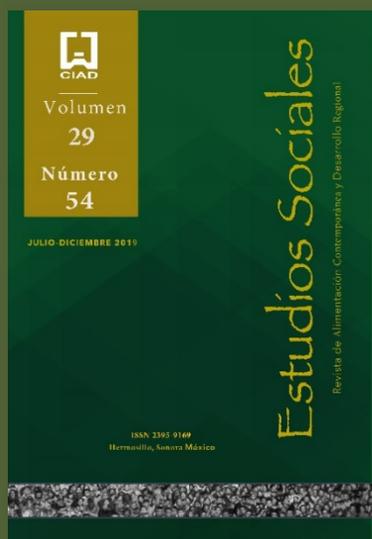


Estudios Sociales

Revista de Alimentación Contemporánea y Desarrollo Regional
Volumen 29, Número 54. Julio - Diciembre 2019
Revista Electrónica. ISSN: 2395-9169



Evolution of industrial policy in emerging regions:
The case of the automotive industry
in Guanajuato, Mexico

Evolución de la política industrial en regiones emergentes:
el caso de la industria automotriz
en Guanajuato, México

DOI: <https://dx.doi.org/10.24836/es.v29i54.757>
PII: e19757

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Fecha de recepción: 14 de febrero de 2019.
Fecha de envío a evaluación: 22 de abril de 2019.
Fecha de aceptación: 12 de agosto de 2019.

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Resumen / Abstract

Objective: This article critically analyses the development of industrial policy (IP) in Guanajuato, Mexico, through the reconstruction of its trajectory and the evolution of its approach. It focuses on the designed policy instruments to promote the automotive industry in this state, which has recently deployed a great dynamism, measured through the foreign direct investment attracted to the region. **Methodology:** The information presented is the result of the qualitative and interpretative analysis of specialized plans and programs. In order to analyse the evolution of industrial policy we reconstructed its trajectory through the consideration of legal landmarks and its policy approach (passive/active). **Results:** Two stages and their policy approach were identified: 1) Setting Basic Conditions-Passive Approach, and 2) Long-term Conditions-Active Approach. During the first stage IP focused on attracting FDI and building basic infrastructure; in the second stage, active instruments have been implemented which seek to promote specialized infrastructure, backward linkages, training, and technological transfer. **Limitations:** Information was gathered by the analysis of official documents and available statistics. It is important to carry out a critical analysis of the results of some of the established projects in the official documents through case studies or correlation studies between key indicators (eg. FDI vs employment, FDI vs insertion of local companies in the industry, among others). **Conclusions:** The policy instruments that have been implemented in Guanajuato have fomented the automotive industry consolidation in the region. Some positive economic results are: greater employment, advancement of local suppliers and training programs, among others. However, its influence on local development is weak. IP should focus on the building of local absorptive capabilities to benefit from the generated externalities from FDI.

Objetivo: Este artículo analiza, críticamente, el desarrollo de la política industrial (PI) en Guanajuato, México, a través de la reconstrucción de su trayectoria y la evolución de su enfoque. Se centra en los instrumentos de política diseñados para promover la industria automotriz en este estado, que recientemente ha desplegado un gran dinamismo, medido este a través de la inversión extranjera directa atraída por la región. **Metodología:** La información presentada es el resultado de un análisis cualitativo e interpretativo de los planes y programas especializados. Para analizar la evolución de la política industrial se reconstruyó su trayectoria a través de la consideración de, lo que llamamos, hitos legales, y del tipo de los instrumentos de política diseñados y aplicados (pasivos / activos). **Resultados:** Se identificaron dos etapas y enfoques de política que denominamos: 1) Establecimiento de las Condiciones Básicas-Enfoque Pasivo y 2) Condiciones de Largo Plazo-Enfoque Activo. Durante la primera etapa, la PI se enfocó en la atracción de IED y en la construcción de infraestructura básica; en la segunda etapa, con una visión de largo plazo, se han desarrollado e implementado instrumentos activos de PI que buscan promover la construcción de infraestructura especializada, el encadenamiento, la capacitación y la transferencia tecnológica. **Limitaciones:** La obtención de la información fue a través del análisis de documentos oficiales. Para futuras investigaciones es importante llevar a cabo un análisis crítico de los resultados de los proyectos establecidos en los planes y programas analizados, a través de estudios de caso o de estudios de correlación entre variables clave (p.e. IED y empleo, IED vs inserción de empresas locales, etc.). **Conclusiones:** Los instrumentos de política que se han implementado en Guanajuato han fomentado la consolidación de la industria automotriz en la región. Algunos indicadores económicos que dan cuenta de esto son: mayor empleo, avance en el desarrollo de proveedores

locales, programas de capacitación, entre otros. Sin embargo, su influencia en el desarrollo local es débil, por lo que la política industrial debería enfocarse en la construcción de capacidades locales de absorción para que exista un beneficio generado por las externalidades de la IED.

Palabras clave: regional development; automotive industry; industrial policy; Foreign Direct Investment; local absorptive capabilities; Guanajuato. Key words: desarrollo regional; industria automotriz; política industrial; Inversión Extranjera Directa; Capacidad local de absorción; Guanajuato.



Introduction¹

According to UNCTAD (2006), one of the clearest signs of globalization in the world's economy is the huge increase in foreign investment -both direct and indirect- across countries. In 2017 most countries actively attracted foreign direct investment (FDI) and the amount of flows amounted to \$1.43 trillion globally (UNCTAD, 2018); even though it fell 23 % (in 2016 \$1.87 trillion were reported), FDI flows to developing countries remained stable at \$671 billion.

Mexico has benefitted by these inflows, and one of the most favoured sectors has been the automotive industry; in 2016, it received 19 % of FDI followed by the chemical industry (14 %) (ECLAC, 2017). In the same year, this sector contributed over 3.3 % of Mexico's GDP and represented 19.6 % percent of the manufacturing GDP (ProMéxico, 2017). In 2017, Mexico produced 4 068 415 units, which represented 4.18 % of world production and a growth rate of 13.09% (OICA, 2017). In 2016, Mexican automotive exports amounted to US\$96 billion and Mexico occupied fourth place on a global level after Germany, Japan, and the United States. In the same year, it directly employed 900, 000 workers (ECLAC, 2017). It is expected that by 2020 light vehicle production will reach 5 million units (ProMexico, 2016). The state of Guanajuato, located in the Bajío area,² has been positively affected by this dynamism, evidenced by the fact that total foreign investment received during the period 2007-2018 reached US\$14.16 billion (82.57 % of the total, according to SDES, 2018). This reflects

policies aimed at attracting investment to Guanajuato, which have played a fundamental role in the concentration of automotive companies in the state, as shown by the arrival of five car manufacturers: General Motors, Hino, Honda, Mazda and Toyota and the subsequent arrival of first- and second-tier³ companies. The decision to set up plants, does, nevertheless, depends on the decision of the headquarters of companies.

Given the aforementioned, the purpose of this article is to analyze the development of industrial policy (IP) in Guanajuato through the reconstruction of its trajectory and the evolution of its approach; therefore, the guiding discussion question is, How has industrial policy evolved during the analysed period?

In order to respond to this question, this contribution is divided into four following sections. The first one shows a brief review of industrial policy concepts. The methodological aspects are shown in the second section. The third one, called “Evolution of industrial policy: the case of the AI in Guanajuato”, a) examines the importance of the automotive industry in the state, and, b) analyses the evolution of industrial policy and its instruments. Finally, conclusions and challenges for the design and implementation of industrial policy in the region are discussed.

Industrial policy: a brief review

During the last decade, industrial policy (IP) has once again become popular. Current IP is more agile, interactive, inclusive, flexible and integrative with other policy areas and responsive (UNCTAD, 2018). Its definition is “... government policies directed at affecting the economic structure of the economy” (Rodrik 2004, cited by UNCTAD, 2018, p. 126). Modern IP is more diverse and complex, and it includes objectives such as global valued chain integration and upgrading, development of knowledge economy, build-up of sector linked to sustainable development goals, among others.

Industrial policy is important to generate local endogenous innovation and absorptive capabilities. According to Narula and Dunning (2010, p. 269) “...fostering appropriate domestic capabilities in an appropriate sequence can create conditions for benefits from knowledge flows within an economy and



between economies.” Its impact on local development depends on the design, instrumentation and evaluation of policy instruments (Padilla, 2014).

There are different classifications of the instruments of industrial policy, for example, Lall (1993) points out the following: incentives, skills, information and technical support, financing and technological policies. Meanwhile, Padilla (2014) mentions that the instruments could be grouped into six areas: 1) Science, technology and innovation policies 2) Education and training policies, 3) Trade policies, 4) Oriented policies to promote selected industries; 5) Competitiveness policies, and 6) Competition policies.

One of the main goals of IP is to attract FDI inflows since it generates jobs, expands local technical knowledge, increases endogenous innovative capabilities, as well as providing development and general welfare of the recipient country. Countries like Singapore, Ireland, Mexico, China, Brazil, among others have focused on activities that allow them to attract flows of FDI with one of their strategies being the establishment of institutions dedicated to their attraction (Wint and Williams, 2002; Kok and Acikgoz, 2009; Narula and Dunning, 2000, 2010). However, authors such as Narula and Dunning have pointed out that:

...MNE (or FDI) activity is not a condition *sine qua non* for *sustainable industrial* development ...Although MNEs may have certain direct benefits (such as employment, balance of payments, etc.) the most significant contribution of MNEs to the growth of productive capacity is indirect where inward MNE activity results in positive externalities, and when domestic firms have the capacity to internalize these externalities usefully (Narula and Dunning, 2010, p. 266).

Within the instruments of IP utilized to attract FDI, we find: a) the establishment of Investment Promotion Agencies (IPAs), which carry out marketing activities to attract foreign investors (Wilson et al., 2014); b) the set of incentives that the host country offers to foreign firms.

Incentives remain the most used for industrial policy (UNCTAD, 2018). Nevertheless, some authors point out the importance the qualitative factors play in the firm’s decision to establish a plant in another country (Wint & Williams, 2002).

A wide set of factors are crucial for firm location. Among many, the most relevant in literature are: geographical proximity to markets, free trade agreements,

active sectoral policies, labour costs, quality of the labour force, availability of local inputs, the size of the market, the institutional environment, transport and energy costs, connectivity, and industrial infrastructure (Wint and Williams, 2002; Kok and Acikgoz, 2009; ProMéxico, 2017, Iplaneg, 2018). In the case of Mexico, factors that have promoted the arrival of large FDI inflows are proximity and preferential access to the United States, lower relative costs, skill labour, connectivity, etc. According to ECLAC (2017), the current average wage for auto plant workers in Mexico is US\$2.38 per hour, meanwhile in the United States it is US\$ 24 per hour.

On the other hand, Narula and Dunning (2000, 2010), identify and classify the motives of a company to establish itself abroad into four groups: resource-seeking, market-seeking, efficiency-seeking and strategic asset seeking. These authors point out that the motives for FDI have evolved between the 1970s and the early 2000s. Currently, for example, resource seeking includes not only natural resources but also entrepreneurship, honesty of local partners, availability of local partners to promote joint knowledge. In market-seeking, firms consider the size of markets (mega regions such as T-MEC, EU, etc.), availability and price of skilled and professional labour, leading industrial suppliers, quality of national and local infrastructure, quality of local norms and standards, etc. Meanwhile, in efficiency seeking: knowledgeintensive and integrated MNE activities, appropriate educational and training programmes, science and industrial parks, etc. Finally, in strategic asset seeking opportunities offered for exchange of localized tacit knowledge, ideas and interactive learning, ability to form productive relationships with acquired firms, among others.

Then the role of industrial policy is very important to foster local absorptive capabilities (Narula, 2014; UNCTAD, 2018) which allow benefitting from such externalities. It is important to point out that the influence of FDI in local development is not direct; it depends on the industrial policy approach.

Industrial policy has changed in the last years (UNCTAD, 2018); this evolution has been seen through the analysis of the key themes, policy goals and policy environment in the four phases proposed by this organization. Since the 2000s the key themes are to focus on recent global concerns, knowledge economy and sustainable development; and the policy goals try to achieve an increased productivity as well as promote a modern industrial ecosystem development (see Table 1).

EVOLUTION OF INDUSTRIAL POLICY IN EMERGING REGIONS:
THE CASE OF THE AUTOMOTIVE INDUSTRY IN GUANAJUATO, MEXICO

MARTÍNEZ-MARTÍNEZ, CARRILLO-VIVEROS



Table 1.
Evolution in industrial policies and new themes

Stage	Until the 1970s	1980s - 1990s	Modern industrial policies	
			2000s and ongoing	Recent / emerging themes
Key features/ themes	Industrialization and structural transformation	Stabilization, liberalization, <i>laissez faire</i>	Knowledge economy GVCs	NIR Sustainable development
Policy goals	Creating markets, diversification	Market-led modernization	Specialization and increased productivity	Modern industrial ecosystem development
Key elements	Import substitution Infant industry protection Sector development Gradual and selective opening to competition	Limited government involvement More horizontal policies FDI opening Exposure to competition	Targeted strategies in open economies Enabling business environment Digital development (IT) and ICT diffusion Participation in global production networks FDI promotion combined with protection of strategic industries SME support Skills development	Technical capabilities development Innovation in production (OT) Learning economy SDG sector development Public-private knowledge / tech development Acquisition of foreign technology
Policy environment	High political legitimacy for national development strategies	Low political legitimacy for interventionist development strategies Limitations to policy space through international commitments	Regained legitimacy for national development strategies Moderate policy space in selected areas	More policy space in new fields More emphasis on inclusiveness

Notes: ICT= information and communication technology, IT = information technology, OT= operational technology, SME= small and medium enterprise. Source: UNCTAD, 2018, p. 130

Methodological features

The information presented is the result of the qualitative and interpretative analysis of state development plans and economic sectoral programs. In the following, we describe our methodological proposal. We analysed the evolution of industrial policy through the reconstruction of its trajectory. In order to do that, we adapted a process followed in a previous research (Martínez, 2006):

- First, we identified the legal landmarks that represented a disruption of the current trajectory. We recognised two important legal facts (see Chart 1): New Planning Law (2000) and the reform of Guanajuato's Planning Law (2011);
- after analysing the policy instruments that appear in the following documents, we determined whether they corresponded to a passive or active policy approach: 1) the seminal policy plan denominated, Guanajuato XXI Century Study (1992), 2) the State Development Plans (2025, 2030, 2035, 2040), 3) the economic sectoral programs (2006 and 2012), as well as, 4) Innovation Agenda of Guanajuato (2015).

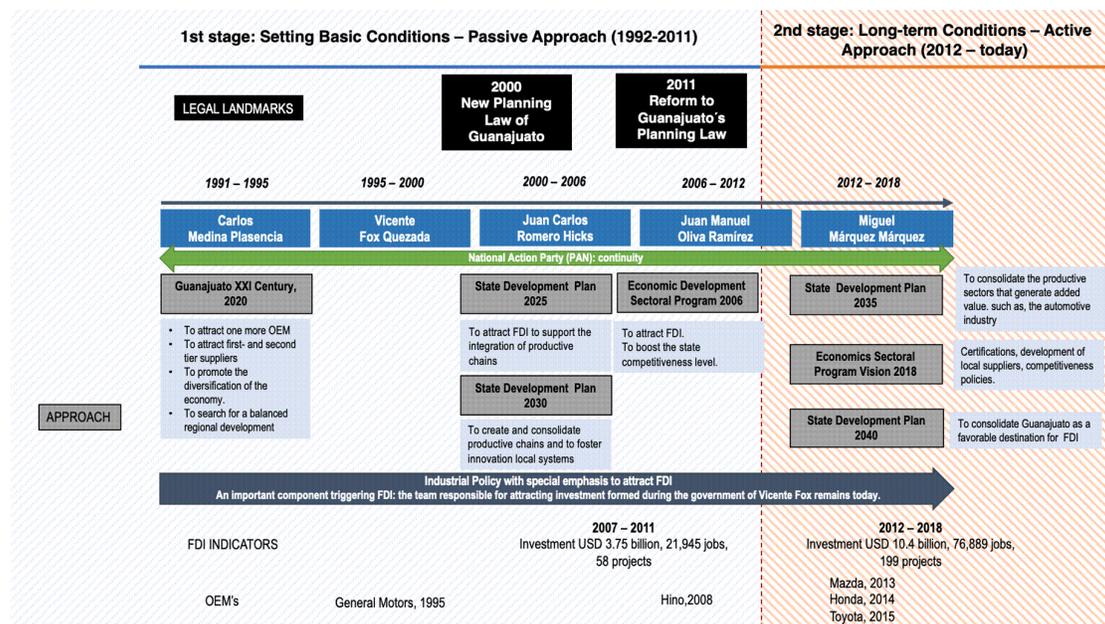


Chart 1. State Planning Evolution: Some important issues. Source: Author's elaboration.

Therefore, we can identify two stages: First Stage, Setting Basic Conditions-Passive Approach (1992-2011); Second Stage, Long-term Conditions -Active Approach (2012nowadays). In the analysis, we bear in mind: a) state industrial policy and b) Federal policy through decrees related to the automotive industry and the innovation agenda. Nevertheless, it is important not to ignore that the automotive industry's economic performance is the result of industrial policies implemented in previous decades in addition to decisions made by the companies' headquarters. According to Covarrubias (2017), it is important to point out that multinational companies, like the automotive firms, have the capabilities to model and take advantage of the institutional environment and the essence of their location decisions is to capitalize on this environment.

Evolution of industrial policy in Guanajuato: from a passive to an active approach

This section is divided into two parts; the first one presents some information about the automotive industry in Guanajuato, and the second one the evolution of industrial policy in this state.

The automotive industry in Guanajuato: brief notes

Ford Motor Company (1925) and General Motors (1937) were the first final assemblers that arrived in Mexico; these were established in the State of Mexico and Mexico City respectively. Their goal was to attend the internal market (Carrillo, 1993, Carbajal, 2015). These plants competed in a closed economy with an intensive workforce production and obsolete technology. Starting at the end of the 1970s and in the beginning of the 1980s the location of car manufacturers started in the North of Mexico: Chihuahua, Coahuila, Sonora, Nuevo Leon, and Aguascalientes.

The use of special automotive decrees was the instrument used by policymakers to attract FDI (Galvin, Goracinova and Wolfe, 2015; Carbajal, 2015). The country's trade openness at the end of the 80's, the implementation of the so-called North American Free Trade Agreement (NAFTA) in 1994 and the

introduction of sectoral development policies promoted the relocation of automobile plants to new regions, such as the area known as Bajío. So, since the 1990s some automotive companies were located in Guanajuato (General Motors, assembly, 1995, stamping, 1997, engines, 2001 and transmission, 2008; and more recently: Hino, assembly, 2008; Mazda, assembly, 2013; Honda, assembly, 2014, and Toyota, in construction from 2016); San Luis Potosí (General Motors Assembly Plant, 2008), and Jalisco (Honda Assembly Plant, 1995).

The plants established since the mid-1980s are more modern, manage a flexible production organization, and their workers are young and multi-skilled; some of the main reasons to have been established in the area are the proximity to the US market, the abundance of workforce and its low cost (García and Lara, 1998; Martínez, García and Murguía, 2009). The boom for the automotive industry in Guanajuato can be traced to 1995,⁴ with the beginning of operations of the General Motors (GM) plant in Silao. It is well known that manufacturers have encouraged suppliers to locate, as close as possible, to their assembly plants; and Guanajuato with the arrival of GM and the subsequent arrival of the other OEMs, has benefitted from this strategy and has attracted a great number of first-tier suppliers such as American Axle, Hirotec, Continental Teves, Kasai, Seglo, Arela, Lear, Aventec, Flex N Gate, GKN Driveline, Bosch, among others (Martínez, García and Santos, 2014). Initially, production began with harnesses and plastic injection that demanded more simple processes. Subsequently, and once skills and quality could be proven, the production of machined components was added.

The importance of the automotive industry in Guanajuato is reflected in the following indicators: it comprises more than 380 companies located in 22 industrial parks and in 19 municipalities; the production between January and September 2014 grew 71.9 percent over the same period in 2013 (Inegi, 2015a); in 2017 exports accounted for US\$18.6 billion which represented a growth rate of 8.24 and 77.75% of the total exports; in 2014, 470 thousand vehicles were produced representing 2nd place on a national level; and according to the Manufacturing Industry Monthly Survey undertaken by Inegi (2015b), employment in the automotive sector experienced a double figure growth (14.3 percent) from September 2014 to 2015, increasing from 139,458 to 159,436 workers, respectively.

Guanajuato currently has five assembly plants, one from the United States (General Motors), and four from Japan: Hino,⁵ Mazda, Honda and Toyota. In addition, Mazda and Toyota have an alliance for the production of vehicles for the former for both national markets as well as for exports. According to ProMéxico (2016), Mazda and Honda are among the largest and most modern in North America; the same is expected of Toyota. The investments made by the five OEMs between 2008 and 2015 total US\$3.5 billion. The arrival of OEM'S, first- and second tier companies (more than 300 firms) have allowed Guanajuato to build a comprehensive production chain within its territory and the conformation of an automotive cluster. In the following, we analysed the evolution of the industrial policy in Guanajuato.

First Stage: Setting Basic Conditions-Passive Approach (1992-011)

The long-term tradition of Guanajuato's planning started in 1992 when the state government undertook the study Guanajuato XXI Century; Tec de Monterrey carried out this study from 1992 to 1995. One of its important results was the identification of the need to promote industrialization and diversification in Guanajuato's economy; furthermore, the automotive industry was identified for its potential in the integration of productive chains (Gobierno del Estado, 1995).

This study established as a course of action, "to attract productive foreign investment to generate direct employment, favour the creation of other sources of employment in related companies and align plans for regional development" (p. 1133).

Policy lines of action focused on the following aspects:

- a) Lack of adequate infrastructure: road and railway networks were developed with the aim of facilitating the reception of raw materials and delivery of products.⁶ Regarding the development of specialised infrastructure, the establishment of Guanajuato's Internal Port (GPI) and Industrial Parks⁷ was identified and they were developed until the next stage.

- b) Lack of specialized technicians:⁸ in order to address this, training programmes for specific technical positions required by Japanese and German companies were translated and adapted into Spanish; instructors from the State Training Institute (IECA) were trained in Germany and Japan; and specialized training was given in hydraulics, pneumatics and PLCs.

These strategies correspond to the importance of “created” assets for the attraction of FDI (Meyer *et al.*, 2010). It should be noted that an important component triggering FDI was the team responsible for attracting investment which shows the role played by the IPAs in this process (Wilson *et al.*, 2014). This was originally created during the government of Vicente Fox Quesada (1995 - 1999) and continues to this day. The permanence of experienced staff with the necessary relationships has contributed to the continuity and success of the policy to attract investment. During this phase, the building of basic conditions in infrastructure was implemented. The Government provided attractive incentives in order to attract one OEM (General Motors) and first- tier suppliers.

Another important issue at Federal government level was the implementation in 1994 of the North American Free Trade Agreement, which promoted the automotive export stage and pushed the established companies in Mexico to compete abroad (Carbajal, 2015). During that year General Motors started to build its plant in Silao, the main reasons were: labour costs, good labour relationships, and incentives given by the government; the company received incentives in cash correlated to the amount of investment and generated jobs (Martínez, García and Murguía, 2009 and Martínez and Carrillo 2017).

From 2000 to 2011, the long-term conditions were being built. In 2000, the New Planning Law of Guanajuato was published in which long-term planning was established as mandatory. The second important change was carried out in 2011 when the Planning Institute of the State was recognized as the coordinator of public policy in Guanajuato. From 2000 to 2011, in Guanajuato, three Development State Plans were carried out 2025 (published in 2000), and 2030 (published in 2005). In all of these plans, there is a special emphasis in Foreign Direct Investment attraction.

The Economic Development Sectoral Program, published in 2006, focused on two purposes: 1) promoting foreign direct investments attraction, seeking to

EVOLUTION OF INDUSTRIAL POLICY IN EMERGING REGIONS:
THE CASE OF THE AUTOMOTIVE INDUSTRY IN GUANAJUATO, MEXICO

MARTÍNEZ-MARTÍNEZ, CARRILLO-VIVEROS



generate value added jobs, and 2) boosting the state competitiveness level through emphasizing economic regional vocations.

At Federal level, in the 2002 Economy Policy for Competitiveness, 12 sectors were chosen to be promoted through special programs and the automotive industry was selected (Peres, 2009).

How was the performance of the automotive industry during this period? Following we present some information about it.

Table 2 shows the annual average growth rate of some important indicators of two periods, 1999-2004 and 2004-2009. During the period from 1999 to 2004, there is a moderate reduction in the number of economic units, which in the reference period had a variation of 2.85 in annual average. This contrasts with an increase in employment and the value of production, measured by the gross value of production,⁹ which grew at an average annual rate of 6.95 and 4.65 % respectively. However, considering the value of production through the variable Gross Census Added Value,¹⁰ a negative rate of 1.35 is observed in annual average in the reference period. During the period from 2004 to 2009, there is a considerable growth in the number of economic units, which grew at an annual average rate of 10.46 percent. Following the previous trend, employment had an average annual growth of 6.36. However, both the value of the production measured in Total Gross Production and measured by the Gross Census Value Added, presented negative growth rates (7.94% and -12.49 %) in annual average in the reference period.

Table 2.
Automotive industry economic indicators 1999 - 2009

Indicator / Period	Annual average growth rate	
	1999 - 2004	2004 - 2009
Economic units	-2.85	10.46
Total occupied population	6.95	6.36
Total Gross Production	4.65	-7.94
Gross Census Value Added	-1.35	-12.49

Source: Author's elaboration with information from the Economic Censuses, 1999, 2004, and 2009 (Inegi)

The boom of the automotive industry in Guanajuato began in 2007, with the increase of the flows of FDI. Table 3 resumes the flows received by the state during the period 2007-2011. The involvement of the two following countries is particularly notable: Japan (10 companies, investment of US\$1.54 billion and the creation of 8,029 new jobs), and, Germany (13 companies; investment of US\$1.01 billion, and 6,183 new jobs). The strategy aimed at attracting companies from countries that have a strong parity versus the dollar and Mexico would serve as a platform for exports.

Table 3.
FDI by country of origin, 2007-2011

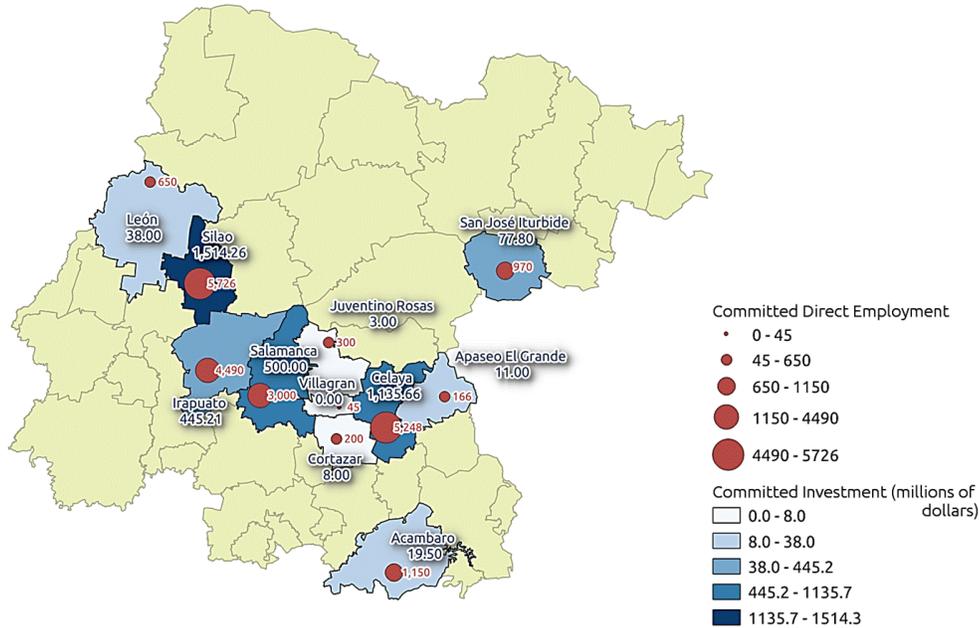
	Investment (billions dollars)	Percentage of participation	Direct employment	Percentage participation	Number of projects	Percentage participation
Japan	1.54	41.07	8,029	36.59	10	17.24
Germany	1.01	26.93	6,183	28.17	13	22.41
Italy	0.4	10.67	1,400	6.38	2	3.45
USA	0.25	6.67	1,361	6.20	8	13.79
England	0.25	6.67	633	2.88	4	6.90
<i>Subtotal</i>	<i>3.45</i>	<i>92.01</i>	<i>19,106</i>	<i>87.06</i>	<i>41</i>	<i>70.69</i>
Rest (9 countries) ^a	0.3	7.99	2,839	12.94	17	29.31
Total	3.75	100.00	21,945	100.00	58	100.00

Note: ^athe rest of the countries are Spain, France, Switzerland, Sweden, Canada, Brazil, Holland, India and Taiwan. Source: Author's elaboration with data from SDES, 2018.

The geographical location of the FDI and the generated direct employment can be seen in the Map 1.¹¹ The benefitted municipalities are located in the so-called Bajío Corridor region. During this period only 11 from the 46 municipalities of the state received FDI inflows.

EVOLUTION OF INDUSTRIAL POLICY IN EMERGING REGIONS:
THE CASE OF THE AUTOMOTIVE INDUSTRY IN GUANAJUATO, MEXICO
MARTÍNEZ-MARTÍNEZ, CARRILLO-VIVEROS

Projects supported under investment attraction programs 2007-2011



Map 1. Projects supported under investment attraction programs 2007-2011.

Source: list of projects supported under investment attraction programs. Secretary of Sustainable Economic Development of the State of Guanajuato.

Second stage: Long-term Conditions-Active Approach (2012-today)

The second stage began in 2012 and continues up until now, the industrial policies implemented in the previous stage focused on creating conditions for take-off. A proactive approach can be seen in this stage whereby the state strategy is based on enhancing domestic technological capabilities and competitiveness and is exports-oriented.

Since 2012, a strong discussion started on how local development can benefit from Foreign Direct Investment but one question that must guide the reflection is How should policy instrument design respond to that concern? Hence, a brief discussion about the issue is offered.

Coordination of different areas (Science, Technology and Innovation; Education, and Economics) to promote the automotive industry is found in this

stage. According to the UNCTAD, (2018) this is a characteristic of modern industrial policy.

In the Economics area, the Economics Sectoral Program Vision 2018 implemented by the Economic Development Ministry establishes as one of its general strategies to strengthen the value chain. Four specific strategies are: a) Certifications to promote the internationalization of the main productive sectors (the auto parts sector is being considered); b) Development of the local suppliers, c) Attraction of private investment to promote more value-added sectors; and d) Competitiveness policies to promote regulatory improvement.

Regarding science, technology and innovation (STI) aspects, the automotive industry is in the so-called “Innovation Agenda of Guanajuato” (Conacyt, 2015); according to this document, one of the main assets of the STI system is the firms’ innovation capacity. Three facts support this statement: 1) Guanajuato is the second state with the most percentage of innovative companies from the total 2) it is also, the second state, which companies declare to invest in Research and Development, and 3) it occupied, during the period 2003-2015, first place in approved projects of the so-called “Mix Funds” program.

This agenda includes the following sectoral goals: 1) Linking academic offer to the needs of the automotive industry in order to improve the process of technology transfer, 2) Reconverting, through innovation, the traditional sectors (such as textile, footwear, and plastics, among others) to the automotive industry, 3) Improving competitiveness and innovation capabilities of local suppliers.

To reach the mentioned goals, the priority projects established are: a) Training programs for the automotive and auto parts industry, b) Development of the Industrial Capabilities of the state of Guanajuato and its evolution to the automotive and auto parts sector, and c) The Technological Development Centre for the Automotive Industry, which will be funded by public and private sectors.

In Education and Training Policies, the following actions have been taken: a) Translation and adaptation into Spanish of Japanese and German Technical Training Programs, b) Instructors from the State Training Institute are trained in Germany and Japan, c) Specialized training: hydraulics, pneumatics and PLC’s.

Active industrial policies such as Supplier Development have been emphasized during this period, through the following actions: 1) Suppliers Specialized Forum, 2) Development and Strengthening of the supplier with the support of JICA,

PNUD; 3) Local companies' support in ISO and ISO/TS certifications, and 4) Workshops for sharing good practices.

During this period, two plans were published: State Development Plan 2035, its conception started approximately in 2009 and it was published in 2012, and State Development Plan 2040. This plan was published in 2018, and it considers three main strategic topics: 1) Employment and Competitiveness, 2) Productive articulation, agro-food sector, 3) Science, technology and innovation.

The third topic tries to promote the technological transfer between the actors that belong to the innovation quadruple helix (academic sector, industrial sector, government and society) in order to face the so-called 4th Industrial Revolution.

With respect to the FDI, this plan points out: to consolidate Guanajuato as a favourable destination through a better regulatory norm, as well as, industrial and logistic infrastructure. One of its main economic projects is the development of the automotive industry.

Following we analyse the same indicators like in phase one.

The state of Guanajuato is undergoing a dynamic manufacturing moment, particularly in the automotive sector. According to information shown in Table 4, analyzing the period from 2009 to 2014, economic units grew at an average annual rate of 10.88 percent. Similarly, employment measured by the total employed population, grew at an annual average rate of 15.53. Regarding the value of the production measured by the gross value of the production or by the gross census added value, it presented positive growth rates of 13.79 and 7.25 on annual average respectively.

Table 4.
Automotive industry economic indicators 2009 - 2014

Indicator / Period	Annual average growth rate 2009 - 2014
Economic units	10.88
Total occupied population	15.53
Total Gross Production	13.79
Gross Census Added Value	7.25

Source: Author's elaboration with information from Economic Censuses, 2009 and 2014 (Inegi)

These results reflect the arrival of the new companies to Guanajuato in this period.

The arrival of new companies, both auto parts and assembly, sought to promote regional development in different parts of Guanajuato. From 2012 to 2018, 199 projects totalling US\$10, 41 billion were attracted (Table 5). The 199 new projects came from 20 countries and generated 76,889 jobs.

Table 5.

FDI in Guanajuato by country of origin, 2012-2018

	Investment (billions of dollars)	Percentage participation	Direct employment	Percentage participation	Number of projects	Percentage participation
Japan	4.46	42.84	31,053	40.39	96	48.24
USA	2.65	25.46	11,881	15.45	26	13.07
Germany	1.17	11.23	17,811	23.16	31	15.58
France	0.71	6.82	4,061	5.28	8	4.02
Italy	0.53	5.09	2,070	2.69	4	2.01
England	0.28	2.68	500	0.65	2	1.00
<i>Subtotal</i>	<i>9.8</i>	<i>94.14</i>	<i>67376</i>	<i>87.62</i>	<i>167</i>	<i>83.92</i>
Rest (14 countries) ^a	0.61	5.86	9,513	12.37	32	16.08
Total	10.41	100.00	76,889	100.00	199	100.00

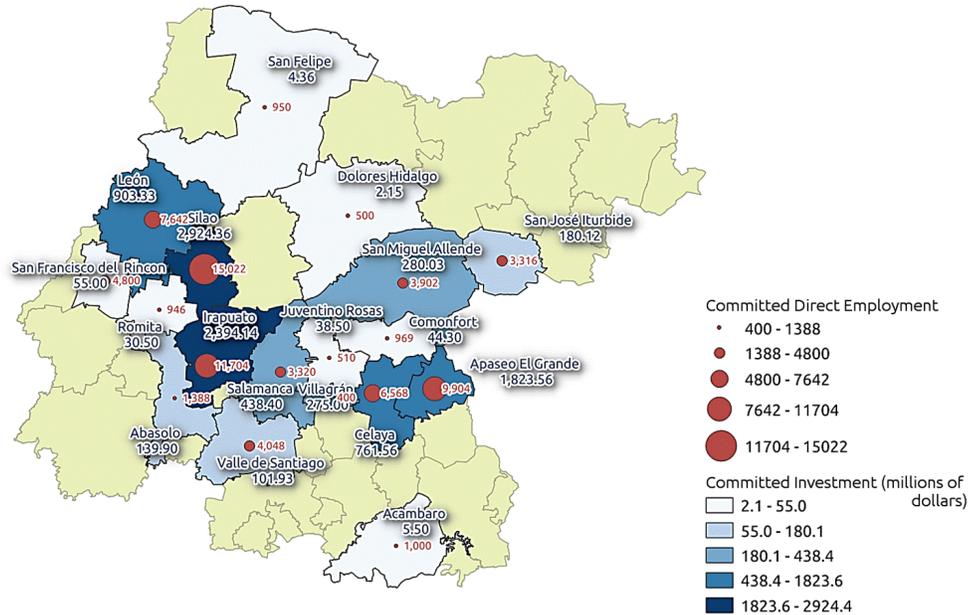
Note: ^athese countries are Canada, Spain, Korea, Austria, Slovenia, India, Sweden, Tunisia, Turkey, Holland, Portugal, China, Switzerland, and Taiwan.

Source: Author's elaboration with data from SDES, 2018.

During this period, the inflows of FDI arrived at 18 municipalities (see Map 2) and respond to the intentionality of the government: to disseminate the presence of the automotive industry in different parts of the State.

EVOLUTION OF INDUSTRIAL POLICY IN EMERGING REGIONS:
THE CASE OF THE AUTOMOTIVE INDUSTRY IN GUANAJUATO, MEXICO
MARTÍNEZ-MARTÍNEZ, CARRILLO-VIVEROS

Projects supported under investment attraction programs 2012 - 2018



Map 2. Projects supported under investment attraction programs 2012-2018.
Source: list of projects supported under investment attraction programs. Secretary of Sustainable Economic Development of the State of Guanajuato.

The involvement of the 3 following countries is particularly notable: Japan (96 companies, investment of US\$4.46 billion and the creation of 31,053 new jobs), the United States (26 companies, investment of US\$2.65 billion and 11,881 new jobs generated), and, Germany (31 companies; investment of US\$1.17 billion, and 17,811 new jobs). Japan continues in the top position, one reason to explain that is the strategic location of Guanajuato and its closest to the United States; another reason was the former NAFTA.

The establishment, and extension of both leading global OEMS, as well as, a large number of first- and second-tier suppliers, has allowed the state to become one of the main emerging and dynamic centres of the automotive industry in Mexico. While the decision to set up plants lies mainly with the headquarters of multinational enterprises, which is largely supported by state industrial policy. Table 6 shows a synthesis of the two identified phases in the trajectory of industrial policy in Guanajuato.

Table 6.
State Industrial Policy: Stage/Approach

Characteristics / Stage	First stage	Second Stage
	Setting Basic Conditions-Passive Approach 1992 - 2011	Long-term Conditions-Active Approach 2012 - today
Legal landmark	A long-run vision New State Planning Law	Modification to the State Planning Law
Plans and programs	Guanajuato XXI Century Study Development State Plan (DSP) 2025 Development State Plan (DSP) 2030 Economic Development Sectoral Program 2006	Development State Plan (DSP) 2035 Development State Plan (DSP) 2040 Economics Sectoral Program Vision 2018
Policy goals	Guanajuato XXI To attract one more OEM To attract auto-parts companies To promote the diversification of the economy. To search for a balanced regional development DSP 2025: To attract FDI to support the integration of productive chains. DSP 2030: To create and consolidate productive chains and to foster innovation local systems	DSP 2035 To consolidate the productive sectors that generate benefit such as, automotive. DSP 2040 To consolidate Guanajuato as a favorable destination for foreign direct investment
Considered areas	Oriented policies to promote selected industries	Science, technology and innovation policies Education and training policies Oriented policies to promote selected industries Competitiveness policies
Incentives	Cash to build complementary infrastructure Temporary exemption from local taxes	Grants for training workers in situ Support for the hiring of new employees. Temporary exemption from local taxes Support in regulatory and environmental processes.
Infrastructure	Basic infrastructure Road and railways Industrial Parks Training programs for operative positions	Specialized infrastructure Guanajuato Internal Port Technological Parks Training programs for technical positions Establishment of specialized institutions:

**EVOLUTION OF INDUSTRIAL POLICY IN EMERGING REGIONS:
THE CASE OF THE AUTOMOTIVE INDUSTRY IN GUANAJUATO, MEXICO**

MARTÍNEZ-MARTÍNEZ, CARRILLO-VIVEROS

Federal Decree and Treaty	1994 - NAFTA	Automotive Cluster of Guanajuato, State Training Institute 2003 - Decree to support automotive industry competitiveness and impulse to development of the domestic car market 2006 - Decree that allows the import of used cars. 2018 - T-MEC
Objectives	Promote the trade liberalization. Led companies to compete in the international markets.	2003 Decree to Support the competitiveness of the established OEMs. Promote the development of the internal market. OEMs should develop training programs and bolster local supplier's development and transfer its technology to Tier 1 and Tier 2.
Federal Programs Objectives of the Innovation Agenda of Guanajuato (iag)	None	Innovation Agenda of Guanajuato, 2015 Linking academic offer to the needs of the automotive industry in order to improve the process of technology transfer. Reconverting, through innovation, the traditional sectors (such as textile, footwear, and plastics, among others) to the automotive industry. Improving competitiveness and innovation capabilities of local suppliers. Training programs for the automotive and auto-parts industries Development of the local firm's endogenous capabilities through supplier development
Priority projects	None	Technological Development Center for the Automotive Industry (private and public funding)
Arrival of OEMs	General Motors (1995)	Hino Motors Manufacturing, 2008 Mazda, 2013 Honda, 2014 Toyota, 2015

Source: Author's elaboration.

Concluding remarks

The purpose of this article was to analyse the development of industrial policy (IP) in Guanajuato through the reconstruction of its trajectory and the evolution of its approach. We found that the policy instruments that have been implemented have fostered not only the industry, but also its consolidation in the region. Furthermore, through greater employment, advancement of local suppliers and training programs, local development has been promoted.

According to the FDI policy classification undertaken by Padilla, policies implemented in Guanajuato have been largely passive, with the main aim of attracting investment. In the 2018 sectoral program, however, a transition towards active policies can be noticed, with the establishment of other objectives, such as the development of suppliers, improvement of regulatory frameworks, and human resource development. This is most clearly seen through the analysis of incentives provided to companies by the State Government. This new policy approach is very important to foster the appropriation of benefits from the automotive MNEs established in the region (Martínez and Carrillo, 2017, Narula and Dunning, 2010; Narula, 2014).

Nevertheless, the design of IP should evolve and consider the new conditions of the global context; in this sense, in order to strengthen its industrial policy, the State government should establish integrated policy instruments in order to achieve insertion in the global value chain by local companies of the automotive industry. However, this is not automatic; first of all, industrial policy should focus on fostering innovative and absorptive capabilities. Given the presence of advance manufacturing, it is necessary for the government to implement policies regarding R&D+I, to foster the generation of innovative endogenous capabilities (Tassey, 2014). It is important to realize that the creation of linkages and the internalisation of spillovers from MNE activities depends on local absorptive capacity (Lall and Narula, 2004). According to Narula (2014), this refers to the ability of a country (in the case of Guanajuato, a region) to integrate the existing and exploitable resources into the production chain.

There is no doubt that one of the main reasons to promote the rapid acquisition of imported technology and its absorption is the role played by the high-skilled labour force (Di Maio, 2009). Therefore, one of the main concerns of Guanajuato

should be to encourage this issue. There is empirical evidence that the catching-up process requires strong industrial policy focus on strategies of targeted technology acquisition that allows the follower country to catch up rapidly with leader countries (Khan & Blankenburg, 2009). However, attracting MNEs without considering the potential for linkage creation is shortsighted (Narula and Dunning, 2010, p. 273)

Furthermore, the two following successful experiences are deemed important to mention. In order to raise the endogenous technological capabilities, according to Di Maio (2009), the Taiwanese government “sought to maximize benefits from FDI for domestic firms, through the following actions: a) promoting local sourcing and subcontracting; b) imposing local content rules, and c) introducing the obligation for foreign firms to transfer skills and technology to subcontractors” (p. 113). On the other hand, China took advantage on FDI, because it allowed the country access to advanced technology and management. It is important to mention that, “China also benefited as workers trained by the foreign firms were lured and the Chinese joint venture partners learned the technology and organization and set up their own firms. Additionally, the governments initially imposed local content requirements” (Dahlman, 2009, p. 318). Although there is a correlation between FDI and development, the positive impact of the first on the latter is not conclusive (Narula and Dunning, 2010); FDI activity is not a condition *sine qua non* for development (Lall and Narula, 2004; Narula, 2014; Martinez and Carrillo, 2017). Hence, policy orientation plays a significant role in promoting MNE activity (Narula and Dunning, 2010, p. 271).

Finally, some of the questions, which emerged from this analysis, are: How can Guanajuato benefit from tapping global knowledge to build endogenous innovation capabilities? If this does not happen, what are the limits of this development model based on attracting FDI? In addition, what will the impact of the recently signed T-MEC be in the future of the automotive industry not only in Guanajuato but also in Mexico?



Footnotes:

¹ We thank Professor Leonardo Rivas Rivas for the revision of the English version.

² The states that comprise this area are Aguascalientes, Guanajuato, Michoacán (north area), Querétaro, San Luis Potosi (central region) and Jalisco (Los Altos area); according to Conacyt (2015), its production consists of 1.5 million automobiles ranking it in the fifteen most important economies of the world.

³ Suppliers are classified according to their distance from the OEM (Original Equipment Manufacturer). Tier 1 companies are those that directly supply these and are strictly monitored in terms of quality, time and costs. Tier 2 companies provide components to Tier 1, as do Tier 3 companies to Tier 2.

⁴ Since the boom of the automotive industry in Guanajuato started in the mid-1990s, we consider it as an emerging region.

⁵ Hino is part of the Toyota Group and produces 500 Series heavy goods trucks in the Silao plant.

⁶ An important point in the process of state planning was the promulgation of the Planning Law for the state of Guanajuato, which included the idea of “long term”; it became obligatory to consider long term planning: 25 years, (Martínez, 2015).

⁷ Currently, 22 industrial parks have been established: Amistad Apaseo el Grande, Amistad Celaya, Castro del Río, Centro Industrial Guanajuato, Colinas León, Opción, Polígono Industrial San Miguel, Colinas Silao, Fipasi, Guanajuato Puerto Interior, Caral, Marabis, Apolo, Colinas de Apaseo, Industrial Park en Salamanca, Sendai, VYNMSA, Entrada Group, and Stiva.

⁸ For example, “... personnel hired by GM, initially, came from the countryside, and as such it was necessary to retrain them for industry. In the beginning, workers were hired for very basic positions: operators and low-level technicians, as qualified labour was not available in the state. Twenty years on from the establishment of GM, this has changed and continues to do so” (personal communication with the Minister of SDES, June 2016).

⁹ Total Gross production value is “... the value of all goods and services produced or marketed by the economic unit as a result of the exercise of its activities, including the value of the products produced; the gross marketing margin; the executed works; income from the provision of services, as well as the rental of machinery and equipment, and other movable and immovable property; the value of fixed assets produced for own use, among others. It includes: the variation of stocks of products in process. Goods and services are valued at producer prices.” INEGI, 2019 Automated Census Information System. Accessed on September 9, 2019. Available at: <https://www.inegi.org.mx/app/glosario/api/glosario/Descarga/?ClvGlo=SAIC&Domain=false>

¹⁰ The Gross Census Added Value is "... the value of the production that is added during the work process by the creative activity and transformation of the employed personnel, the capital and the organization (factors of the production), exerted on the materials that are consumed in the realization of the economic activity. Arithmetically, the Gross Census Added Value (VACB) results from subtracting the Intermediate Consumption from Total Gross Production. It is called gross because the consumption of fixed capital has not been deducted." INEGI, 2019 Automated Census Information System. Accessed on September 9, 2019. Available at: <https://www.inegi.org.mx/app/glosario/api/glosario/Descarga/?ClvGlo=SAIC&Domain=false>

¹¹ We thank Gabriel Santos Navarro for the help in the elaboration of the maps.

Acknowledgements

We would like to acknowledge the financial support received from:

- The Program UNAM-DGAPA-PAPIIT, through the research IN304616 "Innovation, technological convergence and Sustainability: the automotive industry of Guanajuato facing globalization", 2016 to 2018.
- The Program UNAM DGAPA PAPIIT, through the research IN309819 "Industry 4.0, global value chain and new business models: three case studies of the automotive industry in Guanajuato", 2019 to 2021.

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EVOLUTION OF INDUSTRIAL POLICY IN EMERGING REGIONS:
THE CASE OF THE AUTOMOTIVE INDUSTRY IN GUANAJUATO, MEXICO

MARTÍNEZ-MARTÍNEZ, CARRILLO-VIVEROS

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EVOLUTION OF INDUSTRIAL POLICY IN EMERGING REGIONS:
THE CASE OF THE AUTOMOTIVE INDUSTRY IN GUANAJUATO, MEXICO

MARTÍNEZ-MARTÍNEZ, CARRILLO-VIVEROS



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