

The Globalization of Korean Industry: Korean Maquiladoras in Mexico

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Resumen

Este trabajo presenta los resultados de la investigación sobre inversiones manufactureras coreanas en las maquiladoras mexicanas (a las que llamaremos maquilas). Estas inversiones coreanas forman parte de dos corrientes mayores; la primera es la que han seguido las empresas manufactureras de diversos países que están abriendo en México fábricas dedicadas a satisfacer el mercado de Estados Unidos. La segunda corriente ha sido seguida por empresas coreanas que están invirtiendo activamente en el extranjero. La inversión coreana en las maquilas es particularmente interesante porque es la mayor inversión de multinacionales de un país desarrollado en uno no asiático en vías de desarrollo. Los resultados que se presentan en este trabajo son el primer examen a conciencia que se hace de las fábricas coreanas que operan en México.

Abstract

This paper presents the results of research on Korean manufacturing investment in the Mexican maquiladoras (hereafter, maquilas). These Korean investments are a part of two much larger trends:

The first trend is that manufacturing firms from various countries are opening factories in Mexico dedicated to serving the U.S. market. The second trend is that Korean firms are now actively investing overseas. Korean investment in the maquilas is particularly interesting because it is the largest investment by developing country multinationals in a non-Asian developing country. The results presented here are the first in-depth examination of Korean factories operating in Mexico.

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Introduction

The current casual acceptance of overseas investment by non-OECD countries is a marked contrast from the commonly held view in the 1970s that believed overseas investors would be only OECD multinationals. This belief changed dramatically in the 1980s as firms headquartered in LDCs and, especially, East Asia became internationally competitive in manufacturing activities that formerly had been the exclusive province of developed countries. By far the most impressive sustained industrial development occurred among East Asian Newly Industrializing Countries (NICs) as indigenous firms in Korea and Taiwan became international competitors in manufacturing. Their success demonstrated conclusively that capital accumulation is possible in LDCs. Moreover, certain firms in these developing countries had developed sufficient manufacturing skills to establish production activities overseas.

Perhaps the most interesting LDC multinationals are the Korean chaebol firms, such as Samsung, Hyundai, Lucky-Goldstar, and Daewoo. These companies have successfully competed with the largest Developed Country multinationals. During the 1980s these firms unleashed an export offensive that gave them significant market penetration in Developed Country markets. By the late 1980s, however, the Korean firms faced significant changes in the global competitive environment. In North America and Europe, Korean exports confronted newly erected protectionist barriers in product areas ranging from electronics goods such as televisions to steel and numerous other products. A rapid appreciation of the won (though not as rapid as for the Japanese yen) also contributed to an increasing difficulty in exporting. Simultaneously, the Koreans' most significant competitor, Japan, began a massive relocation of labor-intensive production to low-wage environments such as Southeast Asia and Mexico. Finally, Korea's internal environment changed as labor unrest grew and wages rose dramatically (Soon, 1994:87).

This paper presents the results of research on Korean manufacturing investment in the Mexican maquiladoras (hereafter, maquilas). These Korean investments are a part of two much larger trends: The first trend is that manufacturing firms from various countries are opening factories in Mexico dedicated to serving the U.S. market³ The second trend is that Korean firms are now actively investing overseas. Korean investment in the maquilas is particularly interesting because it is the largest investment by developing country multinationals in a non-Asian developing country. The results presented here are the first in-depth examination of Korean factories operating in Mexico.

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² Korean firms usually built new manufacturing facilities. Most other third World investors have favored real estate or acquisition of already operating companies. For example, most Mexican investments in the U.S. have been in the form of acquisitions rather than establishing greenfield subsidiaries and building factories (Pozas, 1993).

³ For a general discussion of the maquilas, see Sklair 1989; González-Aréchiga and Escamilla (eds.) 1989; Camarillo, 1991.

The data presented in this paper are the results of interviews conducted by the authors in November 1993 with managers at six Korean maquiladoras. The paper is divided into five sections. The first section examines the trends and forces that compelled the globalization of Korean manufacturers. The second section describes Korean investment in North America and the reasons for establishing maquila operations. The third section describes the integration of Korean firms into the local Mexican industrial environment and their relationships with suppliers. The fourth section examines industrial relations in the Korean maquilas. The conclusion discusses the role of the maquilas in Korean globalization strategies and the implications for Mexican development.

Korean Industry in the Global Economy

Korean firms are now among the largest non-governmental, non-OECD corporations in the world. During the last two decades Korean firms such as Samsung, Daewoo, Goldstar, and Hyundai have developed production facilities and sufficiently sophisticated technology to compete in the global market, largely because Korea suffers from a lack of resources, a small domestic market, and a strong state (Amsden, 1989; Haggard *et al.*, 1991). After a short initial phase of promoting development on the basis of import substitution, Korean industry, with the support of the State, began an intensive policy of export-led industrialization. Few other LDC firms have matched Korean success in penetrating global markets in core industries such as ship building, consumer electronics, automobiles, and semiconductors.

Korean economic success has been most pronounced in the electronics industry, where firms such as Samsung have had astonishing growth. In less than 20 years Korean electronics companies have become globally competitive in several electronics industry segments such as microwaves, televisions, VCRs, and DRAM memories (Ernst, 1994; Bloom, 1992; Suárez-Villa, 1990). An example of this growth is Samsung Display Devices, which now supplies an estimated 14 percent share of the global market for picture tubes and satisfies approximately 50 percent of Korean domestic demand (Crane, 1993: 41;

Electronics Business Asia, 1991: 47). For semiconductor DRAMs Samsung has become the world's largest supplier.

Korean industrial success has overcome many difficulties. The most salient problem has been that Korean firms have entered industries in which Japanese firms are the global leaders. The usual Korean strategy has been to take advantage of the lower wages and capital costs in Korea to underprice competitors; the profits were then reinvested to develop highly efficient manufacturing operations in an effort to capture an even greater market share. Due to Korean efficiency and a rapid increase in the yen's value, this strategy has been remarkably successful.

Even today, Korean electronics firms lack overseas marketing channels and use original equipment manufacturing (OEM) relationships with other companies to sell their products. The problem with this method of penetrating the global market is that while it raises production volume, it does not create a separate brand identity (Ernst, 1994; Bloom, 1992). Moreover, profits must be shared with the marketing company. OEM sales are a two-edged sword; they facilitate rapid increases in production volume, but do not develop a market and brand awareness that justifies higher prices. Korean firms are aware of this paradox and continue a determined effort to build distribution networks

and brand name recognition. This has not been easy, because the market space is occupied by Japanese competitors who are reluctant to surrender market share and use their higher brand awareness and excellent quality to justify slightly higher prices.

The 1980s were a period of remarkable growth in Korean market penetration, facilitated by the rising yen value. In the mid-1980s Japanese firms responded to their decreasing competitiveness by transferring the production of these commodity consumer electronics products to countries such as Malaysia, Thailand, and Mexico. Because of the rapid increase in Korean wages, these countries allowed Japanese firms to enjoy even lower wages. Simultaneously, in Japan consumer electronics factories were automated, and Japanese firms began to add numerous higher value-added features such as stereo sound, wide screen tubes, and other advanced features (I Hayashi, 1994). The consumer electronics industry is the quintessential example of Japanese response to Korean success.

The other reaction to Korean export success was that U.S. and European firms petitioned their respective governments for protection from Korean television and other electronics imports (Hark, 1991). These various forms of protectionism combined with internal developments in the Korean economy to make further export growth of low value-added commodity type consumer electronics products difficult (Jun, 1990). The combination of foreign protectionism, internal Korean developments, and the responses of their rivals prompted Korean electronics firms to initiate overseas production (Bloom, 1992).

Korean Foreign Direct Investment

Compelled by competition from yet lower wage countries and protectionism, Korean firms confronted the alternative of either investing overseas or abandoning their newly captured markets. Korean firms chose to invest overseas. Jun (1990) demonstrates that Korean firms were forced into overseas production earlier than would have been ideal. The initial advantages that undergirded their export success were fragile because they were based upon inexpensive, high quality Korean labor and government support. Such advantages are not exportable in the same way as is superior technology, quality and/or brand name recognition. Therefore, when producing overseas the Korean advantages based on the domestic economy were unavailable. And yet there was little alternative. Korean firms were compelled to become multinational producers and to develop their own global division of labor.

Korean foreign direct investment (FDI) has evolved through different stages. During the 1970s investment was minimal, due to the substantial trade deficit and the foreign exchange controls of the Korean government. In 1978 foreign exchange regulations were tightened further because of growing concern about capital flight. However, in 1980 policy shifted and there was a loosening of foreign investment restrictions. The new regulations eliminated foreign exchange restrictions for some types of projects and simplified approval procedures. This policy shift was a response to the second oil shock. The immediate goal was to encourage overseas resource development projects to secure access to natural resources such as oil, iron ore, and wood.

After 1986 the level of Korean FDI changed dramatically as the Korean government continued to relax foreign exchange regulations and simplify approval procedures. There are three main reasons for this shift: First, a substantial trade sur

plus provided Korean firms with sufficient revenue and market share to invest overseas. Second, increasing protectionism by developed countries forced large and small Korean firms to initiate overseas production. Third, the appreciation of the won increased the costs of Korean exports. These factors combined with domestic labor disputes, which prompted rapid wage increases. This confluence made the export of labor-intensive, low value-added goods increasingly uneconomical. To maintain competitiveness, Korean firms had to invest overseas.

After initial overseas investments in the Indonesian timber industry in 1968, Korea's foreign investment in manufacturing increased steadily. By 1971 Korean cumulative overseas investment had reached \$15 million (20 cases). From the period 1972 through 1988 the amount of annual investment overseas grew steadily. The number and, especially, the value of these investments increased from a cumulative total of \$1.4 billion (1 353 cases) in 1988 to over \$5.2 billion (2 451 cases) in 1992 (Korean Foreign Trade Association 1993). The Korean garment and shoe industries have made the largest number of individual overseas investments, but the fabricated metal sector which includes household electric and electronic products, has invested the most capital (Ryou and Song, 1993). From 1993 to 1996 Korean overseas investment continued its acceleration as Korean firms built or announced massive investments around the world to produce automobiles and consumer electronics. In 1995 and 1996 L.G, Samsung, and Hyundai announced that they would begin building DRAM semiconductor fabrication facilities in the U.S. and Europe.

The bulk of early manufacturing investments were made by Korean clothing and footwear producers in ASEAN to take advantage of inexpensive labor (Korzenwicz, 1994; Donaghu and Barff, 1990; Barff and Austen, 1993). These were followed by investments in the fabricated metals and electronics industries in ASEAN. As was the case with earlier Japanese investments, Korean investments in Southeast Asia are closely linked with their parent firms. Production equipment is either new or secondhand machines imported from Korea. Further, most raw and intermediate materials are purchased from the parent firm (Ryou and Song, 1993: 17). Until recently, most overseas Korean factories are simply assembly platforms for semi-knocked down kits and only appendages of the home plants (Jun, 1990; Kim, 1995). In Mexico this will be dramatically altered by the investments in building color television tube factories.

Korean foreign manufacturing investment is growing as profits are reinvested in expansion in developed and developing countries. In some measure, the large scale of this investment has been necessary to overcome the substantial lead of the Japanese competition. With the growth of regional trading blocks, Korean firms have had little choice but to accelerate overseas investment. As the tendency toward trade block protectionism continues, Korean firms will be impelled to respond with still greater investment.

Korean Manufacturing Investment in North America

Korean manufacturing investment in North America has been limited. As of 1992, cumulative total investment by Korean firms in North America reached only \$2.1 billion (Korean Foreign Trade Association, 1993:52). Excluding the Pohang Steel-U.S. Steel joint venture that operates a cold strip and hot dip galvanizing

mill in the San Francisco area, the preponderance of Korean manufacturing investment in the U.S. has been in small high-technology electronics firms, for the express purpose of securing access to sophisticated technology (Bloom, 1992). Canada has received little investment, the important exception being the now defunct Hyundai automobile assembly facility in Quebec. The largest concentration of Korean manufacturing investment in North America is in northwestern Mexico.

Korean investment in North America has had setbacks. For example, in the mid-1980s the Korean auto industry and especially Hyundai Motors experienced rapid sales growth in North America. Some observers thought that Korea would follow the Japanese path and become a major investor in North American auto manufacturing. This belief seemed plausible in 1988, when Hyundai had invested approximately \$300 million in Quebec, Canada to build an auto assembly plant capable of producing 100 000 cars per year (*Ward's Auto World*, 1988). Due to shrinking market share and serious labor problems, Hyundai closed the Quebec facility in 1993 (*Wall Street Journal*, 1994). Though the Korean auto industry has continued to grow, Hyundai retreated from its initial goal of producing in the developed countries to refocus on the booming Korean market and developing countries.⁵

Historically, Korean electronics firms have had difficulties producing in the U.S. For example, in 1984 Hyundai purchased a semiconductor manufacturing plant in Santa Clara, California, but later sold it at a loss (Kirk, 1994). Goldstar and Samsung established U.S. plants, in 1983 and 1984 respectively, to assemble televisions using parts imported from Korea (Bloom, 1992). In the early 1990s these plants were closed and replaced by maquilas. Korean firms retreated from their initial goal of producing in the U.S. and Canada. More recently, in 1995 Korean firms reentered the U.S. market by purchasing majority ownership in U.S. high technology companies. The most significant investment was by Samsung, which purchased a 40.25 percent stake in the failing U.S. personal computer maker, AST, for \$378 million (*Business Korea*, 1995).⁶

Korean firms now are aiming to produce and export from Mexico to the U.S. and Canada, and since 1990 Korean manufacturing investments in North America have concentrated in Mexico. These investments use the maquiladora program established by the Mexican government in 1965 to attract U.S. businesses that were starting-up plants in Asian countries such as Korea and Taiwan (Sklair, 1989: 9).

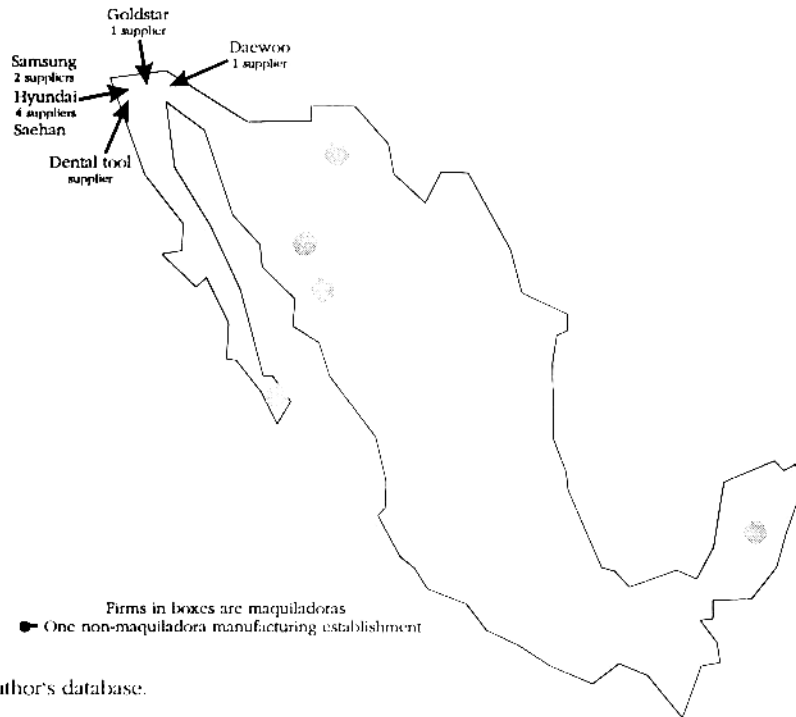
Korean maquilas comprise less than one percent of the more than 3 300 maquilas operating in 1995, the vast majority of which are U.S. owned and operated (Alonzo *et al.*, 1996). The actual number of Korean investments in Mexico is disputed. In 1993 The Banco Nacional de Comercio Exterior listed 16 Korean investments. However, our database compiled in 1994

4 For a discussion of Japanese investment in the United States, see Kenney and Florida, 1993.

5 Recently, auto manufacturers in Korea have added new capacity and are again beginning a concerted export offensive (Kiln and Lee, 1994).

6 Korean garment firms also have invested in North America. However, these investments concentrated in the Caribbean to take advantage of duty-free access to the U.S. market guaranteed by the Caribbean Basin Initiative. Low wages are the driving force for the garment investments (Yu, 1990; 131, Jun, 1990). For example, there are at least 50 Korean apparel assembly plants in Guatemala. These Guatemalan operations employ thousands of workers for wages of \$3 per day or less (Golden, 1992). Petersen (1992) has a detailed discussion of maquiladoras in Guatemala that describes the Korean investments.

FIGURE 1. *Location of Korean Manufacturing Establishments in Mexico.*



SOURCE: Author's database.

contains 25 separate investments. In 1994 the total value of all Korean manufacturing investments in Mexico was approximately \$86 million of the 1992 total \$2.1 billion Korean investment in North America of this, \$16.9 million was invested in a diverse array of non-maquila operations. With the newly announced consumer electronics operations, the total Korean investment in Mexico will be over \$1 billion by 1987. The number of plants is approximately 35, though Samsung's new tube and component production facility in Tijuana is already a massive complex rather than a single plant.

In 1994 Korean firms employed approximately 5,000 Mexicans in northwestern Mexico, but this number will continue to increase rapidly over the next three years to approximately 15,000. Korean employment will remain far less than the approximately 50,000 Mexican employed by Japanese firms, and only slightly more than one percent of the approximately one million maquila employees in Mexico in 1996 (Alonso *et al.*, 1996). For Korean consumer electronics firms, however, production in their Mexican facilities serves as a central pivot of their entire North American operations.

As Figure I indicates, all the Korean maquilas are located in northwestern Mexico. Moreover, these investments are concentrated in electronics and related industries such as videocassette production, i.e., which account for nine of the fifteen maquila investments. The important exception is the Hyundai Tijuana factory which produces aluminum and steel cargo shipping containers. Hyundai invested \$40 million in its Tijuana plant, which in 1993 employed approximately 1 200 workers and was the largest single Korean invest-

ment until the Samsung consumer electronics complex in Tijuana was built.

In contrast to Japanese investments that have been limited to assembly facilities, initial Korean investment in television assembly facilities proved to be the beginning of far larger efforts. Northwest Mexico is becoming a global center of large-scale Korean investment in television and computer monitor production. In 1994 Samsung announced that it intended to invest nearly \$500 million in building a television and computer monitor production facility in Tijuana (Lajud, 1994). In early 1995 Daewoo stated that it would invest a further \$114 million for the production of monitors, small-size television picture tubes, and electronic components at its San Luis Colorado TV assembly facility (*Cambio*, 1996). Finally, LG Electronics announced, by late 1996 it will have invested over \$300 million to set up lines at its plant in Mexicali. When fully operational, the LG plant will annually produce more than 6 million cathode ray tubes for color televisions (*The Korea Economic Weekly*, 1996). When completed, these investments will total more than \$900 million, or more than all Japanese firms had invested in Baja California as of 1995.

Inexpensive labor has been the most important single attraction for the Korean maquilas. Due to the constant price wars in the 25 inch and under television market segments Korean assembly operations in the U.S. could not compete with Mexican-made televisions (Soon, 1994; Bloom, 1992; Yoshihara, 1988). In all of the consumer electronics industry segments occupied by (the Korean maquilas, price competition is severe. In 1993 beginning operators in Tijuana received approximately \$1.10 per hour, whereas in the U.S. nonunion electronics assembly wages were \$6.00-10.00 per hour. In comparison, in 1992 manufacturing wages in Korea were approximately \$4.80 per hour and increasing at approximately 10 percent per annum (Korean Foreign Trade Association, 1993). With Korea's competitors enjoying Mexican wages, it was difficult for Korean assemblers to continue production in the U.S.

The trade laws concerning television manufacturing also were an important incentive. After prolonged and repeated trade talks and threats throughout the 1980s the U.S. government threatened and then imposed trade sanctions on Korean television imports (International Trade Commission, 1984; Bark, 1991). After 1984 the pressure to invest in North America, increased as the U.S. government imposed antidumping duties on Korean televisions and negotiated an orderly marketing arrangement that limited the number of completed televisions that could be imported from Korea. With the elimination of Korean privileges under the generalized system of preferences, Korean imports were subject to the U.S. duty of 5 percent on imported TV sets and 15 percent on imported picture tubes (Kirn, K., 1993: 73ff). The initial response of Samsung and LG was to open plants in the U.S. to assemble televisions with parts imported from Korea. To circumvent the limits on Korean televisions imported into the U.S., Korean firms shipped picture tubes and most of the other major components for assembly in North America. But, the Korean factories in the U.S. operated for only a short

7 The ultimate fate of this Ins investment may be affected by Lucky Goldstar's decision to purchase majority control of Zenith for \$351 million. Lucky now inherits Zenith's large operations in Reynosa and Zenith's television tube production in the U.S. (Carey, 1995; *Business Week*, 1995).

period before production was moved to Mexico.

The Korean Maquilas and Mexican Economic Environment

The establishment of a new manufacturing facility is always a complex coordination problem as inputs must be secured and outputs efficiently delivered to the market. The new facility must make decisions regarding whether to source parts locally, regionally, nationally or globally. Almost invariably it is more efficient to purchase at least some parts locally. For the host country local content issues are important, because they determine how much value is added nationally. Also, along the U.S.-Mexican border there is a choice to purchase parts from either side of the border. With the Korean firms this siting decision also includes consideration of the desirability of encouraging critical parts suppliers to relocate with the assembler to the new site.

The president of one Korean consumer electronics maquila stated that the attraction of the border region is the ability to combine the U.S. infrastructure of communications, transportation, and parts with the inexpensive labor of Mexico. Korean television assemblers have chosen to locate in three different northwestern cities:

Samsung in Tijuana, Goldstar in Mexicali (Baja California), and Daewoo in San Luis Rio Colorado, Sonora, next to Nogales. In contrast, Japanese consumer electronics assembly plants have concentrated in Tijuana. The particular locational pattern is likely explained by the intense rivalry between Korean firms. Also, L.G's location in Mexicali has a historical legacy, because prior to relocating to Mexico, Goldstar purchased its television chassis from Electra Corporation of Mexicali (Kraul, 1988).

Large Korean assemblers are actively encouraging their Korean suppliers to relocate to Mexico. Nevertheless, Korean small and medium enterprises find the move difficult because they suffer from shortages of capital and skilled manpower to dispatch overseas. The relative small size of the Korean suppliers (under 50 employees) in Mexico is remarkable when compared with the size of the Japanese electronics parts suppliers (an average of over 150 employees) operating there.

In 1995 and 1996 the three Korean television manufacturers operating in Mexico have been joined by increasing numbers of Korean suppliers. In our study we only interviewed one Samsung supplier that had established operations in 1992 and specializes in making antenna adapters and controller boxes. In 1993 the manufacturing facility was located in rented quarters, but by 1996 it had moved into a much larger newly built factory. According to a company-provided brochure, both Samsung and Daewoo have been the firm's customers in Korea, although the reason it initiated operations in Mexico was primarily due to Samsung's request.

Once the company began operations in Mexico, Samsung urged the supplier to spread its risks by securing contracts to supply Japanese television assemblers in Tijuana. In 1993 the firm was certified as qualified to supply two major Japanese television assemblers operating in Tijuana. The sales manager reported that the firm received certification from its potential Japanese customers only after repeated visits to one Japanese firm's Midwestern head-quarters. To win the contract, the Korean firm had to compete against a Japanese supplier. As with other firms, the supplier uses almost no Mexican or U.S. content and nearly all of the inputs are imported from Korea. It did purchase some compo-

nents such as capacitors and resistors from Matsushita and Murata.

Due to the quite recent establishment of assemblers in Tijuana, in 1993 there were only a few Korean electronics suppliers in Mexico. Whereas there were four Korean electronics suppliers, there were at least twenty Japanese electronics suppliers. This is understandable, since the major Japanese assemblers such as Sanyo, Matsushita, and Sony began operations in Mexico in the early 1980s and their Japanese suppliers began to arrive in the mid- to late-1980s (Kenney and Florida, 1994).

None of the Korean maquilas had more than 5 percent local content supplied by Mexican firms. If the parts purchased from Korean or Japanese firms operating in Mexico are included, then local content would be slightly higher. A survey of Korean firms manufacturing abroad found that the greatest difficulties faced by Korean firms operating in Mexico was access to raw materials and local financing. Among the other difficulties reported were:

infrastructure, competition, and labor productivity (Ryou and Song, 1995:16). Northwestern Mexico does not have an infrastructure capable of supplying low-cost, high-quality electronic parts or even the plastic injection molded or stamped metal parts used in consumer electronics production.

From the regional perspective, Figure 2 indicates that only K4 has a high North American content ratio. This is true for all three of its products: aluminum containers for domestic trucks, steel shipping containers, and truck chassis. None of these products has a North American content lower than 60 percent, and one has nearly 100 percent. However, K4's operation, a heavy industrial manufacturing process, is unusual for Tijuana since nearly all of the Asian maquilas conduct light assembly. The Korean video cassette manufacturer receives all of its parts from Korea. Hyundai also purchases very few materials from Mexican vendors.

In late 1993 the major Korean television assemblers continued to purchase most inputs from Korea. Only K3 purchases most of its components from the U.S. This situation is changing, however, because of cost concerns and response to NAFTA; all the Korean television assemblers are now increasing their North American content. For example, K1 has purchased its tuner from Matsushita's Tijuana tuner factory and some of its plastic parts from a Japanese parts linn in Tijuana. Now that LG has purchased Zenith, and Samsung and Daewoo are building large component facilities in Mexico, local content should increase dramatically, though indigenous Mexican firms will not *be* the suppliers.

FIGURE 2. *Origin of Inputs to Korean Maquilas.*

	<i>US</i>	<i>Japanese</i>	<i>Mexican</i>	<i>Other Asia (except Korean)</i>	<i>Korean</i>
K1	28	Some	0	0	72
K2	60	6	1	3	30
K3	24	Some	0	0	68
K4	95	0	0	0	5
K5	6-7	0	0	0	93-94
K6	5	0	0	0	90

SOURCE: Personal Interviews, 1991, 1993.

Korean investments in northwestern Mexico do not exist in a vacuum. As mentioned earlier, there is an active infrastructure of Japanese electronics firms and suppliers in the area. The relationship between the Korean and Japanese firms in northwestern Mexico also appears to be changing. In 1991 one of the authors interviewed the president of a Japanese supplier, who said that his firm had failed to secure contracts to supply parts to Korean maquiladoras, because the Koreans could import less expensive parts from Korea. In the intervening two years the continued escalation of Korean wages, the expectation of NAFTA's passage, and pressure to increase North American content altered the situation, and the Korean television assemblers began to purchase more components locally.

The best example of the changes NAFTA will produce in component sourcing is the picture tube. For televisions the picture tube is the most valuable component, accounting for between 25 and 60 percent of the total value. The passage of NAFTA drastically changed the landscape of the global division of labor by unifying the customs regime of the signatories. As a result of NAFTA, over-14-inch television tubes imported into Mexico from outside NAFTA will pay the 15 percent tariff. An importer can no longer avoid this duty by importing the tube into Mexico, assembling the television in Mexico, and then paying only 5 percent duties for assembled TVS (Han, 1994). In other words, the tariff advantage of importing tubes from Asia and assembling complete sets in Mexico disappeared.

NAFTA's implementation in 1995 forced the Korean firms into a dilemma - they would have to purchase from competitors or increase their own investment in North America. Their response was overwhelming. Samsung (the largest Korean electronics firms) decided to invest \$500 million to build an integrated television production facility in Tijuana. Most important, this included the most capital-intensive investment in a tube fabrication facility. This investment allows Samsung to drastically increase North American content and limits its dependence on competitors for tubes. The economics of building a tube making facility means Samsung will need to sell tubes to other Korean and Japanese firms. Daewoo also decided to deepen its investment in Mexico and is investing \$90 million to upgrade its facility in San Luis Colorado.

In our 1993 interviews we were told that other Korean consumer electronics parts and component suppliers are considering establishing plants in Tijuana. One Korean firm provided the names of six smaller electronics suppliers which had visited Tijuana in 1993 to evaluate the establishment of production facilities. Included in the group were: a lead wire company, a spring company, a semiconductor assembly company, and three other electronics suppliers. These visits were in response to warnings from K1 that it would move an increasing proportion of its television assembly out of Korea. The president of K1 told Korean suppliers that they must either follow or lose business, as K1 was prepared to let more subcontracts to North American manufacturers.

By 1996 a number of Korean suppliers had opened or were building factories in Tijuana to supply their important Korean customers. For example, Kyung In Corporation, a relatively large Korean switch maker was opening a plant in Tijuana in 1996. Also, some other parts suppliers were building factories in the industrial park where Samsung was setting up its massive television production complex. As these various suppliers become operational they will dramatically reinforce the Samsung production facility.

K4's container production facility has four suppliers in Tijuana. These suppliers

proved quite elusive, and we were unable to ascertain the parts they provided to K4. We were able to uncover only one small item, a truck cargo door latch, that K4 purchased from a Mexican supplier. While this may appear insignificant, this purchase of a Mexican-made part was greater than those of the other Korean maquilas.

The final significant Korean investment in Tijuana is K5, one of the world's largest producers of videotape cassettes and other magnetic recording media. K5 is an original equipment manufacturer (OEM) of video cassettes for American, Japanese, and European firms operating in North America. Nearly all inputs are imported from Korea, but the company has purchased some packing materials and certain of its labels from the U.S. and Mexico.

Just-in-time (JIT) production has become one of the global standards for efficiency in interfirm relationships. The three TV assemblers responded that they were using JIT for incoming parts. However, one respondent, when pressed as to whether this resembled operations in Korea, qualified his answer by saying that JIT was the goal, not the reality.⁸ One reason for this qualified response is that it is difficult to operate a supplier JIT system, especially when most suppliers are located in Korea.

Korean and Japanese multinational corporations have markedly different North American production chains. However, they have both chosen Northwest Mexico as the site for the assembly of televisions. The relocation of more Korean suppliers to Tijuana, combined with the Japanese suppliers currently in Tijuana and those on their way, could create a significant agglomeration. Baja California should become even more attractive to consumer electronics assemblers and suppliers and Tijuana is developing a supplier infrastructure that will prove attractive to still more electronics firms.

The proximity of so many Japanese and Korean electronics operations in Tijuana and Baja California is creating an environment in which there is increasing interaction between the companies. Currently, both Daewoo and Goldstar already purchase some tubes from Japanese tube factories in the U.S. For example, Daewoo Corporation purchases television tubes from Toshiba's New York factory (Miller, 1993); this could change now that Daewoo is building its own factory tube factory. Sony's San Diego area tube manufacturing plant provides tubes to Goldstar; which assembles Sony TVs on an OEM basis. Also, Goldstar assembles 150,000 television/VCR combination sets on an OEM basis for Sony (*Nikkei Weekly*, 1993: 23).

Industrial Relations

The firms we describe here have reported that they use either a Korean or a mixed management style. A difficulty with interpreting this answer is that there has been little scholarly analysis of the Korean production and management system. Therefore, it is difficult to construct an ideal type against which to compare the maquilas. Thus this paper is limited to describing the management system in the maquilas as currently practiced. One Korean manager offered this comparison with his Japanese competitors: In Korean maquilas there is a Korean president, but the next level of managers is Mexican; in contrast, in Japanese firms both the president and the next

8 This corresponds to the findings of Kenney and Florida (1994) regarding the relative lack of JIT operations in the Japanese maquilas.

level of managers are Japanese. In other words, Korean firms delegate more managerial decision-making to Mexicans, whereas Japanese firms confine their Mexican managers to reporting. The characterization of Japanese maquilas seems largely correct, but it is not so clear that delegation of authority is characteristic of all Korean maquilas.⁹

Korean firms internationalized their production only relatively recently. As mentioned earlier, the primary reason for their choosing Mexico was to circumvent U.S. trade barriers and to secure access to low-cost labor. This section briefly outlines the industrial relations system used by Korean firms in Mexico. It is difficult to make comparisons with the system used in Korea, because there has been relatively little written about the organization of labor-management relations in Korean factories. Moreover, there seem to be significant differences between Korean companies. Kirk (1994) presents ample evidence that at Hyundai labor-management relations are antagonistic and have led to violent strikes. In contrast, other Korean firms, though they have had strikes, appear to have somewhat more consensual labor relations. Given the relative lack of research on industrial relations in Korea, this section is limited to a description of research results but will make some comparisons with Japanese firms operating maquilas in the consumer electronics industry.

High labor turnover is commonplace in maquilas, and Korean firms are no exception, as Figure 3 indicates. The rates for Korean firms are roughly comparable to earlier research reported on Japanese firms in Baja California (Kenney and Florida 1994). Each firm reported that initially turnover rates were in the double digits, but decreased as the firm became more established. The highest turnover was at an only recently established small TV component supplier.

At the time of the interviews in 1993, Korean wages for entry-level personnel were between \$1.20 and \$1.90 per hour and were somewhat higher than those of other electronics maquilas in Tijuana. Salaries for technicians were significantly hi-

CUADRO 2. *Baja California: maestros y personal no docente por tipo de control (medio curso 1993-1994).*

<i>Tipo de control</i>	<i>Maestros</i>	<i>Personal no docente</i>	<i>Total</i>
Federalizado	9 830	5 136	14 966
Estatad	9 328	5 411	14 739
Particular	3 181	2 000	5 181
TOTAL	22 339	12 547	34 886

FUENTE: Elaborado por el autor con base en los datos proporcionados por el Departamento de Microplaneación y Estadística del Instituto de Servicios Educativos y Pedagógicos de Baja California.

9 This paper compares the Korean firms with a typical Japanese maquiladora transplant. The authors recognize that there are some exceptional Japanese maquiladoras such as Sony that have been leaders in delegating management authority to Mexicans. One of the anonymous reviewers said that his interviews comparing Sony to Samsung and Hyundai found the exact opposite. Our respondents were Korean managers, Mexican managers might have a different perspective. Clearly, more research is necessary to validate this point.

FIGURE 4. *Training Activities at the Japanese and Korean Maquilas.*

<i>Company</i>	<i>Before Work</i>	<i>OJT</i>	<i>Later Training</i>
J1	safety training	OJT	
J2	1 day orientation	OJT	
J3		OJT	
J4		OJT	
J5		OJT	
J6		OJT	
J7	1.5 days	OJT	
J8	3 days	OJT	
J9		OJT	
J10		OJT	
J11		OJT	
J13		OJT	
J14	3 days	OJT	
K1	3 days	OJT	
K2		OJT	
K3	1 week	OJT	
K4	4 weeks	OJT	
K5		OJT	
K6		OJT	

FUENTE: Personal interviews, 1991, 1993.

gher than operators; one company reported paying technicians \$3.80 per hour. Managers are generally in short supply and received on average \$20 000 per year, or roughly probably 30 percent of salaries in comparable U.S. factories. In contrast, the workers receive only about 20 percent of comparable U.S. wages. The relatively stronger bargaining position of Mexican managers is due to a pervasive shortage.

In addition to wages Korean firms offered incentive packages consisting of various benefits, including food coupons, transportation expenses, dispensary medicine at the factory, and a small attendance bonus. One firm had developed a far more elaborate bonus scheme with a number of interesting provisions. For example, each month the ten best employees were awarded a \$50 bonus, i.e., almost the equivalent of one week's pay. The company also had incentives including attendance bonuses and a company-sponsored birthday party every two weeks. Finally, for three months' unbroken attendance it offered a radio valued at \$50-60; for six months there was a \$100-120 bonus and for an entire year the employee was given a 20" color television and \$200-300 for vacation use. Interestingly, the average absenteeism rate was approximately 2.5-3 percent, which is slightly better than that of comparable Japanese firms (Kenney and Florida, 1994). Another of the large companies offered attendance and punctuality bonuses, food coupons, a collective bus, and team productivity incentives.

Korean firms had a record of training superior to that of the Japanese firms examined by Kenney and Florida (1994) in 1991 (Figure 4). New employees were provided some initial off-the-job training. The most extensive program taught Mexican workers welding techniques in the

classroom and in the factory. This firm also offered Tae Kwan Doo training after hours. One company also gave three days off-the-job training and then gave the workers a test, which approximately 4-5 percent failed. One Korean manager reported that his firm provided more training to its employees and as a result was more productive than Japanese competitors operating in Tijuana. This firm also had a program to send three Mexicans to Korea each year for further training.

None of the factories were unionized, and in the interviews there were no concerns expressed about labor unrest. This is not surprising, as there have been very few strikes or other forms of labor unrest in northwestern Mexico. Strikes in foreign-owned maquilas are highly unusual, because Tijuana has a long antiunion history and a weak organized labor movement.

There are persistent rumors that at certain factories the relatively authoritarian Korean management style is disliked by Mexican workers. Astonishingly, in March 1995 Hyundai was involved in one of the most serious outbreaks of labor unrest in Tijuana. The number of Hyundai strikers was estimated as being between 200 and 800, from a total of more than 1,200 workers (Sarmiento, 1995). Workers were quoted as saying that working at the factory was "like living in a concentration camp." Other workers claimed that they were "suspended for unjust reasons" (Garibay, 1995:8). The strike was settled quite quickly by dismissing the strikers. Still, the occurrence of a strike at all is surprising.¹⁰

The results of our study of the production process and industrial relations were somewhat surprising. Korean firms offered more training and benefits than did their Japanese competitors. If these results are generalizable, the criticism that Korean firms are not desirable investors because they trail Japanese and U.S. firms technologically might be offset by the fact that Korean firms are more apt to train workers than Japanese firms, and in this way may make an important technological contribution. Thus, the actual technology transfer may be greater. On the other hand, the Hyundai incident indicates that at least Hyundai has significant labor relations problems, despite the fact that the firm provided more training for entry-level workers than any firm reported in the literature on maquiladoras.

Discussion

Korean firms responded to growing U.S. protectionism and (the increasing regionalization in North America by rearranging their production networks in two ways:

First, they closed U.S. facilities and relocated to Mexico. Second, they moved production from Korea to Mexico. Korean strategies in North America contrast sharply with those of Japanese and European consumer electronics firms that continue to operate a North American division of labor. The most important reason is that Koreans, as late comers, did not inherit U.S. factories as did European and Japanese television manufacturers when they acquired failing U.S. producers. Moreover, the Europeans and the Japanese decided to site capital-intensive tube production facilities in the U.S. and Canada. Korean manufacturers, deciding to invest only recently, have taken the risk of building tube plants in Mexico. Thus the production chains Korean firms are

¹⁰ Hyundai has a reputation in Korea for being quite confrontational regarding labor issues (Kirk, 1994). Parenthetically, this confrontational style also contributed to the demise of the I Hyundai auto assembly plant in Bromont, Canada.

building in North America are not integrated across North America, but rather are entirely sited in Mexico.

Korean multinational corporations have made northwestern Mexico their North American production base for televisions, videocassette tapes, and cargo containers. The ability of Korean multinationals to operate large-scale, relatively technologically sophisticated factories in Mexico signals an important new development in the growth of the Mexican economy and its position in the international circuits of capitalism. Korean confidence in operating a capital-intensive tube production facility oriented towards export in Mexico is unprecedented. The previous tube facilities located in central Mexico supplied a protected internal market. Korean maquilas are evolving beyond the simple screwdriver plants that were initially established in Mexico.

There is ample evidence that northwestern Mexico is a globally important center of television and television parts production, created by a combination of Japanese and Korean firms. This fact is even *more* interesting because the evidence suggests that Korean firms are building a Mexican supplier network consisting of both Korean and Japanese firms in the area. This network is not limited to OEM relationships among *the* large assemblers. Korean suppliers are supplying Japanese assemblers and vice versa. If this pattern continues as the number of televisions assembled increases, it can be expected that northwestern Mexico and San Diego will develop an even richer support infrastructure for consumer electronics. These agglomeration economies might then encourage the relocation of assembly operations for other electronics products to Mexico.

The results reported in this paper are important for two reasons. First, for the first time Korean investment in Mexico has been studied using the results of microlevel field research. We explain Korean maquilas as a part of the global strategies of Korean firms. Second, we provide suggestive evidence that Korean management in Mexico operates differently from Japanese firms. Though this conclusion is tentative, it suggests significant differences between the overseas management styles of Korean and Japanese firms.

For Mexico, Korean investment provides another opportunity to proactively strengthen its role in the global consumer electronics market by broadening the products assembled locally, from televisions to VCRs to compact disk players, etc. Mexican strength in consumer electronics might be further bolstered by offering governmental incentives to companies willing to establish parts and components operations in northwestern Mexico, to actively try to capture more of the commodity chain in Mexico. The strategy would be to attract non-Mexican firms and/or encourage indigenous Mexican firms to supply the MNCs operating in Mexico.

References

- Alonso, Jorge *et al.*, 1996. "Working in the Mexican Maquiladoras: Challenges of the Contemporary Industrial Transition and Its Interpretation." El Colegio de Sonora (unpublished document).
- Amsden, A., 1989. *Asia's Next Giant*, New York, Oxford University Press.
- Banco Nacional de Comercio Exterior, SNC, 1993. "Principales Coinversiones Coreanas Establecidas en Mexico" (mimeo).

- Barff, R. and J. Austen, 1993. "It's Gotta Be da Shoes': Domestic Manufacturing, International, 1993 Subcontracting, and the Production of Athletic Footwear." *Environment and Planning A* 25, pp. 1103-1114.
- Bark, T. 1991. "Anti-dumping Restrictions against Korean Exports: Major Focus on Consumer Electronics Products." Korean Institute for International Economic Policy (May).
- Bloom, M. 1992. *Technological Change in the Korean Electronics Industry* (Paris: Development Centre, OECD).
- Business Korea*. 1995. "Challenging the Global PC Market." (April), p. 25.
- Business Week*. 1995. "Will Lucky Goldstar Reach Its Peak with Zenith?" (August 7), p. 40.
- Cambio*. 1996. "San Luis sera plataforma de la Daewoo." (January 8), p. 13.
- Carey, Susan. 1995. "South Korean Company Seeks Control of Zenith, Last of the U.S. TV Makers", *Wall Street Journal* (July 18), p. A3.
- Carrillo, J. V. 1991. *Mercados de traba/o en la industria maquiladora de exportacion*, (Tijuana: RI Colef).
- Crane, Geoff. 1993. "Samsung Talks Big", *Electronic Business Asia* (August), pp. 40-44.
- Donaghu, M. and R. Barff. 1990. "Nike Just Did It: International Subcontracting and Flexibility in Athletic Footwear Production", *Regional Studies* 24, 6, pp. 537-552.
- Electronics Business Asia*. 1991. "A Blue Chip in a Blustery World" (June) pp. 47-48.
- Ernst, Dieter. 1994. *What are the Limits to the Korean Model: The Korean Electronics Industry under Pressure* (Berkeley: BRIE, University of California, Berkeley).
- Garibay, Atahualpa. 1995. "Inició la Huelga en la Hyundai." *Cambio* (March 15), p. 8.
- Golden, Arthur. 1992. "Guatemala a Fine Fit for Korean Clothiers." *San Diego Union-Tribune* (29 March), p. II.
- Gonzalez-Arechiga, B. and R. Barajas Escamilla (eds). 1989. *Las maquiladoras: Ajuste estructural y desarrollo regional* (Tijuana: El Colef).
- Haggard, S., B. K. Kim and C. I. Moon. 1991. "The Transition to Export-led Growth in South Korea: 1954-1966." *Tfyc Journal of Asian Studies* 50, 4 (November), pp. 850-873.
- Han, H. R. 1994. "Rules of Origin of NAFTA and the Policy Implications." Korean Institute for International Economic Policy, Seoul, Korea (in Korean).
- Hayashi, T. 1994. "Restructuring of Items With a Product Line: A Case Study of Japanese Multinational Enterprises in the Electric Machinery Industry." *Environment and Planning A* 26, pp. 509-526.
- International Trade Commission. 1984. *Color Television Recievers from the Republic of Korea and Taiwan* USITC Publication 1514 (Washington, DC: ITC).
- Jun, Y. W. 1990. "Korean Overseas Investment: Patterns, Characteristics and Strategic Behaviors." *Asia-Pacific TNC Review* No. 7, pp. 53-65.
- Kenney, M. and R. Florida. 1993. *Beyond Mass Production* (New York: Oxford University Press).
- Kenney, M. and R. Florida. 1994. "Japanese Maquiladoras: Production Organization and Global Commodity Chains." *World Development* 22, 1, pp. 27-44.
- Kim, H. and S.-H. Lee. 1994. "Commodity Chains and the Korean Automobile Industry." In G. Gereffi and M. Korzeniewicz (eds.) *Commodity Chains in Global Capitalism* (Westport, Connecticut: Greenwood Press), pp. 281-296.
- Kim, K. 1994. "Economic Implications of NAFTA for East Asia." *AFTA After NAFTA*, Joint Korea - U.S. Academic Symposium, Volume 4, pp. 55-75.

Kim, Y. 1995. "Technological Capabilities and Samsung Electronics' International Production Network in Asia." Unpublished manuscript, Australia Japan Research Centre, Australian National University (November).

Kirk, Douglas. 1994. *Korean Dynasty: Hyundai and Chnng Ju Yung* (Armonk, NY: M.E. Sharpe).

Korea Economic Weekly. 1996. "LG Electronics to Set Up CRT Plant in Mexico." (January 27).

Korean Foreign Trade Association (KFTA). 1993. *Korea and the World* (Seoul).

Korzenwicz, Miguel. 1994. "Commodity Chains and Marketing Strategies: Nike and the Global Athletic Footwear Industry." In G. Gereffi and M. Korzeniewicz (eds.) *Commodity Chains in Global Capitalism* (Westport, Connecticut: Greenwood Press), pp. 247-268.

Kraul, Chris. 1988. "Gold Star Plans September Start at Mexicali TV Plant." *Los Angeles Times* (14 July) part 4, p. 7.

Lajud, Olga. 1994. "Samsung Invertira 100 mdd Para Construir una Planta en Tijuana." *El Financiero* (April 11), p. 16.

Miller, Matt (reporter, San Diego Union). 1993. "Persona] Communication." (27 September).

Nakajo, S. 1980. "Japanese Direct Investment in Asian Newly Industrializing Countries and Infra-firm Division of Labor." *The Dereloping Areas* 18, pp. 463-83.

Nikkei Weekly. 1993. "Gold Star to Supply TV-VCR Units to Sony." *The Nikkei Weekly* (13 September), p. 23.

Petersen, Kurt. 1992. *The Maquiladora Revolution in Guatemala* Occasional Paper of the Orville H. Schell, Jr., Center for International Human Rights, Yale Law School, New Haven, Connecticut.

Pozas, Maria de los Angeles. 1993. *Industrial Restructuring in Mexico* (San Diego: Center for U.S.-Mexican Studies, UC San Diego).

Ryou, J. W. and B. N. Song. 1993. "Korea's Foreign Direct Investment in Southeast Asia." Paper presented at Conference on Korea and the East Asian Economy, Hong Kong (22-24 February).

Sanniento, Alberto. 1995. "Conflicto Laboral en la Hyundai." *El Mexicano* (March 15), pp. 1A, 6A (in Spanish).

Sklair, Leslie, *Assembling for Development* (Boston: Unwin Hyman Inc., 1989).

Song, B. T. 1993. "Impact of NAFTA on Korea." Unpublished paper, Daewoo Research Institute, Seoul (in Korean).

Soon, C. 1994. *The Dynamics (of Korean Economic Development* (Washington, DC: Institute of International Economics).

Suarez-Villa, I., and I¹. H. Han. 1990. "The Rise of Korea's Electronics Industry: Technological Change, Growth, and Territorial Distribution." *Economic Geography* 66, pp. 273-92.

Wall Street Journal. 1994. "Linn Scraps Plans to Build New Elantra at Quebec Plant." (March 14). P. C6.

Ward's Auto World. 1988. "Hyundai." (January), p. 45.

Yoshihara, Nancy. 1988. "Suddenly, Tigers Poised to Pounce on Mexico." *Los Angeles Times* (22 February), Part 4, p. 3.

Yu, S. IT. 1990. *Multinationals from Newly Industrializing Economies: The Macro and Micro Determinants of Foreign Direct Investments by Korean Manufacturing Industries*. Ph.D. Dissertation, George Washington I University (Spring 1990).