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AN UPDATE ON MEXICO'S ECONOMY AND FINANCE

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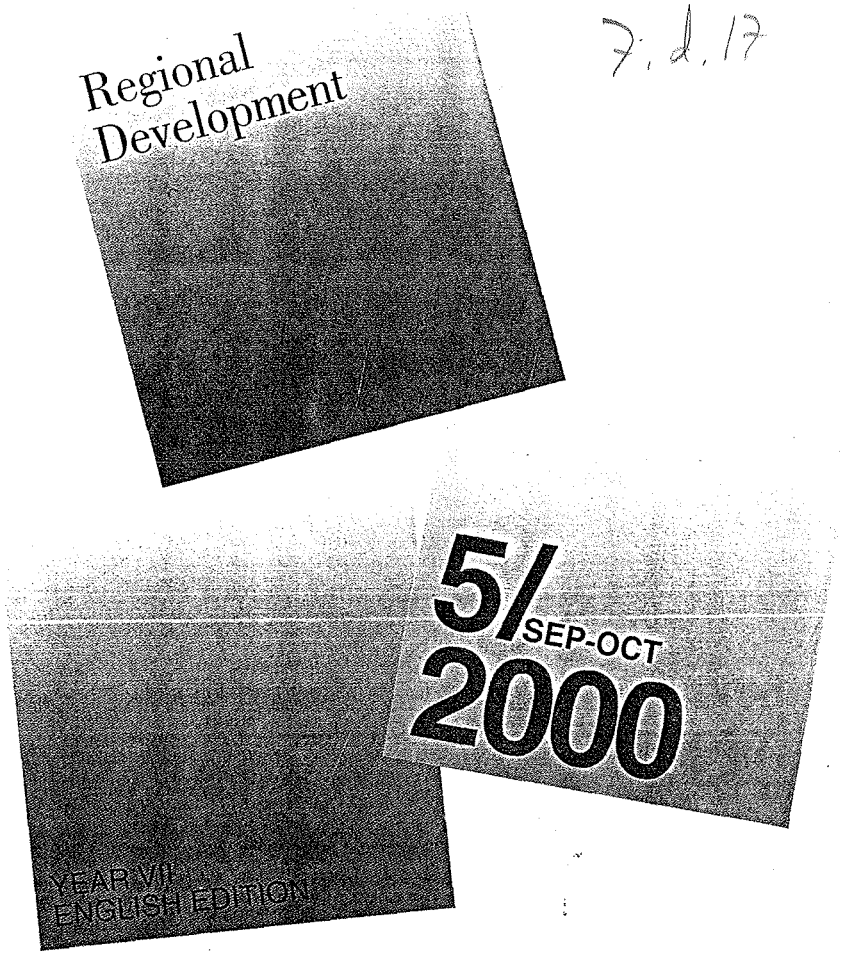

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CONTENTS

Conditions and Challenges of the Electronic Industry in Jalisco

By Enrique Dussel Peters *

The author points out some aspects about the debate of the competitivity and the entrepreneurial policy, where the electronic sector is immersed, and of the industrial organization in Mexico. He presents relevant information on the computers industry at the national and the State of Jalisco level. He describes the "Creación Productiva de la Electrónica A. C." (CADELEC), institution established in 1998 by an initiative of the main enterprises of the electronic industry in Jalisco and supported by industrial chambers and international organisms, having as its objective the promotion of industrial chains and the integration of this industry to the local, regional and national levels.

INTRODUCTION

SINCE mid eighties, the electronic and computer industries have become the core of the revolution in output, management, communication and distribution processes. Multiple accessories (from the fax to web surf, scanners, portable accessories and many others) are part of a multimedia integral system that allows transfer of information flows in an easy way and communication at a global level among individuals, institutions, suppliers and clients. The very same electronic mail and the mail of voice, according to some appraisals, will allow savings of thousand of million dollars for clients and suppliers.

In this context, Mexico has recently managed to be right in the chain of the electronics value added, with special features, which will be explained in this work for the specific case of the group of electronic companies in Jalisco. Nevertheless, before entering this topic, it is important to briefly indicate a series of general aspects on the debate of the competitiveness and enterprise policy, as well as some of the specific characteristics of industrial organization in Mexico.

In the debate around competitiveness, for some analysis starting with Michael Porter publications, different approaches exist and in some cases are even divergent. Without the intention to analyze the topic in detail at the beginnings of the new millennium, it is worth to mention that important coincidences exist. In the first place, many authors have hold that the

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exporting feature of productive units, whether they are companies, locations, regions or nations, is not enough condition of competitiveness, growth and development of these entities and their population. The debate on the matter has been centered on concepts of "territorial endogeneity", "systemic competitiveness" and the search to integrate, "to endogenize" territorially these activities (Dussel Peters 2000; Rodrik 2000/a/b; Vázquez Barquero 1999).

Although conclusive consensuses on the matter do not exist, there are increasing conceptual efforts from very diverse views, but particularly about implementation of economic policy in the OECD countries and Latin America to create integrated mechanisms, involving aspects of education, qualification, companies of small size, territory, industrial organization, commerce, financing, and so fore. The debate generated during the eighties impelled by multilateral institutions and implemented in many countries including Mexico about "The case for a thin and minimalist State" has been left in the past.

On the other hand it is also important to explain briefly the industrial and commercial policy context in which the electronic sector is framed. The changes in industrial policy started in 1988 transformed substantially the Mexican economy. These changes were based on an export oriented model of industrialization, the dismantling of instruments and industrial and commercial mechanisms of promotion applied to import substitution and the policies of horizontal or neutral character with the intention to give similar attention to all companies, without concerning its size or specific condition. The manufacture exports have become undisputed and practically the only one engine of growth of the Mexican economy since then. As a result, the economy as a whole and particularly the manufacturing sector has experienced a deep structural change. Although the export strategy in general has been positive, the same one also has generated new limitations to the medium and long–term economic sustainability (Dussel Peters 2000). It emphasizes, on one hand, a generalized process of economic polarization at level of companies, branches and regions. Thus, only a small number of economic activities have been integrated to the new dynamics of growth, whereas the rest of the companies and regions have lagged in this aspect. The poor behavior of the internal market in general, the real wages with significantly inferior levels to those of 1980, the insufficient generation of employment, the crack of productive chains and the parallel process of growing net imports partly show these new problems arouse since 1988.

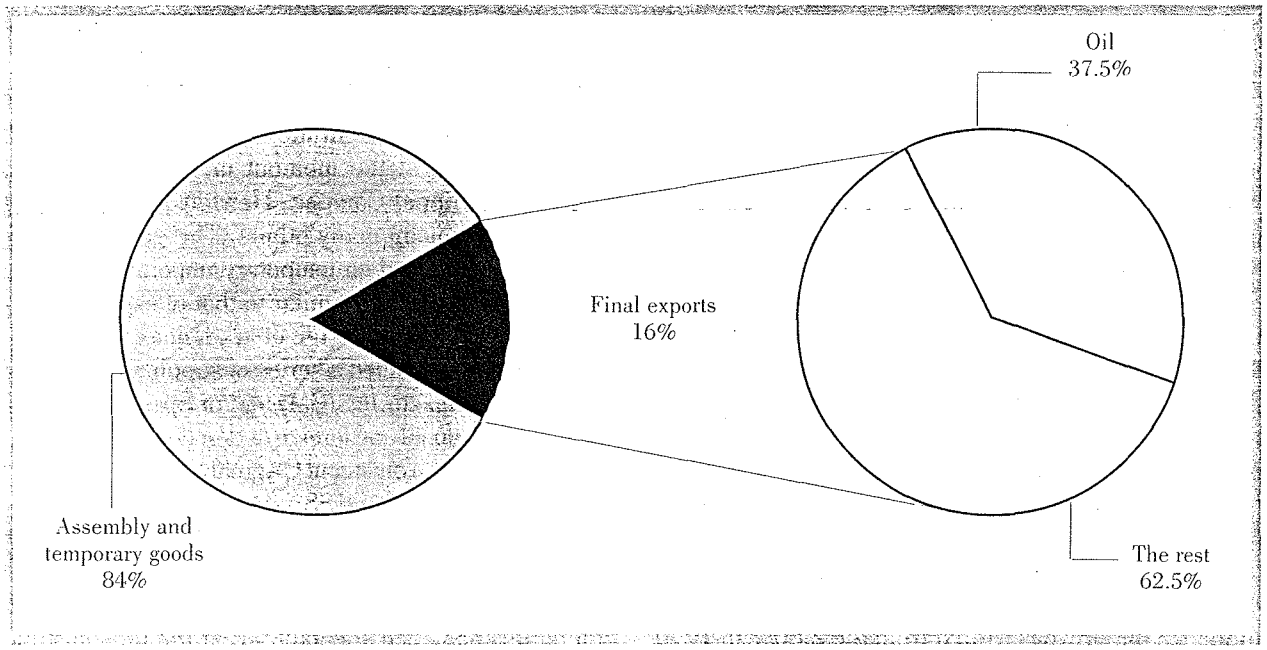
The described phenomena show that, although in global terms, Mexico has been integrated successfully to worldwide market and the United States of America, becoming one of the main exporting nations, this process at the moment has only affected activities of a relatively small group of companies and sectors. Although the number of exporting companies has increased, during 1993–1999 more than 90% of exports were carried by around 3,500 exporting companies and assembly plants, of a universe of more than 3.1 million companies. This exporting segment shared with less than 6% of the employed population during the same period. Moreover, exports involving temporary imported inputs, including assembles and other temporary import programs, have become a fundamental mechanism and shared 84% of the manufacture exports in 1999. These activities, having an important impact in employment and the balance of payments, respond to the rationality of integration of an economy segment and lay down basically on the performance of the American economy. The exporting structure specialized in activities of transformation of temporary imports shows a high degree of fragility and significantly limits a process of endogenous growth in the long term.

The computers industry in Mexico

The computers industry as much as the electronics in general, went through a deep process of tariff liberalization during the period 1985–1987. Up to the implementation of the NAFTA, the computers industry counted on high tariff levels (20%); nevertheless, since 1994 this sector was completely liberalized to a null rate, whether immediately or up to January lst of 2004 [1]. The NAFTA also required changes in the norms of intellectual property responding to American companies' interests. In addition, at the present time, there are not further limitations to foreign investment in this sector. (ECLAC 2000). For the rest of nations, and with the exception of those with which Mexico has signed free trade agreements, the import tariff is 20%. Even in the case of those nations which have commercial treaties signed with Mexico, the tariffs in practically all the cases are higher than 0% and less than 10%. In the case of the United States the import tariffs were 3.9% before the NAFTA, and suddenly were eliminated in January the 1st 1994.

[1] Own estimations to 6 and 8 digits of the Harmonized System show that in 66% of this sector items, tariffs were eliminated immediately; another 18% in January of 1999; and the rest 16% in January 1st of 2004.

Graph 1
EXPORTS BY TYPE OF ACTIVITY IN 1999



Source: Own calculations based on the Banco Nacional de Comercio Exterior data, [Sistema de Información Comercial de México (SIC–M) (Mexican Comercial Information System].

Production–Sharing Provision, PSP, in the United States of America is at least equally important as the previous aspects, particularly taking into account the growth of the export assembly industry in Mexico. Although the legal status of assembles will disappear on January lst of 2001, the PSP will allow to continue similar activities to that of assembly, as much in Mexico as in other countries. The PSP under subchapter 9802 of the United States Harmonized System allows "a tariff exemption for the value of American components that are incorporated into products assembled abroad "(USICT 1997:i; USITC 1998). Although the PSP has lost importance in some countries such as Mexico and Canada with the implementation of the NAFTA, and in other cases by the Most Favored Nation clause, MFN, still is relevant for some exporters to the United States because they are exempted of the user fee.

The electronic industry has been one of the activities of greater dynamism in the Mexican economy since the eighties [2]. Equipment and electronic devices output, excluding assembles, have not only duplicated their share in GDP during 1988–1998, but their share in the total employment has also increased from 0.66% in 1988 to 0.99% in 1998. The industry income is 40% over the economy total income and the labor productivity raised in 50 percentage points during the same period. Although exports increased significantly, so did imports. As a result, and the same apply for the most dynamic activities of the Mexican economy (Dussel Peters 2000), the electronics shows a trade balance coefflcient to GDP highly negative and superior to the value added generated, representing in 1998 = -1.46 [3].

Similarly, it is important to understand computers industry in the Mexican economy context: classification 382302 (manufactures, assembles and repair of data processors machines), according to estimations of the Mexican Entrepreneurial System of Information (SIEM), only counts on 62 companies and 21,375 employees and are part of a group of companies set up in Mexico of 16,258 establishments and 682,288 employed people (Dussel Peters/Ruiz Durán 2000). In this group of companies in the 382302 classification, four states of the Republic (Jalisco, Baja California, Chihuahua and the Distrito Federal) share 75.81% of companies and 91.64% of employment. Jalisco's case

[2] The preliminary data of the last 1998 Economic Census revealed that the electronic equipment classification (item 3832) increased the economic units in 28.3% and employment in 76% during 1993–1998.

[3] Within the export assembly industry the electrical and electronic branches only share 4.39% of the establishments, but employ 8.01% of the total employment and provide 9.28% of the total value added of the Export Assembly Industry, EAI at December of 1999 (NEGI/BIE).

is outstanding sharing 48.35% of the total employment. Other papers emphasize an important territorial specialization of the electronic industry: audio and video in the North border, telecommunications and computers in Jalisco; and electric household and telecommunications in the center (Bancomext 2000).

At the present time more than 95% of the computers industry exports are directed to the United States as its final market. The exporting performance of Mexico is outstanding from several points of view. A) the Asian countries, particularly China, Malaysia, South Korea and Philippines have increased substantially their share in the American market during 1990–1999; including Singapore, Japan and Taiwan, the Asian countries shared 74.78% of the American imports in the computers industry in 1999. B) China and Mexico are of particular relevance, since they have become in 1999 the fifth and the sixth exporters of importance. Other countries as Costa Rica have benefited from the recent set up of specific computers plants as Intel's case in 1998. C) the Mexican share in the US imports has tripled from the 2.60% in 1990 to 8.74% in 1999 and represented 3,415 million dollars in 1999. Mexico competes at the moment in the labor–intensive segments of the computers industry, particularly against China, Malaysia, Thailand, Indonesia and the Philippines (Chart 2; Dussel Peters/Ruiz Durán 2000).

The computers industry in Jalisco

The Sate of Jalisco has become one of the main engines of growth of the exporting sector and head of the manufactures in Mexico during the nineties. While the share of Jalisco in the national GDP fell down from 7.2% to 6.4% during 1970-1998, the manufacturing GDP of this state increased slightly from 6.9% to 7.0% during the same period. That happened as a result of the increasing foreign investment and a dynamic integration to the globalization process. It is significant to consider that the increase of the manufacturing GDP at Jalisco, regarding the national, has been smaller than the expected one, whereas industries as the electronics have experienced a high rate of growth; others like the textile, clothing, footwear, wood furniture, chemical products, rubber and plastic have slowed down their performance as a result of the commercial liberalization (CEED/UDG 2000).

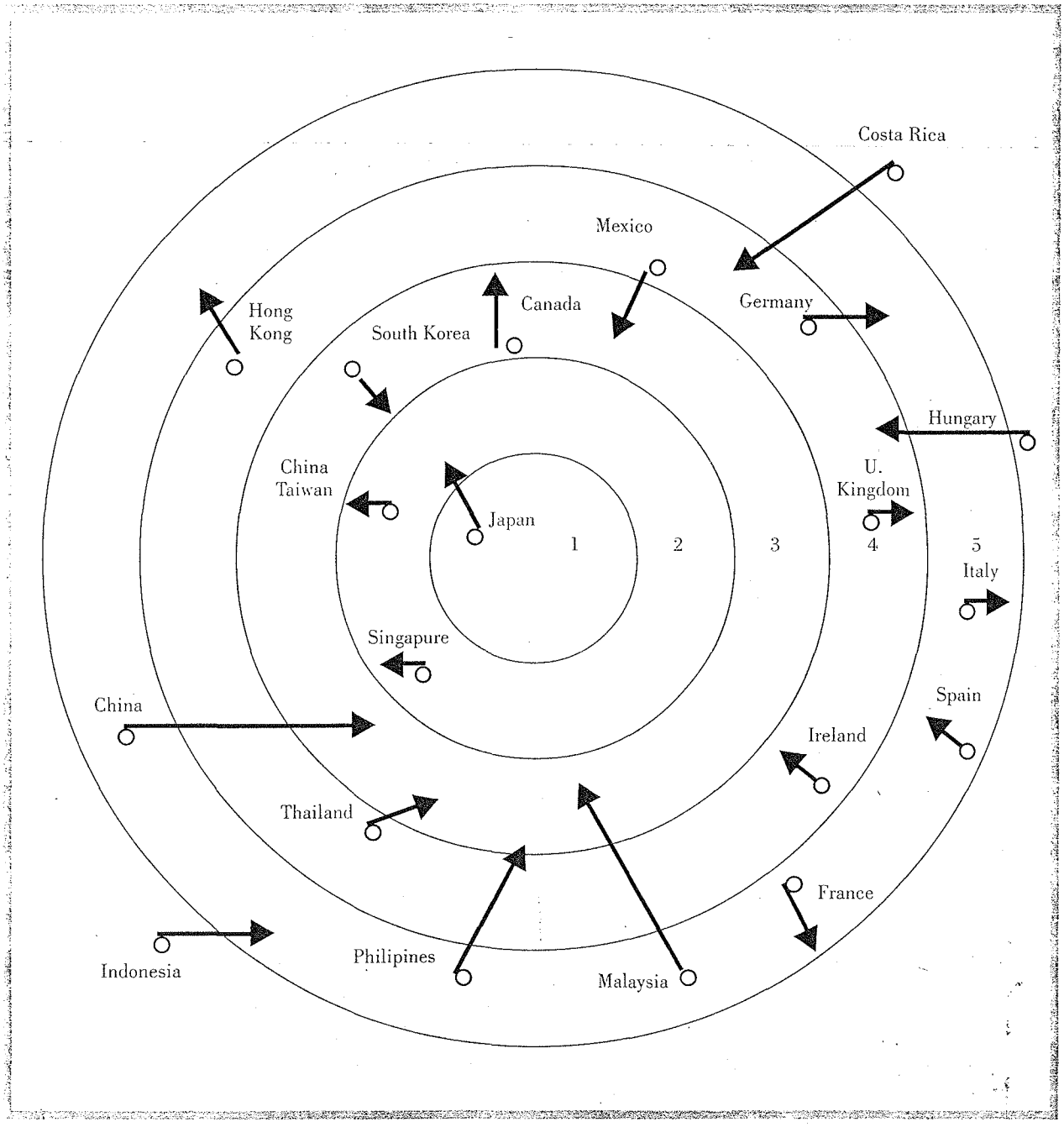
Within this dynamics of growth in Jalisco the computers industry performance during the nineties is worth to mention. Although its genesis goes back to the sixties and seventies, it has been during the past decade, framed by the context of import liberalization and the NAFTA, that this sector has got an impressive dynamics. In the metropolitan area of Guadalajara, particularly in the municipality of El Salto, a significant number of the main companies is grouped in that location: designers, producers and electronic parts and computers distributors in the world like BM, Kodak, NEC, Motorola; at the moment on semiconductors, Siemens, Philipps, Compac, Hewlett Packard, Intel and Telmex, among many others. The great majority of these export based on temporary imports companies and their processes are similar to that of export assembles. Similarly, this cluster of trademark electronic companies has attracted a series of supplier companies [Contract Manufacturing (CM) and/or Specialized Suppliers, (SS)] national and foreign and/or of co–investment. At the present time cluster of Original Equipment Manufacturing (OEM), CM and SS get together more than 120 companies and include 8 from the 10 main CM companies (see http/www.cadelec.com.mx).

The performance of this cluster of electronic companies has been spectacular: at the present time more than 350 companies linked to the electronic and telecommunication industries exported 9.03 thousands of million dollars in 1999, of which 84% had as destiny the United States of America and an annual average rate of growth during 1994-1999 of 36%. The share of the State of Jalisco in the national electronics increased from 3.55% in 1996 to 7.89% in 1999; in this last year around 80,000 direct employments depended on the electronic industry (compared to 5,000 in 1995), with an annual average employment rate of growth of 45.3% during 1994–1999; investment in the electronic and telecommunication sector was more than 2,500 million dollars or more than 50% of foreign investment during the period.

At the present time, the output of the telecommunication and electronic industries is centered in: portable and desktop personal computers, printers, telephones, answer devices, radio localizers, photographic films, power sources, photographic cameras, printed circuit boards, cables and harnesses, compact discs and keyboards. Similarly, the electronic industry in the region generated a demand of more than 1,900 million dollars in 1999 in products such as: semiconductors, services (logistic of materials, transportation, etc.), electrical components, PCB's (Printed circuit boards), PCBA's, connectors, power adapters, acoustics, plastic injection, metallic parts and software. Regarding the processes made in the electronic and telecommunication industries they are the following: assembly and

Graph 2

CHANGES IN THE REGIONAL STRUCTURE OF COMPUTERS SECTOR IMPORTS OF THE UNITED STATES FROM 1990 TO 1999 (SELECTED COUNTRIES) [1]



[1] The share in every country in 1990 is showed through a circle; The share in 1999 is showed with the tip of the arrow. The arrows represent the direction of change during the period.

SOURCE: Elaborated based on MAGIC (ECLAC).

The rings indicate the share in total imports of the United States of America according to the country origin:

1. 30% +
2. 29% - 10%
3. 9.9% - 3%
4. 2.9% - 1%
5. 0.9% - 0.1%

The total value of imports of the computers sector was of 22,226 and 80,076 million dollars in 1990 and 1999, respectively

subassembly, injection by high precision molding, die casting and printings, plastic injection, development and manufacture of tools, calibration laboratories, ISO 9000 certification, translation and editing of proprietor manuals, warehouses, fiscal enclosures, as well as management of supplier chains.

The processes previously mentioned show that activities in electronic industry at Jalisco, at the moment, are fundamentally programs of temporary import for its re–export (Altex, assembles and Pitex, among others). Thus, in 1999 these programs generated 91% of the electronic and telecommunication industries exports of Jalisco. By their own nature, these programs lay down on a high degree of inputs, parts and components imported and are, in general, part of the segments of less value added of the electronic and telecommunication industries at a global level.

The most recent input–output schedule containing 1996 data (CEED/UDG 2000) indicates a series of important structural aspects for Jalisco and the electronic industry:

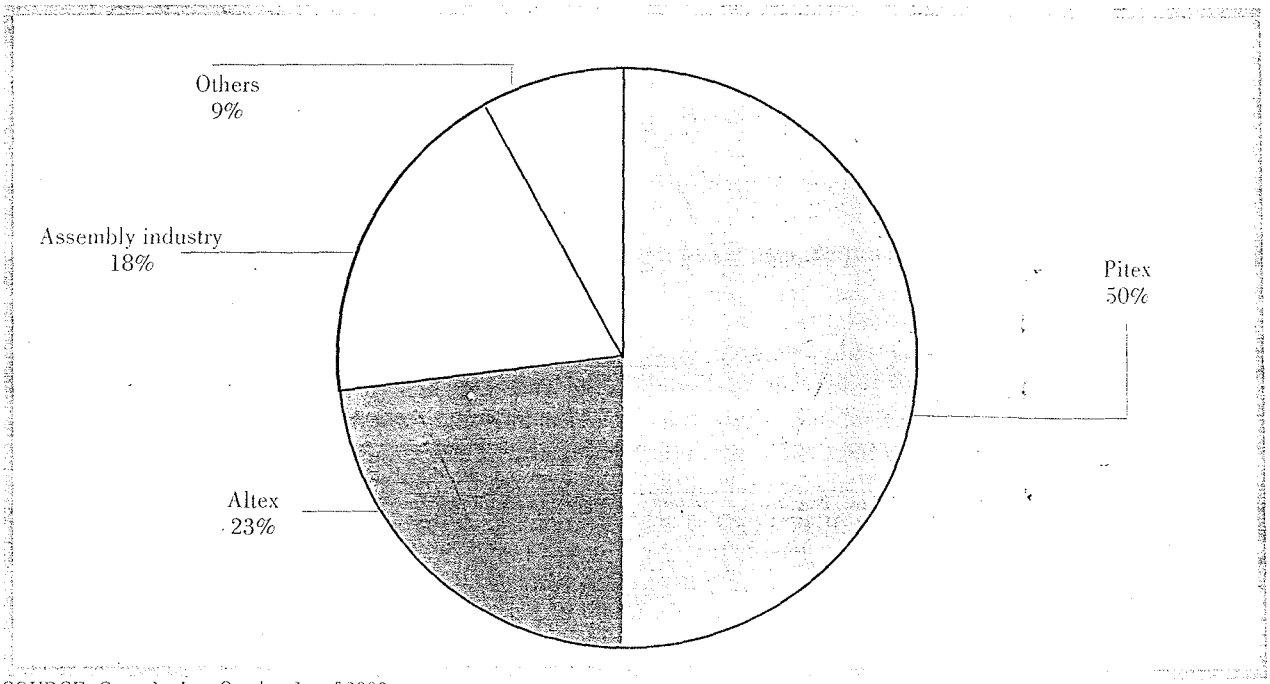
1. Regarding national output, Jalisco continues being a producer specialized in goods like cattle ranch, food and drinks industries, footwear and wood furniture. The equipment and electronic devices industry shows a high degree of specialization in Jalisco, although only after the mentioned activities.

2. Division VIII of the manufacture sector (metallic products, machinery and equipment), that includes the electronic industry and computer manufacture, keep being the activity that less inputs from Jalisco and at a national level requires. The percentage of inputs and raw material consumption, the imports and the value added of Division VIII was 5.42%, 26.53% and 31.16%, whereas the same variables for all the sectors in Jalisco were 12%, 9.38% and 56.46%. Thus, taking into account that these activities have the highest exporting orientation, the national inputs content is below Jalisco's state average.

In the previous context, it is important to examine the structures of industrial organization intra and inter–company of the computers industry in Jalisco [4], in order to understand the low value added of these activities at a local and national level:

[4] For studies intra and intercompany of the electronic cluster in Jalisco, see: *http//www.cadelec.com.org* Dussel Peters (1999); Dussel Peters/Ruiz Durán (2000); Woo (2000).

Graph 3
ELECTRONIC AND TELECOMMUNICATION INDUSTRY EXPORTS IN JALISCO IN 1999, BY EXPORTATION PROGRAM



SOURCE: Consulted on October 1st of 2000.

1. The electronic industry in Jalisco has carried out an impressive increase in growth of set up companies. From a relatively small group of great companies inwards oriented, nowadays the group counts on more than 120 OEM, CM and SS, in addition to other 200 companies of suppliers of goods and services. This dynamics has taken to an important increasingly diversified and specialized demand in goods and services coming from a market with features of high dynamism and continuous change in technology for production lines and an increase in capital intensity.

2. Since the implementation of the NAFTA, most of the companies of PCs and laptops have transferred their processes of configuration and final assembly to the NAFTA territory in the way to fulfill the challenges of industrial organization "in real time" [5]: Laredo, Jalisco or Miami, among others, allow a significant time saving (measured in hours) regarding Taiwan, Singapore, China or Korea, if the final consumer is located in the United States.

3. During the nineties, the OEM companies of first level or "of trademark" on semiconductors, such as IBM and HP among others, became "virtual" manufacturing companies "fablessen", because they have transferred practically the totality of the manufacturing processes to other outsourced companies. It is important to consider that these companies of first level totally transnational and oriented to the American market, have already developed global subcontractors along with the first level company. To break this structure, or in other terms, to allow the entrance of new local, regional or national subcontractors, is very difficult since the new subcontractor companies must bear the high demands of capital intensity, technology, training, financing, quality and volume, but to integrate to an already constituted global network with an important historical experience. Similarly, new contractors, in many cases, had nothing to do when facing the transnational companies strategies that make their decisions for global purchase in their parent companies, being the case that none of them are located in Jalisco and/or Mexico [6].

4. As a result of the previous process, with important exceptions as it will be stated further down in this work, the total imported component of the industry continue to be quite high and with a low degree of local integration according to what we stated in the first part of this paper, given the rationality of the electronic industry organization and specifically the companies' strategy. This structure of suppliers, of parts and components, semiconductors, monitors, specialized services, of post–sale, engineering, design, R&D, and so on, narrows the entrance of new subcontractors and reduces the learning processes and the diffusion of the use of new technologies, integration to greater value added processes and their positive effects on employment, real wages and a qualitatively different dynamic in the regional growth. Thus, even the establishment in Jalisco of OEM, CM and SS, among others, has responded in most cases to a global strategy of the first level companies as well as to existing client–supplier structures in other countries. Similarly, the outsourced companies, although established in the region, import most of their machinery, equipment, parts, components and even services. As a result, and regarding to this aspect, definite forecasting does not exist, the regional and national inputs of electronic industry and of telecommunications in Jalisco are at around 5% (Dussel Peters 1999) and 20% according to diverse official publications issued by Jalisco's government.

Despite the previous difficulties, it is vital to understand the strategic importance that Jalisco has gained, particularly for the global American companies network. At the present time, IBM assembles around 55% of the laptops built worldwide in Jalisco and has made investments of several hundreds of million dollars to expand its operations. With more than 11,000 employments, of which around 800 are directly employed by IBM and the rest by supplier companies in the same IBM plant, the company has become one of the main employers in the region. At the moment, negotiates with Toshiba the feasibility to create a crystal liquid plant for monitors with an investment of around 2,000 million dollars, which would be a significant detonator of new investments. HP, on the other hand, has specialized its Jalisco operations in the assembly

[5] In the creation and deepening process of the computer industry global networks it is very important to take as main restriction the weight, volume and packing. So, geographic proximity is important to attend the specific configuration demands and the response in real time.

[6] Multiple interviews carried in the region clearly present this difficulty for the integration of new suppliers: although the outsourced companies produce according to the required quality, costs and quantities do not match international standards or from the same company which is a hurdle to become suppliers.

of printers and PCs. In the case of HP, its operations depend completely on suppliers and subcontractors, which make the assembly process and shipped the final goods to the clients. At an international level, Guadalajara has become its main operation center, with an output of more than 330,000 injection printers per month.

Institutional measures to emerged challenges: the case of the Cadena Productiva de la Electrónica (Electronic Productive Chain) CADELEC

The structures raised previously in the case of Jalisco electronic industry show the complexities of integration of local and regional companies to the global network of computer industry, featured by high capital intensity, a continuous process of technological development and innovation, as well as by decreasing life cycles of products. An extreme view of these activities is not adequate, because the life cycles of products are not only extremely short but also limited, as they do not take into account the complexity and the development of processes and products of different generations in a simultaneous way.

The local and regional integration process becomes difficult due to a series of conditions. On one hand, the companies' global strategy not necessarily matches with the interests of the development of localities and regions. Nevertheless, and as it was presented in the specific case of Jalisco, the established industrial organization is an important hurdle of entrance for new potentials suppliers. Besides, to respond to global strategies and consequently to global suppliers, the trade mark companies set up in Jalisco have integrated their own foreign suppliers network with processes, parts and imported components. The costs for potential local and national suppliers are extremely high, considering in addition the inefficiencies of the Mexican financial system during the nineties. These structural challenges and limitations explain the local and national low value added of the electronic industry in Jalisco and the high costs required to bear this problematic situation.

Although the federal authorities have not set up mechanisms and instruments to solve, or to face at least, these limitations of the regional grouping, in the state of Jalisco they have generated new initiatives. With the new administration since 1995, the government of the state of Jalisco and particularly the Ministry of Economic Promotion (SEPROE) has made important efforts for the region industrial development to take off. Jalisco has look to put steps forward taking into consideration scarce and very limited resources, to face the challenges of the set up industry through the Development State "Plan Jalisco 1995–2001", the Law for Economic Promotion of the State of Jalisco as well as a series of high–priority sector programs that include the electronic industry in Jalisco. One of the projects of greater relevance for the electronic industry has been shaped in the creation of an *Cadena Productiva de la Electrónica* (electronics productive chain) (CADELEC), which was founded in 1998 as an initiative of the main companies of the electronic industry of Jalisco (IBM, LTCP, now Vtech, HP. Intel and Natsteel, whose intention was supported by the National Chamber of the Electronic Industry, Telecommunications and Informatics (CANIETI), the state government, the United Nations Development Program (PNUD) and the Foundation for Technology Transference (FUNTEC), with the intention of promoting the linkages and the integration at a local, regional and national level of the electronic industry of Jalisco. Despite the limited resources and personnel, CADELEC at the moment has carried the most important and concrete effort to appraise the capabilities of local suppliers and to identify possible local suppliers of goods and services for CADELEC members. Without entering in details on the services offered. some include a potential supplier analysis. a business opportunities databank (through a listing of the demand of imported goods from companies set up in the region), as well as the co–organization of events and specialized fairs and commercial missions (*http://www.cadelec.com.mx* CADELEC has become one of the institutions of greater importance to face the challenges of globalization at a local and regional level for the electronic and telecommunications grouping. Although their resources and possibilities are limited, also because of the lack of support and interest by private and governmental institutions, CADELEC has launched multiple action operations between academic centers of technological development, civil servants and entrepreneurs whose results still will have to be evaluated to detail in the future [7].

On the other hand, although information still is very poor at the present time, the companies grouping around the electronics lives an authentic demand blast for software services. Although a significant part of these new activities are tied to the enterprises design of machinery and equipment, software whose demand is generated with the very same setting up of the new companies, at the moment is also emphasized a "second generation of software demand", specialized for

[7] This kind of institutions to a mid level from the systemic competitiveness view (Meyer–Stamer 1999) are core to promote the inter–industry web and to allow a process of integration of exports with more dnamic activities in the long run.

new processes that are carried in the region. A new group of smaller size companies established in Jalisco started the development of specialized software, although important restrictions have appeared to find trained labor force in the region, as well as in some other headings of the electronic and telecommunication industry. In the year 2000, the SEPROE has made some efforts to link software companies set up abroad (specifically in India) to face this local demand. The potential of this market is enormous, of the mentioned processes as well as those of data transcription and transmission, telemarketing, and other related areas; nevertheless, in addition to personnel highly trained, an adequate telecommunications infrastructure, risk capital and policies that grant incentives for the development of the new companies are required.

The regional public sector efforts as well as private initiatives coming from public sector regarding the creation of new institutions facing the lack of endogenous and territorial conditions of growth (as it is the case of CADELEC to promote the electronic and telecommunication industry in Jalisco), could be the beginning of a definition process about concrete national and regional industry challenges [8]. Nevertheless, enduring the multiple gaps between the demand of the electronic industry set up in Jalisco and the outsourced potential companies, technological, financial, educational, of training, of infrastructure and administrative, among many others imply costs. At the moment, it does not exist a consensus neither at regional level nor at national level between the public and private sectors over who had to confront them. While concrete and massive efforts are not taken into practice the gaps between companies, sectors, locations and regions will continue to widen.

[8] It is important to underline that it is also possible and even necessary to generate a vision from bottom to top in regard to the generation of endogenous conditions and territorial growtk, specifically in the case of mid institutions at a regional level. Specifically in the case of CADELEC it should be made clear the demand generated by the great regional companies, but promote particularly educative institutions. small size enterprises. and so on, in order to link them to such demand. (Dusse Peters 1999).

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