GESTIÓN de la INNOVACIÓN para la COMPETITIVIDAD: Sectores estratégicos, tecnologías emergentes y emprendimientos

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STRATEGIC POSITION OF FEDERAL INNOVATION INCENTIVES IN MEXICO

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ABSTRACT

The main purpose of industrial policy is to align resources and efforts at the government level to favor strategic sectors that allow a country to increase its competitive advantage. The implementation of industrial policy is not an easy assignment, since it requires evaluation systems that measure the level of implementation and alignment of resources with the objectives of the policy. In the last couple of decades, Mexico has improved its efforts to increase investment in research and development activities. However, it has not been possible to build a system for such activities at the national level. In turn, federal public funds have been designed to encourage the industry to carry out activities in strategic industrial sectors. The objective of this study is to analyze and evaluate the industrial policy in Mexico and to determine if there is alignment between public funds and national priority activities by examining one source of federal funding. The results show that there is an implicit industrial policy determined by each federal entity, as well as a partial alignment of the projects approved for funding with the national priorities. This study concludes with the necessity to implement systems and tools to evaluate the generated impact of the projects approved for funding beyond the year in which the stimuli are identified. In addition, it is recommended an independent policy-making system that fosters transparency in innovation public funds grant processes.

Keywords: Industrial policy; innovation public funds; strategic alignment; policy instruments

1. INTRODUCTION

Innovation is a well-recognized key driver of country's economic growth (Klomp & Roelandt, 2004; Patterson, 2009) to achieve necessary the creation and implementation of systems and tools to strategically align public policies with technological resources. Researchers have focused on the implementation of systems of innovation in companies to gain a competitive advantage in the market. However, successful implementation of innovation systems should be guided by a strategic planning that goes under the specific objectives of the companies (Aguirre, 2015). The theory of innovation systems states that companies require industrial, social and environmental conditions that promote their technological capabilities (Scheel Mayenberger, 2012). In recent decades, it has emerged the term "industrial policy" as a means to generate the conditions that companies need to develop innovative activity. In some countries like USA and China, implementation of industrial policy has been successful because they have global advantage reflected in the economic growth and quality of life of their citizens (Ramizo, 2016).

Mexico has had low economic growth during the last three decades. According to Calderón and Sánchez (2012) Mexican market is distorted by externalities, monopolies, incomplete markets, asymmetric information and coordination of drivers. In addition to these factors, OECD (2013) signalize that Mexican environment is characterized for a low spending in science, technology and innovation, lack of innovative culture, poor linkage between academy and industrial sector, low production of specialized human resources and little amount of specialized financial instruments for the innovation process. Furthermore, most of scientific research is characterized for lack of linkage with basic region needs (Herrera, 1995).

It is necessary to establish whether industrial policies in Mexico are present and if so, if they are aligned to a strategic position that allows understanding more clearly what has been the result of political reforms that have taken part in the last decade. This study aims to establish through analysis of federal funds to innovation and the national plan for science and technology characteristics of the strategic position of the federal incentives. State innovation agendas have been analyzed to determine the existence of a national innovation strategy by identifying priority sub-sectors at national level to later compare with federal stimulus subsectors of the projects approved for funding. This study focuses on the Stimuli Program to Innovation, the results of the projects approved for funding. Once the information was obtained, the results were compared and a prioritizing table of sub-sectors is generated.

This article aims to accumulate knowledge of political economic research specifically to policymakers and academic audiences. The intention is to provide a concise overview of Mexican policy environment in science and technology. Policy makers need to be aware of these themes so that they can seek out to overcome them especially in underdeveloped countries such as Mexico.

2. THEORETICAL FRAMEWORK

Developed country governments take measures to support industrial progress through incentives and programs to encourage private firms to attract them to particular geographic areas and induce new investments in specific industrial sectors to create a business environment that stimulates entrepreneurial activity and innovation in the private sector; this is known as "industrial policy" (Yifu Lin, 2014; Klomp & Roelandt, 2004). Two policy categories have been identified:

1) Vertical industrial policy: The objective is to promote particular industries usually referred as industrial targeting.

2) Horizontal industrial policy: It yields externalities to multiple sector and firms, trough government-induced investment; the implementation of these measures helps to improve business environment of the country by facilitating firm entry and resource deployment. (Lazzarini, 2015).

According to Ramizo (2016) there are two main challenges for implementing industrial policy: 1) the bureaucracy's authority to implement merit-based policies underpinned by accountability, and 2) the embeddedness of the bureaucracy in public-private linkages, which provide useful information to decision making. Industrial policy is associated with economic growth, due the fact that the State is most suited to address coordination externality. It aims to share risks and costs of research and product discovery by inhibiting market uncertainties created by employee turnover, market failure and risk of imitation. According to Yifu Lin (2014, p. 1) "sector-targeted industrial policy is essential to achieve dynamic structural change and rapid, sustained growth in an economy", also highlights the importance that industrial policy should be aligned to latent advantages of industries. Meanwhile Tiemstra (1994) advertises that policies that aim to accelerate the process of industrial change by reducing costs should not affect only some sectors or institutions by giving resources disproportionally. Furthermore, Herrera (1995) exposed the difference between explicit and implicit policy, the first is the official policy while the second expresses scientific and technology demand of a national project in each country.

Strategic management is recognized as a main driver of innovation because it promotes competitive advantage (Chereau, 2015). Strategic management can be defined as the actions that take place within an entity in order to accomplish internal and external demands aiming to improve its performance and provide better services to the market (Johsen, 2015). Even though strategy management and innovation are interrelated and can be a source of sustainable performance, industrial policy and strategic management are disconnected, the need for alignment requires firms focus on innovations that are consistent with their strategy (Chereau, 2015; Klomp & Roelandt, 2004). Governmental capability may incentivize entrepreneurial activity using local and external resources and foster insertion of firms in global production networks. Also Klomp and Roelandt indicate that strong competition, technological complexity and major innovation risks force firms to focus in their fundamental activities (2004, p. 372)

3. STUDY CONTEXT

The study is focus in Mexican context; Mexico is the second largest economy in Latin America (The World Bank, 2016a). Mexican economy has a continuous expansion at annual rate of 2.5% relying on private consumption (The World Bank, 2016b). Mexican economy faces a complex external environment where low oil prices persist and a normalization of U.S. monetary policy exists. In addition, Mexico is rank as 57th in global competitiveness level, with a global score of 4.29/7 (World Economic Forum, 2015). According to World Economic Forum (2015), Mexico has improved in financial markets, business sophistication and fostering innovation, however rigidities as public and private institutions are still a problem.

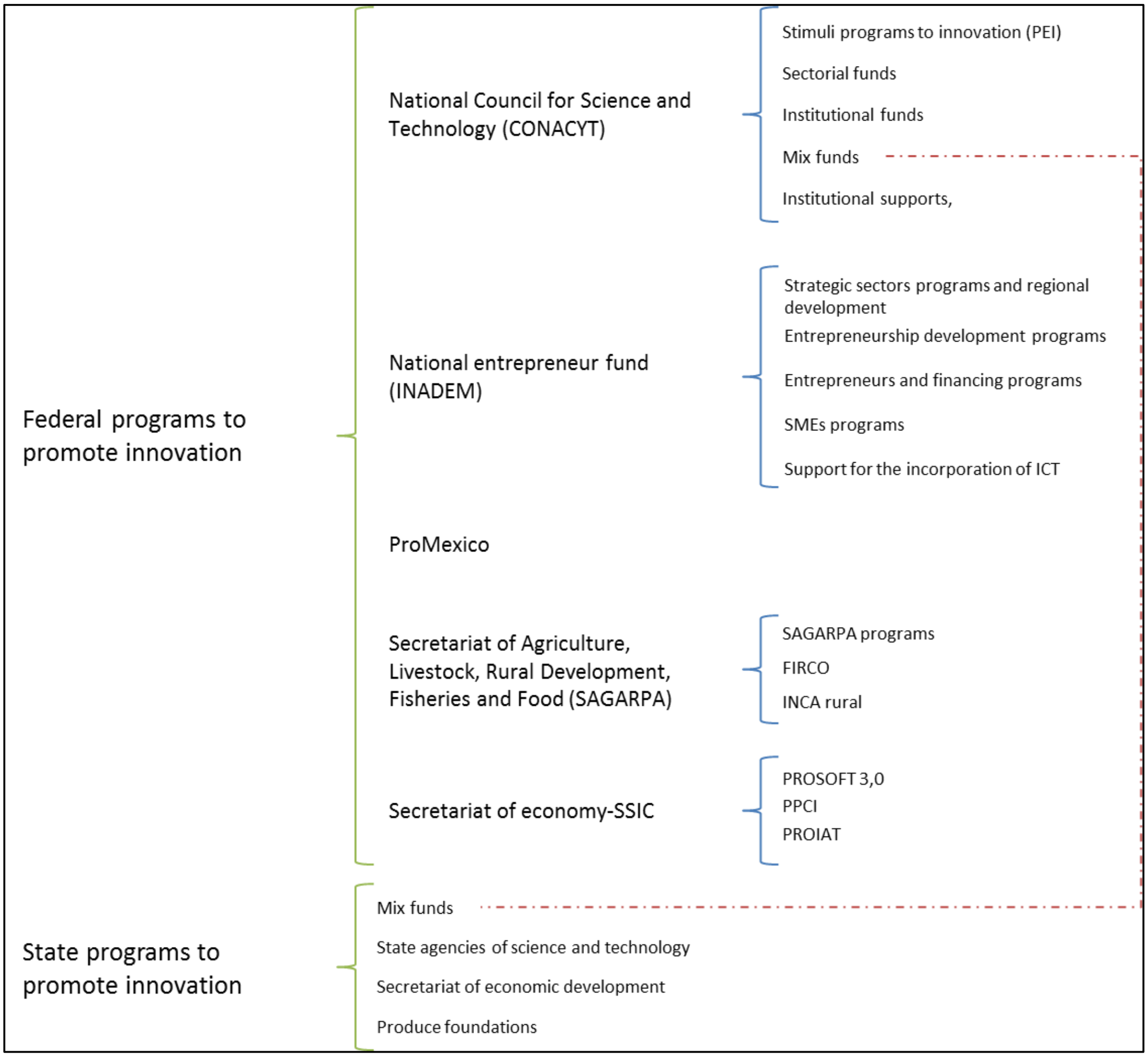
According to "The Global Innovation Index" (2016), Mexican innovation index is rank 61th out of 128 with a score of 34.6/100, with an innovation efficiency ratio of 0.6. This could be explain for the low gross domestic spending on R&D (GDS-R&D), which was 0.53% on 2014 and 19.9 triadic patent families[1] (OECD, 2016b). It is important to remark that in the last 14 years (2000-2014), GDS-R&D has average 0.41%, with a substantial increase from 2012 to 2014, from 0.43% to 0.538%. Correspondingly, Mexico has an average of 0.83 researcher per thousand people employed, OECD average is 7.9 (OECD, 2016c).

In Mexico the organism in charge of publishing national policies is the Official Journal of the Federation (DOF, for its acronym in Spanish) in May the 20th, 2013 It was approved the National Development Plan 2013-2018 (NDP), which establishes the main objectives and strategies that govern the country during that period. One of the main strategies is to increase Mexico's productivity taking into consideration five national goals. One of that goal is "Mexico with Quality Education" which aims to implement a state policy that allows Mexico to move towards an economy capable of supporting its growth in scientific work, technological development and innovation through the "Special Program of Science, Technology and Innovation 2014-2018"

[1] Triadic patent families: set of patents filed at three of these major patent offices: the European Patent Office (EPO), the Japan Patent Office (JPO) and the United States Patent and Trademark Office (USPTO). (OECD)

(PECiTI). PECiTI main strategies are to contribute to national investment in scientific research and technological development grow annually and reach a level of 1% of GDP and the formation and strengthen of high-level human capital. In order to accomplish these strategies PECiTI aims to articulate actors that intervene in the National System of Science, Technology and Innovation (SNCTI). There are numerous National Public Programs for Innovation Development (See Figure 1):

Figure 1 National Public Program for Innovation Development (FCCyT, 2016)



3.1 National Council for Science and Technology (CONACYT)

CONACYT is a public agency of the Federal Public Administration, member of the Education Sector. It is responsible for developing policies on science and technology in Mexico. The goal is "to consolidate National Science and Technology that responds to the priority needs of the country, to solve specific problems and needs, and to help raise the standard of living and welfare of the population."

According to CONACYT, Mexico's challenge is to structure an economic model that enables its people producing goods with high benefit from scientific and technological knowledge. In order to accomplish this, CONACYT has developed several funds and stimuli program to support education, science and technology activities, knowledge and technology transfer and innovation. This study is focus in Stimuli Program to Innovation (PEI, for its acronym in Spanish). (CONACYT, 2014a)

3.2 Stimuli Program to Innovation (PEI)

PEI is the supporting program for enterprises that develop projects in research, technology development and innovation; it is address to new products, process and services development. The main objective of PEI is "to encourage, at the national level, business investment in activities and projects to research, technological development and innovation through the granting of additional incentives, so that these supports have the greatest possible impact on the competitiveness of the national economy." It is important to consider that PEI aim to increase the private investment in innovation, the stimuli is complementary not substitutive. Nowadays, the private investment in R&D activities is 24%[2] (OECD, 2016a). In addition, PEI grants more resources to enterprises that collaborate with universities and propitiate human resources development, through the participation of professors, researchers and postgraduate students. In addition, PEI across new product, process and services development seeks to increase Mexico's competitiveness. (CONACYT, 2014b)

4. RESEARCH METHODOLOGY

The study is focus to study alignment between the National Development Plan 2013-2018 priority sectors, National Council for Science and Technology priority industrial sectors and Stimuli Program to Innovation of the projects approved for funding between 2012 and 2015.

Priority sectors in NDP were obtained using State Innovation Agendas from the 31 states, all the priority sectors were listed in a spreadsheet program, distributed according the state of origin in files and sectors in columns.

Every year CONACYT publishes a list of priority sectors for each federal entity, using 3-digit North American Industry Classification System (NAICS) code. Finally, data from projects approved for funding were obtained from National Institute of Transparency, Information Access and Personal Data Protection (IFAI[3]); the information was classified according to the industrial sector of the project.

In order to analyses data, it was needed to standardize using NAICS[4]; the main reason is that nowadays, National Institute of Statistics and Geography (INEGI) in Mexico used NAICS to classified enterprises activities.

4.1 Data standardization

For each data source a similar standardization method was used, which is described deeply below:

[2] $2775,327 million, U.S. Dollar, data of 2014

[3] Mexican institute that regulates data and information from governmental organism

[4] The standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.

NDP: The main problem standardized data from NDP was the variety of nomenclatures, each federal entity has its own nomenclature, for example, Chihuahua defines advanced manufacture as automotive, aerospace and machinery manufacturing, while Zacatecas defines it as, aerospace, automotive and auto parts and mining manufacturing, meanwhile Baja California and Coahuila just mentioned advanced manufacture. In these cases, each description was taken as single industrial sector. Once multi-sector activities were separated, similar activity nomenclature were considered as similar, for example “food agroindustry”, “agricultural and food industry”, “sustainable food agroindustry”, among others. To codify into NAICS, a simple selection of most-likely industrial activity was performed.

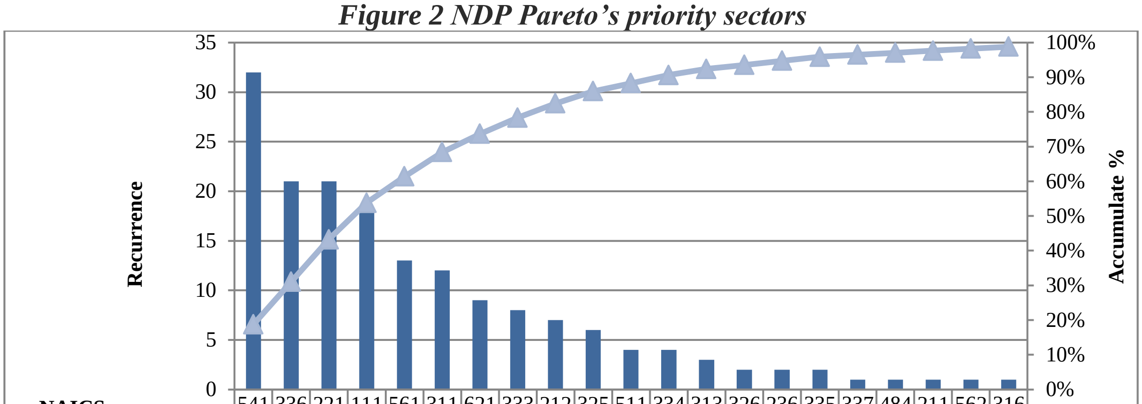
CONACYT: As mention before, CONACYT publishes every year a list of priority sectors according to federal entity with three-digit NAICS code, so it was not necessary to apply any standardization method.

PEI: PEI projects approved for funding list is classified in one or two words nomenclature, thus standardization was made using a simple word searching and selection, for example in PEI list appear “Aerospatiale”, it was looked the word in NAICS code, that is “3364 -Aerospace Product and Parts Manufacturing”, and a reduction of code was made to three digit 336. Due this reduction of digit, a reduction from 31 to 18 different industrial areas was observed.

4.2 Industrial sectors prioritization

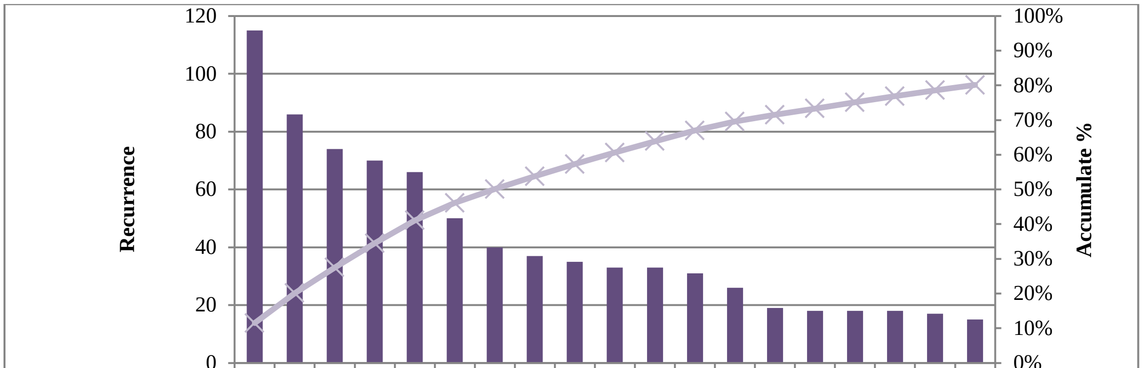
Prioritization for each data source was made; the main method was using a Pareto graphic by taking only the 80% top industrial sector for each. Data from NDP, CONACYT priority sectors and PEI projects approved for funding were graphic according to number of recurrences. In addition, a prioritization from PEI projects approved for funding list was made using the amount of support for each project according to the industrial sector. The results are shown below (See Figure 2, 3 4 and 5):

Figure 2 NDP Pareto’s priority sectors



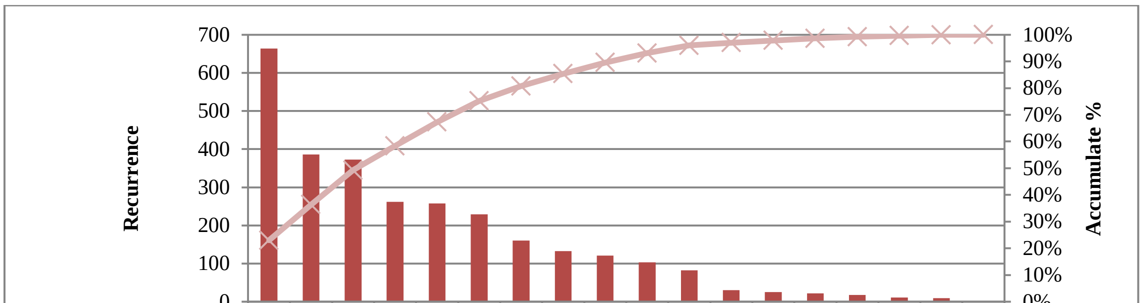
NAICS	541	336	221	111	561	311	621	333	212	325	511	334	313	326	236	335	337	484	211	562	316
Recurrence	32	21	21	18	13	12	9	8	7	6	4	4	3	2	2	2	1	1	1	1	1
Accumulate %	19%	31%	43%	54%	61%	68%	74%	78%	82%	86%	88%	91%	92%	94%	95%	96%	96%	97%	98%	98%	99%

Figure 3 CONACYT Pareto's priority sectors



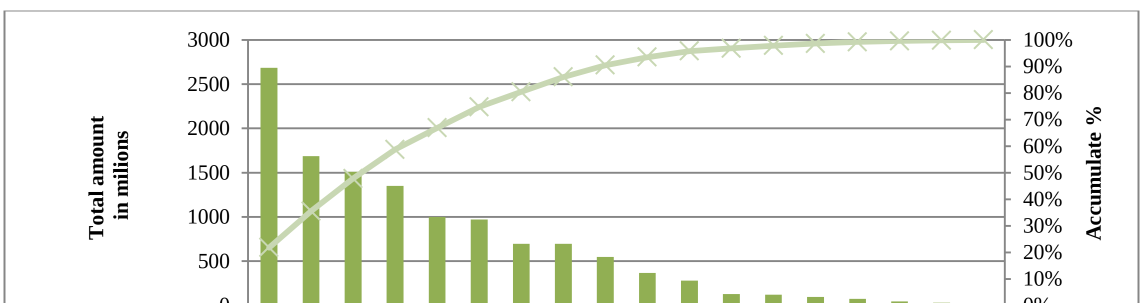
NAICS	311	541	325	333	336	111	332	334	221	212	326	112	335	518	339	511	562	238	327
Recurrence	115	86	74	70	66	50	40	37	35	33	33	31	26	19	18	18	18	17	15
Accumulate %	12%	20%	28%	35%	41%	46%	50%	54%	57%	61%	64%	67%	70%	72%	73%	75%	77%	79%	80%

Figure 4 PEI Pareto's recurrence priority sectors



NAICS	541	325	333	336	311	111	221	334	621	326	236	212	517	313	316	331	323	337
Recurrence	664	386	373	262	258	229	160	133	121	103	82	30	25	22	18	11	9	2
Accumulate %	23%	36%	49%	58%	67%	75%	81%	85%	90%	93%	96%	97%	98%	99%	99%	100	100	100

Figure 5 PEI Pareto's total amount priority sectors



NAICS	541	333	325	336	311	111	221	621	334	326	236	517	212	313	316	323	331	337
Total Amount	2684	1687	1511	1352	1001	969	697	695	549	368	282	130	122	97	73	46	33	22
Accumulate %	22%	35%	48%	59%	67%	75%	80%	86%	90%	93%	96%	97%	98%	99%	99%	100	100	100

5. RESULTS

The results of Pareto Graphics were ranked and tabulated as seen in Table 1.

Table 1 Results of Pareto Graphics

Rank	I. NDP	II. CONACYT	III. PEI (recurrence)	IV. PEI (amount)
1	541	311	541	541
2	336	541	325	333
3	221	325	333	325
4	111	333	336	336
5	561	336	311	311
6	311	111	111	111
7	621	332	221	221
8	333	334	334	621
9	212	221	621	334
10	325	212	326	326
11	511	326	236	236
12	334	112		
13	313	335		
14	326	518		
15	236	339		
16	335	511		
17		562		
18		238		
19		327		

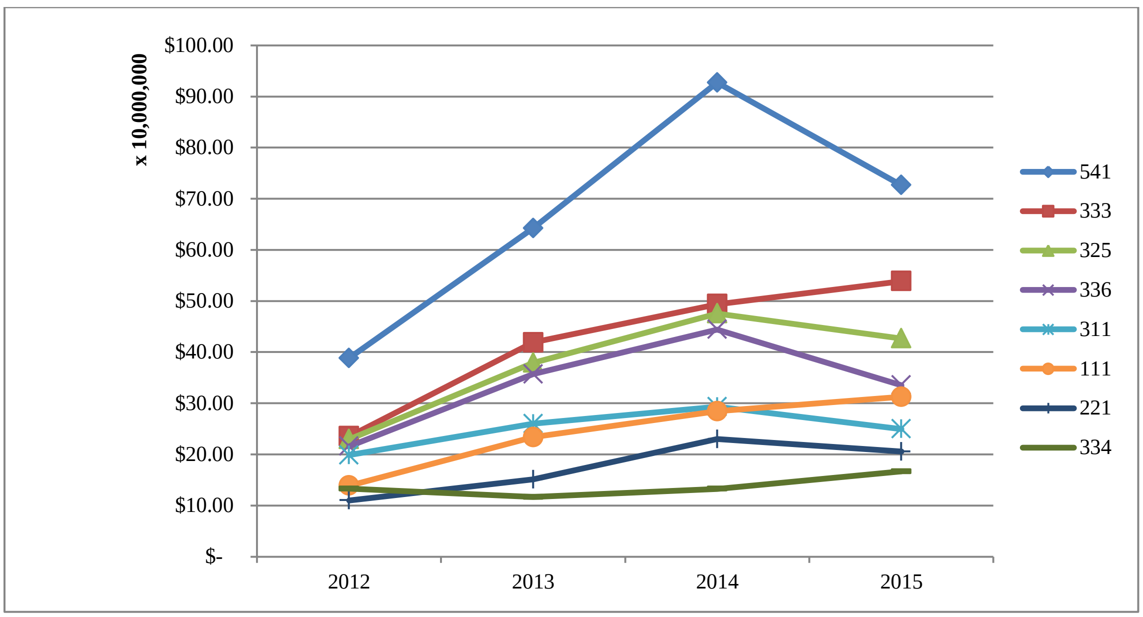
Table 1 shows eight industrial sectors that appear recurrently: 111 - Crop Production; 221 – Utilities; 311 –Food Manufacturing, 325 – Chemical Manufacturing; 334 – Computer and Electronic Product Manufacturing; 336 – Transportation Equipment Manufacturing, and; 541 – Professional, Scientific and Technical Services. Further, they were hierarchized using simple average operation using previous ranking. The result shows that the most "important" industrial sector is 541 – Professional, Scientific and Technical Services as can be seen in Table 2.

Table 2 Ranked priority sectors and average ranking

NAISC	Description	I	II	III	IV	Rank
541	Professional, Scientific, and Technical Services	1	2	1	1	2.25
336	Transportation Equipment Manufacturing	2	5	4	4	3.5
311	Food Manufacturing	6	1	5	5	4.5
333	Machinery Manufacturing	8	4	3	2	4.5
325	Chemical Manufacturing	10	3	2	3	4.5
111	Crop Production	4	6	6	6	4.75
221	Utilities	2	9	7	7	6
334	Computer and Electronic Product Manufacturing	11	8	8	9	9.25

Next, results were compared with PEI projects approved for funding; data were selected according to industrial sector and graphed to observe stimuli amount change year by year from 2012 to 2015 as can be seen in Figure 6.

Figure 6 Comparative among PEI projects approved for funding from 2012 to 2015 (Own elaboration using data from IFAI, 2016)



5.1 Professional, Scientific, and Technical Services subsector

According to NAICS classification, this subsector includes primarily activities in "which human capital is the major input" (Government of Canada, 2016f). Companies in this subsector offer knowledge and skills from their employees in particular expertise that often requires a university or college education. In Mexico, the principals activities related to this subsector are biotechnology, nanotechnology, logistics software, research on new materials and information technology. For Professional, Scientific, and Technical Services subsector, it can be seen that from 2012 to 2014 there was an increment of supported projects in this subsector, but in 2015 a considerable decrease can be observed. It is important to notice that for 541 activities like biotechnology or services are taken into consideration according to standardization method. Graphic shows a considerable increment that could be explained because each year more federal entities considered 541 as a priority industrial subsector, growing from 18 projects in 2012, to 24 in 2015 according to CONACYT priority lists. In addition, this industrial subsector is the one with the greatest amount of support, with a cumulative of $2,684 million Mexican pesos representing an average of $4 million Mexican pesos per project, representing 23% of total projects approved for funding in the last four years.

5.2 Transportation Equipment Manufacturing

Transportation Equipment manufacturing subsector comprises manufacturing equipment for transporting people and goods using all transportation modes. Companies developing activities in this subsector engage activities of rebuilding equipment and parts (Government of Canada, 2016g). In Mexico, this subsector is represented mainly by motor vehicle manufacturing, motor vehicle body manufacturing and aerospace parts manufacturing. Subsector's income is divided as follow (See Table 3).

Table 3 Transportation Equipment manufacturing subsector's income5

Industry	Total income	% subsector income	National	Export
3361 - Motor Vehicle Manufacturing	$11,716.16	0%	$2,668.93	-
3362 - Motor Vehicle Body and Trailer Manufacturing	$63,408.63	1%	$39,213.67	$38,747.16
3363 - Motor Vehicle Parts Manufacturing	$7,439,692.63	91%	$298,792.54	$7,140,900.08
3364 - Aerospace Product and Parts Manufacturing	$482,608.48	6%	-	$482,530.82
3365 - Railroad Rolling Stock Manufacturing	$33,891.62	0%	-	-
3366 - Ship and Boat Building	$39,098.89	0%	-	$38,633.24
3369 - Other Transportation Equipment Manufacturing	$114,589.93	1%	$23.76	$121,947.63
Total (336)	**$8,204,372.47**	**100%**	**$334,485.76**	**$7,869,886.71**

The major industry activity is "motor vehicle parts manufacturing" which is divided in 4% from national origin and 96% from exports. In second place is aerospace product and parts manufacturing industry with 100% from export. Motor vehicle body and trailer manufacturing has divided income between national and export (50%). In this case projects represent 14% of total PEI support, with $1,687.00 million Mexican pesos; however average per project is greater than 541 subsector, $5.1 million Mexican pesos, meaning that the number of projects for this subsector is less than the others, occupying 4th rank in general table.

[5] Average 336 subsector's income from January 2007 to August 2016 (INEGI, 2016a)

5.3 Food Manufacturing

This subsector engages institutions dedicated in producing food for either human or animal consumption, excludes beverages and tobacco manufacturing (Government of Canada, 2016d). Figure 6 shows a substantial increment between 2012 and 2014 and a low decrement in 2015, as seen in previous subsectors, but in this case, the average amount of support is less, $4 million per project. From 2012 to 2015, there were 258 projects of this sector representing 95 of total projects. In Mexico, this subsector consists mainly in food industry, and in some cases it considered sustainable food industry and aggregated value food industry. The subsector's income is divided 50% from national income and 50% from exports being the major income "Sugar and confectionery product". Industries with the lowest income are: Animal and food manufacturing, Seafood product preparation and packing; and Bakeries and tortilla manufacturing. (See Table 4)

Table 4 Food manufacturing subsector's income6

Industry	Total income	% subsector income	National	Export
3111 - Animal Food Manufacturing	$20,820.59	3%	$20,936.35	-
3112 - Grain and Oilseed Milling	$64,670.00	10%	$64,565.36	-
3113 - Sugar and Confectionery Product Manufacturing	$222,046.77	36%	$35,528.10	$188.259,99
3114 - Fruit and Vegetable Preserving and Specialty Food Manufacturing	$107,333.60	17%	$23,886.33	$84,918.48
3115 - Dairy Product Manufacturing	$56,381.10	9%	$56,623.87	-
3116 - Meat Product Manufacturing	$85,351.27	14%	$81,175.76	-
3117 - Seafood Product Preparation and Packaging	$7,857.90	1%	$6,716.63	$2,587.64
3118 - Bakeries and Tortilla Manufacturing	$2,745.56	0%	$864.14	-
3119 - Other Food Manufacturing	$56,435.35	9%	$24,106.34	$32,218.12
Total (311)	**$623,369.75**	**100%**	**$315,417.59**	**$311,158.63**

5.4 Chemical Manufacturing

Chemical manufacturing subsector contains activities of chemical manufacturing and chemical preparations from organic and inorganic raw materials, except of activities concern to crude petroleum a natural gas process (Government of Canada, 2016a). In México, this subsector consists in chemical, pharmaceutical and oil and gas industries and according to PEI projects approved for funding it also registered an increment from 2012 to 2014, from approximately $200 million to almost $500 million Mexican pesos, and a decrement in 2015, from 500 million to 400 million Mexican pesos. According to INEGI almost 67% of total income comes from exports. The mayor incomes of the subsector are "basic chemical manufacturing" and "pharmaceutical and medicine manufacturing" industry. It is remarkable that while "basic

[6] Average 311 subsector's income from January 2007 to August 2016 (INEGI, 2016a)

chemical manufacturing" income comes from exports, "pharmaceutical and medicine manufacturing" comes from national sells as shown in Table 5.

Table 5 Chemical manufacturing subsector's income7

Industry	Total income	% subsector income	National	Export
3251 - Basic Chemical Manufacturing	$223,057.10	34%	$17,172.04	$207,784.97
3252 - Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing	$41,020.09	6%	$24,921.99	$17,612.36
3253 - Pesticide, Fertilizer and Other Agricultural Chemical Manufacturing	$49,678.50	7%	$45,002.09	$2,188.86
3254 - Pharmaceutical and Medicine Manufacturing	$167,987.11	25%	$104,358.41	$63,990.22
3255 - Paint, Coating and Adhesive Manufacturing	$40,102.01	6%	$31,354.10	$11,879.49
3256 - Soap, Cleaning Compound and Toilet Preparation Manufacturing	$65,821.80	10%	$58,079.55	$10,288.81
3259 - Other Chemical Product Manufacturing	$76,971.27	12%	$4,022.23	$73,931.61
Total (325)	**$662,693.44**	**100%**	**$281,646.22**	**$379,739.47**

5.5 Machinery Manufacturing

Machinery manufacturing comprises establishments engaged in manufacturing industrial and commercial machinery. Generally, these actors assemble parts into components, subassemblies and complete machines. They can be classifies in special-purpose machinery and general-purpose machinery (Government of Canada, 2016e). In Mexico, this subsector is represented as industrial manufacturing, mechatronic, machinery and metalworking mainly. In contrast with the other subsector, this sector has a constant increment of PEI support amount, from almost $235 million to $538 million Mexican pesos, representing an increment of the average amount per project from $3.6 million to $5.1 million Mexican pesos. From 2012 to 2015, 373 project of this subsector have won, representing 13% of total projects approved for funding. Subsector income comes almost entirely from exports (96%) being the major industry "Other general purpose machinery manufacturing" which involves manufacturing machinery that is not designed for use in any specific industry, followed by "Engine, turbine and power transmission equipment manufacturing" as shown in Table 6.

[7] Average 325 subsector's income from January 2007 to August 2016 (INEGI, 2016a)

Table 6 Machinery manufacturing subsector's income8

Industry	Total income	% subsector income	National	Export
3331 - Agricultural, Construction and Mining Machinery Manufacturing	$129,349.77	9%	$8,289.13	$122,364.20
3332 - Industrial Machinery Manufacturing	$41,713.87	3%	$8,027.82	$35,312.99
3333 - Commercial and Service Industry Machinery Manufacturing	$39,427.08	3%	$2,758.10	$45,021.12
3334 - Ventilation, Heating, Air-Conditioning and Commercial Refrigeration Equipment Manufacturing	$287,595.54	21%	$24,451.85	$268,040.02
3335 - Metalworking Machinery Manufacturing	$32,230.78	2%	$5,166.47	$27,222.01
3336 - Engine, Turbine and Power Transmission Equipment Manufacturing	$401,157.96	29%	-	$399,410.04
3339 - Other General-Purpose Machinery Manufacturing	$435,310.64	32%	$11,833.61	$433,111.82
Total (333)	$1,366,785.64	**100%**	$55,540.98	$1,323,579.75

5.6 Crop Production

Crop production subsector includes farms, orchards, groves, greenhouses and nurseries engaged in growing crops, plants, vine, trees and their seed. Establishments may use traditional crop production methods, employ modified or improved crop inputs, or engage in organic crop production (Government of Canada, 2016c). In Mexico, this industry consists in agrarian activities such as agroindustry, sustainable agroindustry and high aggregate value agroindustry products. Most of the federal entities mark it as priority economy activity. According to PEI projects approved for funding, it shows a constant increase from 2012 to 2015, from 138 million to 312 million, also the number of projects approved for funding increases from 30 in 2012 to 71 in 2015, maintaining and average per project of $4 million Mexican pesos, representing 9% of total projects approved for funding. Data about income for this subsector is not available at INEGI.

5.7 Utilities

Utilities subsector contains institutions involved operation in electric, gas and water utilities including generation, transmission, control and distribution of electric power, natural gas and water. In addition, they provide related services, generally through a permanent infrastructure of lines, pipes and treatment and processing facilities. In Mexico, this subsector is formed by activities concern electric power including renewable energies, conventional energy and hydrocarbons, bioenergetics, sustainable use of natural resources among others (Government of

[8] Average 333 subsector's income from January 2007 to August 2016 (INEGI, 2016a)

Canada, 2016h). PEI projects approved for funding in this subsector show an increment from 2012 to 2014, but the major increment is shown from 2013 to 2014, going from $151 million to $229 million Mexican pesos. Also, it shows a low decrement from 2014 to 2015, from $229 million to $205 million Mexican pesos. It is important to observe that in 2012, 29 project won, while in 2013 there were 40 and 46 in 2014. Meaning that from 2013 to 2014, the average amount per project increased from $3.7 million pesos to $5 million Mexican pesos. All the projects approved for funding in this subsector represent 6% of the total between 2012 and 2015. Data about income for this subsector is not available at INEGI.

5.8 Computer and Electronic Product Manufacturing

Computer and electronic product manufacturing subsector covers facilities involved in manufacturing computers, computer peripheral equipment, communications equipment, and similar electronic products, as well as components for such products. The design and use of integrated circuits and the application of highly specialized miniaturization technologies characterize the computer and electronic product manufacturing industries (Government of Canada, 2016b).

In Mexico, Computer and electronic product manufacturing subsector consists in measuring and control equipment, electro medical instruments, optical systems and digital manufacturing. PEI projects approved for funding were 30 in 2012, 28 in 2013 and 2014, and 47 in 2015, showing a representative increase during the last year. Average amount per project displays a similar behavior: $4.4 million pesos in 2012; $4.1 million pesos in 2013; $4.7 million pesos in 2014 and $3.5 million Mexican pesos in 2015. PEI projects approved for funding for this subsector are 6% of all projects approved for funding in the lasts four year. Subsector’s income comes mainly from “semiconductor and other electronic component manufacturing” most of which comes from exports. The less income comes from “manufacturing and reproducing magnetic and optical media” with 1% of the total subsector income. (See Table 7)

Table 7 Computer and Electronic product manufacturing subsector's income9

Industry	Total income	% subsector income	National	Export
3341 - Computer and Peripheral Equipment Manufacturing	$520,268.19	10%	$6,870.59	$510,544.05
3342 - Communications Equipment Manufacturing	$1,066,649.84	20%	$5,846.94	$1,060,669.36
3343 - Audio and Video Equipment Manufacturing	$894,373.16	17%	$15,404.44	$890,275.23
3344 - Semiconductor and Other Electronic Component Manufacturing	$2.484.679,97	47%	$11,026.94	$2,473,653.03
3345 - Navigational, Measuring, Medical and Control Instruments Manufacturing	$220,109.15	4%	$4,946.75	$215,297.59
3346 - Manufacturing and Reproducing Magnetic and Optical Media	$69,609.07	1%	$424.38	$69,103.57
Total (334)	$5,254,234.07	**100%**	**$36,098.59**	**$5,218,135.47**

6. DISCUSSION AND CONCLUSIONS

This study makes a comparison between national innovation plan and one innovation incentives program (PEI) in particular, and it was analyzed showing a partial alignment among them. This can referred that in Mexico there is an industrial policy that leads at least PEI stimuli. This is concluded since CONACYT priority subsectors must be aligned to NDP subsector (from Table 1); it can be seen that 12 subsector from NDP match with CONACYT subsector representing 75% of match. While CONACYT subsector and PEI projects approved for funding coincide 9 out of 11, and rankings among subsector are very similar, indicating that CONACYT selection projects approved for funding system yield positive results. As Klomp and Roelandt (2004) pointed "public sector has to create adequate framework conditions for an innovative private sector". Federal stimuli aim to encourage private sector towards research and innovation in strategic activities.

Strategic alignment cannot be determined however, it does not mean that there is no alignment between industrial policy and megatrends. Nevertheless, Mexico is encouraging manufacturing subsector that according to Chereau (2015) and Calderón and Sánchez (2012) they are main drivers of countries' competitiveness, increasing the probabilities that sometime Mexico, with an appropriate industrial policy and skilled policymakers, generates the environment to stimulate economic growth through innovation. As stated by Herrera (1995) explicit and implicit policy may not be divergent especially in undeveloped countries, where explicit policy is constructed from the need of structure and institutionalize mechanisms of action which means that it could be the case of Mexico.

[9] Average 334 subsector's income from January 2007 to August 2016 (INEGI, 2016a)

On the other hand, Lazzarini (2015) marked off that capable governments promote new experimentation rather than specialization while adopting vertical policies, pointing out that Mexico may have vertical industrial policy, since it develops programs that encourage particular industries. Even thought, statistics do not support that Mexico has the infrastructure neither the environment to be a “capable government” of creating and maintaining a country with a vision on innovation and experimentation that generates products, processes and services with aggregated value which in turn increase national competitiveness.

Moreover, the impact of PEI projects approved for funding is not clear at all. Projects approved for funding are evaluated during the corresponding year using two metrics: technical and commercial feasibility. With the purpose of generating an adequate industry policy it is necessary to establish clearer policy evaluation, planning and performance metrics, (Lazzarini, 2015) transparency measures such as the publications of transactions, ex ante performance criterion for continued state support, and clear definitions of success or failure (Ramizo, 2016). It is needed to implement an evaluation system for PEI projects to be able to measure the scientific, technological, commercial and social impact of the project in more than one year, with the purpose of ensuring efficient use of federal resources. According to Lazzarini (2015) capable policymakers coordinate mechanisms to control performance of industries and cease support for ones that prove not having sufficient technological capacity to perform research and development.

By analyzing the results of the study, it can be concluded that the implementation of an industrial policy is fundamental to ensure strategic alignment of public funds that aim to promote and stimulate specific industrial sector activities. In addition, it is necessary for governments, specifically policymakers, to stablish guidelines to observe and identify national trends which may contribute with increase of national competitiveness, by taking advantage of the opportunities. However, strategy industrial policy may have an evaluation system independent from the government structure. The implementation of theses evaluating systems should not only evaluate the impact of public grants but also contribute to stablish effective policy instruments that guarantee transparency in the grant processes of innovation public funds (Ramizo, 2016).

6.1. Limitations

Study limitations are that this study only analyzes one federal program meaning that it may not represent the total environment. However, the study gives a glance of what is happening in Mexico with regard industrial policy and strategic alignment. Likewise, the study was performed using averages to stablish priority subsector. Different standardization methods may be used, according to selection parameters due, as explain before, three actor use different words to indicate their own priorities.

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