

**FOREIGN DIRECT INVESTMENT AND LOCAL LINKAGES: EXPERIENCES AND
THE ROLE OF POLICIES.**

THE CASE OF THE MEXICAN TELEVISION INDUSTRY IN TIJUANA

by

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Introduction

The manufacturing TNC subsidiaries established in Mexico are playing a priority role within the labor markets in the Mexican economy, not only because of their participation in exports, generation of foreign exchange and employment in Mexico, but also because they are in command of a process of deep economic change. In only twenty years, Mexico went from exporting natural resources to exporting manufactured goods. TNCs' macro indicator success has been accompanied by a microeconomic and social process of industrial upgrading based on technological change and a better use of human resources. Although the impact TNC subsidiaries have on the local configuration of productive networks, business capacities and links with different sectors has not been studied well enough in Mexico, it is nevertheless widely criticized. In other words, TNC subsidiaries undoubtedly have a positive impact on different areas, such as employment, generating foreign exchange, technological and organizational capacities and labor skills, but it is based on a learning that takes place within the affiliated plants themselves and in intra-firm relations. In spite of government and private efforts, their local spill over effects on Mexican companies are still very weak.

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The purpose of this study is to identify the impact foreign TNC subsidiaries located in Mexico have on the development of local suppliers. The methodology is based on the application of three different types of questionnaires: one addressed to television TNC assembly plant workers in Tijuana, another to local suppliers, both foreign and national, and a third questionnaire geared to decision-makers and local business associations. We also considered results from other studies and analyzed different sources of information. The questionnaires were applied in Tijuana throughout January 2001.

This article was structured into four sections. The first section presents the importance of the television industry (TVI) in Mexico and the industrial upgrading it has been through. The second section presents the structure of relations between television TNC subsidiaries and their suppliers. The third section analyzes the impact TNC subsidiaries have on local suppliers. The final section presents policy makers' actions and opinions regarding supplier promotion.

1. Importance of the television industry in Mexico and its upgrading process

Television producers have been winners in the trade opening and sectorial deregulation in Mexico. The color television industry has attracted important flows of foreign direct investment (FDI) under the maquila program. The number of televisions shipped from Mexico to the United States grew from 1.7 millions in 1987 to over 25 millions in 1998. According to the MAGIC-CEPAL computer program, the Mexican participation in television imports (HTS item 8528) grew from 40.6% in 1990 to 78.8% in 1996. Other participants, such as Malaysia, Japan and Thailand (**Figure 1**) left Mexico far behind.

The growth of the TVI in Mexico has been a direct result of the changes in this industry in the United States. Towards the mid-80's, European and mainly Asian TNCs forced most U.S. producers to abandon this sector. Thomson purchased the General Electric and RCA plants, Philips bought Sylvania and Magnavox trademarks. Matsuchita purchased Quasar. LG Electronics later bought all Zenith operations. This produced a

television industry mainly divided among European TNCs with production plants in the United States (which by 1990 controlled close to 34% of the U.S. market) and a rapid growth of mainly Japanese TNCs that invested in the creation of a television cluster in Tijuana, on the border with San Diego, California close to Long Beach. **Table 1** shows the current basic structure of television industry clusters in Mexico in which the participation of two Mexican states bordering with the United States stands out.

Seven out of every ten color television sets sold in the U.S. market in 1996 were produced in Mexico by less than 10 firms located in Tijuana, Mexicali and Ciudad Juárez (Carrillo and Mortimore, 1997). Around 110 electronic plants have currently been established on the Northern border, many of which assemble televisions and components from Japanese, Korean, Taiwanese, European and U.S. TNCs (**Maps 1 and 2**). In the year 2000, the television complex in the north of Mexico employed over 90,000 workers, including more than 10,000 technicians and engineers, and produced close to 30 million televisions per year, 90% for the U.S. market.

According to projections by the Mexican Foreign Trade Bank (Banco Mexicano de Comercio Exterior / Bancomext), by the year 2003 the consumption of new television sets in the United States will have stabilized at around 29 millions units per year, whereas the whole North America region will be consuming a total of 33 million television sets (**Table 2**). By then, television production in Mexico will have surpassed the demand of the North America region and will be supplying other markets, such as Central and South America, regions to which firms, such as Sony and Sansumg, have been exporting for years.

The sustained growth of the TVI in Mexico is a result of TNCs' high international competitiveness. Various studies have noted that this industry reached prominence thanks to different comparative advantages, such as geographic closeness to the United States; political and labor stability as well as labor force flexibility, availability and cost. Other advantages have also influenced this prominence: open trade policies, deregulation of this sector and intense promotion of FDI. However, the strategies developed by subsidiaries and headquarters, which have derived in an upgrading process of the subsidiaries in Mexico, are the main cause of high competitiveness

(Carrillo and Mortimore, 1997; Lara, 1998; Barajas Escamilla, 2000; Contreras and Carrillo, 2000).

According to the top management of these subsidiaries (Carrillo and Mortimore, 1997), technology and human resources are among the main internal factors that increase competitiveness. World class technology (equipment, machinery and innovations); increasing automation; expanding research and development; applying engineering to design; implanting technologies to lean and flexible administration and increasing the number of highly specialized technicians and professionals should be noted. Automation, for example, takes place in input reception, the assembly of intermediary and final product components and packing final products. The Samsung Display plant is an extreme case: 95% of the value of its machinery is automated². In the second place, there is increasing autonomy in issues such as the selection, management and use of human resources; the selection of local suppliers; adjusting organizational technologies and intra-firm technology transference.

This has allowed TNCs in Mexico to evolve from traditional assembly activities to more sophisticated manufacturing operations, such as high quality production, development and design (Carrillo and Mortimore, 1997; Lara, 1998; Barajas Escamilla, 2000). The number of television models and other products such as computer components and monitors has increased outstandingly (**Table 1 and Map 1**). Sony, for example, produces 10 different TV and projection models, it also manufactures computer monitors, satellite television sets and key components; Samsung has 6 different-sized TV sets and 65 models with key components (flyback transformer, display yoke, tuner, cathode-ray tubes, etc.) that are locally produced. **Table 3** shows the different "in-house" products made by television TNCs subsidiaries in Tijuana. A recent study found that in some companies machinery and equipment (Samsung Display and Sanyo) and blue prints (Sanyo) belong to subsidiaries that carry out research and development activities (Sanyo) (Barajas Escamilla, 2000:169). This author also found that some TNCs stand out because of their greater sophistication in the

² This is associated with the product itself, which is highly capital-intensive.

production process in manufacture, tools and surface assembly (Sanyo, Samsung, Matsuchita, Hitachi).

Productive complexity is accompanied by organizational and individual processes derived from accumulated experience in the technical sphere, in administration and in directing local TNC personnel. Contreras and Kenney (2000) mention three types of intensive individual learning experiences: participation of local personnel in the transference of operations from plants in the United States to Mexico; training in specific aspects in other corporate or client plants and the experience derived from inter-firm mobility through assimilating knowledge in different types of productive processes, organizational structures and corporate cultures.

These authors pointed out that the experience accumulated within TNC subsidiaries was a factor of competitiveness in the professional labor market for the individuals involved; a factor of the firm's operational efficiency and capacity to adjust; for the locality a factor of maturity of the managers and engineers that becomes collective property and works as a resource available to the industry that has secondary effects on the local economy as a whole (such as creating start ups).³

It should therefore be noted that the relevant corporate strategies have consisted not only in the increase of productive functions and the role played by television TNC subsidiaries in Tijuana, but their greater productive capacity, the increase in the volume of employment and a process of transferring knowledge and continuous learning. Television plants in Tijuana have a trajectory of learning the processes of which have become more complex, technologically more sophisticated and require greater participation of qualified personnel, which has made traditional assembly work, such as television cabinets (Hitachi and Sony), turn into manufacturing plants with a great interdependence in various areas and headquarters that will soon become global manufacturers.

³ A recent study analyzes two successful start up cases in maquilas in Ciudad Juárez associated with television and auto parts firms (Carrillo, 2001a). Unfortunately, there is no information about the creation of firms by former maquila workers in Mexico, in spite of being a central niche to research due to the great development potential it implies.

This trend towards upgrading has in part been the result of a lengthy industrial cluster process. It all started in 1969 in Ciudad Juárez and in 1979 in Tijuana with the arrival of RCA and Matsuchita, but it was not until the 80's that these same firms made new investments and other competing TNCs were transferred to Mexico. The development of component-producing plants started in the mid-90's and the number of local suppliers of passive components and services is expected to grow (**Table 4**). As **Table 1 and Map 2** show, Tijuana has become "the television Mecca"⁴ and the most dynamic source of television sets imported from Mexico to the United States. In 1998, the Tijuana cluster produced more than 9 million television sets. In two years only (from 1994 to 1996), Asian firms invested over one thousand million dollars in new plants in this city (Korea invested \$650 million dollars and Japan \$400 millions).⁵

Television TNC in Tijuana have been through deep modifications in product complexity, subsidiary autonomy, design activities, human resource use and plant modernization (Carrillo and Mortimore, 1997). **Table 5** presents current indicators showing that the trend in television subsidiaries analyzed in 1995 (Carrillo and Mortimore, 1997) continues. A comparison of this study to the piece of research we here present shows that: (a) the participation of Mexicans in top management has increased; (b) subsidiary autonomy in respect to the headquarters has grown; (c) there is an emphasis on design activities; (d) automation has grown; (e) technological levels have increased ("comparable to the highest world wide level" in some firms), and (f) certification of quality and environmental processes has increased. New activities such as financial and administrative management and technological information have been through deep changes.

Television subsidiaries in Tijuana are relatively old (11 years on average) and have rapidly increased the number of people employed: from 377 people on average in 1985 to over 2,900 in the year 2000. Whereas in May 1995, five television TNCs were

⁴ Darlin, D., "Maquiladora-ville", *Forbes*, May 6, 1996, pp. 111-2.

⁵ Darlin, *Op. Cit*, p.112

employing 10,148 workers, by December 2000 close to 20,000 people worked for six firms.

2. Local suppliers and vertical integration

The electric-electronic industry in Mexico in the maquila program has historically had a limited level of national inputs (under 1%) and, apart from using its labor force, has not generated significant links with the national economy. In fact, before the North American Free Trade Agreement (NAFTA), provision HTS 9802 sanctioned the increase of Mexican components assembled for exportation to the United States through the payment of taxes on all parts and inputs that were not from the United States. However, the rules of origin in NAFTA have changed this situation and thus produced a different result. The best example of the effect of these rules is vertical integration achieved thanks to the incorporation of core components, such as cathode-ray tubes, which represent an extremely high ratio of a television's added value.⁶

Figure 2 shows the distribution of firms in North America that are linked to television OEMs in Mexico (19 plants). It can be observed that most of the provisioning takes place in the United States (430) and a lesser part in Mexico (95).

The links between final transnational television assembly plants and their local suppliers are very different and depend first of all on whether they belong to transnational networks or not and secondly on the level they occupy within the production chain. These links are close and long-term. Excepting intra-firm relations, such as those existing between Samsung and Matsuchita with other TNC subsidiaries, which almost by definition are close and long-term, other firms such as JVC and Sony mentioned they did have agreements of this sort. Only Hitachi and Samsug Display claimed not to have this kind of relations with local suppliers (**Table 6**). In all cases, decisions about where supplies are to come from were taken by the interviewed subsidiary. Only Samsung Electronics mentioned that these decisions were taken by

⁶ Interviewed in Tijuana, Enrique Mier and Teherán, an industrial promoter, said the cost structure of a television's value was 80% for cathode-ray tubes, 10% for cabinets and the rest corresponded to manual and automatic insertion. 22-01-2001.

another subsidiary of the same firm. They all expect their long-term relations with local suppliers to grow in the next five years. Only Hitachi is drawing foreign suppliers to the region in order to be able to have more reliable suppliers with the capacity and quality they require. A lack of the required capacity and quality as well as a lack of interest of headquarters are the main hindrances to development (**Table 6**). In regard to the TNCs response to support suppliers in order to develop deeper long-term relations, TNC subsidiaries can be seen to draw suppliers close to their plants by providing them with information about their requirements in demand and market, technical assistance, backing in supply logistics, price negotiation and giving them support so they can have more clients (**Table 7**). Most of them do not receive financial assistance, except one case that acknowledged it gave its suppliers this kind of support. The firms belonging to TNCs believe they are making important efforts to develop and support their suppliers in order to thus maintain more stable and lasting relations with them.

The different interviews carried out in January 2001 allowed us to conclude that television subsidiaries provision themselves with passive and active components⁷ through:

1. *Production within the OEM plants themselves⁸ ("in-house production").*
2. *Purchasing from other subsidiaries of their own corporation ("vertical integration").*
3. *Outsourcing from other TNC television subsidiaries ("inter-maquila trade").*
4. *Outsourcing from local suppliers, either Mexican or foreign.*

In **Figure 3** you can observe the different forms of provisioning occurring in the Tijuana cluster. **Figure 3** shows the three forms of linking with the assembly plants

⁷ The TV industry is part of electronic consumption and requires passive components (resistances, capacitors, switches, harnesses and cables, connectors, etc.) and active components (semiconductors, integrated circuits, microprocessors) (Dicken, 1986). To see employment distribution of these components in the region, see **Annexed Table 1**.

⁸ Original equipment manufacture.

that prevail (2, 3 and 4), the different relations existing between suppliers and TNCs⁹ and the complex interweaving created around the local firms producing televisions.

Current client-supplier relations in the TVI in Tijuana are the result of a long process that has taken place in three stages. In the first stage (from the late 70's to the 80's), Asian IEDs in Tijuana were characterized by final television assembly and the establishment of operations related to the production of components for standardized technology (Lara, 1998). There were hardly any direct suppliers in this period. Instead there were mainly Mexican service firms. In the second stage (from the late 80's to the mid-90's), components, such as cabinets, plates, speakers and connectors, were integrated vertically. These components tend to be labor-intensive parts. The manual and automated subassembly of printed cards that is now carried out in the plants is of particular relevance, thus substantially intensifying capital and automation. It is in this stage that technology, knowledge and personnel transferred from the headquarters to the subsidiary became critical elements in the use of new insertion technologies and the new activities to be developed (Lara, 1998). Both foreign and Mexican suppliers start to develop usually by the initiative of TNCs. The third and current stage, beginning with the signing of NAFTA, the new conditions derived from the rules of origin and the maquila's enormous dynamism reinforces three processes: (a) relocation of Asian suppliers in Mexico responding to an initiative of television TNCs carried out through agreements signed between corporations¹⁰ (b) vertical integration through the establishment of new plants of corporations specialized in components (via agreements signed between divisions) (Carrillo and Mortimore, 1997; Lara 1998; Contreras and Kenney, 2000; Barajas Escamilla, 2000), and (c) dissemination of Mexican suppliers (either local or national) with low added value outsourcing contracts, such as cardboard packing and different services such as garments for the workers and metal structures and pieces. These suppliers were developed by TNCs subsidiaries in Tijuana and only in

⁹ The figure does not include sales to other electronic firms nor to firms in other branches.

¹⁰ According to one of the interviewed managers, "profits" derived from strengthening intra-TNC business benefit a firm's top executives, which is why they are not highly motivated to develop outside suppliers. Since this statement is extremely sensitive, we are presenting it as an opinion only that needs future checking.

some cases did the initiatives come from Mexican firms.¹¹ Firms providing other services, such as legal advice, customs services, security, food as well as infrastructure and technological information have also been strengthened.¹²

In relation to this third stage, Lara (1998) recognized the existence in 1995 of 27 Japanese plants linked to television manufacture, including final assembly plants and supplier firms. He identified a tendency towards the production of a greater number of components and greater technological complexity in local operations, including the production of converters, transformers, power sources and cathode-ray tubes; a progressive escalation towards capital-intensive processes, which among other things require more highly qualified labor force (Lara, 1998). A recent study (Contreras and Carrillo, 2000), concludes that out of over 500 TVI suppliers, over a fifth are firms established in Mexico, as can be seen in **Figure 2**. This study emphasizes on the relocation of Japanese, Korean and Taiwanese suppliers in Mexico in order to supply increasingly more complex parts and components and develop local provisioning networks based on close coordination and the just-in-time system (JIT).¹³

We identified complex provisioning strategies and differentiated TNCs, as can be seen in **Figure 3 and Tables 3 and 8**. Based on the information available, we can say the television cluster in Tijuana is starting to acquire an increasingly more complex configuration with first, second and third level firms.

Considering that this study does not aim to analyze in-house or type 1 production within the television plants, but to identify the relations with local suppliers¹⁴, we will present the different types of external firms supplying final assembly plants. **Figure 4** presents the case of a transnational subsidiary in order to thus show the importance foreign firms have within television TNCs' provisioning strategies in

¹¹ No cases have been heard yet of Mexican firms purchased by foreign suppliers: foreign firm Greenfield investments.

¹² Although many of these services are hardly related to production, other services, such as customs agencies, are essential to distribute production.

¹³ In some cases, such as inter-maquila sales, the JIT system has been operating for more than 10 years.

¹⁴ The relations TNC television subsidiaries have with their clients are not local since all their production is exported to the United States through warehouses in the USA or even delivered directly to the client. In any case, this service is offered by headquarters or another subsidiary, but not by the firm in Mexico.

Tijuana. In this firm, 77% of the supplier firms in Tijuana are foreign-owned (11% other television TNCs and 66% foreign suppliers) and only 23% are Mexican. This relation is even greater if it is measured in terms of value since 98% of this firm's purchases were made to foreign firms established in Tijuana and only 2% of the purchases were made to Mexican companies.

2. Purchasing from other subsidiaries belonging to their own corporation ("vertical integration")

Since 1995, television assembly plants declared that the number of "satellite" suppliers would increase in the next five years and they would thus reach greater vertical integration (Carrillo and Mortimore, 1997). Considerable progress has been made in this direction. Projection mirrors, cathode-ray tubes, cathode-ray tube glass, power sources, tuners and rechargeable batteries are among the parts and components that set up production in the region. In any case, these are parts and components that until the early 90's were imported from Japan and the United States.

Headquarters played a relevant role in this vertical integration process. A recent study (Barajas Escamilla, 2000) found headquarters gave subsidiary assembly plants important support with technical assistance. Technical assistance, however, was not homogeneous. Measured in terms of event frequency, JVC and Matsuchita were high in blue prints, but Hitachi was low; Sony was low in machinery and tools; Samsung Display, Sony and Hitachi were high in production and quality control, but Samsung Electronics was low (**Table 9**). In relation to organizacional assistance patterns, this author found that, in the case of Sony and Samsung plants, both material, part and component traffic and logistics were of relevance to provisioning for these products. Sanyo, Matsuchita and Hitachi would often receive assistance in organization and management.

There are important differences between Japanese and Korean TNC's in the Tijuana-Mexicali region. Whereas Japanese firms (Sony, Matsuchita, Sanyo and JVC) maintain their engineering centers in southern California and produce cathode-ray tubes (CRTs) in the United States (Sony and LG Electronics), Korean firms have integrated

new operations with sister plants to produce glass (Samsung with Asahi and Corning) and CRTs (Samsung and Daewoo) and have drawn some foreign suppliers: Samsung (2 firms), Goldstar (1) Daewoo (1). TNCs' vertical integration strategy can be seen in **Tables 3 and 8**.

3. Outsourcing from other TNC television subsidiaries ("inter-maquila trade")

Intra-firm relations and inter-firm trade among TNCs television subsidiaries have achieved greater importance in the local context. Examples of this tendency: Sanyo sells baffle yokes and tuners to Sony and Matsuchita; and Hitachi sells cabinets to JVC (**Table 3**).

The Samsung television plant is a good example of this kind of trade. It sells CRTs to LG Electronics and Daewoo; and purchases cabinets from Hitachi, CRTs from Samsung Display and components and devices from Samsung Electromechanics. It also purchases from Panasonic and Thomson. **Figure 5** presents trade relations between TNCs. It is clear that there is intensive inter-maquila trade in OEMs. Everything shows that NAFTA's rules will make this form of trade more intensive not only between subsidiaries in Tijuana, but with other television and computation subsidiaries in northern Mexico (**Map 1**). Our interviewees claimed long-term relations with local suppliers in the region, mainly TNCs, would strengthen in the next five years. This scenario is mainly sustained by the economies of scale, timely delivery and tariff exemptions contained in NAFTA. Samsung Display and Samsung Televisions, for example, mentioned that inter-maquila trade will increase in the next years mainly due to the closure of factories that manufacture their products in the United States, the need to reach rules of origin and the increasing production requirements local suppliers cannot supply.¹⁵

¹⁵ Since they manufacture CRTs, which represent 70% of the value of a television; any increase ~~in por lo cual resulta lógico pensar que si se incrementan~~ production costs directly affects the price. If you add distribution costs (~~imports-exports~~IMPORT-EXPORT), you can understand the need to buy their inputs in NAFTA countries in order to enjoy tariff exemptions.

4. Outsourcing from local (foreign) suppliers.

The general pattern of local provisioning in products that are not vertically integrated for TNCs television subsidiaries has been to maintain relations with foreign suppliers that enjoy incentives derived from belonging to the maquila program (Barajas Escamilla, 2000)¹⁶ like Sony, Sanyo and Samsung and JVC and to a lesser degree Matsuchita.

According to our study, **Table 10** shows the trade relations between television OEM firms and ten foreign suppliers interviewed (without considering Samsung's firms producing cathode-ray tubes and components (level 1)). It considers firms manufacturing passive, electric, metallic and plastic components (level 2); and basic raw materials and indirect materials (level 3). From cardboard boxes to plastic cabinets and molds are produced in this city by medium-sized firms, both maquila and non-maquila. Packing and wood cabinet firms arrived in the late 80's and molds and plastic cabinets came in after NAFTA (**Table 11**). Battery and plastic injection suppliers tend to be capital-intensive and automated; and cabinet suppliers tend to be productively complex and labor-intensive, although their capital investment is also relevant.

Information provided by a transnational subsidiary shows that in January 2001, this firm had 35 suppliers in Tijuana of which 27 were foreign and 8 Mexican.¹⁷ The following results stand out:

- These 35 firms supplied 22 products to different television firms.
- Nine different products are supplied to these television OEMs through two or more local firms (inter-firm competition).
- In three cases, suppliers sell more than one product each.

Out of the total sales reported in the year 2000, on average 53% were "domestic" sales (i.e. indirect exports) and the remaining 47% were direct exports. The

¹⁶ This has been a general IED pattern in Mexico since the 90's. For the car industry, see Carrillo and González, 1998. For the auto part industry, see Carrillo and Hinojosa, 2001. For the computation industry, see Clemente and Dussell, 1999.

¹⁷ . Purchase orders are placed mainly every 28 and 14 days

strategies, however, are very different since for some firms exports represented 99% of their sales, whereas others had no exports. Domestic sales oriented to TNC subsidiaries reached 47% of the total sales on average. Heterogeneity, however, was common (between 100% and 1% of all sales). On average, only 6% of the total sales were geared to local firms that are not transnational. Average sales per firm were close to 40 million dollars in almost 19 TNCs and a little over 3 local firms (**Table 12**).

In the case of purchases reported for the same year, they were mostly imports (72% on average) and almost all were made to TNC subsidiaries. Only 3% of the total purchases were made to local Mexican suppliers (**Table 12**). Foreign suppliers in Tijuana therefore import practically all their inputs and components and once the product is made, they export it (directly or indirectly) through transnational subsidiaries.

In regards to TNC participation with these suppliers, except one firm, they all have mainly outsourcing contracts with assembly plants (**Table 13**). Some of these TNC firms support outsourcing by transferring product and process technology through imitation and learning, although in most cases there is no transference. In six firms TNCs provided suppliers with technical assistance and quality control. The workers in supplier firms are generally trained by the TNCs; between 5 and 20 people are trained like this (**Table 14**).

Suppliers have a considerable number of links with transnational clients (26 on average); close to 70% of the plants have up to 10 of these clients. Although the managers we interviewed had a positive opinion of this, two of them considered there were no benefits. As can be seen in **Table 15**, there are different benefits: use of international quality standards, new contracts, an increase in investment and employment, more technology and training, more links with other firms. However, there were also some negative opinions: a lot of pressure, little flexibility to look for new clients, pressure to reduce costs, cultural differences and government red tape.

The interviewed managers expressed contradictory opinions about how public policies have affected the links between suppliers and TNCs (**Table 16**). Whereas some considered the policies included in the questionnaire did not exist, others considered they had a positive impact. A considerable number of managers said the following

policies did not exist: financial assistance (89% of the firms), training at work provided by the government (78%), incentives (67%), match-making (50%) and information (44%). An important percentage had a positive opinion of the impact the following policies have: seminars (67%), information (45%), incentives (22%), training (22%), match-making (12%) and financial assistance (11%).

Only two policy measures were evaluated negatively: incentives (1 firm) and the new sectorial program (2 firms) due to the fact that they would imply tax increases. Three policy measures were considered to have an irrelevant impact: match-making (37%), seminars (33%) and information (11%)

In any case, many more managers claimed there were no policy measures that would affect the links between firms and TNCs (29). Less managers said impact was positive (16) , there was no impact (7) or it was negative (3).

4. Outsourcing with local (Mexican) suppliers

As opposed to the previous types of provisioning, the inclusion of Mexican firms as significant suppliers has not had the expected projection. Seven Mexican firms supplying different television assembly plants were interviewed in Tijuana. **Table 17** shows they do not work on a basis of exclusivity nor do they supply key components. They only supply low value added inputs. **Figure 3** shows the different relations television subsidiaries have with foreign firms in Tijuana. The ratio of Mexican and foreign suppliers in the area can be seen in an important OEM firm that provided information about its whole local chain (**Figure 4**).

The interviews to these seven Mexican suppliers show that they sell low value added inputs, such as basic raw materials and particularly indirect materials (level 3). Small firms (with 57 workers on average), produce plastic, bags, cardboard boxes, labels, manuals, platforms and uniforms. Some of them belong to the maquila program. They are firms and workshops that arrived in the late 80's and some of them only recently started to operate (**Table 18**).

Out of the total sales reported (over 13 million dollars), on average 86% correspond to "domestic sales" and the remaining 14% to exports. This was more or

less common behavior among firms. As was to be expected, most domestic sales went to TNCs (67% of the total sales) and a lower percentage went to local firms (19% of the total). In relation to foreign suppliers, in relative terms Mexican firms purchased three times more from local firms (**Table 12**).

On the contrary, most purchases came from imports (76%) and the remaining 24% of domestic purchases mainly corresponded to local firms (23%) (only 1% of all purchases were made to TNC subsidiaries (**Table 12**). It should be noted that total sales way surpassed total purchases, which does not occur with foreign suppliers. Imports, on the contrary, way surpassed exports as opposed to what happens in foreign firms. Evidence shows there is a common pattern that is similar to other branches at the northern border where the operations of Mexican firms highly depend on imports. Purchases from national firms are higher, which implies that they are relatively more integrated at a local level than foreign firms. Business volumes, however, are much lower. The average sales of foreign suppliers in Tijuana were 2.6 times larger than national sales (7.7 million dollars as opposed to 2.2) and average purchases 5.6 times larger (7.9 millions as opposed to 1.2).

As opposed to foreign suppliers, Mexican firms do not have contracts with TNCs, except a firm with a franchise (**Table 19**). In one case only did a TNC support a firm by transferring process and product technology, importing machinery and imitating Japanese technology. In two firms, a TNC provided training to outsourcing workers (2-3 people) (**Table 20**). In two cases only, TNCs gave assistance to Mexican firms: one was occasional and technical assistance and the other was information.

Although some Mexican suppliers have an important number of transnational clients (41 on average), the vast majority have between 10 and 30 clients of this kind. The interviewed managers had a positive opinion of their relations with their clients. They mentioned the following benefits: market permanence, specialization niches, new products and updated technology, being able to provide services at the plant; getting to know the market better, increasing production and making new clients (**Table 21**). It is surprising that only two managers expressed negative opinions. One said he preferred

North American and Asian suppliers to Mexican suppliers and the other mentioned that contracts did not guarantee sales.

In regards to the managers' opinion regarding governmental policy measures and their effect on the articulation between suppliers and TNCs, most mentioned that they did not exist (80% of the answers) (**Table 22**). Only two firms (33%) said the following measures were positive: incentives, training, information and match-making. Two firms considered seminars to have no impact at all.

After describing some characteristics of suppliers and their relations with TNCs, it is convenient to make a deeper reflection. The opinions and characteristics of Mexican suppliers are congruous with the opinions given by television plant managers. Since 1995, the year in which they were interviewed, they stopped considering local provisioning a priority within their corporate strategies for competitiveness. Recent interviews confirmed that from a TNC's perspective the development expectations of new Mexican local suppliers are still low. Among the main reasons for these poor links, the managers mentioned a lack of capacity to meet the high production volumes required, low quality production, high prices and delivery delays, aspects that are generally linked to a firm's small size. A Philips Consumer Electronics officer mentioned to the USITC that "Mexico does not have the technological infrastructure among its domestic suppliers to support the high volume of requirements for leading electronic products, such as televisions and computer monitors" (USITC, 2000:4). Contreras (2000) found what JVC required from JIT suppliers and there was no way national firms could reach these requirements and maintain prices, which seriously affected trust and Japanese word of honor.

The corporate agreements signed in the country in which the TNC originated are an additional problem. Price conditions, quality and delivery agreed among TNCs are a serious admission barrier for local suppliers since they do not have the capacity to meet these requirements. Samsung, for example, mentioned these Korean agreements as the main problem to find firms in the region (Contreras, 2000).

Other problems at a different level are the unreliability of official statistics, which do not reflect the increasing vertical integration process in the region (cathode-ray

tubes, for example) and the incorporation of minor components and different services¹⁸. The fact that it is well known that with time there is no increase in the contents of national inputs in spite of all efforts, becomes an inhibiting factor for the development of new suppliers.¹⁹

The serious problem of work turnover²⁰ equally affects television OEMs and PYMES (SMEs). In the latter, however, it is very difficult to compete for labor force since they do not have the capacity, wages and benefits nor the work conditions granted by TNCs. Only foreign subsidiaries can offer these economic and non-economic advantages.

Worker turnover is a serious problem not only because of the cost associated to mobility and training (around 300 dollars per worker), but also because it is very difficult to introduce work involvement programs, continue growing at a high rate and draw new suppliers at the same time. Worker turnover has been associated to the dynamism of the maquila industry in the border zone (Carrillo, 2001b). Although high worker turnover started in the 80s, the way the industrialization has accelerated with NAFTA has made turnover rates increase. Workers usually start working in a plant and after a short while start moving to other maquila plants. So long as they remain within the 'maquila circuit', they are estimated to move to between 3 and 4 plants. It is nevertheless important to recognize that around 40% of the workers are 'stable'(they do not change jobs), whereas 60% 'rotate jobs' (move from one plant to another) (Carrillo y Santibañez, 2001). In this process, large firms generally offer better work conditions, such as cafeterias, health care, free transport, food subsidies, etc., which makes competition for qualified and unqualified labor more difficult, particularly in the case of the small and medium firms and TNC suppliers, since they are small firms.

¹⁸ An interviewee commented that although integration into IME had historically been low, there have been substantial changes, such as the inclusion of in-house products, which are not reflected in statistics. Television production is the best example of this: CRT production in Tijuana (70% of the product's value), for example, should reflect in an increase in national integration, and it does not.

¹⁹ Interview with Mier and Teherán, 01-28-2001.

²⁰ Monthly turnover was on average between 6 and 8% in 1995 in television assembly plants (Carrillo and Mortimore, 1997). In the year 2000, it increased to 13%, excepting Samsung (interviews with managers).

The history of this business backwardness is complex: On the one hand, the incorporation of Mexican components under U.S. mechanism HTS 9802 was sanctioned²¹. On the other, Mexican public policies were not sound. The industrial policy never considered a minimal percentage of local content (since maquilas were explicitly excluded from sectorial policies); promotion and support programs had no success at all; and local small and medium-sized firms were *de facto* inhibited in order to improve performance vis-a-vis a large bureaucracy and lack of financial support. Apart from this, there was no manufacturing tradition in border cities such as Tijuana and Juárez and they were located far from Mexican industrial and consumption centers (Monterrey, Guadalajara and Mexico City). A set of internal and external situations inhibited the development of local suppliers. It was not until the 80's that this slow process of creating productive and service links started. With the important growth of the industrial cluster (derived from the maquila program) and the new demands and opportunities derived from NAFTA, it managed to give a qualitative leap forward in the mid-90's.

All this suggests that in the sphere of developing suppliers, the Mexican industrial policy faces an enormous challenge as part of the strategies to improve the firms' international competitiveness. Unfortunately, the managers interviewed in 1995 and at the beginning of the year 2001 did not consider national policies nor Mexican suppliers as relevant aspects of competitiveness. Some firms even complained about the lack of suppliers with whom to work (because of quality, delivery and price problems). The national government's objective of doubling inputs for the maquila industry seems highly unlikely (**Figure 6**)

In spite of this, it is important to acknowledge the changes and tendencies in the TVI. In the first place, the Mexican contents increased from 0.6% to 3.7% during 1990-95 and some firms even reached 8%. In the second place, the OEMs themselves require and are looking for local suppliers. In recent years, all television assembly plants have participated in numerous local and national trade fairs. Sony is a good example of

²¹ Sanctions before NAFTA were through applying differentiated tariffs to components made outside the United States and that did not belong to this country.

this since it has carried out exclusive exhibitions of its own inputs. In the third place, the dissemination of new services (such as internet) is likely to strengthen this cluster.

To conclude this section, we can note that at present parts and components incorporated to televisions manufactured in Mexico represent a market of over 8 thousand million dollars per year. It is a market that has traditionally been beyond the reach of Mexican firms due to various circumstances, such as the difficulty to meet quality standards and the decrease in both the costs and delivery timing the TNCs demand. Although important progress has been made within production in TNC television subsidiaries in Mexico and in the production of some components by foreign firms, given the pressure of NAFTA's rules of origin, Mexican suppliers lag behind in spite of the public policies we present below. However, according to Bancomext (1998), the first steps have been given to unfold a long-term strategy to stimulate local linkage.

This study shows that in fact industrial interweaving is stronger since there is an important cluster of plants linked to television production in which practically all firms competing in the market are located in three cities in the north of Mexico (Tijuana, Mexicali and Juárez). In the second place, there is a complex process of integration: vertical integration (final assembly, subassembly, components), horizontal integration (inter-maquila sales), peripheral integration (input and service suppliers) and cooperation integration (between firms and plants). In Mexico, links between universities and technological institutes and television firms will also grow stronger, (although articulation is currently weak²²), at the same time as new stakeholders and association experiences emerge, as will be seen below.

3. Policy Makers and Government Policies

A. Government Policies

²² The articulation between the educational and productive sectors in Tijuana is characterized by various exchanges (personal and institutional links, agreements and courses and particularly agreements regarding student professional practice in plants) mainly based on informal relations (Carrillo, 2001b; Hualde, 1999), which then to be highly individualized 'between a plant and an educational center' (Hualde, 1999). Although there is an important degree of integration between both sectors, formal articulation is fragile since the education sector and the existing linking committees are located within the political dimension of the Mexican system of education, which belongs to a vertical political system (Hualde, 1999:82). They are therefore very distant from not only business stakeholders, but also of the way TNC subsidiaries work in Tijuana.

As from 1983, the industrial policy in Mexico changed drastically by shifting from the domestic market to the world market. Since then efforts have moved towards deregulating specific sectors, privatization and promoting FDI. This new industrial policy combines macroeconomic stability with a strong structural reform program including the privatization of state firms, import liberalization, promoting export activities (including maquila activities) and considerable deregulation in all spheres (particularly in those spheres affecting FDI, the existence of sectorial industrial and financial development programs). Mexico essentially went from isolation to an increasing integration into the international economy as can be seen by its joining the GATT in 1986, becoming an OECD member in 1994 and signing the Free Trade Agreement that very same year. Mexico's negotiation and its joining NAFTA shows how these new policies are being applied (SECOFI,1994).

Both federal programs and trade agreements have influenced the development of the television cluster in Tijuana. They have encouraged the arrival of FDI and have been widely used by TNCs.

Two federal programs stand out: the maquila program and the industrial cluster program related to supplier development.

1. The Mexican maquila program and its complement, the production share 9802 US Harmonized Tariff Schedule, to see to FDOI at the border zone in the north of Mexico. According to the International Trade Commission (ITC),²³ these programs allow the free flow of investment, machinery, equipment and people in order to send them from the United States to Mexico to carry out assembling and manufacturing activities and thus be able to profit from comparative advantages such as low cost labor force. Assembled goods go back to the United States for further processing and/or packing and distribution and the taxes they pay are only estimated on the basis of the value added in Mexico.

²³ USITC, "Production Sharing: Use of US Components and Materials in Foreign Assembly Operations, 1992-1995", USITC Publication 3032, Washington, D.C., April 1997, p.1-1.

2. The program to promote industrial clusters started in 1990 with the National Industrial Modernization and Foreign Trade Program 1990-1994 (PNMICE in Spanish). It established new instruments: promotion of investment and foreign trade via different programs²⁴; a review of the trade policy; establishment of a new normalization and quality policy; promotion of total quality through different organizations and promotion of technological modernization based on industrial organization mechanisms, particularly relevant for our case, integrating firms and outsourcing (Sanchez Ugarte, *et al.* 1994). This program intended to eliminate obstacles that hinder vertical or horizontal integration in firms. By 1996, the Industrial Policy and Foreign Trade Program (IPFTP) had been established in order to coordinate actions with productive sectors and increase industrial plants' international competitiveness. One of the program's strategic lines was "to induce the development of highly competitive regional and sectorial industrial clusters with increasing participation of micro, small and medium firms". The program therefore promoted policies for the integration of production chains. The core idea was that excessive vertical integration in the ISI period had not been efficient and that very few firms in Mexico had taken advantage of the opportunities of an open economy to join global chains of production although they were disconnected from national suppliers. The challenge, therefore, consisted in "reintegrating the chains of production in an open and globalized environment and stimulating the incorporation of micro, small and medium firms". IPFTP objectives in this area were: (i) to promote the development of regional industrial clusters, (ii) to strengthen and broaden the industrial information infrastructure (match-making) and (iii) to promote the integration of productive chains. At the same time, the Program for the Development of National Suppliers in the IME was established in order to increase national integration. The actions carried out for the integration of the IME are mainly exhibits and fairs of national and international inputs and inter-export maquilas. There has been a wide variety of fairs: (a) input exhibits by potential suppliers; (b) exhibits by maquila-clients; (c) firms that completely "dismantle" their products for visitors to identify the parts that are used; (d) highly specialized exhibits, such as plastic injection and packing; and (e) exhibits promoted by one TNC only, like

²⁴ Programs such as the high export firm program (Altex), the foreign trade firm program (Ecex), temporary import program to produce export goods (Pitex), import tax refund program for exporters (*Draw Back*) and the creation of the Mixed Commission to Promote Exports (Compex). In 1991, the Mexican Investment Board was created and the National Foreign Promotion System (Sinpex) was developed.

Sony for example. According to interviews with government officials in Tijuana, the latter have been more successful²⁵.

These programs are complemented by other state level programs to promote FDI, speed up paper work, provide information and make match-making databases. The Secretariat of Industrial Development of the state of Baja California has been particularly active and closely collaborates both with other public agencies (employment services, CIMO, Nafin (see **Annexed Table 4**), Bancomext) and local business organizations. The interview to this secretariat revealed that great efforts are being carried out to promote industrial development, there is great collaboration between stakeholders and agencies, but with very few results in promoting suppliers. This Secretariat's program for supplier development aims to increase firm competitiveness through a portfolio of business bodies and private consultants. This program, however, has not been launched yet. An important opinion was expressed that reflects how the state government operates: "none of our services are free". Although there is a clear identification of the electronic cluster and its potential, there is not a program particularly addressed to promote it beyond clear acknowledgements in state development programs. Interviews with TNC subsidiaries are critical in respect to public policy performance and also reflect that both foreign and Mexican suppliers do not know public policies. The results of the 1995 survey (Carrillo and Mortimore, 1997) regarding critical opinion of government programs coincide with what Barajas Escamilla found in 1998: "the entrepreneurs do not give too much credit to the action of the local state. Apart from receiving many advantages from local governments, the TNCs criticized government efforts to promote industrial development" (Barajas Escamilla, 2000:221-222).

At present, the main projects implemented by both the government of the state of Baja California and the private sector (with IBD support) aim to develop Mexican suppliers (around 30 in total). In both cases, the purpose is to promote established

²⁵ Sony was the first to start its own fair in which it exhibited all the **components** of their TV models so the guest firms could **identify** the **parts** they could potentially supply. Three fairs of this kind have been held in different cities in **Mexico** and dozens of firms **have** attended.

firms that are not yet linked to the maquila and, to a lesser extent, new firm projects. However, there are very few initiatives to improve firms that are already linked to IME.

In relation to trade agreements, Mexico joined the GATT in 1986; by 1994, it had signed NAFTA and in recent years it has signed different trade agreements with Latin American and Asian countries as well as with the European Union, which is of particular relevance to Mexico. NAFTA is undoubtedly the agreement with more relevance for FDI development and particularly for the television cluster in Mexico. NAFTA has encouraged capital flows in a surprising way, particularly towards the manufacturing sector. This tariff agreement progressively eliminates both taxes from the United States and Canada and quotas on Mexican exports to the North American market. It simultaneously establishes rules of origin in order to stimulate regional production and integration to such an extent that inputs from countries outside the region that do not reach the established quotas must pay taxes. As an expert in NAFTA's rules of origin warned, import tariffs established by the agreement can make the difference between maintaining a margin for profits or completely losing it:

"If a color television produced by a Japanese firm in Mexico can qualify as produced in North America under the corresponding rule of origin, it will therefore be exempted from the five per cent tax *ad valorem* enforced under the favored nation regime; this five per cent may well be higher than the television's actual profit margin" (Glantz, 1999:2)

NAFTA besides modified the maquila program by turning temporary imports into permanent imports and changing the tariff status of foreign firms for Mexican firms and therefore changing tax payment.

Open trade was first attained with the maquila program in 1965 and its various decrees; GATT (1986) and NAFTA (1994) have allowed TNC subsidiaries to diversify their market. Sales to other countries have increased, although all television firms send most of their production to the United States and Canada. Sony and Hitachi, for example, export to other markets, mainly in Latin America. In 1997, Samsung sold 45%

of its production in this region. Domestic sales to the Mexican market have also grown significantly, passing from practically 0% in 1985 to 6% in 1995 (Samsung 14%, Hitachi 10% and Sanyo 2%) (**Annexed Table 3**).

To summarize, we can say that within the Mexican public policies, the maquila program has by far been the most relevant factor mentioned by management as a tool to locate and improve competitiveness (Carrillo and Mortimore, 1997). Other macro policies, such as currency rate of exchange and NAFTA, were also considered as “very important”. The maquila program was undoubtedly the program that, together with a U.S. HTS 9802 mechanism, virtually defined Mexico as a preferential country in which to manufacture color televisions. NAFTA, as we saw in the previous section regarding local suppliers, has been the main instrument to speed up growth and establish conditions to increase national and regional contents in the products. Besides, these new conditions have encouraged the creation of the main television cluster in the world. The rules of origin have particularly impacted the Asian FDI since the assembly plants are actively looking for ways to increase their NAFTA contents, as can be derived from **Table 4 and Figure 6**. As a result, there has been an increase in “in-house” component production (vertical integration), in invitations for Asian suppliers to set up close to the Baja California cluster and in the appearance of local producer services, spill overs and start ups.

Since 1965, with the establishment of the maquila program, the Mexican government has explicitly expressed its intention to promote productive integration via incorporating inputs and raw materials. There were nevertheless no specific programs or instruments devoted to this. It was not until 1996 that the Mexican policy changed its national promotion of inputs for maquila operations through (i) a link between these firms and non-maquila plants established in Mexico; (ii) promoting trade fairs; (iii) reducing taxes for suppliers located outside large cities; (iv) preferential financing and customs treatment by the industry department (SECOFI) for new ‘sub-maquila’ and “indirect exports” categories; and (v) incentives (tax exemption) for foreign firms using national suppliers. Unfortunately, the official results of this process, at least in

quantitative terms, are still very limited since local contents in the electric-electronic branch have not even gone beyond 2% of the added value.

Although the content of national components and the productive links are extremely small among TNCs and suppliers in Mexico, new aspects such as NAFTA's rules of origin (promoting vertical integration and the development of nearby suppliers) and the need to use scale economies derived from electronic clusters (inter-TNC trade, producer services) are playing an important role that is changing this situation.

Subsidiaries have explicitly acknowledged these national policies. However, when more specific policies are reviewed, such as those regarding industrial clusters or the promotion of national suppliers, opinions become more critical. A study carried out in the mid-90's, found that the managers of television TNCs did not see these programs as an important or relevant issue for their firms. Neither TNCs nor local suppliers have received public nor private financing (Barajas Escamilla, 2000:225). This was clearly confirmed in our interviews.

Beyond opinions regarding the performance of these programs, TNCs have been found to have wide access to governmental information in order to expand their business in Mexico (JVC, Hitachi, Sanyo, Samsung complex, Sony). Nevertheless, there is still little interaction between public stakeholders and TNCs subsidiaries (Barajas Escamilla, 2000).

B.. Business Organizations and their Cooperation with other Agents

The new social actors that have emerged in this process and have created a broad structure to support innovation are as follows: universities, technological and research centers, firms, investors, suppliers, regulators (Nafin), support units, the Tijuana Fund (supplier development financed by the IDB) and Fomec (a program to minimize and reuse industrial waste promoted by the Mexico-United States Foundation for Science). The Tijuana Development Council (Consejo de Desarrollo de Tijuana / CDT) is the organization that has best brought these efforts together and is attempting to coordinate them. It is an avantguard bridge in this process to link firms and local suppliers. Its participation, however, is very recent and the interview reflected that

greater linkage with firms is still necessary. Relations between business associations and public institutions are extremely active and are mostly organized collectively. Their relations with TNCs and local firms, however, has a lower profile in part because TNC subsidiary managers, like small firm owners, are overwhelmed with activities within their firms, which is why they do not generally have time for public relations nor can they participate in local events. The interviewees, both from suppliers and TNCs, commented that the seminars the government promotes and even match-making have no impact on the development of intra-firm links.

CDT directors know the potential the electronic cluster has in Baja California and acknowledge the numerous weak spots in infrastructure, technology, business capacity and cultural problems (in both small businesses and TNCs) that hinder supplier development. The current state development program has defined projects that promote the economy and identify the electronic cluster that should be promoted in Tijuana in congruity with the electronic cluster in San Diego, California. As can be appreciated in **Tables 23 and 24**, various stakeholders participate in this process.

The Tijuana Fund is the most complete program. It is coordinated by CDT and promotes 20 firms (whether new or already established) that can supply the maquila, particularly the electronic cluster. It is a program financed by the IDB and private investors (\$12 million dollars in total) and managed by the private sector. The Fund supports the risk capital of firms that want to sell to the maquila industry. It is a five year project and was launched in November, 2000 (it took over two years to get IDB approval). 17 firms will receive support (7 existing firms and 10 firms in the process of creation) (see **CDT Tijuana Fund Annex**).

To summarize, officially there are decrees, policies, programs and instruments to create clusters and the development of suppliers at a national, state and, particularly in the electronic cluster in Baja California. There is also a general and norm framework of open trade and FDI promotion. There is also a macro-economy that is stable and transparent enough to be of use to business development. There are also business organizations and coordination and integration initiatives of both agents and programs to support supplier development. However, they have not yet shown to be effective in

promotion. In this case, it is convenient to underline the ideas to strengthen productive networks that both TNC subsidiaries and suppliers expressed in our interviews (**Table 25**). Although there was a wide diversity of answers, some were very concrete

2. Suppliers of Industrial Services

There are different services that intend to integrate with maquila firms, particularly in the electronic cluster in Tijuana, such as certification promotion (ISO), training in standards, the connection of technological information systems, food, cleaning, security, customs agencies, among others.

Internet use is a little known service that will bring important changes in productive networks as a consequence of expanding technical capacities and of the decision of local subsidiary firms. A recent study (Contreras and Carrillo, 2000) concluded that decentralized access to documents is the most highly valued benefit in intranet since it expands access to graphs, diagrams, maps and data series regardless of time or location (**Table 26**). In the near future, outsourcing relations will be integrated into programs designed for a B2B approach. This seems to be a relatively immediate step among Japanese, Korean and European TNC subsidiaries that carry out inter-firm trade in the television segment (**Table 27**) as well as among first line TNC assembly plants and suppliers (of the same corporation or a different one). This situation, however, is different for local suppliers since their incorporation to transnational chains based on internet is still uncertain and relations between these firms and local service companies are still embryonic (Contreras and Carrillo, 2000). New relations can nevertheless be observed. On the one hand, television TNCs themselves, in spite of having a strong systems department, tend to make use of local internet services providers (ISPs) or design firms in order to develop their own applications. On the other hand, there is a proliferation of new firms created by ex-employees of the large ISP's or young professionals in information technologies (advice, web page design, systems integration and development of "Internet solutions"), thus complying with an important function as technological intermediaries in E-C development in local firms.

Conclusions

First, Mexican suppliers in Tijuana are linked to other television TNC subsidiaries in the second and third line, in other words, they usually carry out unsophisticated activities with low added value. Although this is changing with NAFTA, it is a slow process and the future scenario is not yet clear.

Second, although television TNC subsidiaries in Tijuana share a common pattern of local provisioning²⁶, the firms present important differences depending on their own trajectories. Whereas the Korean firm has been notorious for its vertical integration strategy, one of the Japanese firms has reinforced itself with outside suppliers. The case of the Korean TNC reveals how within the same corporation there are different strategies to develop local suppliers (both foreign and Mexican). Before NAFTA, the corporation's main motivation to draw and develop suppliers was to reduce production costs (in transport and delivery deadlines). Another reason promoted by the subsidiary was added later on: to continue enjoying tariff exemptions (by complying with the rules of origin). NAFTA thus accelerated plans to have nearby suppliers in Tijuana. Agreements were thus signed between Samsung corporation and suppliers from other divisions in Korea, as well as agreements with Japanese TNCs and U.S. medium-scale firms. As a result of NAFTA, one of the Samsung plants is now planning to look for national suppliers of chemical products (for example basic inputs such as sulphuric acid, nitric acid and caustic soda), both to be able to comply with the rules of origin and to be able to confine its waste in Mexican territory.²⁷ Whereas in one case the subsidiary of this corporation faced the following problems to develop national suppliers: the lack of a culture of responsibility and compliance, high production costs (derived from the national firms' limited technological competence), another subsidiary faced the existence of pre-established corporate agreements with suppliers in Korea.

²⁶ Based on the need to comply with rules of origin since most firms in Tijuana are Asian, whereas most firms in Juárez are European.

²⁷ Transport price and availability is much lower than in the U.S.A. They are no longer forced to send their waste back to the United States as the maquila regime stipulates and do not risk being sanctioned nor infringing the law.

Third, according to the TNCs themselves, public policies have a low impact on the development of suppliers. A TNC manager underlined that: "The state and federal government have had little or nothing to do with the development of local suppliers". "We have come close on occasions, they (the state government) have even come to promote supplier fairs, but we are basically in charge of searching for input suppliers (...) as in the case of chemical compounds, which we now have to buy in Monterrey... it is an initiative of ours that is carried out via personal networks"

The loop closes when you observe how the government in its different levels, on the one hand, has little to do with the establishment of new suppliers in the case of the television industry, and on the other hand, is more interested in developing suppliers for the maquila than in the level and type of relation existing between the few suppliers that are linked together. In this sense, the debate, policies and policy recommendations are currently addressed to: analyze the sector at an international and local level; identify, diagnose and strengthen the clusters; establish strategic lines and actions; determine resources and support instruments and mechanisms. There are two projects: one by the state government and a private project to develop slightly over 30 Mexican suppliers. In both cases, the idea is to mainly develop the firms that already exist and to a lesser extent projects by new firms. There are a few initiatives to improve the firms that are already linked to IME.

Fourth, public policies have not had the desired success because of a variety of factors: many firms do not know the different support policies that exist well enough if at all; funding is low and scarce; some policies are inadequate and those that are appropriate have low rates of efficiency; there are no systematic policy evaluations and sometimes there are no evaluations at all; it seems the governments do not consult TNCs and suppliers on a permanent basis; suppliers neither trust nor believe in the policies, they consider bureaucracy to be excessive and low in efficiency. Although the great efforts that have been made and the advances in industrial development policies should be acknowledged, it now seems more important to be clear about its weaknesses and the progress that has been made.

Fifth and final conclusion, the behavior of the television industry in Tijuana in terms of its links with the Mexican economy that have already been described is not unique to this sector. The electronic plants in Tijuana (Barajas Escamilla, 2000), as well as transnational autopart maquilas in Ciudad Juárez (Carrillo y Miker, 2000) behave similarly. Furthermore, very few links have been found between autoindustries in Mexico (assembly plants and non-maquila autoparts) and national suppliers, since, on the one hand, the development of suppliers established in Mexico is based on corporate agreements established in the country where the TNCs originate and, on the other hand, national firms have scale, price, delivery deadline, productivity and technology problems (Carrillo and González, 1999; Altenburg *et al.*, 1998; Ramírez, 1997; Miker Palafox, 1996).

Although subsidiaries of TNC firms are an important vehicle for the modernization and development of firms in Mexico, its transnational nature is also an important limitation for a more balanced relationship between foreign and national firms within regional development. The challenge is still great and needs more research and participation of all the stakeholders involved in this process.

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TABLE 1
MEXICO: TNC'S TELEVISION AFFILIATES IN NORTHERN BORDER (2000)

Firms (*)	Plants	City	TV Products (**)	Country of Origin	Annual Capacity	Employment
<i>BAJA CALIFORNIA CLUSTER</i>						
Matsushita (1980)	1	Tijuana	TV, components (Quassar, Panasonic, National, Technics)	Japan	1,500,000	3,160
Sanyo (1982)	3	Tijuana	TV (13" 20" 27" 32" 36") DY, components (Sanyo)	Japan	1,100,000	2,200
Sony (1985) (1988)	5	Tijuana, Mexicali	TV (13" 36") DY, components PC monitors (Sony)	Japan	3,000,000	6500
Hitachi (1986)	1	Tijuana	TV, components (Hitachi)	Japan	900,000	3,200
Samsung (1988) (1995)	4	Tijuana, Mexicali	TV (32") CRT, components, DY, Projection TV, Digital TV, VCR (Samsung)	South Korea	1,850,000	3,600
JVC (1996)	1	Tijuana	TV (13" 20" 27" 32" 36") components (JVC)	Japan	700,000	500
Daewoo (199?)	2	Mexicali San Luis Río Colorado	TV, CRT, PC monitors, VCR	South Korea	n.d	2,600
LG Electronics (1988)	2	Mexicali	TV, components, PC monitors (Zenith, Goldstar)	South Korea	n.d.	2,200
Mitsubishi (1987)	2	Mexicali	TV, components	Japan	n.d.	1,000 (1997)
<i>CIUDAD JUAREZ CLUSTER</i>						
Thomson (1968.)	2	Cd. Juarez	TV DY, chassis's (GE, RCA)	France	3,500.000 (99)	6,400 (1999)
Philips (n.d.)	1	Cd. Juarez	TV, components (Magnavox, Sylvania)	Netherlands	n.d.	1,700 (1999)
Orion (n.d.)	1	Cd. Juarez	n.d.	South Korea	n.d.	n.d.
Toshiba (n.d.)	1	Cd. Juarez	TV, chassis's	Japan	n.d.	n.d.

SOURCE: © Carrillo, 2001. Data from Bancomext and managers interviews. See Contreras y Carrillo, 2000; Carrillo y Mortimore, 1997.

* Information in parenthesis is the year of entry. base on manager interviews

** Information in parenthesis is the TV models assembled.

TABLE 2
NAFTA: TV PRODUCTION AND CONSUMPTION
(000 units)

Country	Production		Consumption	
	1998	2003	1998	2003
Mexico	25,361	34,800	1,560	2,000
United States			29,925	29,200
Canada	400	400	1,900	2,100
TOTAL	25,784	35,200	33,385	33,300

SOURCE: Contreras y Carrillo (2000) based on Bancomext (1999).

**TABLE 3
MEXICO: TNC'S TELEVISION IN TIJUANA AND LOCAL SUPPLIERS 2000**

Firms/Plants	Components "in-house"	Local Components	Inter-Maquila TV Trade
Matsushita	Turner Model 1 VCO Turner Model 2 components	Bags (4) Plastic Boxes Cardboard boxes Plastic parts Wood cabinets Uniforms Labels Manuals and instructive CRT Packing Components	Toshiba Mitsubishi Sony Hitachi
Sanyo (SIA)	Screen Syntonizer Deflection Yolk Electronic Chassis Transformer Plastics packing	Parts of plastic Bags of plastic (3) Boxes cardboard Uniforms Wooden platforms Components	Samsung Thomson Philips Sony Matsuchita
Sony Tijuana Este	Kinescope Chassis Printed Circuits Deflection Yolk Transformer Syntonizer Plastics Components	Bags of plastic (3) Cabinets of plastic (2) Cabinets of wood Uniforms Repair molds Plastics	JVC Matsushita
Hitachi		Bags of plastic Cabinets of plastic Parts of plastic Batteries	Samsung JVC Matsushita
Samsung Electronics	Cabinets (Frontal, Back) Kinescope Transformer Channel turner Deflection Yolk Unmagnetizing bobbin Components	Cabinets Component Bags of plastic (3) Boxes of cardboard plastic Manuals and instructive	Thosiba Thomson LG Electronics Daewoo Hitachi Matsushita Samsung Display Samsung Electro mechanics
Samsung Display	Kinescope	Glass Components Bags of plastic (3) Boxes of cardboard plastic Manuals and instructive Uniforms, Cleaning products Safety globes	Philips Sanyo JVC Zenith Matsushita
Samsung Electro mechanics (SEMSA)	Turners Reflexion Yolk Transformers Speakers Capacitors	Bags of plastic (3) Boxes of cardboard plastic Manuals and instructive	Matsushita Toshiba Thomson Goldstar Sharp
JVC	Kinescope Electronic components Metal Cooper wire Bronze wire Printed circuits Cabinets Box Plastics	Cabinets of plastic (2) Boxes of cardboard Packs Bags of plastic Boxes of cardboard Manuals and instructive Uniforms (2) Repair of molds Aluminum Electrical insolution	Sony Matsushita Sharp Hitachi

SOURCE: © Carrillo 2001, base on Barajas Escamilla (2000) and interviews with managers.

TABLE 5
MEXICO: TELEVISION TNC's AFFILIATES IN TIJUANA, 2001, 1995
MAIN CHARACTERISTICS

Aspects/Firms	Thomson	Philps	Hitachi	Samsung	JVC	Average 2001	Average 1995
Are the high directive?	Mexicans	Americans	Japanese Mexicans	Koreans Mexicans	Japanese Mexicans	Foreigners	<i>Foreigners/ Local</i>
Is the autonomy of the parent company?	Partial	Total	Total	Partial	Partial	0.80*	0.67*
Three most important activities in those that they have had changes deep last two years:	Other	Manage of the plant. Technological information. Development of planning.	Design of processes Design of product Final assembly	Design of products. Financial administration. Design of processes.	Design of processes Final assembly Administrative autonomy	Design of process Design of product	<i>1995-1990: Design of process Design of product Final Assembly</i>
Years of backwardness in technology	0	4	7	0	2 years	2.6	<i>nd</i>
Automation % (value of equipment and machinery)	70%	50%	8%	50%	50%	45.6%	<i>nd</i>
ISO 9001	No	Yes	Yes	No	Yes	60%	<i>Nd</i>
ISO 9002	Yes	Yes	Yes	Yes	Nd	80%	<i>Nd</i>
ISO 14001	No	Yes	Yes	Yes	Yes	80%	<i>Nd</i>
ISO 14002	No	Yes	Yes	No	nd	40%	<i>nd</i>
workers %	96	80	90	80	90	87.2%	80.4%
Technicians % C29	3	15	5	10	5	7.6%	4.8%
Female workers %	51	70	40	60	80	60.2%	<i>Nd</i>
Turnover % 6-8%	12	15	12	1	12	10.4%	6-8%

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

* 1= total autonomy of parent company 0=total dependency of parent company

TABLE 6
MEXICO: TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
LONG-TERM RELATIONS FROM TNCs TO LOCAL SUPPLIERS

Company	Long-term relation	(%) of local purchases	Decisions where to source inputs	Long term expectation for next 5 years	Main obstacles for long-term linkages	Encourage other foreign firms to located in the region
Matsushita	Yes	80 %	The affiliate	Increase	Lack of interest by your company	No
Sony Este	Yes	-	The affiliate	Increase	Quality and distribution problems	No
Hitachi	No	-	The affiliate	Increase	Quality and distribution problems	Yes
Samsung Mexicana	Yes	75 %	Another company within the TNC?	Increase	Lack of potential partners that match TNC capability and quality requirements	-
JVC	Yes	-	The affiliate	increase	Lack of potential partners that match TNC capability and quality requirements	Yes
Samsung Display	No	20 %	The affiliate	Increase	Lack of technological capacity	Yes
L.G. Electronics	Yes	-	The affiliate	Increase	Lack of potential partners that match TNC capability and quality requirements	Yes

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 7
MÉXICO: TNCs TV AFFILIATES IN TIJUANA, 2001
TNCs LONG-TERM RELATIONS WITH LOCAL SUPPLIERS AND THEIR SUPPORT

Statement	Yes	No	Not relevant
Your company has assisted locally owned suppliers to locate close to you	5	1	1
Your company has provided local suppliers with information on future demand requirements, market trends, etc.	7	-	-
Your company has provided technical assistance to local suppliers.	6	1	-
Your company has provided financial support to local suppliers.	1	6	-
Your company has assisted local suppliers in sourcing various types of inputs.	5	2	-
Your company has assisted in the training of the management of local suppliers.	3	4	-
Your company regularly meets suppliers to negotiate prices of the various inputs.	6	1	-
Your company has reached agreements with local suppliers concerning the allocation of inventories or the sharing of costs for product development.	5	2	-
Your company has assisted local suppliers in the search for new customers abroad.	1	6	-
As a result of a long-term relation with your company, some locally-owned suppliers have begun exporting to other parts of your TNC.	6	-	1

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 8
MEXICO: VERTICAL INTEGRATION (VI)* AND LOCAL SUPPLIERS (X) IN TNC'S TELEVISION IN TIJUANA, 2000

	Matsushita	Sanyo	Sony	Hitachi	Samsung	JVC
Box	VI X	X X	X		X	X
Cabinet	X X		X X X	VI X X	VI X	X X
Components : - Electronic			VI VI		VI VI	
Connectors	X					
CRT/Kinescope	X		VI		VI	VI
Electronic Chassis		VI X	VI			
Filtros de línea	X					
Manuals (instructive)	X				X	X
Metal Cooper						VI
Parts	X X	X		X		
Plastic Injection		VI	X X			X
Plastic packages	X X X X X	VI X X	X X X X	X X	X X X X	VI X X X
Printed Circuits			VI			
Screen		VI X				
Sytonizer		VI X	VI			
Transformer		VI X	VI			VI
Reflection Yolks	X X X	VI	VI		VI	
Remote Control & Channel turner	X				VI	
Unmagnetizing bobbin					VI	
Wire						VI

SOURCE: © Carrillo 2001, based on Barajas Escamilla (2000) and interviews with managers.

- Integración vertical se refiere a compras locales con proveedores de filiales de la misma corporación o de producción realizada dentro de la filial analizada.

TABLE 9
MEXICO: TRANSFERENCE AND ASSISTANCE FROM PARENT COMPANIES TO TNCs TV AFFILIATES

	Matsuchita	Sanyo	Sony	Hitachi	Samsung	JVC
TECHNICAL						
Blue prints	frequent	transferred (ownership)		low		frequent
Machinery & tools		transferred (ownership)	low		ownership	
Production & planning		transferred (ownership)	frequent	frequent	frequent	
Quality control			frequent	frequent	frequent	
R&D	own department	own department	own department		own department	
ORGANIZATIONAL						
Supply of raw materials					frequent	
Organization and Management	frequent	frequent				
Logistic for raw materials			frequent			

SOURCE: Own elaboration based on Lara, 1998; Barajas Escamilla, 2000.

TABLE 10
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
SUPPLIER-CLIENT RELATIONS

Name Company	Product	Sony	Samsung	Sanyo	JVC	Hitachi	Matsushita
A	Boxes of Cardboard			*	*		*
B	Packs				*		*(Panasonic)
C	Repair of molds	*			*		
D	Wooden cabinets	*			*	*	
E	Bags of plastic other products for protection	*	*	*		*	*(Panasonic)
F	Cabinets of plastic	*			*	*	
G	Manufactures of parts of plastic			*		*	*
H	Molds of plastic		*				
I	Wooden cabinets	*					*
J	Metallic parts	*	*	*			

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 11
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
YEAR OF ESTABLISHMENT, NUMBER OF EMPLOYEES AND PRODUCT

Firm	Year of Establishment	Number of Employees	Product
A	1987	70	Fabric of Boxes and cardboard packs
B	1995	120	Packs, Insuladores, Espaciadoras
C	1998	6	Molds repair
D	1988	450	Cabinets for TV
E	1994	140	N.r.
F	1996	170	Plastic cabinets
G	1988	430	Manufacture of parts of plastics
H	1994	300	Plastic of molds
I	1985	310	Wood cabinets for TV
J	1996	150	Metal parts for monitors and TVs

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 12
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
PURCHASES AND SALES

	Total Sales	Domestics Sales		Exports	Total Purchases	Domestic Purchases		Imports
		TNC	Locales			TNC	Locals	
Totals	39,627,587	18,675,363	2,300,000	18,652,224	23,820,350	6,031,817	600,000	17,188,533
Average	7,925,517	3,735,073	1,150,000	6,217,408	7,940,117	2,010,606	600,000	8,594,267
Percentage	100%	47%	6%	47%	100%	25%	3%	72%
Mexican Suppliers								
	Total Sales	Domestics Sales		Exports	Total Purchases	Domestic Purchases		Imports
		TNC	Locales			TNC	Locals	
Totals	13,404,000	8,921,500	2,557,500	1,925,000	5,962,280	40,000	1,372,456	4,549,824
Average	2,234,000	1,486,917	426,250	641,667	1,192,456	40,000	274,491	909,965
Percentage	100%	67%	19%	14%	100%	1%	23%	76%

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 13
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
TYPE OF AGREEMENT

Firm	Contractual Agreement with TNCs	Type of Contractual agreement with foreign affiliates of TNCs
A	Yes	Other: Commercialization
B	Yes	Subcontracting
C	NO	None
D	Yes	Subcontracting
E	Yes	Other: Verbal
F	Yes	Subcontracting
G	Yes	Other: Transferences
H	Yes	Other: Maquila Contract
I	Yes	Subcontracting
J	Yes	Subcontracting

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 14
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
TECHNOLOGY TRANFERENCIES AND TECHNICAL ASSISTANCE

<i>TECHNOLOGY TRANFERENCIES</i>			
Firm	Has Technology been obtained from TNCs?	What is the nature of the technology transferred?	How did you obtain such technology?
A	Yes	Process technology. Product Technology Product design	Through the center of technology development in the USA
B	No	None	None
C	No	None	None
D	Yes	Product design and technology	Trough demonstration effects (imitation and learning)
E	No	None	None
F	No	None	None
G	No	None	None
H	Yes	Process technology. Product Technology	Trough demonstration effects (imitation and learning)
I	No	None	None
J	No	None	None
<i>TECHNICAL ASSISTANCE</i>			
Firm	Employees provided with technical training opportunities by TNCs?	Number of Employees participated in training programs	Assistance given to your company by TNCs
A	Yes	10	Technical Assistance
B	Yes	5	Technical Assistance
C	No	None	None
D	No	None	Molds and design come from TNCs
E	Yes	20	None
F	No	None	None
G	Yes	10	Technical Assistance
H	Yes	15	Technical and financial assistance
I	No	None	Quality Control
J	No	None	None

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 15
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNC's AFFILIATES IN TIJUANA, 2001
FORWARD LINKAGES AND THEIR IMPACT

Firm	How many TNCs your company has linkages with?	Benefits on your company of linkages with TNCs	Negative effects on your company of linkages with TNCs
A	3	None	None
B	50	Use of the International Quality Standards	More Investment more compromise, more pressures
C	10	Several advantages from the clients	None
D	8	Links with other business partners at home and abroad	Japanese enterprise policy don't permit relation with other firms with the same products
E	129	Contracts	Reduction of the value of the finished product
F	5	N.r.	N.r.
G	25	None	Government obstacles by SECOFI
H	1	Foreign Direct Investment, Increase of employment	Different cultures
I	5	Increment of Technology, Productivity, More training to the employees	None
J	4	None	None

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001.

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N.r. No responded

TABLE 16
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
POLICY MESAURES AND THEIR IMPACT

POLICY MEASURES	If such policies do not exist, please tick (√)	Such policies exist and have had		
		positive impact	negative impact	no impact
Incentives (tax incentives, subsidies, etc.)	6	2	1	
Government sponsored tailored training of skills	7	2		
Provision of information	4	4		1
Match-making with prospective business partners	4	1		3
Government/industry joint seminars, meetings, fairs, etc.		6		3
Assistance with procurement finance (e.g. by guarantees or subsidized interest rates)	8	1		
Other policy measure (please specify)				2

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001.

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TABLE 17
MEXICO: MEXICAN SUPPLIERS OF TELEVISION TNC's AFFILIATES IN TIJUANA, 2001

Mexicans Firms				Clients				
Firm's name	Product	Sony	Samsung	Sanyo	JVC	Hitachi	Matsushita	
A-1	Bags and boxes of plastic	*	*		*		*	
B-1	Polyethylene bags	*	*	*		*	*	
C-1	Wood Platforms							
D-1	Uniforms	*		*	*		*	
E-1	Labels						* (Panasonic)	
F-1	Plastics and bags	*	*	*	*		*	
G-1	Manuals and instructive		*		*		*	
H-1	Uniforms				*			

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 18
MEXICO: MEXICAN FIRMS SUPPLIERS OF TELEVISION TNC's AFFILIATES IN TIJUANA, 2001
YEAR OF ESTABLISHMENT, NUMBER OF EMPLOYEES AND PRODUCT

Company	Year of Establishment	Number of Employees	Product
G-1	1990	90	Service's Manuals, Instructive, Boxes
A-1	1994	50	Manufacturers of foam bags, Plastic Boxes, Cardboard, . Re-sell of packing material
B-1	1989	60	Manufacturers of polietileno bags
C-1	2000	20	Wood platforms
D-1	1992	50	Industrial shoes distributors
E-1	1999	120	Manufacturers and distributors of labels
F-1	1988	14	Polietileno's products

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 19
MEXICO: MEXICAN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
TYPE OF AGREEMENT

Company	Contractual Agreement with TNC	Type of Contractual agreement with foreign affiliates of TNC
G-1	None	None
A-1	None	None
B-1	None	None
C-1	Yes	Franchising
D-1	None	None
E-1	None	None
F-1	None	None

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 20
MEXICO: MEXICAN FIRMS SUPPLIERS OF TELEVISION TNC's AFFILIATES IN TIJUANA, 2001
TECHNOLOGY TRANFERENCIES AND TECHNICAL ASSISTANCE

Company	Has Technology been obtained from TNCs?	If yes, What is the nature of the technology transferred	How did you obtain such technology?
G-1	No	None	None
A-1	Yes	Process Technology. Product Technology. Imitation Japanese Technology. Import American machinery	Trough demonstration effects (imitation and Learning)
B-1	No	None	None
C-1	No	None	None
D-1	No	None	None
E-1	No	None	None
F-1	No	None	None
Company	Employees provided with technical training opportunities by TNCs	Number of Employees participated in training programs	Indicate any assistance given to your company by TNCs
G-1	No	None	None
A-1	Yes	3	None
B-1	No	None	Occasionally technical assistance by foreign suppliers
C-1	Yes	2	Information
D-1	No	None	No
E-1	No	None	None
F-1	No	None	No

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 21
MEXICO: MEXICAN FIRMS SUPPLIERS OF TELEVISION TNC's AFFILIATES IN TIJUANA, 2001
FORWARD LINKAGES AND THEIR IMPACT

Company	How many TNCs your company has linkages with ?	Benefits on your company of linkages with TNCs	Negative effects on your company of linkages with TNCs
G-1	20	Permanency in the market, growth, recognition of stability	Higher preference for suppliers of USA and Asian
A-1	25	Specialization niche	There are not contracts that guarantee sales
B-1	30	To know new products. To be a day in technology	None
C-1	10	No Response	No Response
D-1	150	Give service in the plant,	None
E-1	20	To know the market better	None
F-1	30	Increment in production. New Clients	None

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 22
MEXICO: FOREIGN FIRMS SUPPLIERS OF TELEVISION TNCs AFFILIATES IN TIJUANA, 2001
POLICY MESAURES AND THEIR IMPACT

Company	Positive Impact	Such policies do not exist, please tick
Incentives (tax incentives, subsidies, etc)	2	3
Government sponsored tailored training of skills	2	3
Provision of information	2	3
Match making with prospective business partners	2	4
Government/industry joint seminars, meetings, fairs, etc	0	4
Assistance with procurement finance (e.g. by guarantees or subsidized interest rates)	0	4
Other policy measure.	0	

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 23
MEXICO: MAIN PUBLIC AND PRIVATE AGENCIES OF SUPPORT TO THE INDUSTRIAL AND REGIONAL DEVELOPMENT IN TIJUANA

Agencies	Public	Private
Ministry of Trade and Industry (Secretaría de Comercio y Fomento Industrial)	X	
Ministry of Economic Development, State Government (Secretaría de Desarrollo Económico-Gobierno del Estado de Baja California)	X	
National Finance Agency (Nacional Financiera-Financiamiento y Asistencia a la Pequeña Empresa)	X	
U.S.-Mexico Chamber of Commerce		X
National Industry Chamber (Cámara Nacional de la Industria y la Transformación -CANACINTRA)		X
Maquiladora Industry Association- West Coast (Asociación de la Industria Maquiladora Zona Costa)		X
Economic Development Corporation (Binnational Organization Tijuana-San Diego)		X
Economic and Industrial Development of Tijuana		X
Development Council of Tijuana	X	X
Entrepreneur Coordination Council (Consejo Coordinador Empresarial)		X
Educational Linkage Committee (Comité de Vinculación Educativa)	X	X
Border Governors Forum (Foro de Gobernadores Fronterizos)	X	

Source: Barajas Escamilla (20001) Table based on Association of Governments, 1995. "Regional Economic Prosperity Strategy", San Diego, Ca., y South San Diego County, Economic Development Council y Southwestern College, Small Business Development and International Trade Center, "The Market for Raw Materials, Components and Machinery Parts in México's Maquiladora Industry", San Diego, 1997.

TABLE 24
MÉXICO: DEFINITION OF POLYCES FOR INDUSTRIAL DEVELOPMENT IN TIJUANA

01 HIGH VALUE ADD INDUSTRIES			
Content	Participation:	Valor	Products
<ul style="list-style-type: none"> • Manufacture of complete products • National risk capital • Research in collaboration with universities • Introduction of lead technologies • National suppliers • To create industries of services • Pharmaceutical • Coordination with clusters in San Diego like defense 	<ul style="list-style-type: none"> • Committee of Strategic planning (CDT) • Planning and Development Ministries of Cities and State • State Economic Development Ministry (SEDECO) • Association of Maquiladora Industry • National Chamber of Industry (CANACINTRA) • Economic Development Council-San Diego 	<ul style="list-style-type: none"> • Restructuring the assembly industry toward the new century • Integration of national suppliers • University linking to the industry • To assist niches of market of more value add • To improve skills • To improve worker salaries 	<ul style="list-style-type: none"> • Pre • Sel • lob • Ne • wa • Res • Stu • Sup • Ide • Ind
0-2 EIGHT INDUSTRIAL CLUSTERS OF SAN DIEGO FOR INSTALL IN TIJUANA			
<ul style="list-style-type: none"> • Health products and services • Financial services to business • Tourism and Entertainment • Defense manufacture • Electronics • Telecommunications • Software • Recreational products 	<ul style="list-style-type: none"> • Strategic Planning Committee (CDT) • Urban Planning Direction • SEDECO • COPLADEM • EDC San Diego • Universities • SECTURE 	<ul style="list-style-type: none"> • Restructuring the assembly industry toward the new century • Integration of national suppliers • University linking to the industry • To assist niches of market of more value add • To improve skills • To improve worker salaries 	<ul style="list-style-type: none"> • Prep • Sele • lob • Res • Co • dev • Sup • Proj
0-3 SERVICES INDUSTRIAL CLUSTER			
<ul style="list-style-type: none"> • Accountability • Engineering • To write codes of Software • Computer processes • Packs and labels • Processed foods Counting of coupons 	<ul style="list-style-type: none"> • CDT • Municipality • State Economic Development Ministry • Owners • Professional Associations • Association of Maquiladora Industry • DEITAC 	<ul style="list-style-type: none"> • To create an industry of value add • It can consolidate the national investment in maquiladoras • It will be necessary to identify the pioneer companies in the sector 	<ul style="list-style-type: none"> • Str • Ma • Pro
0-4 ELECTRONIC CLUSTER			
<ul style="list-style-type: none"> • To consolidate it with complete products • National Parts • Training of engineers and technicians • Research institute • Support of the CDT to authorities • Tax Lobby • Engineering of process and supply • Transport schemes • National market 	<ul style="list-style-type: none"> • CDT • Municipality • State Economic Development Ministry • Maquiladoras • SECOFI • CANACINTRA • Universities (UIA, ITT, UTT, UABC) • Development Bank • CITEDI-IPN 	<ul style="list-style-type: none"> • Consolidation of this industry like "capital of the electronics in Mexico" • It can consolidate the national investment in assembly plants 	<ul style="list-style-type: none"> • To • stra • Ma • Co • Tec • Ag

<ul style="list-style-type: none"> • Quality • Local capital • Right of patents 	<ul style="list-style-type: none"> • A.I.M • EDC San Diego • CONECT-UCSD 		
0-5 WOOD INDUSTRY CLUSTER			
<ul style="list-style-type: none"> • 969 million dollars in annual import • 1,000 employees • To attract more national capital • More national components • Design Shop Program • To plan the association of this industrial sector in the state • Project of Round Valley 	<ul style="list-style-type: none"> • CDT • Municipality • SEDECO • Owners • CANACINTRA • SECOFI • CRECE • DEITAC 	<ul style="list-style-type: none"> • To consolidate it as industry of more value add • More national investment 	<ul style="list-style-type: none"> • To • stra • Ma • Pro

SOURCE: Development State Program

TABLE 25
MÉXICO: TV INDUSTRY IN TIJUANA, 2001
WHAT KIND OF GOVERNMENT POLICIES WOULD ENCOURAGE YOUR COMPANY TO STRENGTHEN LONG-TERM LINKS WITH LOCALLY-OWNED FIRMS?

<i>AFFILIATES TRANSNATIONAL CORPORATIONS (TNCs) LOCATED IN TIJUANA</i>	
TNC 1	CIMO: It helps in specify cases, but it doesn't work for companies of 500 persons or least. Promote quality standards such QS9000 and ISO 900 with the local suppliers. To improve bonus of performance. Tax returns in investment for development (Japanese mentality that everything has something trade off).
TNC 2	To promote certificates of quality in companies that improve the delivery (JIT) and the culture of the quality
TNC 3	There are not much interest to developed local suppliers but there are worried about origins rules
TNC 4	Development of infrastructure (Electricity, water) Programs to produce glass locally
TNC 5	Fiscal policies, Rules for imports and temporary imports
TNC 6	Reforms and clarify the operation of the maquiladora program
TNC 7	Lack of technology to manufacture the necessary inputs that are used for the production of televisions. In what concerns to services and packing, the capacity is good
<i>FOREIGN SUPPLIERS TO TNCs LOCATED IN TIJUANA</i>	
A	To create elements of development and competitiveness; it should be simplified the administrative process; it should be developed the infrastructure (bridges, roads, airports). To create a global culture; to create incentives in the fiscal environment. There is lack of certainty in the fiscal laws and the external trade.
B	Reduction of internal administrative process (for domestic trade)
C	Insufficient customer, firms could help the government
D	The inspection of the maquiladora plants limit the growth of the industry, it should have equality among the different sectors of the country. Greater administrative process..
E	Import regulation. Incomplete registration of companies and their products.
F	To homogenized the maquiladora industry. To charge taxes
G	Problems associated with the transition of non-Nafta maquiladora. Before, they do not pay taxes, now they must to pay. They "force" to buy from national companies but they don't have quality. They don't stimulated the FDI.
H	Transparent work rules. New rules of international trade. Custom tariffs are not clear
I	US and Mexican customs takes time. The administrative process are very long. Needs more efficiency in the tariff process. Fiscal miscellany change this year. It has changed the way to import and export. More burocratic process
J	Reduction of taxes, penalties and benefits for workers.
<i>MEXICAN SUPPLIERS TO TNCs LOCATED IN TIJUANA</i>	
A-1	Same rights to all maquiladora plants. To simplify taxes. Financing for export with preferential rates
B-1	Exchange of personal among TNCs and suppliers
C-1	Fiscal benefits. Participation in environmental audits
D-1	Flexibility in the laws. To improve the census of importers (clean)
E-1	No response
F-1	No response
G-1	To demand to clients that try with local suppliers. Support to Mexican companies

SOURCE: © Carrillo 2001. Project: Special Business Survey on Linkages Between Local Firms and Foreign Affiliates of TNCs 2000-2001. The Case of TV Industry in Tijuana.

TABLE 26
MEXICO: USE OF INTRANET IN TV TNCs AFFILIATES

Company	Vertical flows of information	Horizontal flows of information	Report of accountants and Personnel Reports	Production reports	Design
Hitachi	✓	✗	✓	✗	✗
JVC	✓	✗	✓	✗	✗
Matsushita	✓	✗	✓	✗	✗
Philips	✓	✓	✓	✗	✓
Samsung	✓	✓	✓	✓	✓
Sanyo	✓	✓	✓	✓	✓
Sony	✓	✓	✓	✗	✗
Thomson	✓	✓	✓	✓	✗

SOURCE: Carrillo and Contreras (2000) based on Bancomext

TABLE 27
MEXICO: USE OF INTERNET IN TV TNCs AFFILIATES

Company	Corporate Web Home Page	Local Web Home Page	Access to corporate intranet	Supplier orders	Supplier monitor
Hitachi	✓	✗	✓	✗	✗
JVC	✓	✗	✓	✗	✗
Matsushita	✓	✗	✓	✗	✗
Philips	✓	✗	✓	✗	✗
Samsung	✓	✓	✓	✓	✗
Sanyo	✓	✓	✓	✓	✓
Sony	✓	✓	✓	✓	✓
Thomson	✓	✓	✓	✗	✗

SOURCE: Carrillo and Contreras (2000) based on Bancomext