of avocado growers (14,000 growers), which were enough to provide the product for the local and export markets. Promotional support was provided through a federal matching fund of \$4 million and the direct involvement of BANCOMEXT, the foreign trade support bank. Asymmetric information

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<sup>33</sup> First movers also realized that sharing the risk of export failures, due to the perishable feature of the avocado, was necessary, especially during the early *trial and error* phase of long-distance avocado transportation.

problems generated between growers' potential expansion plans and private banks were resolved through a branch of the Mexican Central Bank, FIRA, which provided collateral to private banks and technical assistance to growers. Lastly, coordination failures generated by the need to follow strict measures to prevent the spread of disease in orchards and packing plants were dealt with through the formation of APEAM, and the work of the public-private state and municipal Juntas and Committees of Sanidad Vegetal.

A diversity of government agencies participated in the development of the avocado export industry. At the federal level, support was provided by federal banks, through the Ministries of Agriculture and Economics, and through the recent System-Product Committees. Bancomext and FIRA provided loans to growers and exporters at discounted rates and provided both technical assistance and export information (market trends, fair space, meeting arrangements for potential clients, and so on). The Ministry of Agriculture oversaw compliance with phytosanitary standards through the state and municipal Juntas and Committees of Sanidad Vegetal, a public-private organization. The Ministry of Economics took the lead regarding the NAFTA negotiations on avocado exports and the establishment of quality norms, with which compliance is obligatory for exporters. Lastly, the avocado System-Product Committee integrated participants in the avocado production, marketing, and export chain. The Committee identifies key projects for the industry, and whenever federal and state governments wish to provide their support, it must be to one of the projects already identified by the Committee as a priority.

The government met the needs of the avocado growers and exporters, except for two issues. First, compliance with the norm is monitored by the state and local Juntas and Committees of Sanidad Vegetal and not by independent consultants as was originally intended. Giving the Juntas and Committees norm compliance and phytosanitary control meant they were able to regulate the supply of avocados. Second, the System-Product Committees did not seem to work well for two reasons. First, key members in the chain have not been integrated, such as the powerful avocado growers and exporters association, APEAM; the national association of warehouses; and the national association of retailers (Walmart, HEB, Soriana, Comercial Mexicana, and so on). The System-Product Committees do not have a legal structure; therefore, the commitments made by participants are not mandatory.

Local organizations played a key role in shaping the avocado industry. After a period of uncertain land ownership and political cooptation, organizations focused on specific tasks, such as the eradication of disease, compliance with USDA fees, forming a credit union, access to the U.S. market, and so on. Some organizations, like the Juntas and Committees of Sanidad Vegetal and the System-Product Committees, are run by public-private entities. The most relevant organization today is perhaps APEAM, the association of growers and exporters that work with the USDA to ensure compliance with phytosanitary regulations. APEAM collects \$0.11 (recently reduced to \$0.07) per kilogram exported to the United States to pay for the USDA inspectors and for promotions in the United States. APEAM also charges \$160,000 to new exporters seeking access to the U.S. market. This approximates the level of cost the first exporters to the United States had to pay, that is, to “internalize the externalities.”

Regarding the counterfactual, the case of mango exports sheds some light on the factors that have made avocado exports successful. First, having a harvest season 4-6 months long provides avocado producers and packing companies with an advantage over other agricultural products: supply can be regulated throughout the year. Second, the standardization and regulation of avocado selection and classification has been key to provide the international market with a consistent product, even when the fruit comes from dozens of different producers throughout the year. Third, distributing the cost of pest control to producers and packing companies during year-long operations has diffused the cost and allowed all production chains to continue to be profitable. Fourth, having a restricted number of buyers for exports allows the avocado industry to avoid the risk of confronting outside firms with short-term views. Finally, the industry participants are a tight-knit group in Michoacán, which has helped to mitigate the entrance of money laundering operations in a state that, on the whole, is highly permeated by organized crime.

Avocado trends for Michoacán growers and exporters look good for the short term and uncertain for the longer term. In February 2007, Mexican exporters were able to export avocados to all U.S. states, for an expected 20 percent increase in avocado exports. The medium and longer terms seem more complex. On the one hand, market conditions in the avocado industry are getting tougher. For example, the Eurogap norm requires that orchards exporting to Europe comply with a set of food security, innocuous, ecological, and social security regulations. Although the Juntas and Committees of Sanidad Vegetal oversee some of these issues, not all

Eurogap regulations have been covered by current procedures. It is likely that other countries, such as Japan, will follow the European example. This would put exporters in a difficult position because it would require a commitment from the growers. On the other hand, new entrants such as Peru, with state-of-the-art technology and favorable soil and climate conditions, will put pressure on Mexican growers and exporters not only in the international market, but in the domestic market as well.

### ***Policy Recommendations to Increase the Pace of Discovery***

The case of avocados shows that the way to let the public sector know about the market failures that slow the pace of discovery is to let the private sector direct public organizations. In the case of Michoacán, public officials and local growers run the Juntas and Committees of Sanidad Vegetal, which were able to eliminate disease and certify the exports of avocados in some regions.

However, groups within the private sector must be equally represented. In the case of APEAM, the association of avocado growers and exporters to the U.S. market, both growers and exporters have 50 percent of the votes. The counterfactual, EMEX, the mango exporting organization that works with the USDA, is formed only by exporters, omitting growers, who in turn have been blamed for not honoring their contracts with exporters.

Lastly, the organization must have a legal structure. The System-Product Committee for avocados brings together the participants of the production, marketing, and export chain of the avocado industry. However, although the Committees consist of official and unofficial members, the lack of a legal structure makes their agreements unenforceable.

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## Acronyms

AALPAUM	Local Association of Avocado Producers of Uruapan, Michoacán
Agrexco	Israeli firm name
Aguamich	Aguacates Michoacanos
APEAM	Association of Producers and Exporters of Avocado from Michoacán
APHIS	Animal and Plant Health Inspection Service
ASEEAM	Business Association of Avocado Exporters of Michoacán
Banamex	National Bank of Mexico
Bancomext	Banco Nacional de Comercio Exterior
CEO	Chief Executive Officer
CESIPRO	Comité Estatal del Sistema-Producto Aguacate
CNOP	Confederación Nacional de Organizaciones Populares
COMA	Michoacán Avocado Commission
CONAFRUT	National Commission of Fruit Growing
Dovi	Company name
EMEX	Mexican association of mango exporters that organize USDA services
FIRA	Fideicomisos Integrados Relacionados con la Agricultura
IMCE	Mexican Institute of Foreign Trade
INIFAP	Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias
NAFTA	North American Free Trade Agreement
NGO	Nongovernmental organization
Nuca	New California
SAGARPA	Ministry of Agriculture
SCL	Limited Liability Corporation
Socoaac	Sociedad Cooperativa de Agricultores de Aguacate del Cupatitzio
SOCOAAI	Sociedad Cooperativa Agrícola de Cupatitzio
Socopaum	Firm name
SPS	Sanitary and phytosanitary
SUMA	Harvesting Firms Association
UDECAM	Michoacán Avocado Packers' Union
UEAP	Unión de Empacadores de Aguacate de Peribán
USDA	U.S. Department of Agriculture
Vifrut	Company name

## **II. Medical Equipment: Catheters**

Medical equipment is an industry that has boomed in the past five years in the United States and other developed countries. The increase in sales is closely related to discoveries and advances in medicine and health care services. Health care and related industries include health care services, pharmaceuticals, government hospitals, drugstores, medical equipment and supplies, and health insurance providers. Although biotechnology has played a main role in the life sciences field, other related products such as mechanical equipment have had an increase in demand in the past decade.

Employment has declined in the United States, whereas the health sector grew by about 1.7 million jobs between 2000 and 2005. An interesting point about this growth is that medical equipment and supplies, as part of the health sector, added no jobs in this period. This might be because large consortiums producing medical equipment have moved to other countries, where the medical technology sector has positioned itself as a stable engine of innovation and economic growth. The successful commercialization of new medical devices has fostered new investment and also venture capital. From 2004 to mid-2006, 44 medical technology companies in the United States completed initial public offerings. In addition to the mergers and acquisitions that have continued their usual activity in the sector, a main target of the larger medical technology companies is small companies located in the United States and in countries like Mexico.

Besides the fact that the lifespan of a venture capital fund is 10 years, investors seek regions that can create and sustain a healthy venture-investment environment. Two of the strongest regions in the United States are Northern and Southern California, which possess some of the elements that help to create a critical mass to reduce investment risk:

- Strong infrastructure including capital and professional services
- Entrepreneurial culture supported by local government
- Large established companies from which firms can recruit talent and expertise
- University communities that support research and provide the knowledge base for innovations.

Despite good prospects, the medical equipment industry faces a number of challenges that affect companies inside and outside the United States. The challenges are related to pricing, expansion of global markets, industry consolidation, and evolving regulatory requirements.

*Regulation.* American medical equipment firms have to fulfill the Federal Drug Agency (FDA) regulations. Some of them are very complex and imply high costs, affecting smaller companies more.

*Reimbursement.* A large consumer of medical equipment and services, such as a prestigious medical center, can affect the level of market prices according to the amount that they are willing to pay. Therefore, when small companies launch a product, they have to look for the best channels of commercialization.

*Consolidation.* In the past years, the tendency has been for large companies to merge, and small ones to remain independent. This has generated a need for financing and driven down overall returns.

### ***1) Medical Equipment Exports in Mexico***

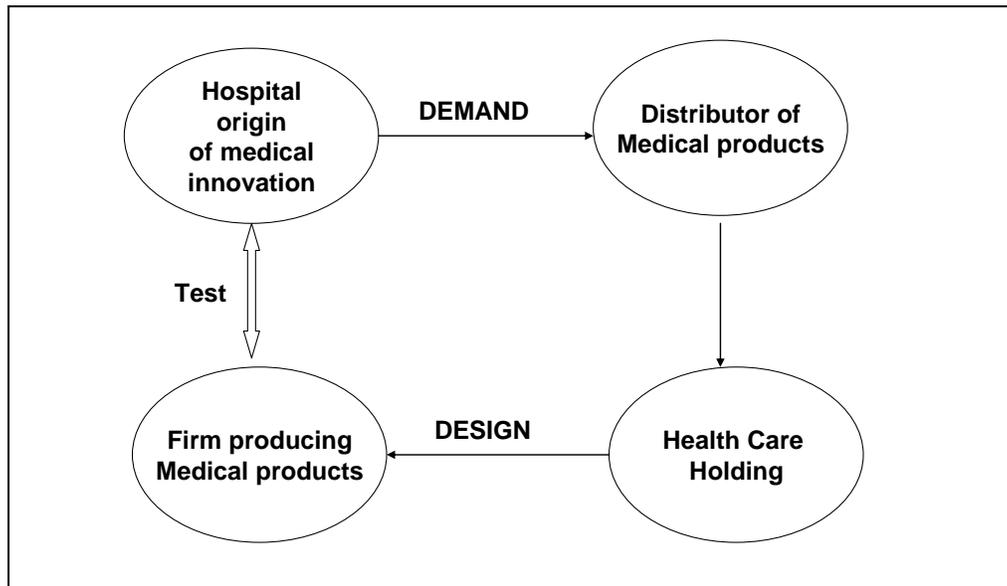
For classification purposes, the term “medical instruments” or “medical devices” has a broad definition. According to the Global Harmonization Task Force, a medical device (9018) is any instrument, apparatus, implement, machine, appliance, implant, in vitro reagent or calibrator, software, material or other similar or related article intended by the manufacturer to be used, alone or in combination, for human beings for one or more of the specific purposes of:

- Diagnosis, prevention, monitoring, treatment, or alleviation of disease
- Diagnosis, monitoring, treatment, alleviation of or compensation for an injury
- Investigation, replacement, modification, or support of the anatomy
- Physiological processes
- Supporting or sustaining life
- Birth control
- Disinfection of medical devices
- Provision of information for medical purposes by means of in vitro examination of specimens derived from the human body and which does not achieve its primary intended action in or on the human body by

pharmacological, immunological, or metabolic means, but which may be assisted in its function by such means.

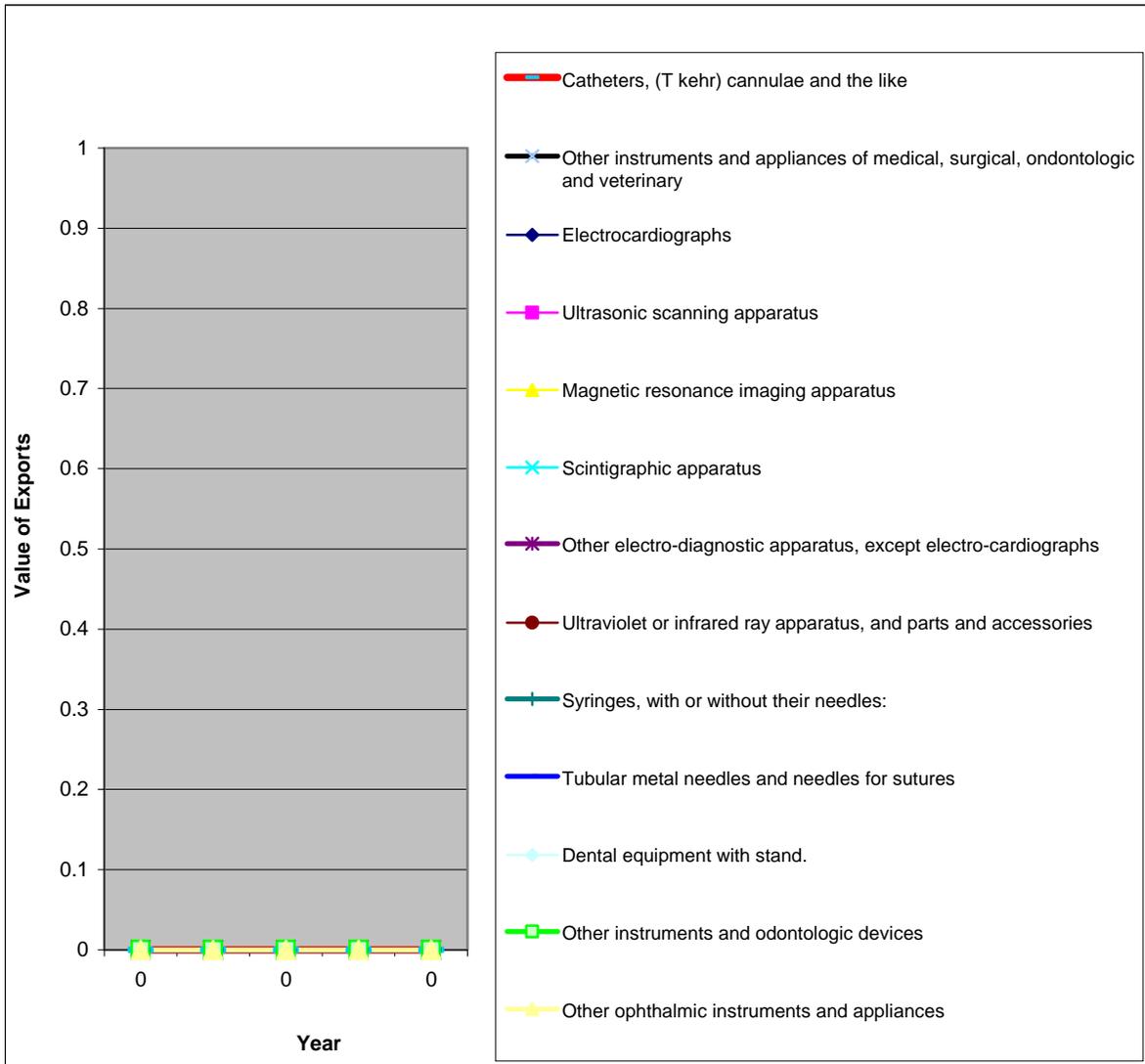
There are two types of medical equipment producers in Mexico: those that produce short-use devices such as disposable rubber gloves, and those that produce long-use mechanical devices such as catheters for heart valves. Most of the major firms produce several devices in at least three or four families of products. This means that a firm must have a wide variety of production processes. In order to reduce costs, medical equipment consortiums are organized in divisions according to their products. Such groups are distributed in different countries, with cost reduction being the main criterion for allocation. The medical equipment industry does not imply direct contact with the final consumer; demand for a specific product or device is generated by the medical procedure or treatment. The physician or hospital department requests the product from a medical equipment distributor that has a commercial relationship with the producer. The main producers of medical equipment devices are well-organized, large corporations with a long tradition in the industry. The headquarters send specific requirements to the appropriate division to produce the supply. Sometimes a device is a new product or requires a new design that leads to a discovery or innovation. The corporations have research and development departments with high technology to supply this kind of demand. Once the design is developed, the production process is implemented in the factory. Three phases characterize the production of medical equipment, as shown in Figure 5.

**Figure 5.**  
**Processes in the Production of Medical Equipment**



In Mexico, annual exports of medical instruments (9018) increased from U.S. \$394.4 million in 1995 to U.S. \$ 2,967.1 million in 2005. Figure 6 shows the 6-digit medical products that had the largest increases in exports. These are 901839, catheter (*sonda*) T-kehr; 901890, other instruments and appliances for medical surgical, deontological, and veterinary uses; and 901819, other electro-diagnostic apparatus, except electro-cardiographs. Catheter T-kehr had the largest export value at U.S. \$ 1,999,916 <check value and units, thousands?> in 2004. At the 8-digit level, the products under 90183999 classifications represented 57 percent of the total amount. The products in this classification are a wide diversity of catheters, from very standard devices, such as a simple plastic tube, to a very sophisticated catheter with a laser included.

**Figure 6.**  
**Annual Exports of Medical Products, 2001-2005 (US\$ million)**



Source: Authors' calculations.

**2) Antecedents in the Production of Medical Equipment and Services in Mexico**

The production of medical products in Mexico existed well before the arrival of the Spaniards. Traditional medicine was a very common practice for the indigenous groups settled in the Mesoamerican region. This tradition continued during the Colonial Period and after Independence in the eighteenth century. Around 1930 some companies from the United States that were producing medical products, mainly medicines, were established in Mexico as subsidiaries of U.S. headquarters. One of them was Merck Sharp & Dohme, which was, at the

beginning of 1900, a small affiliate of a German producer of chemical substances. By 1932 the Mexican firm worked as a distributor but by 1950, after important discoveries in this branch of medicine, the company started to produce hydrocortisone and dexametason, substances that were used in Mexico.

The medical product industry and medical services started to grow after the creation in 1943 of the Instituto Mexicano del Seguro Social (IMSS, the Medical Insurance Institute of Mexico), a tripartite institution (government, business, and workers) that provides medical services for everyone who has a formal job. The IMSS is one of three health care systems in Mexico. The second is the Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE, Medical Insurance for Government Workers), which offers medical services such as workers' compensation for the federal government's workers. The third system is run by the Health Secretariat, the Secretaria de Salud y Asistencia Publica (SSA), which provides public health care services for people in the informal sector, the unemployed, and the poor. In addition, private medical providers work with private health insurance; these services are usually very expensive.

All these health care systems have a whole infrastructure of hospitals, clinics, and medical offices that require medical equipment such as hospital beds and other sophisticated devices. Nonetheless, most Mexican medical equipment companies were distributors, and even producers depended on foreign companies for inputs. That dependence was an obstacle to growth and expansion as a national industrial sector.

### ***3) Key Reasons for Choosing Mexico to Produce or Manage Medical Equipment***

In contrast to many other Latin American countries, Mexico has had a stable political and social environment in the past years. Although in 1995 Mexico suffered one of the worst economic crises of the twentieth century, the federal government made a huge effort to rescue the key economic activities.

When it opened to international trade in 1986, Mexico changed from a highly protected economy to one of the countries with many trade agreements. Some critical phenomena regarding international trade have characterized the Mexican economy.

The reduction of tariffs and restrictions benefited firms that were prepared for the international market, most of them being large consortiums with monopolistic characteristics.

Large companies such as Telmex, the main and for a long time sole provider of telephone services in Mexico, and CEMEX, one of the two main providers of cement in Mexico, took advantage of the new conditions set in the international trade agreements.

On the other side, small and medium firms that were not prepared for international competition had their market participation reduced or lost completely. Some had to close and others survived but suffered serious financial problems. The increase in demand for urban services and products, a consequence of the population concentration in urban areas and of some monetary strategies, required a supply that the Mexican firms were unable to provide. The main Mexican firms were concentrated in a few specific products and the rest, which accounted for more than 92 percent of the firms, were unorganized and inefficient.

Conditions were prepared for foreign firms to produce what the Mexican consumers required. With the incorporation of Mexico into the General Agreement on Tariffs and Trade, the federal government undertook a very aggressive policy to attract foreign investment. During the decade from 1975 to 1985, Mexico had been a very attractive country for investment, given the oil discoveries on the Gulf of Mexico; however, restrictions on international trade were still effective. Once tariffs and barriers started to be reduced, foreign investors considered Mexico as an attractive option. At the same time, indirect investment was accepted under very flexible conditions, and short-term capital arrived in the country, producing an increase in demand and creating a false illusion of monetary power.

Around 1990, the number of foreign firms arriving increased, some to supply the deficit in production by Mexican producers, some looking for new markets. The Mexican government, at the federal and state levels, helped the foreign firms to build industrial parks and provided them with facilities and promotions such as temporary tax exemptions. The *maquila* regime that had started decades before was the perfect framework for the establishment of foreign firms, mainly along the border between Mexico and the United States, most of them belonging to American consortiums.

The foreign firms gained cost reductions by hiring the cheap labor force. And some of the foreign firms took advantage of the relatively flexible regulations in the use of dangerous inputs or production processes that caused environmental contamination.

Some of the first firms that were established in Mexico in the medical equipment sector used plastic or silicon as inputs. At the time, those inputs were not subject to technological controls to reduce pollution at a low cost.

The first firms producing medical equipment were established in Baja California. This state is located in the extreme northwestern part of Mexico, sharing the border with the U.S. state of California. The economies of the Mexican city of Tijuana and the U.S. city of San Diego had been tied for centuries. Both share similar natural resources and an ancestral culture and traditions. In spite of the differences in language and level of development, both cities comprise an economic region and are complementary to each other.

For years Tijuana was the Mexican border city with the most firms under the *maquila* regime. It had good road infrastructure for connecting with San Diego, and therefore with Los Angeles, California. Tijuana attracted many American corporations that wanted to take advantage of the tax exemptions and the cheap labor force. To enjoy Mexican privileges and at the same time be close to their main distribution centers was an excellent opportunity that many firms took.

Around 1980 some firms producing medical equipment were established in Tijuana. Most of them were small factories using simple production processes. The corporate headquarters were located in the U.S. state of California, a few hours drive from the production plants. Supervision was an important factor in monitoring directly the whole process that some devices required. To be close was a key factor for the U.S. managers that in this way kept quality under control.

As the *maquila* firms increased in number, Baja California state authorities started to provide legal and infrastructure conditions in order to attract more firms and retain those that provided many jobs. A flow of immigrants started to move to Tijuana; some of this population saw the city as a step toward the United States, and the *maquila* companies provided them a short-term way to survive. The cheap and abundant labor force reinforced the attraction of Tijuana as a *maquila* city.

In the specific case of the production of catheters, Table 2 lists some of the most important firms according to their year of arrival.

**Table 2.**  
**Main Catheter Producers in Baja California**

TIJUANA				
Firm	First year of operation	Investor country	Number of employees	Products
Dime-Pack S.de R.L de C.V. (ONIX IND)	2000	USA	228	Assembly and packaging of surgical products
Coastline de México, S.A. de C.V.	1993	USA	230	Medical products (staple guns for veins and arteries), electronics (coils and boards)
Block Medical de Mexico, S.A. de C.V.	1993	USA	250	Assembly and manufacture of portable plastic bombs for serum application, disposable antibiotics and accessories for plastic bombs
Del Mar Biotecnología S.A. de C.V. (Integra Biotechnical)	1997	USA	300	Assembly and packaging of medical products for hospitals and laboratories (catheters and plastic pipettes)
NPA de México, S.A. de C.V.	2001	USA	380	Assembly of medical products
Smiths Healthcare Manufacturing, S.A. de C.V.	1996	U.K	500	Manufacture of medical products
Medimexico S. de R.L. de C.V.	1993	USA	550	Disposable medical products
Ensatec S.A. de C.V. (Pall Medical)	1983	USA	600	Manufacture of medical filters
Sistemas Médicos Alaris, S.A. de C.V.	1997	USA	600	Medical assembly
Medtronic México, S. de R.L. de C.V.	1998	USA	1000	Manufacture and assembly of catheters for vascular uses
Pacific Device de México S.A. de C.V.	1993	USA	1500	Bags for surgical waste, white coats and catheters
Tayco Healthcare	1985	USA	1800	Surgical equipment
Nellcore Purittan Bennet México S.A. de C.V. (Tyco Nellcore Healthcare)	1996	USA	2232	Catheters, oxisensors, urinal bags, surgical products, scissors and syringes

ENSENADA				
Firm	First year of operation	Investor country	Number of employees	Products
BMP de México, S.A. de C.V.	1998	USA	498	Assembly and manufacture of medical equipment
Industrias Hudson, S.A. de C.V.	1988	USA	1000	Electronic equipment, disposable medical equipment for respiratory therapy and masks

MEXICALI				
Firm	First year of operation	Investor country	Number of employees	Products
Martech MDI Wets Shelter	1991	USA	270	Assembly of medical products
Martech Medical Products	1992	USA	270	Medical products

TECATE				
Firm	First year of operation	Investor country	Number of employees	Products
Kenmex de México S.A. de C.V. (from Tyco Healthcare)	1995	USA	30	Manufacture of medical products
Industrias Hudson, S.A. de C.V.	2002	USA	270	End tracheal tubes and catheters

Source: Baja California State Government State, Secretariat of Economic Development, 2005.

Some economic characteristics of Baja California have fostered the activities of the medical equipment cluster. Some of the most important are:

- Economic activity in Baja has increased in concentration. Fifty percent of the gross value added from the 2003 Economic Census decreased from 39 economic sectors in 1998 to 27 in 2003.
- Of all the priority clusters in Baja California, at least four coincide with those in the city of San Diego.
- There are programs that seek to improve the level of higher education
- A high percentage of the population is between 20 and 30 years of age, the most productive stage.

- The state government supports the legal structure to promote urban development.
- Baja California has four local divisions (municipalities), each of which has its own urban development plan.
- There is a good land-use plan for regulating the installation of factories.

#### ***4) Characteristics of the First Mover and Some Followers***

##### ***4.1. The First Mover: Nellcore Puritan Bennet Mexico***

The main medical equipment producers are part of large corporations, long established in business. As seen in Table 3, one of the first firms to arrive to Baja California was Nellcore Puritan Bennet Mexico, a company whose headquarters is in Massachusetts. This company is part of the Tyco Int., Ltd. Corporation, which has roots in the Kansas Gas Company established in 1913. The company later was named Puritan. In 1940 Puritan acquired Bennet to form Puritan Bennet Corporation.

In 1981 Nellcore started to produce the first pulse oximetry sensor. In 1995, Nellcore acquired Puritan Bennet Corp. Later Mallinckrodt purchased Nellcore Puritan Bennet, which in 2000 was acquired by Tyco to become Nellcore Puritan Bennet Mexico. This corporation has several divisions, one of the most important being medical equipment. Tyco has about 240,000 employees around the world. In Mexico there are 57 firms belonging to this corporation, three of them in the health area, the most important being the Tijuana factory with 3,400 employees.

In 1984, Nellcore's corporate chief executive officers made the decision to establish a firm in Tijuana, Baja California to produce the silicon parts of pulse oximetry sensors. At that time the Mexican federal government provided a lot of support to attract foreign firms in order to generate jobs; most of the foreign firms were established along the border as part of a government policy to concentrate the *maquilas* out of the main industrial centers. One of the most successful sectors was the electronics industry, which produced television cabinets and monitors. Through this industry the infrastructure of a skilled labor force was created in Tijuana. In addition, facilities were developed to foster an environment for producing devices related to the electronics industry.

One of the main reasons for locating Nellcore in Mexico was the cost of labor and also that the firm was under the *maquila* regime, in which it still remains. The advantages of being in

this regime were: 1) tax exemptions for introducing inputs; 2) no quotas on imported inputs; and 3) government support for renting land and building industrial areas. Some preconditions were important in Nellcore's arrival in Tijuana, some of which are internal to the consortium: investors willing to put capital in this specific sector. At that time (1970s) some important discoveries were made, such as the heart transplant, which created great expectations for the sector. But there were other preconditions in the countries where subsidiaries were located: in the case of Mexico, the *maquila* system and the access to cheap inputs such as gas and plastic, besides the labor force.

During the first years in Tijuana, Nellcore had to face some uncertainties whose solution helped to strengthen the firm. First, the unskilled labor force meant that the first firms in Mexico had to implement training programs or look for other regions for better prepared workers. Second, delays in the input supply, caused by custom regulations, were in part solved by choosing Tijuana, which is one of the main urban centers on the U.S. border. And third, the poor quality of public services meant that some services had to be supplied by the firm, such as the water supply, electricity, and public transportation.

The *maquila* system has been under strong criticism by Mexican politicians, the main reason being the low value added to Mexico that these industries have. As an example, Nellcore exercised the Regla Octava (the eighth rule) of the Mexican fiscal system. Under this rule a firm can import inputs without paying taxes, if it proves that such goods are not produced in Mexico, and this exemption can be renewed every six months. In this way Nellcore could import inputs from China without paying taxes. However, the presence of Nellcore had positive externalities for Tijuana and for the medical equipment industry in Mexico.

1. It developed well-trained intermediate employees. At Nellcore's arrival in 1981, there was a good flow of workers from other Mexican regions looking for a job in Tijuana; however, they were unskilled and had low formal education. Nellcore had to look for workers in the Southern state of Chiapas (in the very opposite geographical location from Baja). Since they were peasants, Nellcore offered them travel expenses and housing in Tijuana. These workers received training and started to work in very simple activities, and as they improved in their skills they moved to more complex duties.

2. It built trust in the Mexican managers. At first all the decisions were made in the corporation's headquarters. The managers were Americans and monitored closely all the production steps made in Tijuana. It took about ten years to develop managerial skills in the Mexican administrative employees to allow them to make important decisions in the administrative and production processes.
3. It started a cluster in the medical product sector in Baja California. By 2000 the Economic and Planning Department of Baja California State decided to implement an economic plan in which entrepreneurial development was of high priority. Through various studies the main economic activities of the state were identified, and a portfolio of key activities was designed with the consensus of authorities and businessmen. As a result, the Baja California Entrepreneurial Development Plan arose. In this Plan several economic clusters were selected. One of them was the production of medical equipment. Table 3 shows the main catheter producers and number of employees in this cluster.
4. It used high technology in production processes. If a new medical procedure or treatment requires a very sophisticated device, it pushes a technological change or innovation. Along with the increase in production volume and value of the Nellcore factory, the use of high technology in products like ventilators forced the development of local skills or brought highly trained professionals from other regions.

In 1984 Nellcore had a production plant of 12,000 square feet; by 2006 it had established an area of 38,000 square feet. During the first years in Tijuana, and in accordance with the demand for medical devices in the United States, the company produced different medical products such as catheters and syringes. Being a *maquiladora*, the headquarters made all the decisions about the production and administrative processes. Around 1995 it started to focus on blood pressure devices but still produced other products including standardized catheters that require machinery with low technology.

At Nellcore Tijuana oxygen sensors are still the main product, with an annual production of 35 million units. Other important products are: disposable urine bags; surgery kits, which are

very specialized and produced depending on use for the heart, kidney, or other kind of surgery; and urology catheters, for which demand has increased 3 percent in the last year.

Different from the first years, now all the administrative activities and control of the factory are done in Tijuana. Some changes are suggested by the headquarters but the design and implementation are made in Tijuana. There is a formal program to reduce costs and organize training courses for the workers in order to improve productivity.

Another important phenomenon has occurred. Now direct clients, for example a distributor of medical products in the United States or France, ask the Tijuana factory to develop the whole process starting from the design to build a sample model. Once the model device is complete, the distributor takes the sample to test it on patients (in hospitals and clinics) and returns it to Tijuana for final adjustments. This process has attracted very specialized professionals from different parts of Mexico. New generations of well-qualified young immigrants are arriving in the city, receiving higher salaries than in their home cities. A main concern is procurement, as Nellcore has relations with about 800 providers, and only one is Mexican and provides a very low value added product: the tags for the bags.

Large changes came around 2002 when the demand for some special medical products started to increase. Changes in surgical procedures require some specific medical devices such as surgery kits, which must include all the instruments needed in the medical procedures. The demand for special instruments increased. For example, heart surgery requires specific scalpels and valves that are now produced in Nellcore Tijuana. However, the firm responded slowly to the technological change regarding catheters; Nellcore continues producing the traditional ones, those made with very low technology. In addition, they have not moved to take advantage of the opportunity to offer a very important step in the production of medical equipment: the sterilization process. All the medical equipment products are required to be sterilized, according to Food and Drug Administration rules, rules, to be sterilized, and the lack of risk capital to build a provider in Tijuana forces all the medical equipment firms to take the products to a sterilization firm located in the United States.

## ***4.2 Followers***

### ***a) Main Follower: Medtronic***

The most important follower of Nellcore is Medtronic, which was established in Tijuana in 1998. It is part of the international corporation with the same brand name, which has annual sales of 12 billion dollars and 35,000 employees around the world. By 1997, Medtronic had a factory producing catheters for aneurisms in San Diego. A federal law was approved in the United States restricting the use of the patent for this type of catheter. The headquarters looked for a place where it could avoid such restrictions and find a low-cost labor force. Some international consulting firms advised the chief executive officer in San Diego to choose Tijuana, and recommended hiring a Mexican manager for the new factory.

The manager chosen has played an important role in the firm's development in Mexico. He knew the market well because he had been a businessman in Mexico City. Some conditions were settled by this manager to work in the consortium, such as having full control in the administrative aspects. At first a shelter company was hired to look for workers, but after a while this duty was under the manager's control. It is important to say that most of the diffusion process was done under the shelter company's authority. Although many medical products are produced under patents, there are a lot of important administrative and distribution aspects that are key in the success of a firm. Shelter companies are firms that help solve all the bureaucratic steps in setting up a firm in Tijuana, including the selection of the place to build the factory. The knowledge obtained by the shelters through consulting and assessment is an important base in the Baja California medical cluster.

The factory started to produce catheters for aneurisms in January 1998, with 150 workers and the ISO 9000 certificate. Around 2000, the heart devices division of Medtronic Corporation in the United States was losing money because of obsolete technology. From 14 factories around the world, 10 were closed and moved to Tijuana, being incorporated into the local factory. The strategy of Medtronic Tijuana differed from the headquarters, since the local manager had a more aggressive strategy, both in production and in distribution. Since the beginning the goal was to expand the products and not to concentrate in just a few. They provided products to other areas of the medical division, not only catheters for aneurisms. Now they produce the whole kit for heart surgery.

The factory started to produce in an industrial plant that had been part of a Panasonic factory that had been producing television monitors but went into bankruptcy. Now Medtronic has several plants in the same industrial area. The average number of workers is 1,500 and annual sales are around U.S. \$400,000,000.

Medtronic Tijuana is a high tech factory, with the most advanced clean-room technology (given that these devices are used in surgery, all have to be very aseptic). However when they require a very special technology, the device is sent to Ireland and then back to Tijuana to complete the process.

There are three important problems. The first problem is procurement. Because all the inputs are imported, they have tried to develop providers in Mexico but the investment is high and therefore so is the risk. The second problem is worker rotation. Although Tijuana has a flow of immigrants, these workers just stay a few months and then move to another factory or to the United States. The third problem is lack of a sterilization plant for the final products.

#### ***b) Block Medical***

Block Medical is the case of a small factory also located in Tijuana. It is part of Inflow Corporation with headquarters in California. It produces different medical equipment products. Since the plant was established in 1985, it has specialized in local anesthetic kits and portable infusion pumps.

This factory fits more the model of a *maquiladora*. All the processes are made in the headquarters, including the design, the sample tests, and distribution. Different from the above firms, Block Medical does not have a direct relationship with the client.

However, it has experienced a large increase in sales in the past two years. In 2003 sales were U.S. \$ 80 million and this year they will be U.S. \$120 million. This increment was mainly because of the increased demand for catheters. Although the star product is the elastometric pump, for which the factory has the patent, it is planning to expand in order to produce catheters.

Because it is a relatively small factory, Block Medical does not have any problems hiring workers. It has around 300 workers who receive three times the minimum legal salary in Mexico.

### ***c) Del Mar***

Del Mar is a factory that was established in Tijuana in 1997. It belongs to a sole American owner, who travels two or three times per week from his hometown in California to Tijuana. They began with a small plant located in one of the oldest industrial parks in the city, with 200 workers. The administrative issues are handled locally but under the supervision of the owner.

The factory has experienced the increase in demand for catheters, and produces about 150,000 units per month. The factory produces about 400 varieties of disposable products, from syringes to scalpels. Given the increase in demand, it rented more space to build two clean rooms, one for tests and the other for producing the surgery kits, and now it hires 800 workers. This year the plan is for sales to reach around U.S. \$100 million.

### ***4.3. The Nuevo Laredo Cluster***

In the past two years, a new cluster has developed in the city of Nuevo Laredo, which is located on the border with the city of Laredo, Texas. Nuevo Laredo is one of the busiest crossings along the Mexico-United States line because it is the entry port to the United States that is used by many freight-line companies. The *carretera nacional* (National Highway 54) connects to U.S. 35, linking Mexico City and Monterrey to the border.

### ***a) Medline***

This company has its headquarters in Chicago, Illinois. Its Nuevo Laredo factory started in 1988 producing generic catheters and was located downtown (at that time Nuevo Laredo was still a small city). Three years ago, in 2003, it had to move to an industrial park that was a 30-minute drive from Nuevo Laredo. The company has 1,000 workers and three main product lines: stock, for the market's sudden changes; catalog purchases; and direct clients.

The main product of Medline is surgery kits, which include everything required in the surgery room, from scalpels to baby cloths (in the case of a delivery). Regarding urinary catheters, until recently they had to buy them in the United States and include them in the kit; now they produce part in Nuevo Laredo and the rest in the Chicago factory. An important aspect is that this company does not have direct contact with the clients.

Given that this plant faces strong pressure from its headquarters, it is very actively looking for ways to reduce costs. Recently it found a provider that prints the instructions

brochure in Monterrey. In addition, the company receives local government support through training courses for the workers in order to improve productivity.

### ***b) Teleflex***

Teleflex Inc. is a large corporation with several divisions, one of them in the medical branch. The corporation established a subsidiary in Nuevo Laredo in 2004. It is located on 400,000 square feet in one of the new industrial parks along a main highway that connects National Highway 54 with International Bridge No. 2. Among others, one objective of Medical Teleflex's arrival in Nuevo Laredo was to look for an opportunity to enter with a very aggressive policy in the medical devices market and to take advantage of the market boom in urinary catheters.

Teleflex's strategy is to consolidate several well-known medical brands in one consortium. In doing so, it bought five companies, including their patents and brand names. The factory is located next to the automotive factory of Teleflex but has a different management system. Regarding the production of catheters, Teleflex Inc. did not have the molds to produce the catheter as this part of the production process is very expensive; so instead of buying new machinery and learning the process by themselves, the headquarters decided to buy the Hudson company. Located in Baja California, it had two plants, a large one located in Ensenada and a small one in Tecate. In four weeks, the Teleflex people learned the production process to produce standardized catheters from the Ensenada factory, then fired all the 1,100 workers, closed the installation, and moved the machinery to Nuevo Laredo. However, the transference faced a lot of problems. While in Baja catheters were produced with silicon, in Nuevo Laredo they were made of pellets (which is an obsolete technology), and as a result the general manager was fired and now the Baja California community has a bad opinion of the corporation. Teleflex produces several types of catheters, more of the generic type (different from the case of Medtronic, which specializes in a very sophisticated type). The catheters are packed under the name of Hudson; in this way they retained the clients, who in this market segment are very sensitive to quality.

The same strategy that was used in the Hudson case was implemented with the Rusch Company in the production of respirators and syringes. According to the manager of quality production, they are expecting about 110 million dollars in sales in 2006, which seems a low amount given that the initial investment in the factory was about one billion dollars. Another

goal of the factory is to produce enough products to be sent to Germany, and in addition to increase the offer for the U.S. market.

Different from Baja California, Nuevo Laredo does not have problems hiring blue-collar workers or employees with college degrees. Most of the intermediate level workers come from Monterrey, which is located at a two-hour drive from Nuevo Laredo. In addition, this location has the advantage that right after crossing the border it is easy to access the highway to Dallas, Texas, where the sterilization plant is located and all the products have to be sent for the final process of sterilization.

#### ***4.4. The Role of the Shelter***

The shelter is a figure that arose in 1980 in Baja California along with the *maquila* boom. One of the first firms was Offshore Promotion Inc. This company was located in the same industrial park as some of the most important *maquilas*. The objective was to help the American corporations to have an easy landing in Tijuana. Foreign firms, unknowledgeable about Mexico's legal procedures for establishing a firm, may opt to hire the services of a shelter to facilitate their arrival. At first, the clients were small companies that did not have the financial support to face strong risks in their move to Tijuana. One way to minimize costs was to obtain a whole kit of services from the shelter:

- Location. The shelter looks for a location for the factory, either in an industrial park or in a well located plant.
- Legal services. The shelter handles all the legal requirements such as propriety permissions (in Mexico urban plans determine the use of city land and it is mandatory to build in the right space), access to public services, tax payments, environmental permission, custom documents, etc.
- To look for and to hire employees, mainly blue-collar workers. Tijuana is located in a border crossing where migrants enter the United States without a legal passport. Therefore a continuous flow of unskilled workers are looking for temporary work in Tijuana. The shelter helps select the best workers and reduce the turnover. As a strategy to attract workers, it is common practice to offer 10 percent above the salary of other firms.

- Administrative duties, accounting, payroll, and back office activities are also provided by the shelter.

Some shelters still continue providing all the services; others offer just a few and have changed to an outsourcing mode. Some others, such as Bucher Industries, which started in 1986, shifted to establishing a warehouse in San Diego, where it is easier to provide customs permits and transportation for raw materials to Tijuana. They have twin factories, one in San Diego or in another place in California, but close to the border, and another in Tijuana. In addition, they make alliances with American firms to provide logistical services.

Bucher Industries started in 2006 providing incubation for small firms; through joint ventures they connected small entrepreneurs with large companies, such as H Steel or Hilfinger.

### ***5) Counterfactual: Stem Cell Bank***

The counterfactual analysis for the case of medical equipment is the business of cord blood banks. This medical service offers the collection and preservation of newborn babies' umbilical cord blood stem cells in order to safeguard families from many life-threatening diseases. Stem cells are the master cells normally in our bone marrow and are found in the baby's cord blood. The cells are used to treat more than 70 diseases such as non-Hodgkin's Lymphoma, leukemia, and sickle cell disease, and have been used in many transplants world-wide. The collection process consists in taking the cord blood immediately after a baby's birth, but generally before the placenta has been delivered, which is the only opportunity to harvest a newborn's stem cells. Within 38 to 48 hours of collection, the blood is processed and tested, and its stem cells cryogenically stored (frozen).

In Mexico, there are few stem cell banks offering this type of service. One of these is Cryo Cell. In 2001, Cryo Cell International established its first affiliate in Mexico and rapidly got the ISO 2001-2000 official recognition to become the first private blood bank to obtain it. The high-tech laboratory located in Guadalajara has automatic systems for fires, electric failures, and floods; sophisticated control access; and cryo-tanks protected inside an anti-earthquake bunker. It also has state-of-the-art video surveillance systems that monitor all building entrances, laboratories, and the cryogenic storage.

The laboratory where the cells are stored is in Guadalajara, and the headquarters is settled in Monterrey. The main reason is that Monterrey represents the highest demand and is the site of physicians and hospitals that are able to perform the medical procedures to collect the cells. In addition, Monterrey is a city with a health sector that has been growing in the past years.

José Cohen, owner of Cryo Cell, made a high investment taking risk capital from relatives; the business had rapid success obtaining the return on its capital in less than a year. Mr. Cohen has looked to export the services of Cryo Cell Mexico to clients in Texas, but has faced lack of trust in the medical techniques applied by a Mexican firm. In addition there are some conditions that limit the possibilities for export:

- The laboratories cannot be settled in every city. Guadalajara was chosen because it fulfilled the requirements to build and maintain the cryo-tanks. The most relevant condition is “the correct year-round temperature” and only this city matched this criterion. In addition, the population density is the highest at Guadalajara. Therefore, trying to export this business would be difficult and it has not grown as much as the owners would have liked.
- Cryo Cell gets approximately 120 clients per month; however, according to Mr. Cohen, there still exists a “cultural barrier” that has a negative effect in this business. People tend to have different ideas (or ignorance) about what stem cells are and how they can help them. This service is extremely new in Mexico and only a few people can afford it. Moreover, Mexican couples do not tend to consider this product as medical insurance. All these factors slow down the process of export to other countries.

As seen before, Nellcore, Medline, and many other medical firms have found customers in California. High amounts of capital have been invested by these firms, the latest technology in clean rooms and machinery is part of their business, and sales are growing fast. This is not the case at stem cell banks, where the diffusion process is not the same and is much slower. In Mexico, the stem cell bank markets are still limited. Along with Cryo Cell, only three firms offer this service: Cordon Vital, Concesión de Ginecología Guadalajara, and a small hospital in Mexico City.

## **6) Policy Recommendations**

According to its socioeconomic characteristics, Mexico can be categorized as an emerging country. Although it made large improvements in terms of macroeconomic aspects, where it has reached stability (the rate of inflation was around 3 percent in 2006 and the exchange rate variation was around 1 percent), on the microeconomic side 90 percent of the firms are small, with financial problems and low productivity.

The health sector looks like an opportunity to develop some important competencies in Mexico's economy:

- To hire and to train blue-collar workers in productive methodologies with high technologies
- To use and develop natural resources, such as the raw materials used in the production of medical equipment and medicines
- To attract foreign direct investment and to look for partners in joint ventures
- To develop value chains in specific regions
- To promote innovation and technical change
- To improve the balance of payments through increased exports.

To reach these goals, it is necessary to apply some public policies. Some of the most relevant are the following.

### **6.1. Education and Technical Training**

Universities and technical schools must improve the quality of the students. Federal authorities in the education sector have to establish programs to develop research abilities. Medical schools in Mexico are recognized for the quality of diagnosis and patient attention, but the students do not have research abilities and/or scientific curiosity. Most of the students at higher levels are in administrative areas, causing a deficit of professionals in the engineering and technical areas.

### **6.2. Legal Aspects**

Federal and local authorities should reform the legal procedures for establishing a firm. Some of the requirements to open a firm are very complicated, and sometimes it takes six months to start a business. In the case of medical equipment that uses special substances, the health secretariat

and the environmental department have to supervise all the productive processes to approve the firm, delaying the start of production.

### ***6.3. Facilities Provision***

Industrial parks and designated industrial areas with access to public services are key in facilitating the arrival of foreign firms or the decision to establish local investment in the production of medical equipment. An important aspect is to identify the most important elements in the health cluster to promote the development of the health sector. This review of the production of medical equipment in Mexico shows that Baja California, Nuevo Leon, Chihuahua, and Mexico City are the areas with a high concentration of firms in the sector. Catheters are devices with a high market value but there are about 2,000 products that could also be part of the export potential of the country.

### ***6.4 Financial Support***

The federal government could provide special funds to promote research and development in the sector and to support investment in special areas. As the managers said in the interviews, lack of risk capital is an obstacle to building a sterilizer plant in Mexico. If the firms had access to sterilize their products in Mexico, the time and costs of production could be reduced in an important way.

## **Interviews**

Bandala, Carlos, Quality production manager, Nellcore Puritan Bennett Mexico S.A. de C.V. (Tyco Nellcore Healthcare), Tijuana, Mexico.

Cohen, José, General manager, Cryo-Cell, Stem Cell Banking, Monterrey, Mexico.

Concha de la, Gerardo, Manufacturing manager, Medtronic México, S. de R.L. de C.V., Tijuana, México.

García, Miguel Ángel, Marketing - Customer Service, Offshore Promotion Inc., Tijuana, Mexico.

Garza, Jose Luis, Manufacturing manager, Teleflex Medical, Nuevo Laredo, Mexico.

Hernández, Octavio, General manager, Bucher Industries, Tijuana, México.

Herrera, Jaime, Vice-president, Productos Medline, S.A. de C.V., Nuevo Laredo, Mexico.

Moreno, Omar, Senior Manufacturing engineer, Block Medical de Mexico S.A. de C.V., Tijuana, Mexico.

Rico, Manuel, Manufacturing manager, Del Mar Biotecología, S.A. de C.V. (Integra Biotechincal), Tijuana, Mexico.

Rocha, Natacha, Coordinator of the health cluster, Secretaria de Economia del Estado de Baja California.

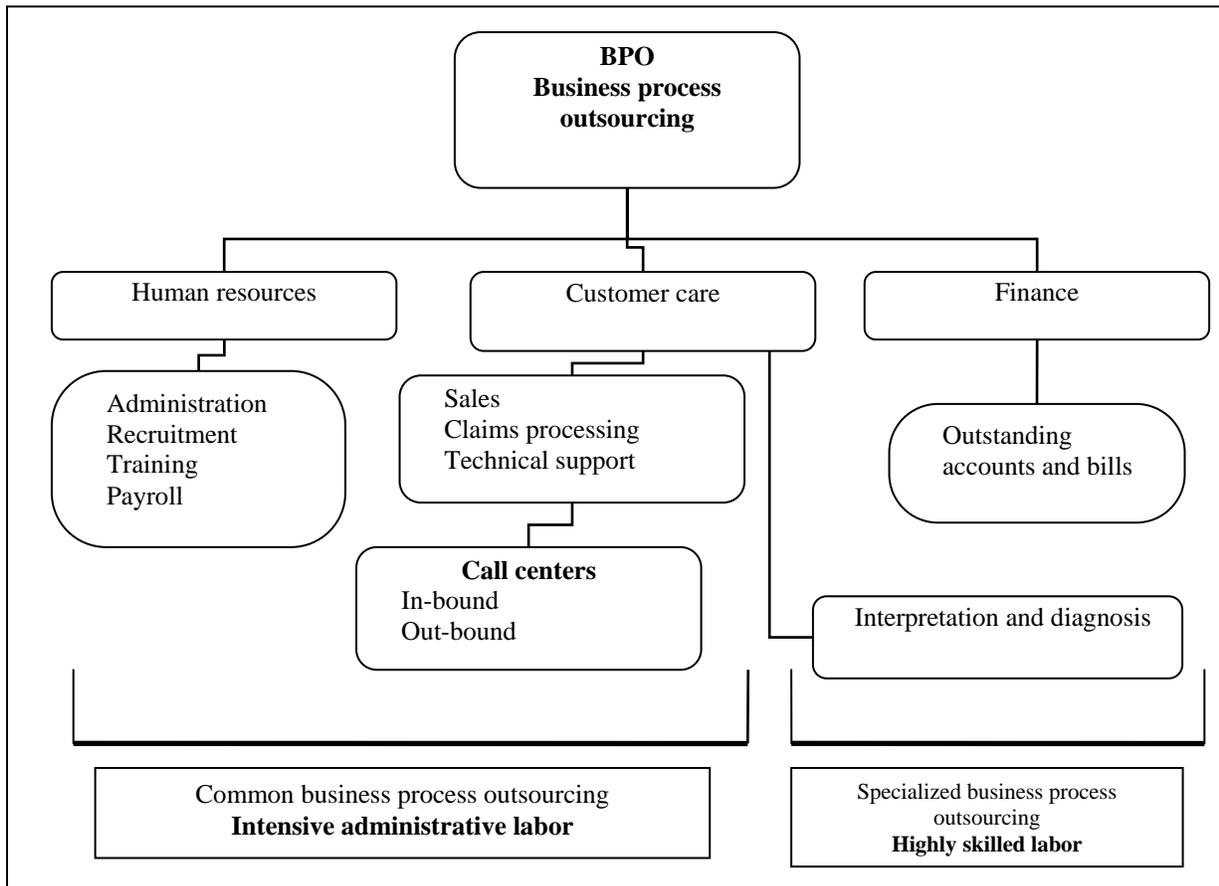
### **III. Outsourced Call Center Services in Mexico**

To increase their productivity and focus on their core competencies, many companies have turned to outsourcing both manufacturing and service operations. This trend has opened up opportunities for developing countries, including Mexico. Before going into the details of the Mexican case, the following section will examine this issue at the international level, focusing on business process outsourcing and the call center industry in order to assess the scope and potential of this new phenomenon.

#### ***Business Process Outsourcing***

Business process outsourcing refers to the outsourcing of business processes and functions in the areas of administration, finance, human resources, distribution logistics, manufacturing services, sales, marketing, and customer care. These functions are outsourced to locations that can provide the services at a lower cost through high-speed data communication links, which guarantee timely delivery of data and services. Figure 7 shows the different activities in the business process outsourcing sector. The call center sector, which will be examined in this paper, is located under the customer care branch of business process outsourcing.

**Figure 7.**  
**Categories of Business Process Outsourcing Activities**



***Call Centers***

The call center sector emerged in the 1960s from the need to develop a strong and lasting relationship between the customer and the enterprise. This relationship was supported by marketing techniques and customer services. The innovation resided in the end of the anonymity in what used to be a purely mercantile relationship between the customer and the enterprise (Micheli, 2004).

According to the Call Center Association, there have been four key stages in the development of the sector. The first one, taking off in the mid-1980s, was aimed at cutting back costs and increasing marketing efforts and direct sales. The second stage began in the early 1990s and was fed by the growing demand for customer service and the expansion of financial products facilitating consumer credit. The third stage began in the second half of the 1990s, and

saw the expansion and growth of telemarketing businesses and outsourcing enterprises that emerged from the growing need to outsource parts of administrative tasks.

The gradual specialization of the call centers led to the creation of companies specifically devoted to provide these services, which ranged from customer service to searching for new clients. This fourth stage began in the XXI century and is characterized by a cost-reduction motivation and an increase in off-shoring to regions and countries with low wages. Technological development and the spread of communication technologies have facilitated relocation. Call centers moved first to North Africa, India, and South Africa to supply the French and English-speaking markets in Europe and North America. Later, the Hispanic market in the United States propelled the emergence of call centers in Latin America to serve this niche.

The development of call centers in Mexico is situated in this stage. There are economic, cultural, and geographical advantages underlying Mexico's success as a host country for call centers. First, cost reduction is mainly based in low wages that make labor from 50 percent to 75 percent cheaper than in developed countries (Martino 2004: 6). Second, membership in NAFTA has facilitated the installation of operation centers and set up an enabling legal framework. Another important factor is language. The United States has experienced a considerable increase in its Spanish-speaking population, which has surpassed 40 million.<sup>34</sup> Thus, call center agents need to be bilingual to serve this market. Finally, geographic proximity is also important. Sharing 2,000 kilometers of border with the United States allows enterprises to maintain close contact with the centers providing the services. And, contrary to India's position, Mexico shares time-zones with the United States, which can be an advantage in some services.

The next section will examine how call center service exports emerged and developed. Specifically it presents the case of the pioneering company Hispanic Teleservices.

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<sup>34</sup> In 2005, according to the U.S. Census Bureau there were 41.8 million Hispanics in the United States, which is about 14.5 percent of the population. Hispanics are the first minority in the United States. Only 16 years ago, the population was half that level, at 22.4 million.

## ***1) Breaking Ground in the Hispanic Customer Service Market: The Hispanic Teleservices Corporation***

The Mexican Hispanic Teleservices Corporation was the first firm to export in the customer service sector targeted at the Hispanic market in the United States. The growing potential of the Spanish-speaking market in the United States was the idea that spurred the development of this company.

The Hispanic Teleservices case is the story of a young individual entrepreneur, not that of an existing firm, which makes it relevant to examine his personal career in order to have a better understanding of the evolution, strategies, and lessons of this case.

### ***1.1. A Young, Bicultural, Mexican Entrepreneur and How He Found a Niche***

Hispanic Teleservices was founded in Monterrey, Mexico in 1999 by the young local entrepreneur Alberto Fernandez. He holds a BA in Economics from Notre Dame University and an MBA from Georgetown University.

During his stay in the United States, Fernandez realized the need and potential for providing services to the Hispanic market, a group with a purchasing power estimated at around U.S. \$475 billion. What sets this market apart in the United States is that Hispanics maintain strong links with their countries of origin and thus with their mother tongue. A large part of the Hispanic population in the United States is either Latin America-born or first-generation immigrant. This creates a huge need for bilingual (Spanish-English) customer services.

Born into an entrepreneurial family, Fernandez always had the objective of developing his own business; however, to do so, he needed to gather the required skills, experience, and contacts.

### ***1.2. Gathering the Experience Needed to Develop a Business of His Own***

In 1994, after having completed his BA studies in the United States, Fernandez returned to Mexico at a moment when the country was suffering a deep financial and economic crisis. One of the hardest hit sectors was banking, which had passed from a nationalization process in 1982 to one of re-privatization and liberalization in the early 1990s. To deal with the crisis, the sector was restructuring its management and services processes. This created opportunities for recently graduated professionals, who were selected to replace senior managers that had been fired in the

attempt to cut payroll costs. At 24 years old, Fernandez was hired as a branch manager by the Confia Bank, of the Abaco Group.

One of Fernandez's first contributions was to develop a special area for bank clients to perform some basic transactions while avoiding long waiting lines. In a short period of time, he sought new challenges and was transferred to the re-engineering and process improvement department. In that time, the bank had no distance banking services, partly due to the fact that the telecommunications sector was still a public monopoly with very high costs. Yet new communication technologies were starting to emerge.

Wanting to improve banking services, Fernandez made a proposal based on the use of communication technologies. This would be his first contact with this sort of activity. The proposal led to the creation of an entity called ABASER, with three call centers operating in Monterrey, Guadalajara, and Mexico City. Through the use of a toll-free line, the bank began providing distance services, first allowing its clients to check their account balance with only a telephone call. The main difficulties that Fernandez and his team faced were high technology costs and budget restrictions to hire personnel. To overcome such difficulties and take advantage of economies of scale, they provided outsourcing services to Abaseguros (another company belonging to the Confía Group) and GM Mexico. With GM Mexico it was agreed that ABASER would provide services in exchange for having GM Mexico absorb the payroll costs. It was also agreed that the recruitment, selection, and training would be under the direct control of Fernandez.

While Fernandez was working at Banca Confía, he also started up his own business. With a group of friends, he opened a small manufacturing enterprise to manufacture luxury ties. However, the enterprise failed because of the extremely high cost of silk and the equipment needed to produce the ties.

In 1997 Fernandez left Mexico once again to study for an MBA at Georgetown University. By that time, he had already learned several lessons that would later prove useful for his next enterprise, both from his experience in ABASER and from the failed enterprise. Both would be key for the creation of his future business.

### ***1.3. Implementing the Business Idea***

When he arrived in the United States to pursue his master's degree, Fernandez already had a business idea in mind: a call center to service the Hispanic market. He used his courses in the MBA program at Georgetown (1997-99) to develop his idea. Specifically, he took advantage of two courses: Emerging Companies and Entrepreneurship. Fernandez recalls that at the very beginning he faced skepticism from his classmates. For the Entrepreneurship course, students were required to develop a business plan in groups. It was the Internet and IT boom and everyone wanted to develop online businesses. Fernandez pitched his call center idea but no one wanted to join his team. Fernandez argued that the need to serve the Hispanic market was inevitable and had great potential; plus, his project would go beyond a class project because he wanted to materialize it. He was able to convince Kit Cooper, who became not only his teammate but also his real-life business partner. Both completed their studies and agreed to develop and execute their business plan.

The call center would be based in Monterrey because Fernandez believed this Mexican industrial city, settled in the North of Mexico and close to the U.S. border, had the required labor force: bilingual and bicultural. Since Fernandez and his family were from this city, he had a valuable social capital network. Nevertheless this did not guarantee him access to the financial capital required to start operations.

The main obstacle was the lack of economic resources, which took one year to overcome. There were no investors willing to take the risk in Mexico. According to Fernandez, "Many Mexican businessmen had their capital offshore and they did not want to invest in innovative ideas. If they showed some interest, they wanted to have a 100 percent return rate for themselves... some businessmen like Alfonso Romo [from Pulsar] had venture capital yet it was a very limited amount." That is why Fernandez and his partner looked for funding abroad, specifically in the United States.

In addition to the business plan, to win some credibility vis-à-vis American banks, he created an advisory board comprised of some of the most prominent Mexican and Hispanic businessmen. Among them were Carlos Abascal (Afianzadora Insurgentes), Armando Garza Sada (Grupo Alfa), Eduardo Garza T. (Frisa), and José Niño (ex-president of the Hispanic Business Chamber and ex-advisor to President Bush, Sr. and Dany Villanueva, a Hispanic

businessman from California). Except for Eduardo Garza T., the members of the advisory board gave Fernandez their moral support but no financial capital.

The way the entrepreneur managed to access funding among U.S. investors was interesting because he used not only his professional skills, but also his social capital. Throughout his undergraduate and graduate studies in the United States, he had made some friends who would later work in finance and banking firms like JP Morgan and Morgan Stanley. It was these friends who in 2000 helped Fernandez to get some appointments with investment banks and some of them even provided part of the capital needed for the project.

Fernandez and Cooper found an investor interested in their project in San Francisco, California: JP Morgan Latin American Partners Venture Capital. Since the funding was granted under very strict conditions, the entrepreneurs decided to offer/sell just 40 percent of the enterprise value.

Besides the financial conditions, there were three other conditions: (1) to have a technology director, (2) to look for a senior director instead of having Kit Cooper in this position because he was too young, and (3) to hire a Mexican operations director selected by JP Morgan.

To meet the first condition, Fernandez resorted to his longtime contacts from Banca Confía and hired Alejandro Jaimes as technology director. Jaimes had participated in the creation of the ABASER customer service center and was working for a telecommunications company called Alestra (partly owned by AT&T). Finding the senior director was more difficult, and it took them more than a year to fill the position. The third condition was immediately met by hiring a person from the banking sector in Mexico recommended by JP Morgan.

To sum up, the first and largest obstacle was obtaining the financial capital needed to start up the business. Besides the originality of the idea, the obstacle was overcome with the application of the business expertise gathered so far and thoughtful use of Fernandez's social capital in Mexico and the United States.

Once they had the capital needed and the managerial team, Hispanic Teleservices began operations in Monterrey, specifically in San Pedro Garza García. They rented two floors in a building where they set up 30 work stations. Surprisingly, when Fernandez tells the story, the handling of technology does not appear as a problem. This might be because he was backed up by people who had wide experience in the field. For example, a former colleague from Banca Confía, Daniel Aldrete, was appointed network architecture director. Aldrete was an expert in

voice-network technologies and had managed the predictive dialer systems for Banca Confía. Later, Noel Orozco, another former Banca Confía colleague, would join the team as head of Technology and Information. Kit Cooper also had acquired experience in business process outsourcing while he worked for Fritz Companies in Houston.

#### ***1.4 Getting the First Clients***

The main uncertainty in the planning phase was related to the first clients. The objective of Hispanic Teleservices (HTS) was to go beyond simple telemarketing, providing a more complex service to its clients. As sales director, Kit Cooper looked for clients in the United States using a door-to-door strategy. He visited many companies that had Hispanic customers and offered them HTS services. Although it did not want to do telemarketing, their first client, UPS, hired them to do a telephone sales campaign. This allowed the newly created company to begin operations in the year 2000 using 50 percent of its capacity, for which they hired 15 employees.

Another important uncertainty was to prove whether the human resources available in Monterrey were in fact adequate to their needs. They knew that people in Monterrey were bilingual and bicultural, so in theory labor would not be a problem. However, they did not know whether the available pool was suitable for conducting telephone conversations and servicing Hispanic customers. With their first projects, they realized that the labor force was in fact suitable and they just needed to implement an adequate and careful recruitment and training process.

The desired client appeared a few months after the UPS project: Sage Telecom. In the sales effort, HTS had contacted Sage Telecom but it was not until 2001 that the company signed a contract with them. Fernandez recalls that Sage had visited other well-established Mexican companies servicing the domestic market, yet they chose Hispanic because they liked their organization and their human resources approach.

The project involved high levels of training, security, and quality control. The operational costs were so high that after six months of the contract with Sage, Cooper and Fernandez realized they only had resources to cover the fixed costs of two more months of operations. JP Morgan offered them additional funding but at high rates, so they decided to visit Sage's director, explain the situation to him, and ask him for support. Fernandez was really surprised

when the director agreed to lend them the funds without asking for large concessions in the interest rates or the buying/selling prices set up in the service contract that HTS had with Sage.

Another round to increase the financial capital required to expand operations was undertaken by mid-2001. It was then that JP Morgan along with Citicorp Venture Capital acquired an additional 11 percent of the company's value, summing to 51 percent of the assets. Since then, HTS has financed its growth with its own capital using its operational flows and profits.

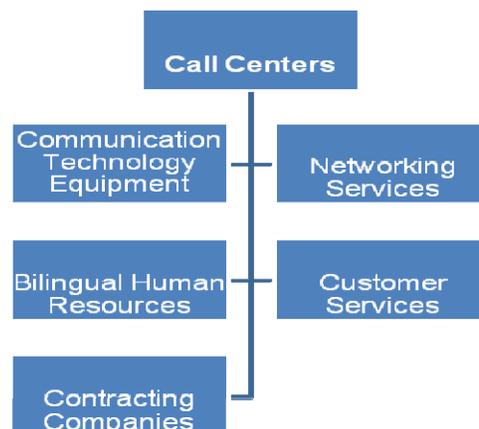
In 2002 they got another important client, America Online (AOL), for which they now offer 100 percent of their customer services in Spanish in the U.S. market.

### ***1.5. Description of the Call Center Operation***

The call service industry inserts itself globally in a production chain comprising a wide range of technological services, beginning from the most essential ones (such as computers and web access) up to the most sophisticated services that develop new technology. In between those extremes, a series of software for call management is included.

The value chain of the call center industry is quite limited. There are three basic inputs: communication technology equipment, networking service providers, and bilingual human resources, which frequently come from local universities. The contracting companies provide the client databases and the guidelines for the specific services that the outsourced call center will provide. The call center thus is in charge of processing the information and the resulting outputs are customer services.

**Figure 8. The Value Chain of the Call Center Industry**



It is worth noting that in the case of Mexico, the call center industry has a few local providers, with the rest hired in the United States. The companies that set up operations buy their communication technology equipment and networking services abroad. The bilingual human resources are sourced locally, most of the time coming from universities and sometimes from job fairs organized by public entities. The contracting companies are mostly American and the customer services provided are exported.

At the internal level, the activity developed by the call center is incorporated in the development of outsourcing, which comprises several options: marketing, sales, customer service, insurance policy management, or the management of relationships between a company and its suppliers or clients. The operation of a call center is basically divided into two processes: inbound calls and outbound calls (see Table 3).

**Table 3. In-bound and Out-bound Calls**

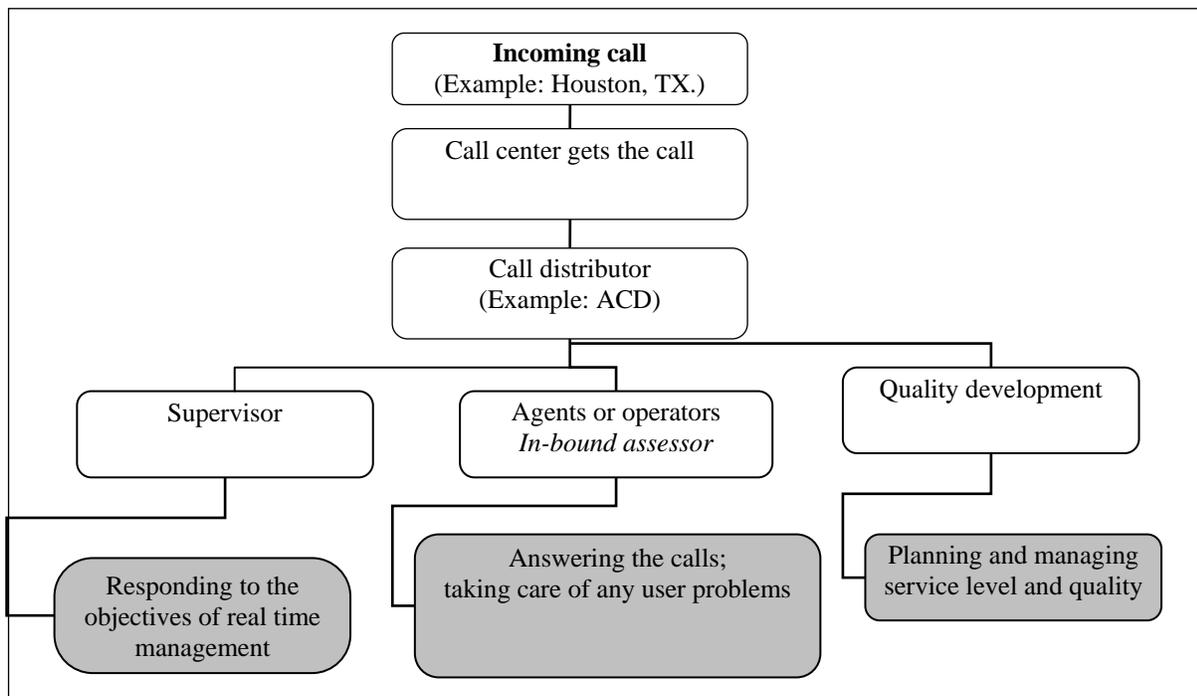
<b>OUT-BOUND CALLS</b>	<b>MOST FREQUENT SERVICES</b>
<ul style="list-style-type: none"> <li>• Offering of a product or service</li> </ul>	Known as “cold” calls. Probably the most emblematic part of telemarketing. An example of these is calls to produce commitments to pay debts.
<ul style="list-style-type: none"> <li>• Market Research</li> </ul>	Calls to find out people’s political or consumer preferences. Calls may be linked to offering certain products.
<b>IN-BOUND CALLS</b>	
<ul style="list-style-type: none"> <li>• Fulfillment of information needs</li> </ul>	Calls to request information as part of a post-purchase service. Calls to ask for information or social support. Emergencies. Hot lines.
<ul style="list-style-type: none"> <li>• Purchase of a product or service</li> </ul>	Calls to encourage purchase merchandise or services after some kind of advertising.
<ul style="list-style-type: none"> <li>• Customer care service</li> </ul>	Calls to request technical support, invoicing, or payment.
<ul style="list-style-type: none"> <li>• Credit and insurance</li> </ul>	Activation of an insurance or credit account.

*Source:* Authors’ elaboration based on Micheli (2006).

Given the available technological infrastructure, HTS chose to specialize in inbound call services. An inbound call center is a customer service system where calls from customers of the outsourcing client arrive to be handled by agents or operators.

The process of an inbound call center starts with a call from a customer of the outsourcing client. The call goes directly to the call center and is channeled to an agent. This first step needs a call distributor such as the ACD (Automatic Call Distributor), which is able to keep a record of the time needed by each agent to process every call. Because of this record, the ACD is also able to assign the incoming call to the agent with the longest idle time. Some inbound machines also have an interactive voice response, where the calls that do not need an agent are processed by the ACD itself. A critical issue is to keep the correct balance between the number of agents and the volume of calls.

**Figure 9. The In-bound Call Process**



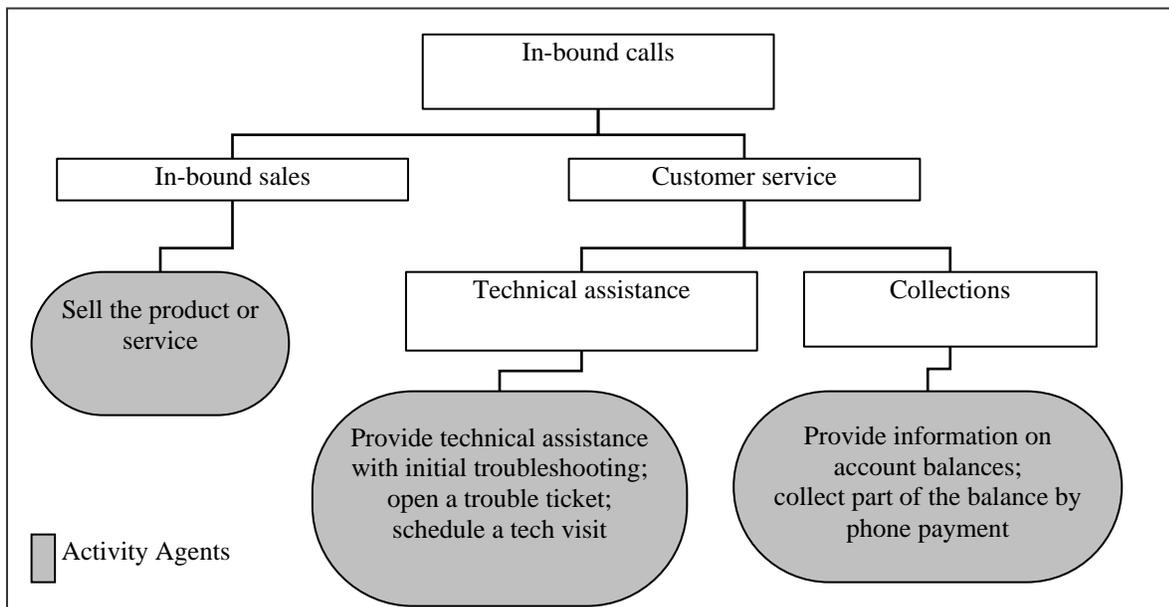
When an agent takes a call, two fundamental challenges appear: service level and response time objectives. Supervisors have to plan and set up these objectives. The call center has some specific tools to help supervisors with the management of time, like the *answering speed average*, which provides the average time that a caller waits on line, and the *average call duration*. The quality development department is in charge of controlling the quality level of the call, establishing and managing quality service level agreements. Inbound call centers work around the key issues of time and quality.

## Production Organization

HTS handles different kinds of clients that have a strong influence on the way the work is organized. Agents' activities change according to the type of activity each call demands. The range of actions to be performed goes from selling a product, to fixing a technical problem or registering an insurance policy, for instance. Three different clients provide examples: Sage U.S. Telecom, AOL, and a company from the credit and insurance sector.

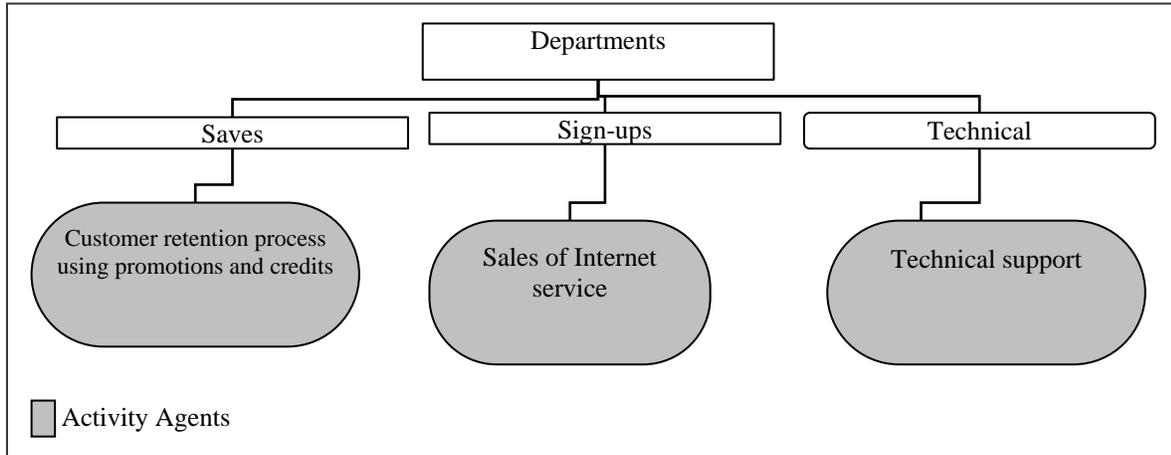
In the cases of SAGE U.S. Telecom and AOL, the operator needs to have the following skills: the ability to sell the product to a prospective client when the client calls to ask for basic information, and the technical language and knowledge to provide technical assistance (see Figures 10 and 11).

**Figure 10.**  
**SAGE U.S. Telecom's Call Process**



*Source:* Authors' elaboration based on interviews.

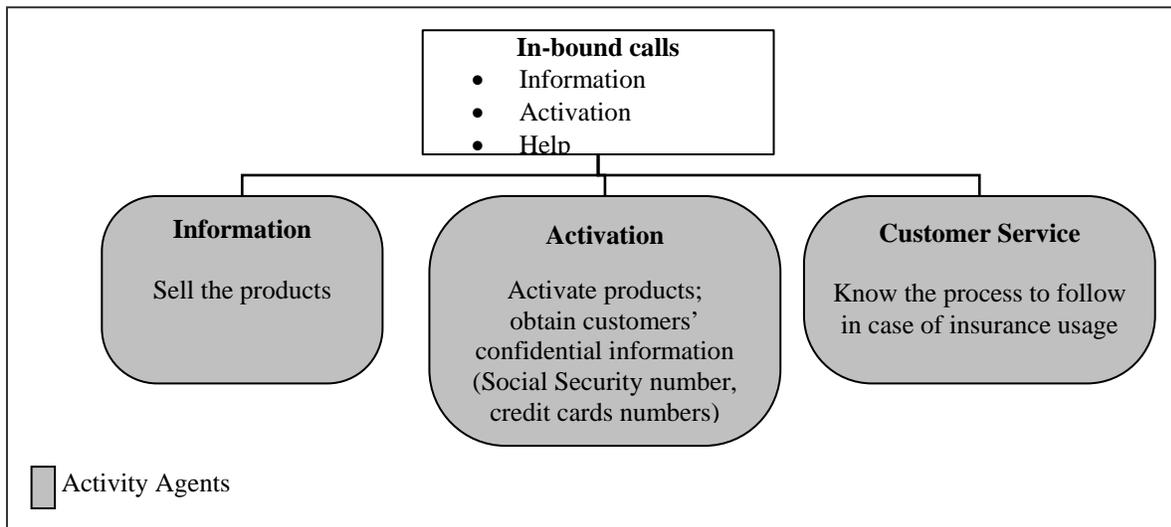
**Figure 11.**  
**AOL's Call Process**



Source: Authors' compilation based on interviews.

In the case of a client from the credit and insurance sector, this company requests the call center supplier to guarantee strict confidentiality of the customers' personal data, which requires the company to certify its procedures in the ISO27001 norm (see Figure 12). This can represent an important entry barrier for competitors.

**Figure 12. The Process for Credit and Insurance Companies**



Source: Authors' compilation based on interviews.

## **Training Process**

To solve the uncertainty of whether the labor force was suitable or not, HTS developed a recruitment and training process for agents that is key to its success. There is an internal “university” with a long and meticulous recruitment and training system. The nature of the activity, providing services by telephone, requires not only English language and information technology skills. Call agents must also have strong control of their emotions. The training processes developed by each company help to improve labor skills and are a key differentiation factor.

The HTS recruitment and training process is made up of four stages. The first one is an interview to filter the candidates. Once they pass this filter, candidates begin a second stage, where their English fluency is assessed through a simulation of a conversation involving five people at the same time. In the third stage, the agents attend a full-time training session for two weeks. During this time, in which they start receiving a reduced salary (50 percent), role play is one of the most frequent training methods, as well as short courses about the working philosophy of the enterprise. The fourth stage is an in-situ training that lasts 4 to 8 weeks facing real cases. This phase consists of three sub-stages: the first one is to practice the use of IT systems, in the second the trainees have to imitate the communication process of the more experienced agents, and in the third sub-stage they begin to answer real-life calls with the help of their supervisor and the more experienced agents.

### ***1.6. Overcoming Coordination Difficulties***

The toughest coordination difficulty was technical and it was related to the handling of incoming calls from the United States and how to transfer them to Mexico to be handled by the agents in Monterrey. The solution was to create a co-location in Houston, which received the calls on a toll-free U.S. line. They had to hire a private network between Monterrey and Houston to transmit the data without using public telephone services because long-distance calls were extremely expensive. The private network allowed large amounts of data transmission through cables. The installation was smooth, thanks to a close collaboration with the provider of the service, called MCI–Avantel. This American company had arrived in the country in the mid-1990s after the liberalization of the telecommunications sector in Mexico, and had operations in the United States as well as in Mexico.

Once operations took off, another problem emerged: HTS did not have a back-up network, so when the primary network was down, the service had to stop and they could not answer incoming calls. This problem was eventually solved after the number of clients increased and the company was able to absorb the costs. Yet the solution represented a significant amount of resources, so HTS implemented state-of-the-art technology: an MPLS network in close cooperation with its network providers. They even conducted simulations in a lab to test the performance of the new network configuration. Once adopted, it largely improved the company's performance and allowed it to open up new call center facilities in other Mexican cities.

The solution of the coordination difficulties relied not in government support or industry associations, but in the capacity that these entrepreneurs had to develop a close collaboration with their suppliers and their capability to hold simultaneous operations in Mexico and the United States.

## 2) *Monterrey: A Preferred Destination for Call Centers Aimed at the Hispanic Market*

Imitating companies have emerged in the years following the creation of Hispanic Teleservices. Some of them are companies that have made greenfield investments to service the Hispanic market in the United States from Mexico. Others are companies that were already servicing the domestic market and decided to reorient part of their production to export. In 2006 the sector had around 15,000 agents and there were about six main enterprises (IMT 2006), most of them based in Monterrey.

The main spillover from the first mover was to reveal the potential of providing services to the Hispanic market from Mexico and proving that the Mexican labor force was suitable to do so. Perhaps high entry barriers, particularly the high costs of technology and equipment, have prevented more domestic companies from going into the same business. Interestingly, it was the multinational enterprises that set up operations in Monterrey through the acquisition of domestic firms or through direct investment. An example of the former is Teleperformance, which bought Merkafon; an example of the latter is Client Logic.

From the top five companies in the call center sector in the world, two already have operations in Mexico, specifically in Monterrey. Table 4 summarizes the main features of the HTS followers.

**Table 4.**  
**Followers in the Call Center Sector in Mexico**

<b>Firm</b>	<b>Export Activities Year</b>	<b>Creation Year</b>	<b>Capital Country of Origin</b>	<b>Workers</b>	<b>Export \$US million</b>
<i>Hispanic Teleservices</i>	1999	1999	Mexico-USA	1 300	50 \$ (2005)
<i>Merkafon-Sr.Tele Performance</i>	2002	1996	France	4 500	ND
<i>Clientlogic</i>	2003	2005	Canada	830	32 \$ (2005)
<i>Telvista-Compu USA</i>	2003	1997	Mexico-USA	2500	ND
<i>Sutherland Global Services</i>	2006	1986	USA	ND	ND

*Source:* Author's compilation.

*Note:* ND=no data.

### **2.1. Teleperformance**

Teleperformance is the fourth-largest call center company in the world. In 2002 it took over Merkafon to service the Hispanic market from Mexico. Merkafon was the most important local company in the call center sector. It was created in 1996 by Pulsar Group to provide customer service to its own clients. Then it began servicing other local companies. Since its origins, Merkafon's directors recognized the emerging importance of the Hispanic market and they wanted to serve it. Yet they chose to enter the United States through the acquisition of a similar company in American territory instead of trying to serve the market from their Mexican facilities. In May 2000, they bought Access Worldwide's call center in Plano, Texas. Access Worldwide was an American direct-marketing company. The operation was renamed Merkafon Internacional, with 300 workstations.

Yet in 2002, Pulsar Group fell into financial trouble so it had to sell many of its companies, among them Merkafon. The buyer was Teleperformance, a French company with world-wide operations. The ownership change allowed a reorientation of the company to the international market, not only Hispanic, but also European and Latin American. Currently 65 percent of Teleperformance's profits in Mexico are generated in the U.S. market and the rest come from local clients (McKeary).

## ***2.2. Client Logic***

Client Logic began operations in 2003 in Monterrey, attracted mainly by cultural proximity. Amit Shankardass, one of the top executives of the company, says he likes to visit malls around the world in locations where the company is planning to set up operations. After visiting Monterrey's malls, he was impressed by how much they were like the ones in California. Under the premise that if consumers in Monterrey behave in a fashion similar to those in the United States, he believes local employees will better understand the services that American clients expect (Lyons, 2006). At the Monterrey center, the company handles a large number of reservations for American companies in all of Latin America and for Spanish-speakers in the United States (Sternlieb, 2005).

## ***2.3. Telvista***

Telvista is a company owned by Carlos Slim, the Mexican telecommunications mogul of TELMEX and Grupo Carso. Telvista was originally created to provide internal support to Grupo Carso companies in 1998. But in recent years, it began to explore opportunities in the United States, selling its services to clients like Verizon. As part of its strategy, Telvista bought Comp USA in 2001 to penetrate the U.S. market from its own territory, yet it did not envision any services to the Hispanic market until 2005. Telvista has used its facilities in Tijuana to do so; however, it also has an important part of its operations based in Dallas.

## ***2.4. Sutherland***

Sutherland began Mexican operations at its Monterrey facilities in May 2006. In a 2006 interview, Idania Quintanilla (2006) explained that the company undertook a study to evaluate the feasibility of investing in Monterrey. They were attracted by the presence of competitors and the existence of a bilingual labor pool; however, they soon realized that the labor supply was scarce. Thus they decided to offer more benefits to their personnel. Specifically, they have sought to retain employees by offering them a full-time contract after three months. Thus, in Monterrey there are no technological obstacles; but the availability of labor has become limited, forcing companies to develop new strategies to manage their human resources.

### 3) *The First Mover's Reactions to Competition*

The emergence of competitors has increased service exports. With regard to the first mover, competition did not sharply affect sales. HTS mentions that the Hispanic market in the United States is huge and a large number of companies still require bilingual customer services.

To prevent a negative effect on its sales, HTS has looked for differentiation and has acquired the ISO 27001 quality standard.<sup>35</sup> This enabled the first mover to hold onto its clients and attract firms that require confidentiality. The company has also tried to get contracts with very demanding clients that require a certification process that secures a certain amount of fidelity given the high costs involved. It also developed a consulting service to provide feedback to clients using the information gathered in the calls HTS handles.

Nonetheless, competition has affected HTS by reducing the pool of human resources available in Monterrey. Many of the companies that set up operations in this city went straight to HTS workers, offering them higher wages. Thus, they benefited from the intensive training process developed by HTS. This affected the first mover in the following ways: (1) considerably increased turnover levels,<sup>36</sup> (2) rising labor costs, and (3) creation of recruitment/training cost losses that are not recovered by the company. As a result, HTS had to open new facilities in Guadalajara. Yet its imitators have followed it there.

The largest limitation faced by HTS in its expansion process was the technological infrastructure it had. In the year 2005, the company undertook a very important upgrading project in collaboration with its network providers that allows it to serve many more clients as well as to set up operations in many different locations.

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<sup>35</sup> The ISO 27001 standard deals with information security. It handles objectives and policies related to integrity, confidentiality, and accessibility (from <http://www.icontec.org.co/MuestraContenido.asp?ChannelId=632>).

<sup>36</sup> A newspaper article revealed that in Monterrey the sectors with the highest turnover rates were: call centers, at 125 percent; retail, at 107 percent; and assembly plants, at 83 percent.

#### 4) *Public Policy*

In the early stages of the development of the call center industry in Mexico, there were no public policies encouraging the emergence of service exports. What did facilitate the process was privatization and liberalization in the telecommunications sectors, particularly the arrival of foreign providers that brought with them new technologies in the early 1990s. Another positive factor linked to liberalization, specifically of long-distance services, is that the arrival of new companies also involved the improvement of infrastructure and the introduction of optic fiber in the country's main cities.<sup>37</sup> NAFTA also set up a regulatory framework, which gave legal certainty to U.S. businesses, providing a specific chapter for cross-border services: Chapter 12.

The first mover took advantage of the fact that there was a U.S. company that was able to provide networking services in Mexico and the United States, yet he did not receive direct support from the government. Alberto Fernandez from Hispanic Teleservices recalls that in 2000, when he went to look for support from the Economic Development Agency in Nuevo Leon, the long and burdensome bureaucratic process discouraged him.

Since the year 2003, the state government of Nuevo León has undertaken some sector policies in a two-stage process. In the first stage, policies were devised on a case-by-case basis. This is the case of Teleperformance. When the French group showed some interest in investing in Monterrey, the Ministry of Economic Development (SEDEC) offered to design and implement a program to train bilingual call center agents. The government offered scholarships paying one-third of the monthly wage for a period of 1 to 3 months. The company had to pay the other two-thirds. Unemployed people were given priority and the program was implemented in coordination with the Labor Council and the Faculty of Languages at the Universidad Autónoma de Nuevo León. In other cases, the government has organized job fairs along with the newly arrived companies or has granted them a reduction in the payroll tax on new employment posts.

In the second stage, as the sector grew, the authorities realized the employment generation capacity of call centers and sought to expand them. At the same time, companies already operating in the city pushed for deeper public-private cooperation. The parties involved were aware of an important bottleneck that needed to be solved: many of the recruitment

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<sup>37</sup> By 1995 the companies had installed about 13,500 kilometers in the main cities with the participation of Alcatel-Indetel (ITT-Telmex), AT&T, and Northern Telecom y Ericsson (Ruelas, 1995).

candidates did not meet the profile required to fill the posts serving English-speaking or Hispanic clients, particularly because of their low English-speaking abilities.

So companies in the sector along with the Ministry of Economic Development began a cooperative initiative called the Call Center Industry Committee. This initiative seeks to design and implement a technical studies diploma to increase the pool of workers for the sector. SEDEC is in charge of providing the meeting place and materials, as well as the communication and coordination of participants. Involved companies are: Teleperformance, Hispanic Teleservices, Marcatel, Sutherland, GE Money, and Toptel. Three educational institutions are also participating: the Universidad Tec Milenio, the ICET, and the Language Department of the Universidad Autónoma de Nuevo León. They are interested in offering their knowledge, faculty, and facilities for the project. The Committee has met four times since July 2006 and so far is working to design a curriculum to set up a technical diploma. One of the major difficulties will be finding funding to offer scholarships for interested candidates and implementing the program.

At the federal/national level there has not been a public policy directed at developing call center service exports. The closest program is PROSOFT but it has full preference for those companies producing software, which is a higher value-added activity. In 2005 an initiative to eliminate the value-added tax for long-distance calls originated in Mexico was presented to the Congress by one of Nuevo León's deputies. Nevertheless the proposal was rejected.<sup>38</sup>

In the absence of a nationwide strategy and awareness of the creation of employment that call centers encourage, other Mexican states have developed their own set of policies. In general, the type of support available is in the form of land concessions, training, organization of job fairs, and tax exemptions. For example, Aguascalientes is planning to open a services park to attract business process outsourcing companies "being one of the strategic guidelines to stimulate competitiveness and technological development...the government will design tailor-made incentives supporting the acquisition of equipment, capital goods and up to 50 percent of the technological infrastructure needed" (Shwebel 2006). In Durango, the state government has consolidated an incentive package including financial support with federal and state resources that can be used to acquire or rent technological equipment, or to pay for the lease, renovation, or construction of buildings. It will also grant full exemption of the payroll tax for four years and a

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<sup>38</sup> In July 2005, Juan Carlos Pérez Góngora, deputy for Nuevo León at the Federal Congress, submitted the reform project, which sought to increase the attractiveness of Mexico as a call center destination. The Congress first approved the initiative but a couple of months later, in November, it was discarded.

50 percent discount of the subscription rights in the public registry of property. There are training scholarships for up to 60 days and programs to encourage English language learning.

#### 5) *External Non-state Actors*

There are some non-state actors around the call center industry that range from employer associations to local universities. This is the case in Monterrey, where a large part of the call centers have agreements with private universities through which they secure a constant inflow of labor, university students, in exchange for scholarships. The agreements have helped in the reduction of turnover rates (Teleperformance has an agreement with Universidad Regiomontana as well as with Tec Milenio).

At the national level, the Mexican Telemarketing Institute (MTI) gathers some of the most important companies in the call center sector serving domestic and international markets. Every year it organizes an annual meeting where the companies showcase their products and also meet technological suppliers and prospective clients. MTI also supplies relevant industry information through its web site.

Very recently the National Chamber of Electronic and Information Technologies has begun to develop certain activities around the call center sector given the technological specificities of the sector. Yet their priority, as happened with PROSOFT, is to develop the software industry.

#### 6) *Counterfactual*

Some business process outsourcing could be called “specialized business process outsourcing,” implying more aggregated value from the workforce. In this area, it is possible to develop remote services such as interpretation of x-rays, the processing of tax declarations, or design and engineering activities.<sup>39</sup> Unlike the administration of services, which are labor intensive and require a less qualified workforce due to the nature of the tasks, specialized business process outsourcing requires a qualified workforce with diagnostic ability and decision-making skills. In the Mexican case, specialized business process outsourcing has not been as successful in exporting as call centers for customer relationship management. Therefore, the counterfactual

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<sup>39</sup> For example, this is the case of Carrier, which designs the installation of air-conditioning for certain venues, such as movie theaters, establishments, etc. That part of the design could be made remotely, from Mexico, reducing the labor costs.

case for this study lies in specialized business process outsourcing, which in theory could benefit from the same location advantages as the call centers: a bilingual and skilled labor force as well as relatively low wages.

None of the companies in this case study, either the first mover or followers, is currently undertaking specialized business process outsourcing. The main reason for this is that they only have the capacity and know-how to undertake customer service activities. Interestingly, there are some other companies in the IT sector that have entered this niche, yet even they state that it is underdeveloped. This is the case of Neoris, one of the most important information technology outsourcing companies in Latin America.

### ***6.1 Neoris***

Neoris is a company originated in Sentek, initially created by Cemex to outsource its own IT needs. Later, in 2000, in order to take advantage of the company's expertise, it joined 12 Latin American companies and changed its name to Neoris. In 2002 the company acquired Andersen's Business Consulting group in Mexico. With revenues placing it among the top five IT service providers in Latin America, Neoris has 3,000 employees and offices in 13 locations, including the United States, Mexico, Venezuela, Brazil, Argentina, Chile, Spain, Germany, and Portugal (AMR Research Report, 2004:15). They have 180 clients around the world.

Based on its IT services, Neoris has identified another niche in business process outsourcing services and has tried to diversify its portfolio of customers. The focus is on human resources because it is a critical service in every company. Neoris has undertaken functions such as processing payroll, following up worker inquiries, and other fiscal issues that can affect efficiency (Olguin).

Yet, the main share of its income is still in IT services. Carlos Aguilar, Neoris' outsourcing director, recognized that although the company perfectly envisions the market opportunities arising from the demand for these services, it has not been fully able to take advantage of this due a list of several factors. First, speaking about why other companies are not taking part in this niche, he highlighted that it could be due to a low level of entrepreneurial culture in Mexico that is willing to undertake the risks of entering new sectors. Second, he pointed out a lack of diffusion of government programs, such as PROSOFT in the software sector, for the different modalities of support for entering the specialized business process

outsourcing business. And finally, there is a limited infrastructure in English language education, which undermines the skills of the bilingual work force for these areas.

## **6.2 Hewlett Packard**

Another company that has entered the specialized business process outsourcing sector is Hewlett Packard. The company announced in 2006 that it would outsource its administrative tasks, such as payroll, for the North American region to its Guadalajara, Mexico facilities, creating 1,000 jobs. Yet that represents intra-firm trade.

As these two short examples reveal, specialized business process outsourcing definitively represents a potential niche for Mexican exports. Yet some steps must be taken before firms will be able to fully exploit it.

## **7) Policy Recommendations**

The analysis of the emergence of call center service exports leads to a set of four venues for policy recommendations: human capital formation; financial support; legal framework; and industrial policy.

### **7.1. Bilingual Human Resources and Human Capital Formation**

Only six years have passed since the first exporting call center began operations, yet the sector is already experiencing some scarcity of bilingual human resources. Therefore, to remain an attractive location and prevent a general bilingual labor scarcity, the Mexican state needs to design and offer English courses at accessible prices, if not free, for those people not attending a university yet holding a high school education. They could become the workforce of customer service business process outsourcing.

As for specialized business process outsourcing, a stronger effort is needed to make sure that people holding a bachelor degree have enough English skills to apply for this type of job. This could be an interesting opportunity for many unemployed or underemployed professionals in Mexico.

### **7.2. Incentives**

In order to face international competition, it is important that the Mexican government develops a federal policy for call center/business process outsourcing incentives. Such a policy would

become an umbrella to coordinate state and local level policies. New incentives should also be designed to develop specialized business process outsourcing, particularly providing market insights to raise awareness of this niche and to a certain extent providing funds or mentoring to start up or upgrade businesses in this sector.

### **7.3. Legal Framework**

Regarding the legal framework, Mexico's fiscal reform has languished. The reform would allow the elimination of value-added tax in the call center sector, thus cutting operation costs. As this report has pointed out, the reform has already been taken to the chamber, where it failed. The elimination of the tax would definitely be a competitive advantage for Mexico vis-à-vis the rest of Latin America.

### **7.4. Industrial Policy**

Mexico's manufacturing industry is currently undergoing a transitional phase to services, but with the risk of repeating the mistake of becoming technologically and economically dependent. Therefore, if the country wants to successfully migrate from manufacture to *mindfactory*, an industrial policy that considers all branches of business process outsourcing, customer service, and specialization is crucial. This has to be in coordination with educational institutions to make sure that skilled labor is available.

The government should also encourage the development of local providers in areas such as software services and high technology product designs that link to the business process outsourcing value chain. This would promote more local components in the industry. Finally, attention should be paid to the development of the security, confidentiality, and quality norms of the business process outsourcing industry. This task would be promoted by the Ministries of Labor and Economy.

Finally, the Mexican government should design a plan to promote Mexico's competitive advantage abroad, to find more clients for the already established companies, and to bring into the country new international investors that encourage the development of exports from the call center and specialized business process outsourcing sector.

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