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**PATENTS OF INTRODUCTION  
AND THE SPANISH INNOVATION SYSTEM**

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# Patents of Introduction and the Spanish Innovation System\*

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## I. Introduction

It is very apparent that the processes of technological change occurring throughout the last two centuries are intimately related to the sustained production and population growth among numerous economies. The acceleration of technological and organizational innovations -inherent to industrialization phenomena which expanded from western Europe to other parts of the world- were the base for the expansion of productivity in all sectors and of the continuous rupture of Malthusian traps, which led to the initial Great Divergence, observed from then on, between countries or zones of greater and lesser development around the globe.

Technological innovation, that is the introduction of newer information in the production processes which tended to increase economic efficiency, could have come from local and national inventive and research activity, or from the transfer of foreign technology. In reality either option produces similar effects on situating a specific region on one side or the other of the divergent zones mentioned previously, and often it was a combination of both which drove the acceleration of the rhythm of innovation and the expansion of industry. For example, specific research into what we now call Global History emphasized and insisted that certain key inventions in Western Europe originated in the Far East although it was in the West that their real impact was felt<sup>1</sup>.

If this was fundamental for Great Britain and its early followers such as France, and the US (the magnet for capital and labour throughout the entire 19<sup>th</sup> century), what cannot be said of the latecomers and the underdeveloped countries? Spain, for example, suffered from scientific, technological and industrial backwardness which impeded the implementation of a national research and development infrastructure capable of

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<sup>1</sup> See INKSTER, I.: *Science and Technology in History: An Approach to Industrial Development*, New Jersey, Rutgers University Press, 1991, p. 15. Also PACEY, A.: *Technology in World Civilization: A Thousand Years History*, Cambridge, Mass., MIT Press, 1991.

generating a competitive inventive activity. However, the *national innovation system*<sup>2</sup> was designed, from the 18<sup>th</sup> century onwards, to favour the transfer of technology and human capital from abroad and thus establish the basis of the modern economic growth and industrialization process. These characteristics remained throughout the 19<sup>th</sup> and 20<sup>th</sup> centuries, apparently sustained by institutional and socio-cultural weaknesses in education, scientific research and technological development –activities with strong net economies only achievable in the long-term. Weaknesses in the Spanish economy derived, first, from the crisis of the 17<sup>th</sup> century and self-exclusion from the European scientific revolution, second, from the long and difficult transition from the Ancient Regime to the liberal society (which lasted almost the entire first half of the 19<sup>th</sup> century); and third and finally, from the consequences of the Civil War and the first 20 years of Francoism, devastating (generally up until the end of the dictatorship) in all above-mentioned aspects.

Our initial hypothesis, therefore, is that in the period analyzed (1750-1930) and also later, there was clearly an institutional “will” to design an innovation system based on the transfer of technology, technicians and know-how from abroad, reinforced over time as the system moves away from fomenting inventive activity and national research, since they are activities with strong net economies and path-dependent trajectories. Specifically we will attempt to characterize one of the institutional aspects of the Spanish innovation system –the patent system-, in order to understand the real role and function of a special curious legal figure –“patent of introduction”- which in practice promoted and permitted anyone to protect foreign third-person technologies in order to implement them locally, providing they were not already established. Although this figure represents a very clear declaration of intentions concerning the innovation policy and notwithstanding its existence in other patent systems in lagging countries, economic and technology historians have paid little or no attention to the subject<sup>3</sup>. Therefore it is unclear how they functioned

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<sup>2</sup> Understood as the analysis of technological change into the institutional, educational, entrepreneurial, political and socio-cultural environment in which it occurs: FREEMAN, C.: *Technology and Economic Performance: Lessons from Japan*, London, Pinter Publishers, 1987. LUNDVALL, B. A.: “Innovation as an interactive process: From User-Producer Interaction to the National System of Innovation”, in G. DOSI, C. FREEMAN, R. R. NELSON y G. SILVERGER (eds.): *Technical Change and Economic Theory*, London, Pinter Publishers, 1988, pp. 349-369.

<sup>3</sup> There are only indirect references to patents of introduction in undeveloped countries in PENROSE, E.: “International Patenting and the Less-Developed Countries”, *The Economic Journal*, Vol. 83, n° 331, 1973, p. 782; suggestions as to its negative effect in the United Kingdom in KHAN, Z. and K. SOKOLOFF, “Patent Institutions, Industrial Organization and Early Technological Change: Britain and the United States, 1790-1850”, in M. BERG and K. BRULAND (eds.), *Technological Revolutions in Europe: Historical Perspectives*, Northampton, Edward Elgar, 1998, p. 312, note 25. See also some preliminary work on patents of introduction in Spain and Mexico in BEATTY, E. and SAIZ, J. P.: “Propiedad industrial, patentes e inversión en tecnología en España y México (1820-1914)”, in R. DOBADO, A. GÓMEZ and G.

and what consequences they had on the innovation and industrialization processes, especially in very underdeveloped countries such as Spain, which, incredibly, maintained this figure until joining the European Union in 1986.

In the following pages we will attempt to shed light on how patents of introduction were established and evolved, the role they played in the promotion of innovation, who used them and how, and the real impact they had. The conclusions point out that, as with protectionism as a commercial policy, forcing processes of innovation without respecting the rights of the original inventors –as generally occurs with the transfer of technology from abroad- in addition to being frequent in all countries in the early stages of “catching up” with the pioneering economies, could also have positive consequences on the industrialization process as well as helping lagging countries such as Spain to catch up with modern societies, leading it to the favourable side of the Great Divergence. Although it was not the particular case of Spain because of the political and institutional problems of the 19<sup>th</sup> and especially the 20<sup>th</sup> centuries, promoting innovation ended up guiding many countries, soon or later, to the development of technological capabilities and an original invention activity in some sectors. The questions which immediately emerge have to do with the current international patent protection and copyright policies and their role in the most underdeveloped economies, which will find it difficult nowadays to emulate the historical attitudes and behaviours of lagging countries.

## **II. Between Protection and Imitation: Privileges, Patents of Introduction, Utility Models and Patents of Exploitation**

From the end of the 17<sup>th</sup> century onwards, and especially in the second half of the 18<sup>th</sup> century, coinciding with Charles III's reign, Spain experienced a proliferation of invention, introduction and manufacture “privileges” which, as occurred in France and other European Absolutist Monarchies, demonstrated political interest in the development of novel industrial production. Although they could be granted in order to protect national inventive activity, in reality the enlightened mercantile spirit which guided them rewarded the introduction of new technologies and manufactures from abroad, whether by nationals or foreign technicians tempted by the granting of monopolies who were willing to move

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MÁRQUEZ (comp.), *México y España ¿historias económicas paralelas?*, México, Fondo de Cultura Económica, 2007, pp. 425-467; and very recent work from KHAN, Z. and K. L. SOKOLOFF: “Historical Perspectives on Patent Systems in Economic Development”, in N. W. Netanel (Ed.), *The Development Agenda: Global Intellectual Property and Developing Countries*, Oxford University Press, 2008, pp. 215-245, which also reflect on the role of patents of importation and introduction in underdeveloped countries.

into the country<sup>4</sup>. We must keep in mind that the impact of the recession of the 17<sup>th</sup> century on the Spanish productive economy, along with the reinforcement of attitudes among the nobility which devalued craftsmanship and industrial labour, found an outlet in the substitution of imports attracting foreign skilled workers (the leading method of transferring technology and industrial arts in modern times<sup>5</sup>). Accordingly, the differences between privileges of invention and especially introduction and manufacture grants are scarce and confusing during this period, where invariably preference is given to establishing monopolies on new productions previously non-existent nationally.

These types of monopolies were referred to by J. Bentham in the 1790's, when in his dissertation on state intervention he distinguished between the inadequate measures such as manufacture privileges, subsidies, and tax exemptions, and more adequate ones, among which he cited patents of invention, which in spite of the fact that *in their legal form of creation are monopolies, in their political effects, in their influence on the total prosperity of the community are exactly the opposite*<sup>6</sup>. The maintenance of patents of introduction therefore was more directly related to the mercantilism and interventionism of the absolute monarchies when conceding economic grants and privileges than to the liberal necessity of establishing private property rights on inventions and ideas. In fact, before the appearance of modern patent legislation, there was no great difference between invention and introduction patents.

However, several liberalization processes which led to the elimination of economic privileges of the Ancient Regime and the establishment of private property rights on inventions –in the sense expressed by Bentham- did not prevent most countries from maintaining the possibility of obtaining monopolies on the introduction of new technologies. This occurred in the Statute of Monopolies of England in 1624, in which they differentiated between privileges granted to the primary inventor or “primary introducer” of new technologies from the rest of the economic privileges<sup>7</sup>, or in the

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<sup>4</sup> See MACLEOD, Ch.: *Inventing the Industrial Revolution. The English Patent System, 1660-1800*, Cambridge, Cambridge University Press, 1988; also HILAIRE-PEREZ, L.: “Invention and the State in 18th-Century France.” *Technology and Culture*, vol. 32, n° 4, 1991, pp. 911-931.

<sup>5</sup> EPSTEIN, S. R.: “The Generation and Transmission of Technical Knowledge in Pre-modern Europe, C.1200-C.1800”, *Global Economic History Network*, Conference 4, Leiden, The Netherlands, 16-18 September 2004 (especially point 4.2)  
<http://www.lse.ac.uk/collections/economicHistory/GEHN/GEHNPdf/TransmissionofTechnicalKnowledge-StephanEpstein.pdf>.

<sup>6</sup> BENTHAM, J.: *Manual of Political Economy*, in STARK, W. (ed.), *Jeremy Bentham's Economic Writings*, London, Allen & Unwin, 1952, vol. 1.

<sup>7</sup> MACLEOD, Ch.: *Inventing the Industrial Revolution. The English Patent System, 1660-1800*, Cambridge, Cambridge University Press, 1988, pp. 16-17.

revolutionary French Law of 1791, which contemplated the possibility of obtaining “patents of importation”<sup>8</sup>. This procedure was also common in the great majority of follower countries that adopted the patent system during the 19<sup>th</sup> century, such as Austria, Belgium, Italy, Portugal, Spain, Russia or Sweden, which also took place in South and Central America<sup>9</sup>. We must not forget that the European context at the end of the 18<sup>th</sup> century and during most of the 19<sup>th</sup> is that of intense economic and technological competition among nations, so this type of patents was granted in order to foment new production over and above the “sacred” rights of the inventor. One of the few exceptions is the US Law of 1790 in which only invention patents are recognized<sup>10</sup>, which will progressively occur in other countries, especially after international treaties on industrial property were signed from 1883 onwards<sup>11</sup>. In Spain, whose first laws were enacted in the heat of the liberal revolution imitating the text of the French Law of 1791, patents of introduction were specified from the beginning, although unlike other countries, they remained until entering the European Union in 1986, when new norms governing patents were decreed, standardizing European and international policy.

**Table 1. Patent types in Spanish Law (1811-1986)**

LAW	<i>Patents of Invention</i>			<i>Patents of Introduction</i>		
	<i>Duration</i>	<i>Cost (current prizes)</i>	<i>Priority Rights to Foreign Patents</i>	<i>Duration</i>	<i>Cost (current prizes)</i>	<i>Importation Prevention</i>
1811	15 years	Unknown	No	5 years	Unknown	Unknown
1820	10 years	3 €	No	5 years	1.5 €	No
1826	5, 10 or 15 y.	1.5; 4.5 or 9 €	No	5 years	4.5 €	No
1878	20 years	First year: 0.06 € 20 years: 12.62 €	2 years but limiting the patent to 10 y. until 1884	5 years	First year: 0.06 € 5 years: 0.9 €	No
1902	20 years	First year: 0.06 € 20 years: 12.62 €	1 year according to international agreements	5 years	First year: 0.06 € 5 years: 0.9 €	No
1929	20 years	Since 1924 First year: 0.06 € 20 years: 23.29 €	1 year according to international agreements	10 years	Since 1924 First year: 0.06 € 10 years: 4.66 €	No
1986	20 years	First 2 y. 562 € 20 y.: 4,747.09 €	1 year according to international agreements	No	----	----

Source: SAIZ, J. P.: *Legislación Histórica sobre Propiedad Industrial. España (1759-1929)*, Madrid, OEPM, 1996.

<sup>8</sup> PLASSERAUD, Y. y SAVIGNON, F.: *L'Etat et l'invention : histoire des brevets*, Paris, Institut National de la Propriété Industrielle, 1986, pp. 186-187.

<sup>9</sup> See a survey in KHAN, Z. and K. L. SOKOLOFF: “Historical Perspectives...”, Table 10.1.

<sup>10</sup> LUBAR, S.: “The Transformation of Antebellum Patent Law”, *Technology and Culture*, n° 4, October 1991, p. 934.

<sup>11</sup> On the development of the international patent system see: PENROSE, E. T.: *The Economics of the International Patent System*, Baltimore, Johns Hopkins Press, 1951.

One of the most important considerations supporting the idea of a patent system designed, more than to protect original inventive activity, to stimulate industrial development is the non-existence (up until 1986) of previous technical or novelty exams. In practice this implied the transferring to the free market the administration of oppositions and configured a system which, together with judicial weakness in prosecuting fraud, favoured copying foreign technology. Another essential aspect of legislation up until joining the EU was the obligation of putting into practice within national territory the patented technologies, difficult to enforce in various periods, but which clearly pointed out the intention of implementing real innovation processes by otherwise declaring an expiration date when that technology would pass into the public domain<sup>12</sup>.

As seen in Table 1, all legislation contemplated the possibility of applying for and obtaining patents of introduction *by persons of any condition and nationality who proposes to establish or establishes machinery, apparatus, instruments, processes or mechanical or chemical operations which are wholly or in part new, or which are not established in the same mode or fashion in these Realms* (Article 1, Royal Decree of the 27<sup>th</sup> of March, 1826); ...*for 5, 10 or 15 years, decided by the interested parties, for objects of his own invention and for 5 years only if the application is for introduction from other countries; understanding that the privilege granted for these will be called “introduction” and that the objects must be executed and put into practice in these Realms, but not brought in completely from abroad* (Article 3). The definition of these types of patents is practically the same in 1826, 1878, 1902 and 1929 and always stipulated that they cannot prevent importations.

In general its cost was similar to those of invention patents (except from 1826 to 1878 which tripled for the same time extension) and were granted for only five years (10 years after 1929). They were subject to the same proceedings as invention patents as far as the administration and implementation within the country and were very useful for copying and “monopolizing” third party inventions if they had not been registered and implemented in Spain already. This was especially effective before the recognition of priority rights of the original inventor in the Law of 1878 and above all before Spain’s entry into *The International Union for the Protection of Industrial Property* in 1884. In

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<sup>12</sup> The first laws (1811 y 1820) established a two years period to put into practice the patent, which was reduced to one in 1826, returned to two in 1878 and reach three from 1902 onwards.



any case, beyond the priority deadline, the patent of introduction could still be used to appropriate third-party technologies with no apparent problems.

In fact, the emphasis on innovation and industrialization over the rights of the original inventor increased during the most nationalistic and protectionist periods, above all after WW I during the Primo de Rivera dictatorship, when the secondary sector experienced tremendous growth with accompanying technological changes. The Law of 1929, the culmination of this process, also penalized the duration of the grant, increasing the yearly quotas, and the control of obligatory implementation (from 1924 onwards), increased the extension to ten years, presented *utility models* –minor patents lasting 20 years which did not insist on international novelty but required the registered object to be manufactured in Spain– and even opened up the possibility of registering *patents of exploitation*. These constituted a surprising legal procedure which harked back to the ancient “manufacture privileges” since, in theory, they allowed the monopolization of a complete industrial activity if that production did not exist within the country or if they innovated or modernized already existing ones: *Whoever has established, is establishing or proposes to establish an industry which is unique in Spain, or if others exist, but are rudimentary, imperfect in the means used or limited in production, does not prevent the national market from the necessity of supplying from foreign countries preferably or mostly, may obtain an exclusive patent, heretofore called “patent of exploitation”*<sup>13</sup>.

As in the case of patents of introduction, these types of patents were granted for 10 years without being able to impede importations, but were considered to be outside the *International Union for the Protection of Industrial Property Agreement*, that is, priority rights and nationality rights for foreigners were not recognized. Obviously, that could not be done without seriously infringing international agreements and this figure disappeared in 1930 (Royal Decree-Law of the 15<sup>th</sup> of March), although we believe it summarizes perfectly the spirit and characteristics of a hybrid patent system, which, even though it guaranteed ownership rights to national and foreign inventors, always gave precedence to national industrial activity.

In reality, the exceptionality of the Spanish case is not so much in the existence of an institutional environment favouring copies –quite common in other countries at the beginning of the 19<sup>th</sup> century as we have seen, and extremely so in some countries such as Switzerland where a patent law did not come into being until 1888, or Holland, where it

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<sup>13</sup> Article 73 of the Real Decree-Law of the 26<sup>th</sup> of July, 1929.

was rescinded between 1869 and 1912– but rather in the persistence over time of these characteristics. Almost all countries employed similar strategies in order to favour their national industrialization to the point of developing competencies and comparative advantages in specific technological and economic areas which allowed them to compete internationally<sup>14</sup>. However, during the greater part of the 19<sup>th</sup> and 20<sup>th</sup> centuries, Spain never achieved competitive capabilities worthy of mention in any technological sector, regardless of having very noteworthy scientists and technicians, especially in the first third of the 20<sup>th</sup> century, whose work becomes a mere anecdote in the long-term history of national technology. The Spanish innovation system has historically been focussed on the transfer of foreign technology.

### **III. The Use of Patents of Introduction: 1750-1930**

Once we describe the legal environment and the basic characteristics of patents of introduction, it is necessary to approach the reality of their concession in order to discover how they were used and their true role in the transfer of foreign technology. Firstly, we must remember that, in general, the Spanish patent system has always had a strong presence of foreign inventive activity (an average of 65% throughout the period) measured both by patents of invention or introduction registered by foreigners and by patents of introduction under Spanish names<sup>15</sup>. However, applications for the latter (by Spanish nationals or foreigners) present, as we have seen, specific characteristics of technical transfers and copies beyond the original registered inventors, that is, without respecting intellectual copyrights, which is what we propose to analyze here.

In Graph 1 we see that before the establishment of modern patent laws, grants for “privileges of introduction” were anecdotal. After researching several archives and sources dating from 1750 to 1820, we found and studied an interesting sample of 51 privileges, all granted after 1770, of which only four were “of introduction”, given to Spanish nationals attempting to implement foreign products. During the same period, we also found 232 different awards applied for or granted to new technologies, which shows, first, that the granting of privileges was somewhat more difficult than the granting of other types of awards (money, political posts, etc.) and secondly, that there was very little

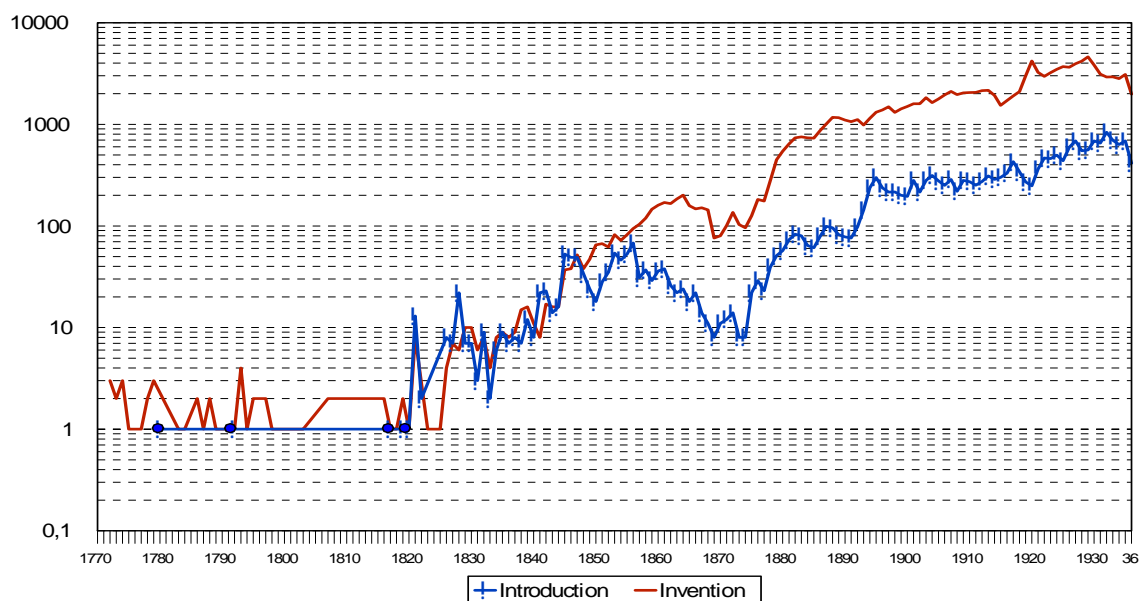
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<sup>14</sup> P. MOSER’s work on international exhibitions data, for example, stands out that some countries as Switzerland, Denmark or Holland took advantage from no-existence or abolition of patent laws to acquire leading technological competence in concrete sectors as scientific instruments manufacturing or food and beverage: *How Do Patents Laws Influence Innovation? Evidence from Nineteenth-Century World Fairs*, NBER Working Paper n° 9909, 2003, p. 5 (<http://www.nber.org/papers/w9909>).

<sup>15</sup> See SAIZ, J. P.: “The Spanish Patent System (1770-1907)”, *History of Technology*, vol. 24, 2002, Table 2.

difference between inventions and introductions (including privileges of manufacture) since, as we have stated, all of them responded to the same absolutist logic: monopolies to foment national production within a political system where private property “rights” do not yet exist regarding production factors<sup>16</sup>.

**Graph 1: Patents of invention and patents of introduction applications.  
Spain 1750-1936**



Source: *Archivo Histórico Nacional y Gaceta de Madrid* for privileges from 1770 to 1826. Between 1826 and 1936: Original documents of patents at the *Oficina Española de Patentes y Marcas* (OEPM). We do not include “additions” available in Spanish legislation from 1878.

Much more interesting is what occurred after the consolidation of the liberal industrial property laws (1820 and 1826), in which patents of introduction were regulated and became operative. As seen in the above graph, up until 1856, an equal number of patents of invention and introduction were applied for, exactly during the period in which the system began to function and coinciding with a phase of industrial backwardness and socio-political problems derived from the long peculiar Spanish liberal revolution. Perhaps with few exceptions in Barcelona and Madrid and in some areas of Andalusia (the three regions with the greatest number of patent applications at that time<sup>17</sup>) the period was characterized by a high level of economic divergence with respect to the major European powers, where the first processes of industrialization were being consolidated. Patents of

<sup>16</sup> These first privileges and awards have been analyzed in SAIZ, J. P.: *Invención, patentes e innovación en la España Contemporánea*, Madrid, OEPM, 1999, pp. 106-109.

<sup>17</sup> About the regional distribution of patents in Spain see SAIZ, J. P.: *Invención, patentes...*, pp. 153-159, Table 9 and Graph 22. See also SAIZ, J. P.: “The Spanish Patent System...”, Figure 1.

introduction, therefore, could have played an interesting role in transferring efficient technologies already tested abroad in this first phase, although commercially protectionist, which must be contrasted through analysis of effectiveness of those patents and case studies. Between 1856 and the Bourbon Restoration in 1874, however, the number of patents of introduction fall sharply before the general collapse of the system after the financial and institutional crisis of 1864, which affected the entire economy. The decade of 1854-1864 was of growth and convergence in which construction of the railway system began, the banking system was established, several industrial activities commenced, and in some cases, the liberalization of commerce and technology imports, such as the customs franchise for the railway system. The tariff of 1849, although somewhat protectionist, had decreased prohibitions, and within the context of the gradual increase in prices, it helped to reduce protectionism in effect from 1850 to 1860, and culminated in the free trade tariff of Figuerola in 1868. But perhaps of greater influence on the decrease of introduction applications were the restrictions beginning in 1849 requiring the implementation of the object registered and not simply its importation from abroad, as we will see in the following paragraphs. The recovery of the growth rate of patents of introduction is greater than that of invention in the following decade (1874-1883), which also occurs from 1891 until the end of the period, with special emphasis on the decade of the 1920's, all within the framework of the moderate beginnings and then the general development of the nationalist and protectionist change of direction by Spain, as well as internationally towards the end of the 1870's.

**Table 2. Annual growth rates of applications in Spain by patent type.  
Calculated from tri-annual averages.**

	<b>Invention</b>	<b>Introduction</b>
1820-1930	6.33	4.44
1820-1856	8.42	6.73
1857-1874	0.33	-8.51
1874-1883	23.41	25.21
1874-1920	7.76	7.63
1874-1930	6.53	7.69
1891-1930	3.29	5.32
1920-1930	1.04	7.97

*Source:* See Graph 1.

The annual rates of growth for the periods presented in Table 2 confirm the general impression we have discussed. In addition to applying for more patents of invention than

of introduction, generally, the growth rate for the former is greater for the entire period (1820-1930). Nevertheless, as we have already stated, the growth rates for patents of introduction appear to increase during periods of protectionism, especially in the 1920's when the nationalist and protectionist turn of events supporting national industries reached a peak. In that decade the growth rate of patents of introduction is seven times greater than that of invention (in addition to extending the grant to 10 years), which, together with the appearance of utility models (and including patents of exploitation) and of the reinforcement of obligatory implementation is a clear indication of the attempt to substitute industrial imports and to foment imitation and copies in the name of national interests. During this period, heavy industry was increased and the structure of the economy was changed. For the first time, the secondary sector's contribution to the GNP was greater than that of agriculture, which was later reversed with the civil war and the Franco dictatorship.

In reality, with the limiting tariff of 1875, and in spite of the patent legislation of 1878, which recognized the priority rights of foreign inventors, the growth rate for patents of introduction was almost always greater than that of invention, irregardless of the period examined. We must not forget that the tariffs of 1891, 1906, or 1922 were clearly protectionist, to which we must add the diverse national legislation favouring production within the national territory<sup>18</sup>. It appears, therefore, that an innovation system based on the transfer of foreign technology such as that of Spain, had two options which could be used in combination: take on new technology by importing it (in a free trade context) and improve the rights of foreign inventors and enterprises, or use protectionist barriers and legal frameworks such as patents of introduction in order to foment national industrialization. The efficacy of protectionism and in this case the factors which permit the imitation and copying of technologies has been hotly debated in economic theory and history, but its success in supporting the development of a country would depend on innumerable factors, such as the period in which it is used, the international context, its extension over time, the capability of developing later competitive technologies as well as the socio-cultural environment in which they are produced. In any case, a possible scenario is that the protection and imitation are interesting in the early stages of industrialization in order to achieve comparative economic and technological advantages,

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<sup>18</sup> There were several laws supporting national industry in 1907, 1909, 1917, 1918 and 1922 (see GALLEGO, J. A. and L. SUAREZ: *Revolución y Restauración (1868-1931)*, Madrid, Rialp, 1982, p. 460).

judging by its use in many countries where the economic policy of substitution of imports was initially essential.

But in order to consider the use of patents of introduction at one time or another, in addition to observing the growth rates we will examine what we have called the “effectiveness” of grants. Thanks to the large body of work carried out over the years at the Spanish Patents and Trademarks Office on each and every file<sup>19</sup>, we have been able to analyze a vital point in the administrative life of Spanish patents, which is their obligatory implementation. As previously indicated, within a 1 to 3-year timeframe (depending on the period, see Footnote 12) the recipient was required to demonstrate that the patented object was being implemented within national territory, which was enforced to varying degrees depending on the period, being especially efficient from 1849 to 1878, when notarized independent reports were required. The same occurred after 1924 (and again in 1929), when a new Regulation<sup>20</sup> clarified the Law of 1902, reinforcing the practice clauses and requiring implementation under penalty, at first, of a forced compulsory license of the patent to whoever applied, and then including an expiration date<sup>21</sup>. From the beginning of the protection system until 1849, there was hardly any control over patent implementation, but a radical change introduced by a Royal Order that year<sup>22</sup> precipitated the immediate expiration due to non-implementation, which then drastically influenced the number of applications for patents of introduction in the 1850's, as observed in Graph 1. This, together with a decrease in protectionism, was the main reason for the reduction in applications for patents of introduction preceding the crisis of 1864, since the registration of this type of patents was too costly and of such short duration as to risk the expiration due to non-implementation, above all if the protected object could be imported with ease. In fact, in the absence of controls concerning implementation, many patents of introduction could be used to monopolize the importation of technologies. Between 1878 and 1924 the implementation procedure was relaxed, being sufficient, in some cases, a report by an engineer certifying that the necessary means to produce an object existed at such-and-such a factory.

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<sup>19</sup> Supported by the *Collaboration Agreement between the Oficina Española de Patentes y Marcas and the Universidad Autónoma de Madrid for Cataloguing and Studying the Historical Documentation on Patents and Trademarks (1999-2009)*. In this framework we have been able to index and study (from the original files) around 150,000 patents between 1826 and 1939. Around 70 people have been involved in this enormous project (see <http://historico.oepm.es> for details).

<sup>20</sup> Regulation of the 15<sup>th</sup> of January, 1924 (see SAIZ, J. P.: *Legislación histórica...*, pp. 306-332).

<sup>21</sup> On compulsory working procedures see SAIZ, J. P.: “The Spanish Patent System...”, point VII.

<sup>22</sup> Royal Order of the 11<sup>th</sup> of January, 1849 (SAIZ, J. P.: *Legislación histórica...*, pp. 74-75).

**Table 3. Patents of invention and introduction effectiveness index\*.  
Spain (1820-1930)**

	PATENTS OF INVENTION				PATENTS OF INTRODUCTION			
	Imple- mented %	Non Imple- mented %	Effec- tiveness Index	Total Inven- tions	Imple- mented %	Non Imple- mented %	Effec- tiveness Index	Total Intro- ductions
<b>1820-1930</b>	<b>22.6</b>	<b>77.4</b>	<b>0.98</b>	<b>104,796</b>	<b>24.9</b>	<b>75.1</b>	<b>1.08</b>	<b>15,053</b>
1820-1856	29.1	70.9	1.26	935	37.2	62.8	1.62	724
1857-1874	21.7	78.3	0.94	2,442	28.5	71.5	1.24	369
1875-1920	29.5	70.5	1.28	64,626	28.7	71.3	1.25	8,659
1921-1930	8.7	91.3	0.38	36,793	15.9	84.1	0.69	5,301

\*The effectiveness index is the quotient of the percentage of patents implemented in each period and patent type over the national average for the entire patent system (additions included) and periods (which is 23%), average, therefore, which is equal to 1.

Source: See Graph 1.

Nevertheless, this data invites us to consider the efficacy of these types of monopolies, which as we can see in Table 3, was generally very limited. If we take into account the entire system between 1820 and 1930, only 23% of the patents were actually implemented, which means that three-quarters of the patents were null and void and became public property. Although there is not much literature with respect to this topic, apparently the same thing occurred in all systems, with most of the applications not becoming real “innovations” in the economy. It is possible, moreover, that a portion of this percentage of implementations is not realistic and did not give rise to significant technical changes, but it is clear that it is the documentation of these patents that deserves to be researched in detail and made the object of further case studies since, frequently, the applications will contain specific data on the establishments, firms and technicians involved in the implementation of technologies. Additionally, we can verify interesting differences between patents of invention and introduction, the latter being easier to demonstrate in practice, as we would assume if they were to implant innovations already successfully tested abroad. Up until 1874, the percentage of implementation and the index of effectiveness shown in Table 3 were substantially greater in the case of introductions than in that of inventions (37.2% compared with 29.1% before 1856 and 28.5 compared with 21.7% between that year and 1874). Between 1875 and 1920, the percentage of implementation of patents of introduction is almost 29%, and those of invention a bit higher, coinciding with the long period of extremely lax enforcement of the requirements. However, once enforcement increased dramatically during the 1920’s, we can see the implementation rate fall drastically over all types of patents, although patents of introduction appear to be twice as successful as patents of invention.

All of this leads us to the discussion of two periods in which the relevance of patents of introduction in fomenting the implantation of foreign technologies without respecting the ownership rights of the original inventors or firms appears to be greater. The first takes place from the beginning of the protection system until 1874 and the second during the 1920's. In both cases they are periods of convergence with European industrialization (especially between 1840 and 1865 and from 1922 until 1929) and the arrival of foreign technologies. Hence, it is useful to concentrate on these periods in future research, although the entire period between 1875 and 1930 could also be a subject of analysis since, among other things, most patent applications are concentrated here, especially after 1890.

#### **IV. Who used patents of introduction and to what purpose?**

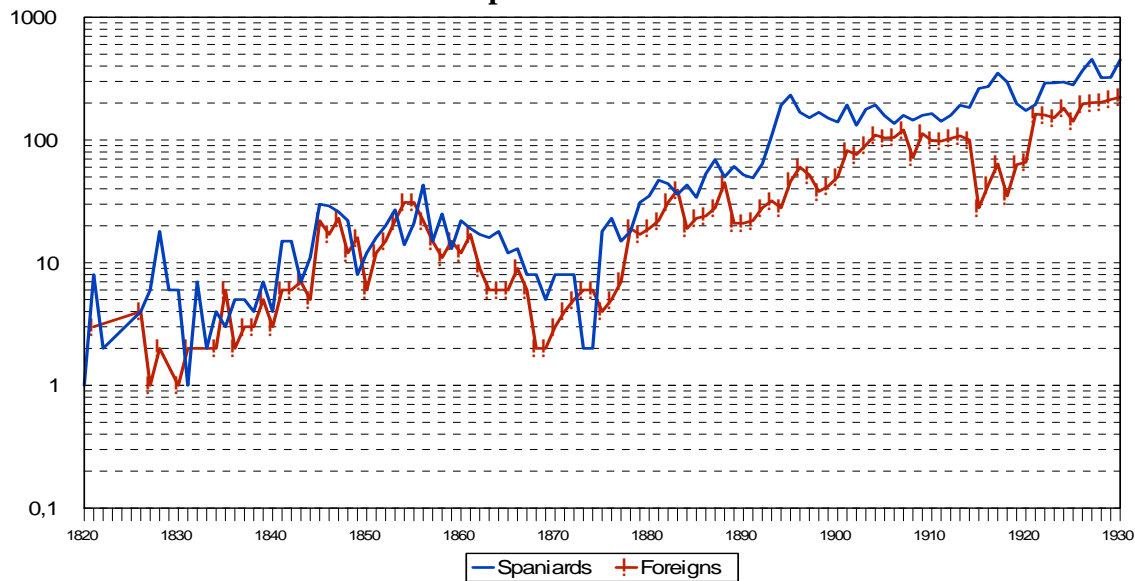
Thus, if patents of introduction –this paradoxical manner of establishing property rights on others' invention activity- were actually commonly used in Spain throughout the entire period studied, as we have seen in the previous point, and if we take into account that, in spite of being of shorter duration and more costly, they were somehow more effective than patents of invention, it would be convenient now to address whether or not there was any special bias in the socio-professional groups who used them, as could be expected. Contrariwise to patents in general during this period<sup>23</sup>, it is more likely, first of all, that there were more Spaniards than foreigners using 'introductions' as a particular way of bringing in functional technology from abroad (given the lack of domestic inventive activity), probably people connected with the real productive economy and incipient industrialization with a greater interest in introducing and monopolizing techniques widely tested in more advanced countries. As we can see in Graph 2, Spaniards always applied for more patents of introduction than foreigners, albeit the ratio between them was similar before 1855-1860; it continued from the latter year to 1890 (although domestic users slightly began to dominate), but it clearly changed in favour of Spaniards from the 1890's to 1930, precisely with the nationalist and protectionist turn of events during that period.

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<sup>23</sup> See SAIZ J. P.: "The Spanish Patent System...", Graph 1, and SAIZ, J. P.: "Investigación y desarrollo: patentes", in A. CARRERAS and X. TAFUNELL (coords.), *Estadísticas Históricas de España, Siglos XIX y XX*, Madrid, Fundación BBVA, 2005, Graph 11.1. In both it can be confirmed that foreign patents superseded domestic ones, especially from 1870 to 1930.



**Graph 2: Patents of introduction by applicant's nationality\*.  
Spain 1820-1930**



\*We do not include 560 patents of introduction in which applicant's nationality is unknown, although they probably are foreigners.

*Source:* See Graph 1.

Hence, it seems, first, that although patents of introduction were more generally used by Spaniards, this kind of application was a common practice, both for nationals and foreigners, before 1880-1890, i.e., before the existence of international agreements on industrial property and priority rights, when many other patent regimes also used 'introductions' to favour national industrialization (at least in the first half of the 19<sup>th</sup> century) or did not even guarantee property rights to inventions (Switzerland). Secondly, that after the development of an international patent system, when not only the UK but also other countries reached innovative and technological capabilities as well as international competitiveness, maintaining only patents of invention in their systems, Spain still kept patents of introduction active for a long time as a way of promoting innovative attitudes among national or resident entrepreneurs, industrialists and businessmen, who used them extensively to put new technologies from abroad into practice inside the country.

Nevertheless, although Spaniards dominate the scene after 1890, many foreigners still used this legal procedure to protect others' technologies in Spain after that year. Table 4 shows the nationalities of foreign patentees applying for introductions in Spain during all the periods studied. We clearly see there two distinct phases, first from 1820 to 1875, in which French applicants monopolized around 70% of introductions, followed at a

distance by the British (12 to 15%), and second from 1875 to 1930, in which the French ratio went down to a quarter or even less in the 1920's, while Germans, North Americans and citizens from other countries increased their share, especially the former (22-25%), as the British maintained and slightly increased theirs between 16-19%.

**Table 4. Foreign patents of introduction by applicant's nationality.  
Spain 1820-1930**

	<b>France</b> %	<b>Germany</b> %	<b>UK</b> %	<b>USA</b> %	<b>Rest</b> %	<b>Patents of Introduction</b>
<b>1820-1930</b>	<b>28.2</b>	<b>22.3</b>	<b>17.4</b>	<b>9.8</b>	<b>22.3</b>	<b>4,690</b>
1820-1856	73.4	1.0	15.2	1.7	8.6	290
1857-1874	67.1	2.9	12.1	5.7	12.1	140
1875-1920	26.0	25.7	19.0	8.2	21.1	2,423
1921-1930	21.0	22.8	16.0	13.5	26.8	1,837

*Source:* See Graphs 1 and 2.

So, apparently, geographical proximity matters, which is very clear in the French case during the first three quarters of the 19<sup>th</sup> century and even afterwards. Some time ago we analyzed this French presence in the Spanish Patent System before 1878 to conclude that France, besides having a strong influence on Spanish laws, was the most important country in taking out both patents of invention and patents of introduction in Spain before that date. Not only that, thanks to the fact that approximately half of patents of introduction used to cite the origins of the technology the patentee wanted to establish, we found that, in those registered by Spaniards, France was the country most mentioned (54.3%)<sup>24</sup>. On the other hand, the French presence in the patent system matched very closely the general investments made in Spain by this country before 1914, measured in total capital or in number of enterprises with economic interests in Spain<sup>25</sup>, something that also occurs with the rest of the countries represented in Table 4. After 1875-1880, the arrival of German patentees completely changed the outlook. As we have seen, the proportional presence of French patents of introduction decreased and gave way to Germany's technological and industrial expansion, which was spreading inventions and patents all throughout Europe during the second industrial revolution. That also seems to have increased patents of introduction in Spain applied for by German engineers,

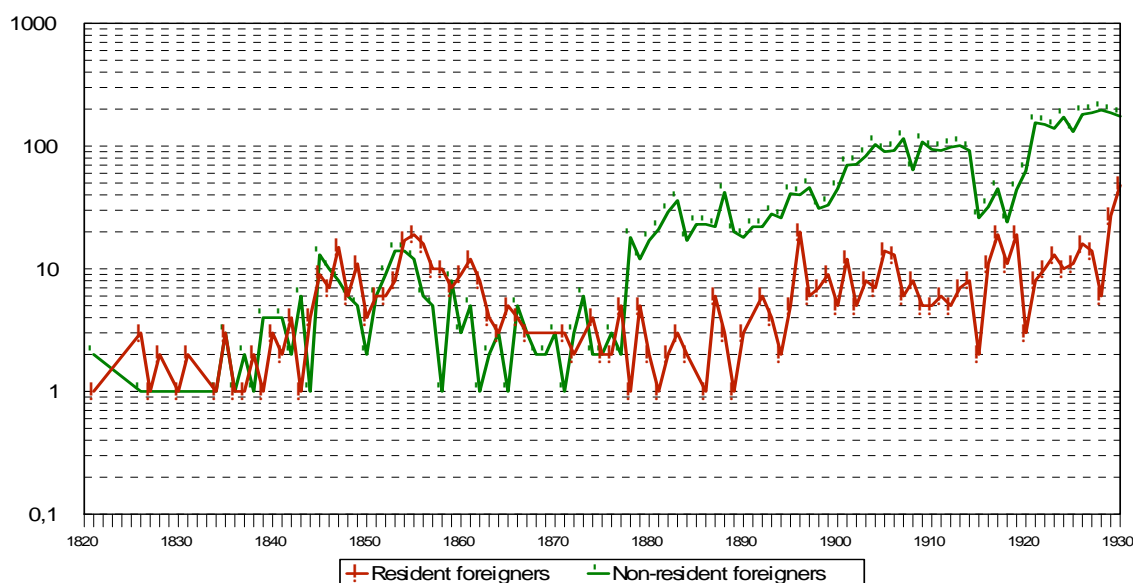
<sup>24</sup> See, for details, SAIZ, J. P.: "Patents, International Technology Transfer and Spanish Industrial Dependence (1759-1878)", in L. HILAIRE-PEREZ and A. F. GARÇON, *Les chemins de la nouveauté: innover, inventer au regard de l'histoire*, Paris, CTHS, 2003, pp. 223-245 (Tables 1, 2, and 3).

<sup>25</sup> See TORTELLA, T., *A Guide to Sources of Information on Foreign Investment in Spain, 1780-1914*, Amsterdam, International Institute of Social History, 2000, Tables 1 and 5, pp. xi y xix.

businessmen and corporations, just when they were penetrating other economies and investing outside their borders in the middle of the protectionist and nationalist battle, characteristic of the last decades of the 19<sup>th</sup> century and the beginning of the 20<sup>th</sup>. During that period, and especially in the 1920's, other European countries as well as the USA were increasing their presence, investments and patents in third nations, which is also reflected in the Spanish patent of introduction statistics.

Some of these foreign patents of introduction holders were residents in Spain at the time they presented their applications, something especially relevant before 1880, i.e., before the international extension of patent agreements and the technological expansion of the second industrial revolution mentioned, which lead patentees (increasingly corporations) and their agents to proceed in systematically registering inventions around possible markets in the most interesting countries of the world. In the manner we have worked with patents, studying each and every file from the original documentation, we were able to differentiate nationality and residence in many cases. If we analyze the entire patent system, the portion of foreign residents was more than half of all foreign applicants before 1850, practically one-fourth between 1851 and 1878, and somewhat less than 4% between 1878 and the first decades of the 20<sup>th</sup> century<sup>26</sup>. Graph 3 and Table 5 demonstrate that relationship between resident and non-resident foreigners in the case of patents of introduction.

**Graph 3: Foreign patents of introduction by applicant's place of residence.  
Spain 1820-1930**



Source: See Graphs 1 and 2.

<sup>26</sup> See SAIZ J. P.: "The Spanish Patent System...", point IV and Table 3.

**Table 5. Foreign patents of introduction by applicant's place of residence and nationality of resident foreigners in Spain (1820-1930)**

	<i>Non Residents</i> %	<i>Residents</i> %	France %	Germany %	UK %	USA %	Rest %	Patents of Introduction
<b>1820-1930</b>	<b>85.5</b>	<b>14.5</b>	<b>6.3</b>	<b>2.4</b>	<b>1.6</b>	<b>0.3</b>	<b>3.9</b>	<b>4,690</b>
1820-1856	45.9	54.1	42.8	0.3	7.9	0.7	2.4	290
1857-1874	40.0	60.0	44.3	0.7	5.7	3.6	5.7	140
1875-1920	88.6	11.4	3.4	2.9	1.1	0.2	3.8	2,423
1921-1930	91.1	8.9	1.4	2.2	0.9	0.1	4.3	1,837

Source: See Graphs 1 and 2.

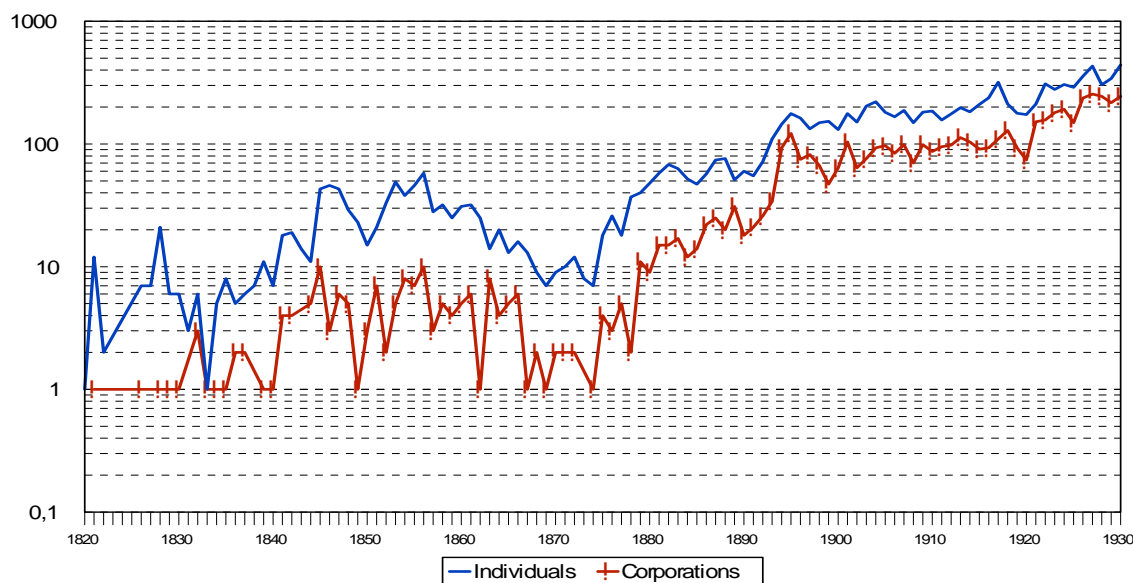
As we can see, the results are rather different and demonstrate, first, that when foreigners took patents of introduction, there was more probability that they were living inside Spain than when taking patents of invention, especially before 1875-1880, when the ratio of residence reached almost 60%. That might mean that the mobility of human capital was essential to technology transfer during the greater part of the 19<sup>th</sup> century as it was in the previous centuries, and, as we have already suggested, that this legal procedure was more widely-used by people closely connected to the productive sectors and interested in bringing sufficiently tested technology in from abroad. Just like domestic patentees, foreign residents had economic networks and knowledge of the Spanish market and institutions, with the advantage of also having these intangible assets in their original countries. Proper connections to technological enclaves in Europe and their business and technical knowledge allowed them to effectively attempt to transfer certain technologies that could be useful to their economic interests in Spain. Alone or associated with Spaniards, many resident foreigners, especially the French during this period, as we demonstrated in Table 5, but also the British and others, were patenting machines and processes that they had not invented, just as they were investing in many sectors of the Spanish economy in which they saw business opportunities at that time. The presence of French, British, Belgian, Swiss and German engineers, mechanics, entrepreneurs, technicians, etc. working in railway, mining, chemical and other industries in the 19<sup>th</sup> century is very well-known in historiography, although perhaps the real role played by the mobility of such human capital in the processes of technology transfer and Spanish modernization in certain sectors or regions is not so well understood.

In the second place, Graph 3 and Table 5 also show the radical changes in the statistics around 1880 caused by the massive arrival of foreign applications ‘from abroad’ which also affected patents of introduction patterns. This, once again, indicates the institutional changes brought about by the passing of the Law of 1878 (which diminished costs, etc.; see Table 1), the internationalization process of the patent system guaranteeing priority rights, the acceleration of innovations which characterized the period and the growing presence of corporations using patents and applying for intangible properties outside their countries of origin. In that context, in which the applications of patents of introduction were slowing down in total numbers compared to patents of invention (see Graph 1), mobility seemed to be less important as time went on, although around 10% of patentees were still in Spain when they applied for the introduction (French 3.4% to 1.4%, Germans 2.2 to 2.9% and also citizens of other countries). German direct interest and investments in Spain had been increasing since 1880, especially in the 1920’s, as some important German corporations were establishing factories or participating in joint ventures with Spaniards or other foreign investors in several sectors (chemical, electricity, machinery and equipment, etc.)<sup>27</sup>. This process can also be followed with other countries’ investments, which were generally incrementing at the end of the 19<sup>th</sup> century and during the 20<sup>th</sup>. Hence, apart from patents of invention, but to a lesser degree, patents of introduction were still used by foreigner individuals and corporations to appropriate others’ inventions and to obtain monopolies in Spain during this period inasmuch as national legislation allowed it to encourage technology transfer and industrialization.

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<sup>27</sup> See PUIG, N. and J. LOSCERTALES: “Las estrategias de crecimiento de la industria química alemana en España: exportación e inversión directa, 1880-1936”, *Revista de Historia Económica*, vol. 19, nº 2, 2001, pp. 345-382. Also LOSCERTALES, J.: *Deutsche Investitionen in Spanien 1870-1920*, Franz Steiner, Stuttgart, 2002.

**Graph 4: Patents of introduction by applicant's legal status.  
Spain 1820-1930**



Source: See Graph 1

**Table 6. Patents of introduction by applicant's legal status.  
Spain 1820-1930**

	Corporations	Individuals	Patents of Introduction
<b>1820-1930</b>	<b>32.6</b>	<b>67.4</b>	<b>15,053</b>
1820-1856	13.4	86.6	724
1857-1874	15.7	84.3	369
1875-1920	31.5	68.5	8,659
1921-1930	38.3	61.7	5,301

Source: See Graph 1

If we focus now on the legal status and socio-professional activity of patent of introduction applicants, Table 6 demonstrates, first, that individual patentees always predominated in all the periods studied, both domestic and foreign, and, second, that corporations, especially foreign ones, began to increase their presence after 1880 in Spain (as was also occurring in other systems). Nevertheless, the ratio of corporations using patents of introduction is higher than that obtained from the analysis of the entire patent system as a whole (around 8.5% from 1820 to 1875, and 26.7% from 1876 to 1930) which clearly emphasizes the hypothesis expressed in this work as to how introductions were more widely used by people connected to productive activities, perhaps not inventors themselves, but innovators desiring to implement new technologies. So, that is what enterprises and corporations are, in the final analysis, productive joint ventures that may

develop their own invention activity or simply use others' technologies: paying for licenses, copying without respect any property rights or making use of such a legal concept as the patent of introduction when it was possible, or probably both systems at the same time depending on the firm, R&D competence, technological and innovative capabilities, business, sector, period or country.

**Table 7. Individual patents of introduction by applicant's socio-professional status. Spain 1820-1930**

	Civil Servants	Liberal professionals, qualified technicians	Manufacturers, salesmen, craftsmen...	Others	Patents of Introduction*
<b>1820-1930</b>	4.2	30.4	60.1	5.3	3,152
1820-1856	9.8	17.0	72.0	1.2	418
1857-1874	4.3	18.8	75.0	2.0	256
1875-1920	3.3	34.1	57.7	4.9	1,756
1921-1930	3.2	33.1	53.9	9.8	722

\*Profession is mentioned on an average of 31.1% of individual patents of introduction between 1820 and 1930. We have expressly excluded corporate patents.

*Source:* See Graph 1.

The same issue emerges from the analysis of individuals' occupations, reinforcing our hypothesis of how patents of introduction were used. Corporations apart, patentees used to mention their profession, position or status in one third of the cases, which allow us to process a large sample of who really applied for protection to establish inventions or technologies from abroad in Spain. We have aggregated and divided all patentees' data throughout four major categories according to different socio-professional characteristics, as in Table 7: a) civil servants, which includes low-level clerks, high-level appointments, lawyers, military officers, university professors or technicians working in an administrative position; b) liberal professionals and qualified technicians, such as mechanics, engineers, architects, doctors, pharmacists, physicists, chemists, directors, designers, professors, lawyers etc., self-employed or not, always emphasizing their academic title or knowledge; c) entrepreneurs, manufacturers, industrialists, businessmen, master craftsmen, craftsmen, skilled workers and salesmen; and d) others; that is, a heterogeneous group including unskilled and semi-qualified labourers, nobility, students, etc. Once again the third group formed by productive classes directly in charge of business activities stands out above the others.

If, once again, we consider the patent system as a whole, the average presence of manufacturers, industrialists, salesmen, etc. was around 59% before 1875 and 41% from the latter year to 1930, which compared with the percentages displayed in Table 7 (72-

75% before 1875 and 54-58% after) clearly shows a striking difference of 15 percentage points in every period when we focus on patents of introduction. Thus, as occurred with enterprises, individuals directly attached to productive activities also appeared as the essential users of patents of introduction, which fits with their theoretical interest in looking for, establishing and obtaining short-term monopolies of new technologies for their workshops, factories, industries and businesses. Meanwhile, Table 7 also corroborates the differences between two periods: the three first quarters of 19<sup>th</sup> century, when the presence of manufacturers is higher, and the period from 1875 to 1930, in which engineers and qualified technicians –increasingly connected to scientific knowledge and academic training- increased their presence until becoming the principal group of applicants in the patent system (44%), albeit not in patents of introduction as we have seen.

## **V. Preliminary conclusions.**

Things are not always what they seem. The establishment of patent systems throughout Europe, the US and several other countries in the 19<sup>th</sup> century, and throughout world during the 20<sup>th</sup>, has been analyzed mainly as the result of the extension of intellectual property rights observance and of the widening of international agreements signed with respect to intangible assets, such as those derived from invention activity. Patent systems have also been studied as the normal consequence of the extension of industrial development, technological training and scientific knowledge linked to capitalist expansion and of the necessity of guaranteeing appropriation of intangibles in order to foment inventions and progress. Hence, many economists and economic historians, with few exceptions, have used and are using patent data as a partial technological proxy, aggregating each and every patent statistic from different countries and periods, and making international comparisons without regarding the fact that there were huge differences among systems and that we must take into account the hidden aspect of laws and their enforcement<sup>28</sup>, which, in other words, attempt to reflect on institutions and agents.

Nevertheless, with very few exceptions, perhaps that of the US, all the patent systems were established at the beginning (the UK, France, Austria, Belgium, some

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<sup>28</sup> To have an idea of the important historical differences among systems, see LERNER, J.: “150 Years of Patent Protection”, *American Economic Review. Papers and Proceedings*, 2002, vol. 92 (2), pp. 221-225 and LERNER, J.: “150 Years of Patent Office Practice”, *American Law and Economics Review*, 2005, vol. 7 (1), pp. 112-143. See also KHAN, Z. and K. L. SOKOLOFF: “Historical Perspectives...”.



German States, Sweden, Italy, etc.) not only as an institution for protecting invention activity and intangible properties, but also, and above all, as a political strategy to promote innovation processes, with or without respecting others' properties. This continued to be the predominant viewpoint in a time which we could call "technological mercantilism" and nationalism, when technology transfer and human capital movements mattered greatly and when copying or establishing new technologies from other countries were favoured by all governments and nations. Nowadays we call all these attitudes 'piracy', especially when it comes from undeveloped countries, just at the moment when some theoretical economists, for the first time in decades, begin to openly speak out "against intellectual monopoly" and to incite scholars to a free discussion of the topic<sup>29</sup>.

Thus, early pioneers and followers used, in the past, patents of introduction or importation –as they were called in several systems- to make innovations easier and to implant foreign technologies within the national borders, leaving original property rights aside. The same occurred with very late followers such as Spain, in which encouraging industrialization turned into one of the most important justifications of the patent system, without mentioning Switzerland or Holland, where there were none or where they abolished patents during long periods of time, as is well known. So it seems, as Z. Khan says, that "intellectual property institutions over the past two centuries were largely endogenous"<sup>30</sup> in the sense that there were really different types of legal systems related to various domestic factors associated with political interest regarding invention or innovation activity and technology transfer.

The truth is that, soon or later, the majority of these follower countries found, after transferring or copying from abroad, technological niches of innovation in which they were able to develop original invention activity at an international competitive level. The Spanish case is extraordinary in this sense because the national innovation system was never able to achieve scientific and inventive capacities in any sector, as least as a net complex system out of individual genius of a handful of scientist and inventors who were honourable exceptions that usually ended up abroad. We believe that there were three principal means of understanding this process: the Spanish crisis of the 17<sup>th</sup> century, the long and difficult transition from the Ancient Regime to the liberal society in the 19<sup>th</sup>, and the harsh 40 years of Franco dictatorship in the 20<sup>th</sup>. Three scientific and technological

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<sup>29</sup> See BOLDRIN, M. and D. K. LEVINE: *Against Intellectual Monopoly*, Cambridge, Cambridge University Press, 2008.

<sup>30</sup> KHAN, Z. and K. L. SOKOLOFF: "Historical Perspectives...", point 10.4.

blows, especially Spain under Franco, that led the innovation system towards underdevelopment. There we must look for the reasons for maintaining within the patent system not only introductions, but utility models, obligatory working clauses and other weak points, until joining the European Community in 1986. Like it or not, the Spanish innovation system depended on technology transfer and foreign scientific and inventive activity to achieve economic development, which demonstrates that it can be done without domestic scientific or technological competence.

To learn more with respect to this topic, we have began to analyze in this paper the manner of protecting foreign inventions in Spain without being the original inventor: patents of introduction, which in spite of being of shorter duration and more costly than invention patents, not blocking importations and having to be put into practice, were continuously used in the period studied between 1820 and 1930. They were applied as much as invention patents until 1855 and to a lesser degree after that year, although they always followed the same increasing trend until 1930. They usually were more effective than invention patents in demonstrating the obligatory implementation. They were more used by Spaniards, albeit by resident foreigners, especially the French until 1875, as well as Germans from the end of the 19<sup>th</sup> century to 1930. They were also profusely used by corporations and by individuals who identified themselves as industrialists, manufacturers, craftsmen, salesmen and other professions or status linked with direct productive activities. All of this points out the special role of patents of introduction in promoting innovation among domestic and resident entrepreneurs or foreigners with special interest and knowledge of the national market.

There is much unresolved work in progress in order to analyze patents of introduction sectorial distribution and, above all, to research case studies which will allow us to go deeply into micro-history samples and discover more information as to their real role in promoting innovation. Now we can release only some clues on that topic. When the first smelting furnace was established in Marbella and Malaga, around 1830, a great part of the technologies were patented as introductions from UK by the Andalusian entrepreneur and factory owner Manuel Heredia<sup>31</sup>. In 1856, after the public release of the Bessemer converter technology in London, some Spanish iron entrepreneurs registered the

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<sup>31</sup> Between 1830 and 1841 the *Sociedad Anónima de las Ferrerías de Marbella y Málaga* applied for several patents of introduction related to the iron industry and put many of them into practice in Manuel Heredia's iron factories, actually transferring British technologies to Spain. See OEPM, Historical Archive, privileges of introduction n° 98, 144, 177 and 178. Heredia's family also used introductions in other sectors during the 19<sup>th</sup> century.

patent of introduction in Spain and put into practice one of the first European converters near the Somorrostro iron mines with the ideal mineral for the converter. It is true that Bessemer himself signed an agreement with these domestic businessmen to obtain a patent of invention, but the first step was a patent of introduction<sup>32</sup>. When A. G. Bell patented the telephone in the US –we now know that using information from A. Meucci, who has been designated by the US Congress as the real inventor<sup>33</sup> - a Catalanian optician, José Dalmau, used a patent of introduction to obtain a monopoly in Spain for Bell's phone and to put into practice the first apparatuses and communications in several places in Barcelona<sup>34</sup>. Finally, in some of our previous works we have demonstrated that patents of introduction were extensive and effectively used in the cotton textile industry in Catalonia, the most advance industrial area of Spain at the 19<sup>th</sup> century, to bring in known and tested looms, spinning machines and other textile technology from abroad<sup>35</sup>.

So, apparently patents of introduction worked and made some innovation easier, at least in some cases or early stages, achieving the goals established within the institutional framework. More empirical research is needed and we expect to offer some in our continuing research, but our final reflection must expose the consequences that this kind of historical analysis on patents and institutions, in which we include this paper, could have, for the understanding of intellectual property treatment and the character of national innovation systems in undeveloped countries at the dawning of the 21<sup>st</sup> century.

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<sup>32</sup> The first patent of introduction was obtained in September 1856 by Jose Vilallonga and *Ibarra Hermanos* (OEPM, Historical Archive, privilege nº 1482) who were dealing with Bessemer, in order to introduce the converter. They installed one in Guriezo (Cantabria) in the North of Spain. Days after that, Bessemer registered a patent of invention (OEPM, Historical Archive, privilege nº 1510) putting the converter into practice in the same place.

<sup>33</sup> The 15<sup>th</sup> of July, 2002 the US Congress passed a resolution declaring Meucci the true inventor of the phone (107<sup>th</sup> Congress; 1<sup>st</sup> Session; H. Res. 269).

<sup>34</sup> Jose Dalmau applied for the patent of introduction in September, 1877 (OEPM, Historical Archive, privilege nº 5753) and he put Bell's invention into practice in Catalanian factories and between the Civil and Military Government. A month later, Bell applied for improvements on his phone (OEPM, Historical Archive, privilege nº 5766) which did not justify the obligatory work.

<sup>35</sup> See SAIZ, J. P: *Invención, patentes...*, Grahps 59, 62 and 66.