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DEPENDENT MARKET ECONOMIES AND HIERARCHICAL MARKET ECONOMIES AND THEIR NATIONAL INNOVATION SYSTEMS: THE CASE OF POLAND AND MEXICO

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DEPENDENT MARKET ECONOMIES AND HIERARCHICAL MARKET ECONOMIES AND THEIR NATIONAL INNOVATION SYSTEMS: THE CASE OF POLAND AND MEXICO

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Summary

The National Innovation System drives the creation of new knowledge and economic growth. The effects of innovation on Market Dependent Economies and Hierarchical Market Economies have been studied in isolation. However, no one has conducted a comparative study between these types of economies that allows us to know which type of economy generates the best conditions for innovation. The aim of the paper is to compare a country of the Dependent Market Economies (Poland) with another country of the Hierarchical Market Economies (Mexico) in relation to their National Innovation Systems. To do that, we will carry out a comparative study with indicators that are related to the concept of the National Innovation Systems: elements, relationships and products. The results show that Poland has a more developed National Innovation System than Mexico, due to the fact that several indicators of the European country are higher than those of the Latin American one.

Keywords: National Innovation Systems, Dependent Market Economies, Hierarchical Market Economies, Innovation, Institutions

Introduction

The National Innovation System (NIS) is essential for economic growth, because it enables the development of new goods and services, which are a consequence of new knowledge. In this way, economies that constantly create knowledge are the ones that grow fastest.

The type of economy conditions the NIS, because the institutional comparative advantages that each country has demand different types of innovation. Economies like the United States (US) require radical innovation, which encourages the creation of an NIS with innovation in high-tech industries.

After the fall of the Berlin Wall, Eastern European economies had to transform their type of economy into a market one. Most of them chose to liberalise their economies and begin taking the first steps in the European integration process in the early nineties; the Polish economy was no exception, although unlike the rest, its primary sector represents an important part of its economy.

In the case of Mexico, its economy began to change in the mid-1980s, and when the North American Free Trade Agreement (NAFTA) came into force, it went from a closed economy to an open economy. In both countries (Mexico and Poland) the strategies were different regarding the privatisations and the relationship with the Multinationals (MNS), because in the case of Mexico they privatised several public companies that are now an important part of the Mexican Diversified Business Groups (Grupo Carso, Grupo México, Grupo Salinas, etc.) and although the MNS also obtained public companies (mainly banks), they focused the greater weight of the economy on national ones, while in the case of Poland, the strategy of the governments was the attraction of Foreign Direct Investment (FDI).

The objective of the paper is to analyse the elements, relationships and products of the NISs of Mexico and Poland, with their economies having as the main characteristic dependence and hierarchy.

We carry out a theoretical review of the NIS and the types of economies to analyse the institutional complementarity and the existing institutional comparative advantages. We use theoretical references of

the NIS of Lundvall and Nelson, in addition to analysing authors such as Nölke and Vliegenthart (2009) who consider several Eastern European economies as Dependent Market Economies (DME), while Schneider (2009) classifies Latin American economies as Hierarchical Market Economies (HME).

The methodology is a comparative analysis between the economies of Poland and Mexico, through indicators of the NISs

The results show that Poland has higher levels of human capital, the elements of its NIS are better linked and related, a higher level of entrepreneurship, a more efficient NIS, an economy that exports a greater variety of products, an innovative environment with more patents and an economy that attracts more investment. On the other hand, according to international indicators, the European country has a higher democratic level, is less corrupt and is influenced by public policies and multilevel governance of the European Union (EU). Although Poland's indicators are better than those of Mexico, the European country is still far from those presented by most of its EU partners.

The conclusions show that the Polish economy is developing a more dynamic NIS with more innovation than Mexico, this is due, among other things, to the fact that the European country has higher levels of human capital, in addition to the effect of the convergence of its institutions to European regulations.

The paper comprises the introduction, a theoretical section on the NIS, the methodology, the results and the conclusions and discussion.

National Innovation Systems and Institutional Complementarity

In order to analyse the NIS, it is necessary to start from a definition. We use the classic definition of Lundvall (1992), where he points out that the NISs are constituted by elements and relationships, besides the fact that the product of them is useful knowledge. If we use the definition of Nelson (1993), this author incorporates the interaction of institutions

that have the innovation of companies as a product. Based on the two previous definitions, it is appropriate to point out that we consider institutions in the sense of North (1992): as the restrictions that human beings establish to interact.

We take the concept of innovation from Schumpeter's classic definition (1943) of creative destruction, understood as the possibility of one company displacing another by the introduction of a new product or process in the market.

The NIS are made up of the relationships that occur between institutions and produce innovation, so it is important to analyse these relationships, and how an institution can have a positive or negative effect on another institution. In this sense, the definition of institutional complementarity of Aoki (1994) allows us to understand the importance of relationships between institutions. For Aoki, institutional complementarity refers to the effect that one institution has on another, that is, the operation of an institution has positive (or negative) effects on another. Borges and Saucedo (2018) point out that there is institutional gearing if the existence of one institution has positive effects on another institution and on the NIS, in such a way the gears affect themselves and the entire system.

Once the NIS is defined, we will analyse the relationship between institutions of the NIS in Poland and Mexico. Nölke and Vliegenthart (2009) define Poland as a DME; while in the case of Mexico, Schneider (2009) has classified it as an HME. The institutional comparative advantages of the European country are the assembly platform for semi-standardised industrial goods, while for the Latin American country they are commodities and simple manufactures.

Institutional Complementarity in Hierarchical Market Economies

Schneider (2009) developed the HME term to describe the Latin American economies. The author starts from the idea that in this region the organisations assume the role of the institutions because of the weakness of the latter. Schneider introduces the term of negative institutional complementarity, understood as the presence of an organisation that has negative effects on another organisation. For

Schneider (2009) the HME organisations are the following: Diversified Business Groups, MNS, Low skills of workers and Low labour density. In this way, in Latin America there is a negative institutional complementarity between the organisations, which generates a low creative destruction, with institutional comparative advantages in commodities and simple manufactures.

The negative complementarities, according to Schneider (2009), would be the following:

1. The existence of MNS in high technology industries generates incentives for Diversified Business Groups to invest in low-technology sectors.
2. The Diversified Business Groups are linked to a majority of workers who are not unionised and in the informal economy, which generates incentives for those companies not to negotiate with workers.
3. The existence of workers with low skills generates incentives in the Diversified Business Groups and the MNS to invest in sectors that do not require skilled work.
4. The development of atomised labour relations and the low skills of workers generates incentives for workers to have high turnover rates and, therefore, not invest in themselves.

The four previous points affect the development of the NIS, due to the fact that they do not encourage creative destruction, patents are low, jobs are bad quality and poorly paid, and in the long term there are no improvements in people's living conditions.

Institutional Complementarity in Dependent Market Economies

Nölke and Vliegenthart (2009) developed the DME classification to represent countries that depend on FDI and MNS. These authors point out that the dichotomy developed by Hall and Soskice (2001), with regard to the classification of countries as Coordinated Market Economies (CME) and Liberal Market Economies (LME), is not enough to be applied to the Central and Eastern European economies, such as the Czech Republic, Poland, Hungary and the Slovak Republic.

DMEs are characterised by low labour costs, such as HME, and high-skilled workers in the use of technology (medium level). The comparative advantage of the DME is manufacturing industries with a level of intermediate sophistication and semi-industrialised industrial goods.

Nölke and Vliegenthart (2009) focus on the institutional complementarities of DME using the sphere of corporate governance and the use of hierarchy by multinationals.

1. FDI goes from the headquarters (of the MNS) to the subsidiaries, through hierarchical control, that is, investment decisions are made in the developed countries where the MNS' headquarters are located. In the DME, the hierarchical use of FDI decisions is preferred over other sources of financing such as banks (CME) or the stock exchange (LME).
2. MNS take advantage of low labour costs and high skills of DME workers. The above generate incentives for these companies to have labour agreements at the company level (long-term), where workers do not affect the decision-making of companies as in the case of CME.
3. The arrival of FDI in the DME comes from the need for low labour costs and high (and medium) labour skills, where the need to train more workers is not considered, so the investment in job training is low. Job training in DMEs is low compared to LMEs and CMEs, but with some degree of similarity to HME.
4. The fact that innovation comes from the headquarters of the MNS does not generate incentives for creative destruction in the DME.

The four previous points do not allow the development of an NIS as in the LME with radical innovation (pharmaceutical industry), or in the CME with incremental innovation (automotive industry).

National Innovation Systems of Mexico and Poland

The main element of Mexico's NIS is the public sector (Rullán and Casanova, 2016), because a large part of the policies and resources allocated to investment in research and development come from public funds, in this sense, the National Council of Science and Technology (CONACYT) is the main driver of Mexico's NIS. Rullán and Casanova (2016, p. 61) point out that the main actors of the Mexican NIS are: "The

National Council for Science and Technology…The General Council…The Inter-sectoral Budget Committee…The inter-sectoral Innovation Committee…The National Conference on Science and Technology…[and] The public higher education and research institutions". In each of the previous organisations, CONACYT intervenes with different governmental organisations. These authors point out that one of the elements that can improve Mexico's NIS is the creation of a Secretary of Science and Technology to coordinate the different institutions that now operate in Mexico, as well as a general improvement of the education system. Another element to take into consideration in Mexico is a greater link between industry and University, this would strengthen the links of Mexico's NIS.

Barcikowska (2017, p. 111) points out that the main elements of the Polish NIS are "the Polish Academy of Sciences, research institutes, research-development centres, central laboratories and other organisations ... universities, units serving science…commercial entities dealing with R&D along with their core business activity…industrial-research centres, technology parks". Jankowska, Matysek-Jedrych & Mroczek-Dabrowska (2017) point out that the lack of transparency and coherence among the institutions of the NIS are the main elements that explain the low innovation of Poland.

National Innovation Systems: Public Policy and Governance

One of the central aspects to approach the topic of the NIS worldwide is that of the institutions, and in this sense, both the experience of Poland and Mexico are interesting since both countries come from authoritarian political traditions, and are incorporated into what is called the third democratic wave that began at the end of the 20th century. The experience of both countries can be characterised as a weak institutionality before the construction of their democracy due to two reasons. The first was a depletion of the dynamics of political control, due to an authoritarian exercise that was favouring the social "order" to the efficiency and rationality in the decision-making process in political power. The second one was a legal, but not legitimate exercise of political

power, which resulted in an inefficient and ineffective public administration for the resolution of social problems.

In this respect, both countries (Poland and Mexico) not only had to transform their political spheres, but also had to reform their schemes of public administration to be able to modernise and adapt them to the times and the dynamics of the age of globalisation.

Those countries passed from a public administration that was centralised vertically in the government, based on the schemes of political control, to a new system of public management, where the decision-making processes were generated from a logic of co-responsibility between the organised social actors, the State and the economic agents, arranged under a scheme of intergovernmental governance, understood as the construction of new schemes of social legitimacy from a new intergovernmental dynamic, consolidating processes of making public policies, in a similar way as the developed central countries do. The idea of governance comes from the idea that it is necessary to construct new forms of interaction of the political sphere with regard to the economic, social and administrative spheres. Assuming public management in three senses:

(a) Rapprochement between the management techniques of the private sector and the public sector;
(b) Change from a Legal-rational model to a style of management that puts emphasis on the results, and
(c) Greater concern for efficiency, quality and effectiveness.

The idea of recovering these levels in public management was to promote: (a) a more decentralised State, (b) less hierarchic control within State organisations (c) greater accountability, (d) a more efficient Public Administration, and (e) an improvement in the making, and the results in the application, of public policies.

Governance we can understand then, as a mechanism of interaction and coordination between the different social actors, the State and the economic actors, through public policy, "an increasing consensus has been emerging that the efficiency and the legitimacy of public action is based on the quality of the interaction between the different levels of

government and between these and business organisations and civil society" (Prats 2008, p. 3).

This idea comes from the idea that political actors are not the only ones involved in political processes[1] and in this respect, society must take part in this process of governing, with the intention of improving administrative processes, since this relationship between both actors (State and company) "needs extraordinary doses of strategic vision, conflict management and consensus building" (Prats, 2008, p.1), which does not imply ignoring public administration, but rather establishing a close interaction that allows them to improve the targeting, making and implementation of public policies.

Governance is based on the idea that "politics can no longer claim to have an exclusively legal and technical foundation. Its legitimacy comes from the recognition that doing politics is to choose between equally valuable public goods and that the decision answers to judgments of value, interest, opportunity and others that are not only necessary, but must always be discussed in the public sphere " (Prats: 2008, p. 2).

Therefore, we can understand governance as a new theory that was trying to solve the problem of the governability crisis of the States and traditional public administrations, placing the analysis on the importance of the State-company interactions and the horizontal coordination between multiple social agents, for that reason, it is orientated especially, to the way in which the guidelines of interaction are established and structured between public administration and society (Natera, 2004, 2005).

Thus, governance turns out to be fundamental for institutional stability and consequently for the pro-innovation systems, since it implies there are conditions for business development, the facility to establish companies and to respect the generation of intangibles as the basis of the value of 21st century companies.

Legal Framework for Innovation

Once we locate the socio-political context of intellectual property between the Mexico-Poland relations, we move on to studying the

Institutions and the legislation that, in these two countries, are responsible for giving legality and acting efficiently and effectively, as well as the development and the promotion of innovation and how this has an impact on the Global Innovation Index.

The law, for a long time has faced great challenges when it comes to regulating intangible assets and everything that the economic development of a country implies, but also, the regulatory system of these is dispersed and, in many cases, as with Mexico, in which there is a serious lack of culture of registration and ownership of rights (such as intangible assets), this increases the problem.

"The exploitation of an intangible asset is basically done directly or indirectly. Direct exploitation consists of the use of the intangible property by the person who created and protected it, while indirect exploitation relies on the transmission of all or part of the rights inherent to an intangible asset to companies belonging to the same group, or to third parties" (Torre, 2010, p. 851).

When we talk about intellectual property and innovation the panorama becomes dense and dispersed, as we all know, intellectual property is divided into industrial property, this protection is based on three guiding principles: exclusivity, territoriality and temporality; and into author's rights both with different regulations and authorities and with diverse programmes and public policies in each of the countries.

"Intellectual property refers to knowledge and information that are part of inventions, creations and even signs and words. Their specific function is to legally convert them into intangible and tradable private goods in the market, for a determined period of time and with certain restrictions" (Díaz, 2008, p. 25).

Table 1. Applicable regulations to intellectual property in Mexico and Poland

Legislation	Mexico	Poland
Constitution/ /Basic Law	Constitution of the United Mexican States	Constitution of the Republic of Poland
Main Intellectual Property (IP) Laws	• Federal Law on Copyright • Law on Industrial Property • Federal Law on Plant Varieties	• Amending the Act on the Legal Protection of Plant Varieties • Act on the Legal Protection of Plant Varieties • Act on Amendments to the Act on Copyright and Related Rights • Act on Copyright and Related Rights • Act on Amendments to the Copyright and Related Rights Act and Gambling Act • Act amending the Act on Industrial Property and some other Acts • Act on Industrial Property • Act on Amendments to Act on Copyright and Related Rights • Act amending the Act on Trademarks
IP Related Legislation	• Federal Law on Telecommunications and Broadcasting • Law on the Public Broadcasting System of the Mexican State • Law on the Promotion of Reading and Books • Federal Law on Production, Certification and Trade of Seeds • Customs Law • Federal Law on Administrative Procedures • General Law on Education • Federal Law on Consumer Protection • Law on the National Emblem, Flag and Anthem • General Health Law • Federal Criminal Code • Federal Law on Economic Competition	• Code of Criminal Procedure • Act on Seed Industry • Act on Combating Unfair Competition • Code of Civil Procedure Act on the Protection of Databases • Ustawa o Ochronie Baz Danych

cont. table 1

Legislation	Mexico	Poland
	• Federal Law on Administrative Contentious Procedure • National Code of Criminal Procedures • Law on Science and Technology • Organic Law of the National Council on Science and Technology • Federal Code of Civil Procedure	
IP Regulations	• Regulation on the Industrial Property Law • Regulation on Health Supplies • Regulation of the Federal Law on Production, Certification and Trade of Seeds • Regulation on Amendments to the Regulation on the Mexican Institute of Industrial Property • Regulation on the Mexican Institute of Industrial Property • Regulations of the Federal Law on Copyright • Rules of the National Institute of Copyright • Regulations of the Federal Law on Plant Varieties	• Prime Ministerial Decree on Filing and Processing of Patent and Utility Models • Ordinance of the Minister of Culture and National Heritage on the Procedure for the Distribution and Payment of Remuneration for Public Lending of the Copies of Works and the Designation of Collecting Societies through Competition for Distributing and Paying Remuneration • Regulation of the Council of Ministers on the Litigation and Appeal Procedures and on Fees relating to the Protection of Inventions and Utility Models

Source: own elaboration with data from the
World Intellectual Property Organisation (WIPO) website.

Regarding the international regulations, derived mainly from the organisms in terms of protection of intellectual property and in economic matters, below we indicate the binding documents, of which both countries are signatories. (WIPO, 2016): Vienna Agreement, Strasbourg Agreement, Locarno Agreement, Nice Agreement, Rome Convention, Berne Convention, Paris Convention, WIPO Convention, UPOV Convention, Madrid Protocol, Beijing Treaty on Audio-visual

Performances, Budapest Treaty, Patent Cooperation Treaty, Marrakesh VIP Treaty, Nairobi Treaty, Singapore Treaty, WIPO Copyright Treaty, WIPO Performances and Phonograms Treaty and Trademark Law Treaty.

Mexico is characterised by having a very broad catalogue of standards (303 current federal laws http://www.diputados.gob.mx/LeyesBiblio/ consulted 01/May 2018). Although the World Intellectual Property Organisation sets out guidelines that serve to unify criteria, each of the countries exercising its sovereignty establishes the bases for the promotion and regulation of intellectual property.

Table 2. National authorities

Mexico	Poland
• Mexican Institute of Industrial Property • National Patent Bank • National Copyright Institute • Public Copyright Registry	The Intellectual Property and Media Department Ministry of Culture and National Heritage, Legal Office

Source: own elaboration with data from WIPO´s website.

"The intellectual property in any of its aspects is related to the certainty and the culture of the registry that in each of the countries is different according to the legitimacy of the State itself.

The list of specific rights enjoyed by the holder of an intellectual right means for its competitors a corresponding limitation of its activity. The owner of a patent, for example, enjoys various rights that limit free competition in the market:

a) Exclusivity to manufacture the product or use the patented procedure throughout the country.
b) Right to market the product exclusively.
c) Right to grant exclusive or non-exclusive licenses, limited or not in time or space, being able to impose in this way the conditions to which the

exploitation of an invention by a third party will be subject, and regulate to a lesser or greater extent its productive and commercial activity.

d) Right to introduce new similar products that could eventually be covered by the granted patent, or to allow them to be introduced by a third party (note that the counterfeit action is private and only the owner of the patent is entitled to exercise it).
e) You can accumulate your patents in a way that does not allow the entry of new competitors.
f) By exploiting the invention exclusively, it has the power to set a higher price for the commercialisation of protected goods than would arise from a competitive situation " (Ginebra, 2008, p. 123–124).

Methodology

In this section we carry out a comparative analysis of several indicators related to the NISs of Poland and Mexico. According to Lundvall, the NIS has three components: members, relationships and products (economically useful knowledge). The following table shows the variables and the databases we used in the comparative analysis.

Table 3. Variables and Databases

Components of NIS	Variable	Database
I. Members	I. 1. Human Capital Index	The Global Human Capital Report, 2017. World Economic Forum
	I. 2. Capacity Sub-index	
	I. 3. Deployment Sub-index	
	I. 4. Development Sub-index	
	I. 5. Know-How Sub-index	
	I. 6. Entrepreneurial Employee Activity	Global Entrepreneurship Monitor
	I. 7. Democracy Index	Democracy Index. Economist Intelligence Unit (EIU)
	I. 8. Corruption perception index	Corruption perceptions index 2017. Transparency International
	I. 9. The WJP Rule of Law Index 2017–2018	Law index 2017–2018, World Justice Project.

cont. table 3

Components of NIS	Variable	Database
II. Relationships	II. 1. . Innovation Linkages	The Global Innovation Index 2017, Tenth Edition. Cornell University, INSEAD, and WIPO
III. Products	III. 1. Global Innovation Index	The Global Innovation Index 2017, Tenth Edition. Cornell University, INSEAD, and WIPO
	III. 2. Innovation Input Sub- Index	
	III. 3. The Innovation Output Sub- Index	
	III. 4. The Economic Complexity Index	The Observatory of Economic Complexity, MIT
	III. 5. Patent applications to the European Patent Office	OECD Science Technology and Industry Outlook, OECD
	III. 6. Patent applications to the US Patent and Trademark Office	
	III. 7. Foreign Direct Investment	UNCTADStat, FDI Statistics.

Source: WEF, GEM, Cornell University-INSEAD-WIPO, MIT, OECD, UNCTAD, EIU, TI and WJP.

Results

To carry out the comparative analysis between the NISs of Poland and Mexico, we will take up three components of Lundvall's definition: elements, relations and products.

Elements

According to Lundvall (1992) the elements of the NIS are important for its development. It is considered that the main parts of the NIS are the human factor (researchers), entrepreneurship (to bring inventions to market), government organisations, companies, and all laws (institutions in the sense of North) that drive innovation. It also includes democracy as a meta-institution according to Rodrik (2007), and corruption, the latter as part of the environment where the elements of the NIS are developed.

The first element is the human factor, which in this case we use a set of variables of human capital. The general index of table 4 shows that Poland has a higher level of human capital than Mexico, because the European country reaches 31st place in 2017, while the Latin American country reaches 69th place. In the Capacity sub-index, which measures the level of formal education for past investments, Poland ranks 25th worldwide, while Mexico ranks 61st. In the Know How sub-index, which measures the use of specialised skills in the workplace, Poland ranks 24th worldwide and Mexico 48th. In general, in this element of the NISs, Poland is better positioned than Mexico.

Table 4. Human Capital Index, 2017

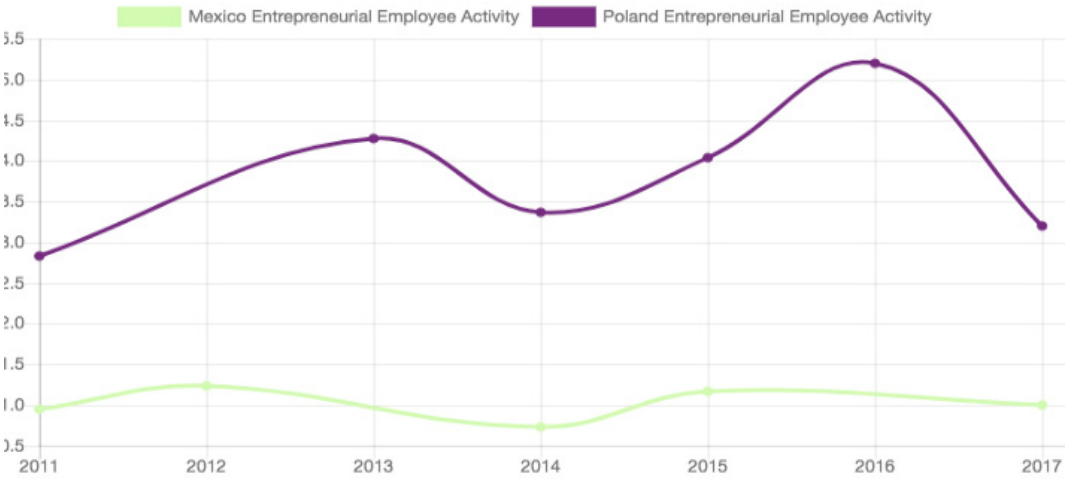
	Mexico	**Poland**
Overall Index		
Score	61.25	69.61
Rank	69	31
Capacity Sub-index		
Score	70.5	76.6
Rank	61	25
Deployment Sub-index		
Score	62.4	65.9
Rank	77	65
Podwskaźnik Rozwoju		
Score	57.2	72.7
Rank	92	34
Know-how Sub-index		
Score	54.8	63.2
Rank	48	24

Source: WEF

Another important element of the NISs is the entrepreneurial activity, because it allows inventions to reach the market, and in this way Schumpeterian creative destruction occurs. Figure 1 shows an

indicator of entrepreneurial activity of employees in the period 2011 and 2017, and in all years, Poland has higher levels of entrepreneurship, with falls in 2014 and 2017, but surpassing Mexico.

Figure 1. **Entrepreneurial Employee Activity**



Source: Global Entrepreneurship Monitor.

In order to talk about the innovation strategies between both countries, it is necessary to present the major indicators of democracy and governance between them so that we can become aware of the institutional stability that is needed to promote these pro-innovation strategies.

Maybe the most important indicator to characterise both countries is that of democracy, both countries belong to what is known as the third democratic wave that initiated in the last quarter of the twentieth century. The indicator that we will use to measure democracy is the Democracy Index, which is conceptualised as a reliable indicat[2]. (https://www.eiu.com/home.aspx, sprawdzone 20 maja o 21:56)

Below we can see that Mexico and Poland present similar results in the Democracy Index:

Table 5. Comparison of indicators of Democracy Index

Ranking	Country	Score	Electoral processes and pluralism	Functio-ning of go-vernment	Political partici-pation	Political culture	Civil rights	Category
53	Poland	6.67	9.17	6.07	6.11	4.38	7.65	Flawed democracy
66	Mexico	6.41	7.83	6.43	7.22	4.38	6.18	Flawed democracy

Source: Own elaboration with data from the following page (https: // www.eiu.com/home.aspx, consulted on May 20 at 21:56).

The institutional situation of both countries is very similar, nevertheless, the difference between them lies in the respect for the electoral processes and pluralism, and in civil rights, an aspect that turns out to be very important, since an institutional factor for a good environment of innovation is that of the rule of law and respect for the law, a situation that favours innovation.

And in this sense, one of the most important details regarding the institutional difference between both countries is in the issue of corruption. According to the Corruption Perceptions Index of 2017, designed by Transparency International, Poland occupies 36th place, whereas Mexico occupies 135th place of corruption levels, with a score of 29 (information from https: //www.transparency.org/news/feature/corruption_perceptions_index_2017, consulted on May 20, 2018 to the 22.38), Reinforced by information from the World Justice Project (WJP) of 2015, (consulted in the page https://worldjusticeproject.org on May 18 to the 23.08) where they measure the efficiency of the democracy (rule of la[3]. In this indicator, Poland came out with a score of 0.71, in 21st place, and Mexico with 0.40 in 79th place of the world ranking. This is the data that would most impact a pro-innovation scheme between both countries.

Another point of difference, is the fact that in Poland there is an area of multilevel governance, where the important thing is not only decentralisation, but also focusing on the ideas of collaboration and

cooperation (Natera, 2004). The strength of multilevel governance centres on the interaction of inter-administrative systems and inter-governmental relations (Natera 2005).[4]

The central thought of this analytical approach, is to consider how the actions of different public administrations affect the citizens that reside in a certain territory, being understood by different administrations: at the local, state, national and supranational level — national and supranational sphere, as well as different actors both in the public and private sphere, thus coming to the consideration of citizenship, company, government and international organisation.

The concept of multilevel governance originates in Europe, and was proposed as a principle of union of the different realities of the States that comprise it; with the existence of an institutionality with multiple levels of decision — Supranational: European Commission, European Council, European Parliament; Native: Federal, Regional, Local; and Social Actors: Citizens, Companies.

Therefore, according to the document of "The European Committee of the Regions' White paper on Multilevel Governance", 2009 cited in Fernández, (2010, p. 5), multilevel governance is defined as:

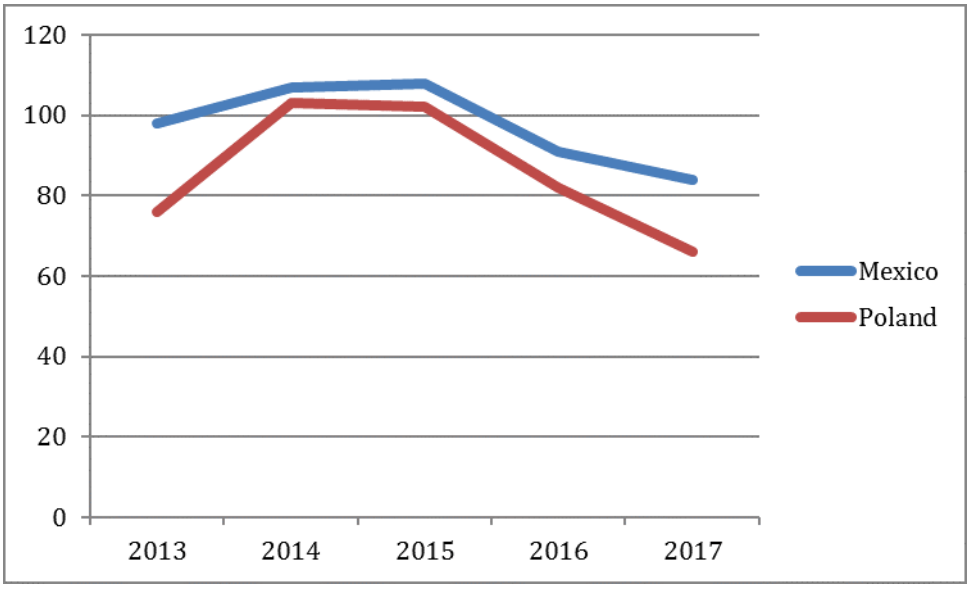
"A political system of action that is constructed from the association of public entities of different levels (in the case of the EU, the member states and the regional and local entities), and that is orientated towards the production and execution of public actions (such as public policies and programmes) or to the production of common goods. In this system of coordinated action, the diverse levels of power share responsibility, and grant democratic legitimacy to the system based on their own legitimacy and representativeness".

Thus, Poland had this institutional design that promoted the institutional context to consolidate a pro-innovation system, whereas Mexico does not possess this system of intergovernmental interrelationship, and much less a system of international structure that allows it to promote real and effective innovation strategies that make it possible to raise the competitiveness in Mexico.

Relations

The relationships that occur in the NIS are fundamental for their development, because they enhance the advantages presented by the elements. The following figure shows the place reached by the links of innovation in each country on a global scale. Since 2013, Poland ranks higher than Mexico, although that European country fell in 2014, but from 2015 it moves from 102nd to reach 66th. In the case of Mexico, it has always been below Poland, going from 98th place in 2013 to 108th in 2015 and reaching 84th in 2017.

Figure 2. Innovation Linkages (ranking)



Source: GII.

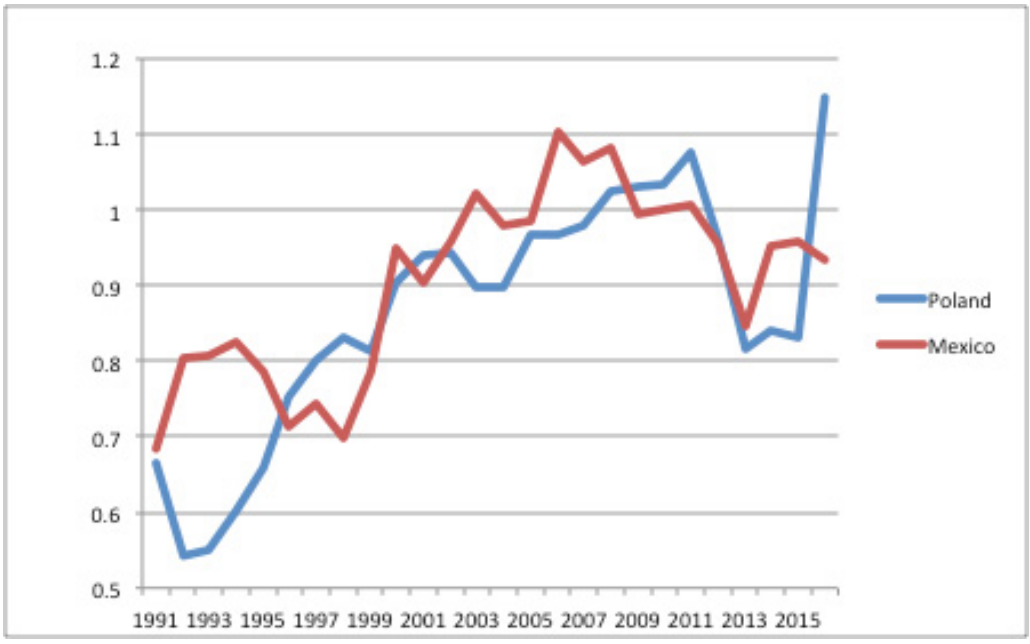
Products

The products of the NIS are all those variables that show that these systems have generated creative destruction. In this section we will use innovation indexes, patents, FDI and the structure of the countries' exports, because they show the institutional comparative advantages.

For the year 2017, the Global Innovation Index (GII) of Poland is greater than the Mexican one, in addition, this European country reaches the 38th place (globally), while Mexico reaches the 58th place. In the years that the GII has been published, Poland has always reached a better place than Mexico.

In relation to the Economic Complexity Index, for the year 2016 Poland shows a better position (at a global level) than Mexico, because the European country reaches 21st place, while the Latin American country 25th, although the difference is not significant. The following figure shows that in the past decades Mexico's economic complexity index has been higher than the Polish one, in addition to the fact that these countries have had an increasing tendency in that index. However, since the beginning of the Great Recession in 2007–2008 there is a fall in the economic complexity of both countries and in the case of Poland, this fall has already been recovered, but in the case of Mexico, this situation has not occurred.

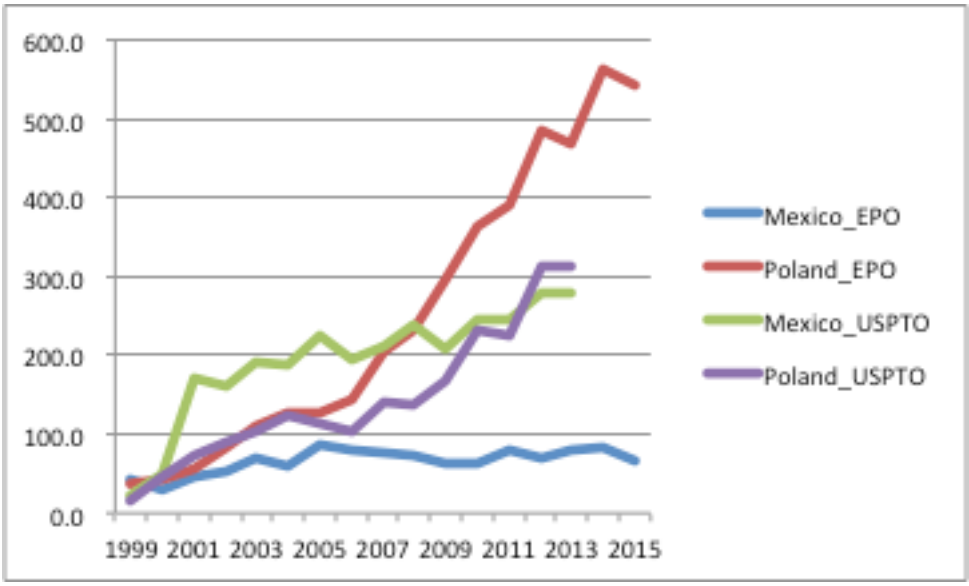
Figure 3. **Economic Complexity Index**



Source: The Observatory of Economic Complexity, MIT.

Concerning patents, the difference between Poland and Mexico is significant and growing. At the beginning of the 2000s, Mexico and Poland requested almost the same number of patents (although Mexico has a bigger economy), however, while the European country presents a growing trend, the Latin American country has been practically stagnant in the patent application in the last 15 years (using the patents registered by the EPO). If we use the patents that are requested in the patent office of the United States, Mexico and Poland register an increase in the last 10 years, however, the increase is more significant for the Polish case.

Figure 4. **Patent application to EPO and USPTO (Inventor´s country of residence)**

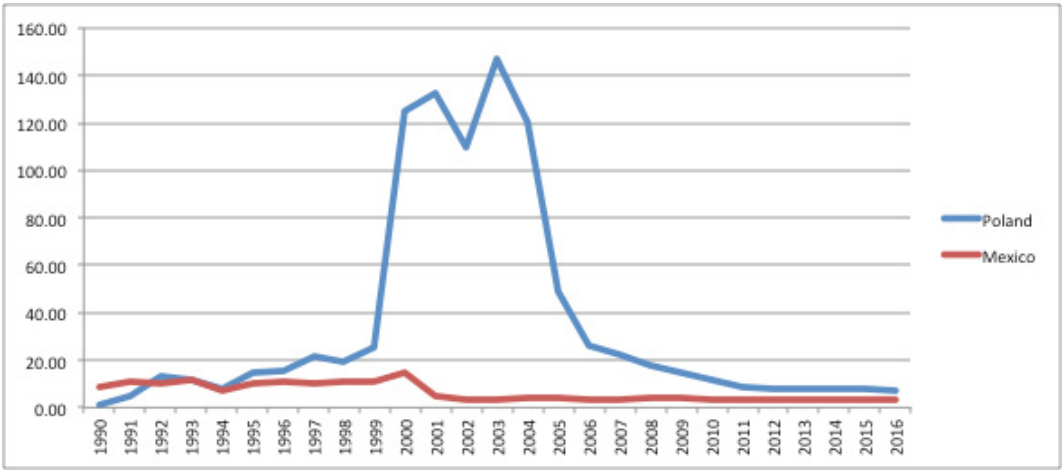


Source: OECD.

Another indicator that can serve as a reference on the operation of the NIS is the flow of FDI. Figure 5 shows that in the period from 1990 to 2016 in almost every year this indicator has been higher for Poland than for Mexico, which indicates that the Polish NIS has generated

greater confidence for international investments in relation to the Mexican one.

Figure 5. Ratio Inward FDI Stock /Outward FDI Stock



Source: UNCTAD.

Conclusions and discussion

The NISs of Poland and Mexico are different and are anchored to two types of economies. Using this case study, DME have better results in innovation than HME. The NIS of Poland produces better results than the Mexican NIS, due to:

Elements: greater human capital, greater entrepreneurial activity and a lower level of corruption.

Relationships: a greater link between agents that innovate.

Products: greater efficiency of the Polish NIS, an economy that exports a greater variety of products, a greater patent application and a greater flow of FDI.

The future research that emerges from this text is the realisation of an analysis that includes most of the DME and the HME in relation to their NISs. In this way, we can have more elements to determine if the

creative destruction between both types of economies is significantly different. On the other hand, another element to consider is a comparative analysis with emphasis on institutional complementarities.

One of the limitations of the paper is the lack of a more detailed analysis of the organisations of the NIS of each country. On the other hand, the text does not have a point of comparison with the CME and the LME, because it is possible that the distance in innovation between the DME and HME may not be very large compared to those developed initially by Hall and Soskice (CME and LME).

We consider that what makes the difference in the innovation between Mexico and Poland, is the high level of human capital and the lower level of corruption in Poland, because both countries have deficiencies in the institutional complementarity of the NIS elements. However, due to the high level of Polish human capital and more investment flows, it makes innovation possible in Poland, a situation that does not happen in Mexico, because Diversified Business Groups prefer to invest in commodities or simple manufactures, which do not require any skilled work.

The influence of the EU has been greater on the NISs of Poland, than the one that NAFTA has had on the Mexican NIS. We can explain the above because NAFTA is only the first step of an integration process, that is, a Free Trade Agreement, while in the case of the EU, it implies an Economic and Monetary Union, where several competences are ceded to supranational instances, in addition there are several policies with a high degree of cooperation, which in some way condition (indirectly) to make changes that converge to European parameters (Europeanisation), something that does not happen in North America.

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[1] The Polyarquy theory argue that the political processes are characterized by the participation and interaction of many groups of interest or stakeholders, o lobbying, in such a way that the end of the political process, when already the public policies were constructed, already they ordered themselves initiatives of law, normative frames were modified, the decisions already took after a process of negotiation between the different groups interested and involved in the topic.

[2] To consult the methodology: https://www.eiu-com/home.aspx
[3] To consult the methodology: https://worldjusticeproject.org/
[4] Situation that happens in Poland and not in Mexico

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