
The Life-Cycle of the Barcelona Automobile-Industry Cluster, 1889-2015¹

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The life cycle of a cluster: some hypotheses

Authors such as G. M. P. Swann and E. Bergman have defended the hypothesis that clusters have a life cycle.² During their early history, clusters benefit from positive feedback such as strong local suppliers and customers, a pool of specialized labor, shared infrastructures and information externalities. However, as clusters mature, they face growing competition in input markets such as real estate and labor, congestion in the use of infrastructures, and some sclerosis in innovation. These advantages and disadvantages combine to create the long-term cycle. In the automobile industry, this interpretation can explain the rise and decline of clusters such as Detroit in the United States or the West Midlands in Britain.³

The objective of this paper is to analyze the life cycle of the Barcelona automobile- industry cluster from its origins at the end of the nineteenth century to today. The Barcelona district remained at the top of the Iberian automobile clusters for a century. In 2000, when Spain had reached sixth position

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2. Bergman (2008); Swann (2009).

3. Swann (2009); Klepper (1996), (2010); Donnelly, Begley & Collis (2017); Walker (2017); Pardi (2017).

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in the world ranking of producers in terms of the number of vehicles, Barcelona was still the Spanish province with the most employees in this industry (about 50,000). In this paper, we aim to explain why the automotive industry succeeded in Barcelona and why its decline was less intense than that of other mature districts with a similar pattern of specialization. Four theories will be used to try to understand the relatively favorable performance of the industrial cluster: Marshallian external economies, the capabilities of leading firms, the adoption of strategic or industrial policies, and district institutions that are favorable to growth.

In the late nineteenth century, Marshall underlined three main advantages of a geographically concentrated industry. Knowledge and information are, partially, free in the district. Entrepreneurs can benefit from a pool of skilled labor and may rely on numerous subsidiary industries. Therefore, the Marshallian triad of district advantages is comprised of knowledge spin-offs, the labor pool and specialized suppliers.⁴ More recently, M. Porter recovered the original Marshallian interpretation to underpin the basis of the competitive advantage of territories.⁵ Marshallian approaches to understanding the structural transformation of core districts of the Industrial Revolution in both Britain and America were adopted by J. Wilson, A. Popp and J. Singleton, and P. Scranton.⁶

D. Landes and A. D. Chandler insisted on the efficiency gains derived from firm size.⁷ The latter stressed the fact that, during the Second Industrial Revolution, the best world performers were those firms that could not only benefit from economies of scale in production, but also develop organizational capabilities in management, R&D, and marketing and distribution. However, Chandler accepted that a common feature of all three industrial revolutions was a geographically concentrated location of profit-orientated large enterprises in the developed world.⁸ Similarly, A. Markusen focused on hub-and-spoke districts, which she considered to be rather common in the United States.⁹ Such clusters hosted a few leading firms of a certain size, which acted as coordinators of the district. Hub-firms, mainly of local origin, could take advantage of both internal and external economies. A more extreme position has been put forward by S. Klepper, who analyzed the formation of key clusters such as Detroit. According to him, the successful cluster not only hosts outperforming firms that dominate the industry, but is, in fact, the re-

4. Marshall (1890); Krugman (1991).

5. Porter (1990), (1998), (2000).

6. Scranton (1997); Wilson & Popp (2003); Wilson & Singleton (2003).

7. Chandler (1964); Landes (1969), (1987); Chandler (1990), (1992); Landes (1998); Chandler, Amatori & Hikino (eds.) (1997).

8. Chandler (2005).

9. Markusen (1996).

sult of abundant spin-offs from leading firms.¹⁰ Latin business historians, such as J. Nadal, A. Carreras and X. Tafunell, F. Amatori, J. L. Loubet, P. Fridenson, and D. Barjot, have also insisted in the fact that the large firm has performed a central role in leading economies by accumulating technological, organizational and distribution capabilities.¹¹

H. J. Chang stresses the role of politics in changing the comparative advantage for latecomers.¹² He recovered the old arguments put forward by A. Hamilton and F. List, in favor of government support for development and extended infant-industry protection. With regard to the automobile industry, he underlined the cases of Japan and South Korea, which benefited from domestic protection during the golden age and experienced terrific success in automobile production in the last quarter of the twentieth century. His insistence on the need for latecomers to adopt industrial or strategic policies and to depart from free trade has been shared by other authors such as S. Reich, A. Amsden, P. Krugman, and G. Dosi and J. Stiglitz, among others.¹³

The Italian authors G. Becattini, S. Brusco, A. Bagnasco, and A. Rinaldi, among many others, have repeatedly claimed that the flexibility provided by medium-small firms and the institutions that encourage cooperation within a district contribute considerably to success in world markets.¹⁴ From a macroeconomic perspective, B. Eichengreen explained that the remarkable growth of Western Europe during the second post-war golden age was due to the implementation of a set of cooperative arrangements which made it possible for workers and capitalists to defer current compensation in return for future gains.¹⁵ M. Olson, K. H. Paqué and, more recently, D. Acemoglu and J. Robinson also pointed to institutions as a key explanation of development, even if they insisted on the fact that better economic performance depended on the erosion of the power of extractive elites through market competition.¹⁶

As the automobile industry cluster of Barcelona was formed, classical Marshallian externalities were created and hub-firms emerged. Infant industry policies were adopted in the mid-twentieth century, but were later abandoned. Cluster institutions developed and a few were long-lasting. This arti-

10. Klepper (1996), (2002), (2010).

11. Nadal (1975); Nadal, Carreras & Martín Aceña (1988); Carreras & Tafunell (1993); Barjot (1995); Loubet (1995); Chandler, Amatori & Hikino (eds.) (1997); Amatori (1999); Loubet (2001); Carreras & Tafunell (2003); Amatori (2009); Fridenson (2007); Amatori & Colli (2011); Loubet (2011).

12. Chang (1993), (2007); Ling & Chang (2009).

13. Amsden (1989); Reich (1990); Krugman (1991); Catalan (2000); García Ruiz (2001); Cimoli, Dosi & Stiglitz (eds.) (2009); San Román (2010); Catalan & Fernández de Sevilla (2013).

14. Bagnasco (1977); Becattini (ed.) (1979); Brusco (1982); Bagnasco & Sabel (eds.) (1995); Rinaldi (2005); Becattini, Belandi & De Propis (eds.) (2009).

15. Eichengreen (2007).

16. Olson (1992), (1996); Paqué (1996); Acemoglu & Robinson (2012).

cle aims to evaluate which of these factors was most decisive for the long-term success of the cluster.¹⁷

Preconditions for a cluster: building cars in Barcelona, 1889-1903

In 1889, the textile entrepreneur Francesc Bonet visited the International Exhibition of Paris. He was so impressed by the applications of the Daimler engines exhibited by Panhard Levassor that he decided to bring one back to Barcelona, and in December 1889 Bonet patented the first automobile in Spain.¹⁸ He built a tricycle which incorporated the Daimler engine and rode it with some friends down Passeig de Gràcia, one of the main avenues of the Catalan capital. Gimeno observes that Bonet imported at least three Daimler engines from Panhard between September 1889 and May 1890.¹⁹ From that moment, Bonet became Panhard's sales agent in Spain. As the manufacturer of the first vehicle powered by a combustion engine, the cotton industrialist is usually referred to as the pioneer of the Iberian automotive industry.

Another entrepreneur established in Catalonia was the Valencian lieutenant Emili La Cuadra, and La Cuadra also visited the Paris International Exhibition. He was working with electric engines, and had opened a plant in Lleida to generate hydroelectricity. During the 1890s, the growing interest in international racing competitions convinced La Cuadra that the motor industry was going to define the future of manufacturing. He sold his Lleida plant and transferred to Barcelona in September 1898 to create the *Compañía General de Coches y Automóviles E. La Cuadra*. There he began by building electric cars, helped by D. Tamaro, with somewhat disappointing initial results. Later, La Cuadra and Tamaro began to build automobiles using combustion engines and contacted a bright young Swiss engineer named M. Birkigt. La Cuadra also became Benz's sales agent in Barcelona. Thanks to 21-year-old Birkigt's formidable skills as an engine-designer, La Cuadra was able to build at least five gasoline-powered automobiles in 1900.

La Cuadra went bankrupt during the general strike of 1901. One of his creditors was Vic railway head J. Castro, who found financial support in the latter town to create *J. Castro en Comandita, Fábrica Hispano Suiza de Automóviles*. The new company acquired the works of La Cuadra and continued using Birkigt for its designs; but although it opened new premises in Barcelona, it was unable to sell more vehicles than La Cuadra had done.

17. This set of hypotheses was already advanced in Catalan (2013).

18. De Castro (1964); Ciuró (1970); Gimeno (1993).

19. Gimeno (1993).

None of the three pioneering firms established in Barcelona built more than a few cars but each contributed to generating technological innovations of different kinds. Bonet's first car featured an imported single-cylinder engine. Twelve years later and with Birkigt's help, Castro was building automobiles powered by the company's own engines, some of which carried as many as four cylinders.

We can use the number of national brands as an indicator of the degree of development of the automobile industry at the turn of the century. At that time there were more than 200 manufacturers in the United States, even though the size of the US domestic market was not comparable to any of the European countries. France and Britain were manufacturing over 100 brands each. Germany, the industry's pioneer and the country where the early movers were already benefiting from scale economies, had 35 car manufacturers. As the first continental country to engage in industrialization and major steel production, Belgium came next with some 27 firms. After Belgium followed Italy, Switzerland and Austria, the most developed countries on the European periphery, each with about ten companies. Finally, there were Australia and the Netherlands, each with between five and ten.

In sharp contrast to the pattern in Western Europe, the number of manufacturers in Spain could only be compared to the Scandinavian periphery (even while Spain's population was obviously much larger than the populations of Sweden or Denmark). On the other hand, production levels in Spain were slightly higher than they were in Portugal, the Slav and Balkan countries, or Asia and Latin America (none of which are listed in Table 1). In general terms, therefore, we can say that in 1901 the Spanish automotive industry was performing at a much lower level than the industries in the countries which led the first and second technological revolutions, but that at the same time certain notable initiatives were being taken.

TABLE 1 • *Ranking of world manufacturers in 1901 (number of brands)*

	Number	%		Number	%
1 United States	215	35.2	8 Austria	8	1.3
2 France	167	27.3	9 Australia	7	1.1
3 United Kingdom	112	18.3	10 Netherlands	6	1.0
4 Germany	35	5.7	11 Canada	4	0.7
5 Belgium	27	4.4	12 Sweden	4	0.7
6 Italy	11	1.8	13 Spain	4	0.7
7 Switzerland	9	1.5	14 Denmark	3	0.5

Source: Own work from De Castro (1964).

With regard to these initiatives it should be noted that even if just four brands was rather a poor record for an economy of 19 million inhabitants, most of them actually came from just one part of the country: Barcelona, with its population of 0.5 million people, and Catalonia, the region of which Barcelona was the capital city, with a population of some 2 million. That 75% of Spain's new manufacturers should have emerged from this one city, at least up until 1901, suggests something of Barcelona's promise at the time as a location for the future development of a cluster.

Moreover, two new brands launched in Barcelona by local car manufacturers were Bons and Ultramovil, both created in 1902.²⁰ Later there was Fenix, which La Cuadra's one-time associate Tamaro used to launch a new vehicle. Under the name of that mythological bird, Tamaro is reported to have created a network to distribute cars with engines that could produce up to 30 hp, but we still do not know if any vehicles were actually built. The Fenix project ended in 1904. Both Castro and Tamaro can be considered as spin-offs of La Cuadra. Either way, Klepper's hypothesis about the origins of successful clusters does seem to fit with Barcelona's experience at this early stage.²¹

Critical mass: externalities, hub-firms and institutions, 1904-1925

In 1904 a group of Catalan entrepreneurs led by D. Mateu and M. Birkigt founded *La Hispano Suiza Fábrica de Automóviles S. A.*²² Hispano Suiza can be considered as one of La Cuadra's start-ups but its greater success, supported by key figures in Barcelona's financial elite, qualifies it for Markusen's definition as a hub-firm and as the leading company in the district.²³ In 1908 Hispano Suiza had already built 200 20- to 40-hp engines. Given the low demand for private transport in relatively underdeveloped Spain, the firm supported the creation of coach companies using Hispano vehicles. In 1910 there were already 30 coach lines comprising 64 vehicles built by Hispano Suiza. The combustion engines designed by Birkigt were particularly light and long-lasting, and as early as 1907 the firm was already exporting patents.

The premises of Hispano Suiza were located in the neighborhood of La Sagrera in Barcelona. In its first days, Hispano Suiza's growth was hampered by the scarcity of qualified technicians and car workers, the lack of specialized suppliers and the constant labor conflicts in the Catalan capital. Most of all, however, Hispano Suiza faced the problem that the demand for luxury

20. Gimeno (1993).

21. Klepper (2002), (2010).

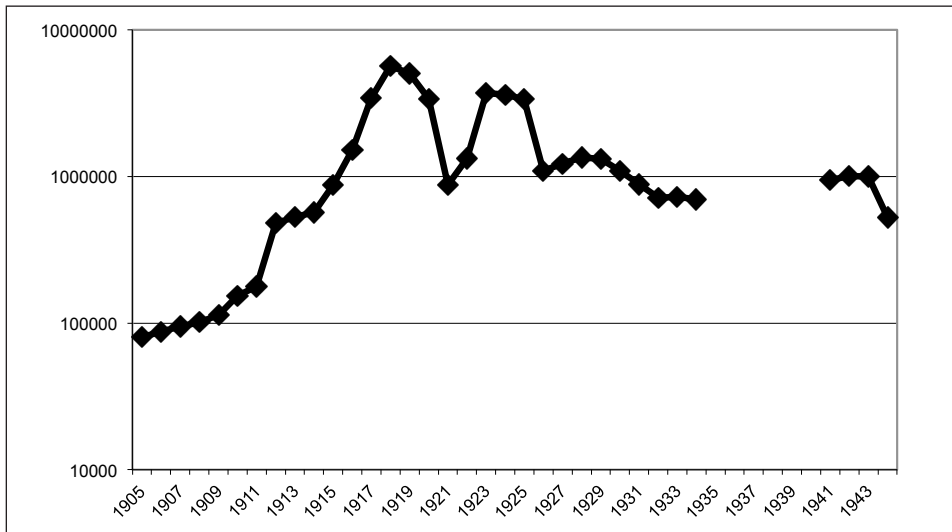
22. De Castro (1964); Ciuró (1970); Gimeno (1993); Nadal & Tafunell (1992); Polo (1994); Lage (2003); Nadal (2004), (2006), (2010).

23. Markusen (1996).

automobiles was limited in Spain, a poor and chiefly agrarian country. In order to increase its demand, the company created an agency in Paris in 1911 and two years later it began to build a new plant in Bois de Colombes, on the outskirts of the French capital.

At the outbreak of World War I, Birkigt began to work on the design of an aircraft engine and in early 1915 presented the new V-shaped engine, which produced over 150 hp. As Nadal has underlined, this engine contained far fewer parts and was much lighter than the Benz engines used by the German planes.²⁴ The Birkigt engine could run without stopping for 50 hours and, as a result, it won its first order from the French government. Its terrific success in air fronts not only expanded production of Hispano Suiza's plants in Barcelona and Paris but led to applications for its patent by major companies all over the world. During the war, the Hispano Suiza engine was being manufactured by 15 factories in France, three in the US, three in Italy, one in Britain and one in Japan. Among these, the companies which manufactured Birkigt's aircraft engine were Peugeot, Wright and Mitsubishi. More than 40,000 Hispano Suiza aircraft engines were built all over the world. And Hispano Suiza's profits rocketed, as Chart 1 shows.

CHART 1 ▪ *Real profits of La Hispano Suiza S.A., 1905-1944 (1929 pesetas, 3 years moving averages)*



Source: Own work from *Anuario Financiero y de Sociedades Anónimas*, various years.

24. Nadal (2010).

The second hub-firm in the Barcelona district in the period before the Spanish Civil War was Elizalde, which was considerably smaller than Hispano Suiza.²⁵ Born in Spanish Cuba, A. Elizalde was Delahaye's Spanish sales agent. He opened his first automobile workshop in Barcelona in 1909. Production expanded slowly, under different society names and with different partners, and Elizalde manufactured crankshafts, valves, differentials, gears, bumpers and other parts.²⁶ In 1913, the firm presented its first car built in Barcelona and the car made the 600-kilometre trip between the Catalan capital and Madrid in 13 hours. The outbreak of World War I delayed the commercial launch of the new cars, which required imported parts from Belgium. Nevertheless, in 1915 the *Fábrica Española de Automóviles Elizalde* was founded and the company built automobiles and their engines until 1927. The first Elizalde engines were incorporated in Victoria cars, first assembled in Madrid, by *Talleres Franco-Españoles*, and later in England, by Gwynne Cars. In 1917 Elizalde also designed two 220-hp and 150-hp aircraft engines.

Elizalde tried to imitate Hispano Suiza in its bid for luxury cars and aircraft engines, but had less competitive success. It launched a series of 15-, 20- and 25-hp engines and even one 180-hp model. This last model, an 8-cylinder colossus, was built into the Elizalde 48, which at a body length of 5.7 meters was advertised in 1921 as the biggest car in the world. But although its engine featured additional technical innovations, the main drawback of the Elizalde 48 was its price and at 60,000 pesetas it cost much more than other cars being sold in Spain, such as the Ford models that could be bought for around 10,000 pesetas.

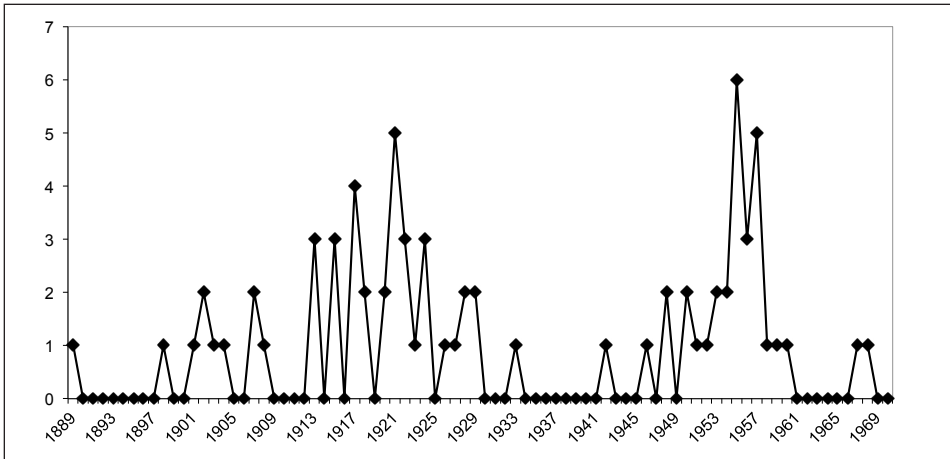
In the period leading up to 1921, a series of other firms tried to enter the sector, following first in the footsteps of Hispano Suiza and later, and more discreetly, in the steps of Elizalde. The years 1907-08 saw the emergence of the two new manufacturers Catalonia and Victoria. Later, a new surge of initiatives preceding the outbreak of World War I led to the creation of the cycle car manufacturer David and of the Abadal company (which had begun production in Belgium, where steel could be provided much more cheaply than in Spain, but which then moved to Barcelona as a result of wartime pressure).²⁷

During World War I the import of vehicles from belligerent countries was blocked and this further encouraged the construction of artisanal cars by modest entrepreneurs, even though some of these models lasted less than a single year on the market. In 1915 three new brands were launched in Barcelona, the most important being D y G (*Díaz y Grillo*) and Ideal (*Talleres Hereter*). Two years later there were a total of five new brands, led by *España*

25. De Castro (1964); Ciuró (1970); Gimeno (1993).

26. Catalan (2006a).

27. Gimeno (1993).

CHART 2 - *New manufacturers in the Barcelona automobile-industry cluster, 1889-1970*

Source: Own work, mainly from Gimeno (1993).

(manufactured by *Fábrica Nacional de Automóviles F. Batlló S. C.*). All in all, eleven new automobile brands were created in Barcelona during the period 1914-18.

During the 1920s the creation of new automobile brands in the Barcelona cluster generally went into decline. In the middle of the decade, Spain was importing about 14,000 units per year, mainly from the US and France and led by Ford and Citroën respectively. The capacity of the leading Spanish firms in the sector (with Hispano Suiza in first place) stood below 2,000 vehicles (including cars and trucks). Elizalde could supply less than 100 vehicles per year, and increasingly directed its production resources to the manufacture of aircraft engines. During this decade, the remaining manufacturers rarely produced more than 20 vehicles each.²⁸

The competition created by the biggest mass producers (led by Ford) proved to be disruptive for the emerging cluster of Barcelona during this period. Not only did the artisan producers tend to disappear, but the profitability of the local hub-firms also suffered. This was seen, for example, in Hispano Suiza's declining profits (incidentally, that company's French branch had been detached from the original company because of heavy taxation in Paris on the wartime earnings of foreign firms²⁹) (see Chart 1).

According to Lebrancón, it was cheaper for the Ford Motor Company to ship its cars to the European continent in parts.³⁰ When examining locations

28. San Román (1999), (2010).

29. Nadal (2006), (2010).

30. Lebrancón (2009).

in Spain where the final assembly of its vehicles could be made, the company originally opted for Cadiz rather than the Catalan capital because of the perceived danger of Barcelona's militant working class. Ford began to operate in the Cadiz free-trade zone in 1920 and its original plan was to assemble around 5,000 vehicles a year in Andalusia. But during the first year of activity only 1,132 units were assembled and in 1923 Ford decided to move to Barcelona.³¹

Ford's decision can be interpreted as proof of the advantages of locating within an industrial district, even for the firm which had the most advanced production capabilities at that moment. Barcelona not only benefited from a similar free-trade zone to Andalusia but could already provide the classical Marshallian externalities which did not exist in Cadiz: a trained labor force, parts suppliers and non-codified knowledge of the automotive industry.³² After their unsatisfactory results in Cadiz, the American automobile giant in some way concluded that the advantages offered by Barcelona (an emerging cluster in its first years) would compensate for whatever drawbacks this city had in the supply of key inputs.

If the established firms in the cluster were mainly of local origin in the period up to 1923, from the moment when Ford established itself in Barcelona and beyond that moment competition intensified. The structure of the cluster in the mid-1920s was that of a district led by three hub-firms: two of local origin, and one subsidiary of a multinational which was in turn the industry's international leader. In terms of manpower, Hispano Suiza was the district's main hub-firm, followed at some distance by Elizalde. Nevertheless, every year the American company assembled several times the number of automobiles that Hispano-Suiza could produce. In addition, there were craft manufacturers who tended to disappear within a few years. The growing competition created by Ford and imports from other mass producers also led Elizalde to give up automobile production and turn instead to aircraft engines.³³ Even Hispano Suiza experienced a significant decrease in profits during the second half of the decade (Chart 1).

In spite of the cluster's increasing inability to compete with mass producers, there was notable institutional development. Riding on the shoulders of the Industrial Revolution, Barcelona benefited from the work of three influential institutions that were bringing structural change to the sector: the Chamber of Commerce, the School of Labor and the School of Industrial Engineering. The last of these three had been financed by the local bourgeoisie and by the government at municipal and provincial levels, and was the only

31. Wilkins & Hill (1964); Echevarría & Voltés (1990); Nadal & Tafunell (1992); Catalan (1992); Estapé (1997); Catalan (2000); Lebrancón (2009).

32. Marshall (1890).

33. De Castro (1964); Ciuró (1970); Estapé (1997); San Román (1999); Catalan (2006a); San Román (2010).

school of its kind to survive the bankruptcy of late-nineteenth century Spain. The Chamber of Commerce and the School of Labor did not specifically cater to the automotive industry but the Chamber supported industrial protection and the School of Industrial Engineering trained future entrepreneurs and qualified technicians. For its part, the School of Labor had already created a department for machinists back in 1907. And finally, the district had also created its own specific institutions.

Amongst these was the Royal Automobile Club of Catalonia (RACC), created in 1906.³⁴ In 1913 the RACC held its first Barcelona automobile show, where in addition to the products of Hispano-Suiza, Elizalde and other luxury manufacturers, the Ford T was presented. Three years later the Association of Automobile Manufacturers' Unions of Barcelona (CSAB) was founded to defend the interests of car, motorcycle, bicycle and auto part producers. In 1919, the CSAB institutionalized the international car show by hosting the First Automobile Exhibition of Barcelona. The show exhibited the products of 58 firms, both Spanish and foreign. In 1921 the CSAB was recognized by the International Permanent Bureau of Automobile Manufacturers (BPICA). The same year saw the creation of the Spanish Confederation of Automobile Manufacturers' Unions (CECSA), based in Barcelona. During the years of 1922, 1924 and 1925, the car show opened its doors again, with the editions of 1924 and 1925 being held during the regime of Miguel Primo de Rivera. In 1925, the Fourth Automobile Exhibition of Barcelona hosted 408 different firms, all advertising their products.

Search for a survival strategy, 1926-52

During the 1920s, the Barcelona automotive cluster was already generating the classical Marshallian externalities of the industrial district, which led Ford to change its mind and transfer its assembly lines from Cadiz to the Catalan city. In addition, the cluster also benefited from the emergence of both hub-firms and specific district institutions, which might have facilitated the successful development of local mass production. Nevertheless, whereas Spanish automobile imports were already above 16,000 vehicles a year in 1926, the Barcelona cluster did not show itself capable of manufacturing a comparable number of vehicles until 1958. So much delay might be interpreted as a significant weakness in the cluster's first take-off stage. Therefore, at the end of the 1920s Spain began to design a strategic policy to support the development of its automotive industry.

34. Pernau, Del Arco & Arias (2006).

In 1926, General Miguel Primo de Rivera’s regime created the Official Committee on the Motor Industry (COMA), following the advice of a petition signed by D. Mateu, A. Elizalde and leading Basque industrialist, R. de la Sota, as well as the conclusions of the First Motor and Automobile National Congress.³⁵ Coma was created to ensure that government agencies would buy Spanish cars and to grant additional incentives to favor domestic production. In 1927 the Automobile Industry Protection Act restricted such benefits to firms whose assembled vehicles were made of parts that were at least 50% of Spanish origin. The Committee also planned to introduce a system of classification in which local producers would be identified in any of three groups: luxury, middle-range and economic vehicle production.

According to Estapé, some of Coma’s proposals contributed to the beginnings of the industrial policy adopted much later by Juan Antonio Suanzes, the first president of the public holding Instituto Nacional de Industria (INI), created by Franco in 1941.³⁶ However, the financial funds allocated under Primo de Rivera were not enough to induce local manufacturers to increase the scale of their plants. According to San Román, local firms only received Coma orders for 200 cars (plus 100 motorcycles) during 1927 and 1928, and the results of the policy for local producers in the Barcelona cluster were not very significant:³⁷ Elizalde decided to permanently give up automobile production in 1927 and to focus its efforts on aircraft engines instead, and Hispano Suiza never tried to go into mass production, even while it maintained its hegemony in the luxury automobile market. Moreover, the various industrial projects launched by craft producers to build automobiles in Barcelona were not economically successful either. For instance, the fifth biggest manufacturer in 1926 was the firm founded by the bright Catalan engineer, W. Ricart, who launched his first cars with his own 4- and 6-cylinder engine design. But with

TABLE 2 • *Leading firms in the Barcelona automotive-industry cluster (by number of employees)*

	1926		1950c
Hispano Suiza	2,250	Enasa	3,078
Elizalde	393	Eucort*	432
Ford Motor Co.	302	Clúa	360
España	165	Ford Motor Ibérica	272
Ricart	128	Artés de Arcos	200

Note: Figure for Eucort is estimated. Sources: Own work from Echevarría & Voltes (1990), Catalan (1992) and Catalan (2012).

35. Estapé (1997).

36. Estapé (1997).

37. San Román (1999), (2010).

barely over 100 employees in 1926 he could not benefit from appreciable scale economies and tried to survive by merging with the fourth biggest firm, Batlló, which was not much bigger than Ricart's firm anyway. And when Batlló and Ricart merged to create *Industria Nacional Metalúrgica* (APTA) in 1928, this spin-off was no more successful than the previous ventures had been.

In 1928, Henry Ford approved a plan for Europe which involved building a huge new plant in Dagenham, near London, which would supply the assembly plants on the European continent. According to Tolliday, this plan forecasted yearly sales of 15,000 units of the Model Y in the Iberian Peninsula.³⁸ The Spanish subsidiary was transformed into Ford Motor Ibérica (FMI) in 1929 and, as with the rest of Dearborn's interests in Europe, 40% of the capital was allowed to remain in the hands of local shareholders. According to Lebrancón, the volume of assembled cars in the tariff-free zone of Barcelona rose from 1,995 tons in 1927 to 14,764 tons in 1929. Most of this output went to the Spanish market but 3,442 tons were also exported to Italy, 1,085 tons to Portugal and 1,165 tons to North Africa.³⁹ Consequently, the number of employees in Ford's plant in Barcelona rose from 302 in 1926 to 494 in 1929.⁴⁰

At the beginning of the Great Depression in the 1930s, Spain's serious problems with its foreign balance forced the country to raise tariffs and introduce import quotas for many products, including automobiles. In April 1931, the Second Spanish Republic was proclaimed. Before the end of the year, the Republican government had approved legislation establishing tariff rebates on imports of automobile parts when and where an increasing share of domestic components was incorporated in cars assembled in Spain. This policy encouraged the use of local components in Barcelona's Ford Motor Ibérica assembly plant. Before the outbreak of the Spanish Civil War, roughly half the components the American subsidiary was using to assemble automobiles and trucks in the Barcelona district were local products, including tires, batteries, axles, wheels and glass. According to Estapé, the company employed 750 people in July 1936 and about 2,500 employees of the auto parts industry worked exclusively for the Barcelona production plant.⁴¹ Many years ago now, Wilkins and Hill observed that on the eve of the Civil War, Motor Ibérica was actually one of Ford's most profitable European subsidiaries.⁴²

Moreover, the Barcelona district eventually attracted the main rival of the Dearborn colossus, General Motors (GM). Like Ford, GM had also chosen Andalusia as the first headquarters for its Spanish subsidiary, in the mid-

38. Tolliday (2003); Lebrancón (2009).

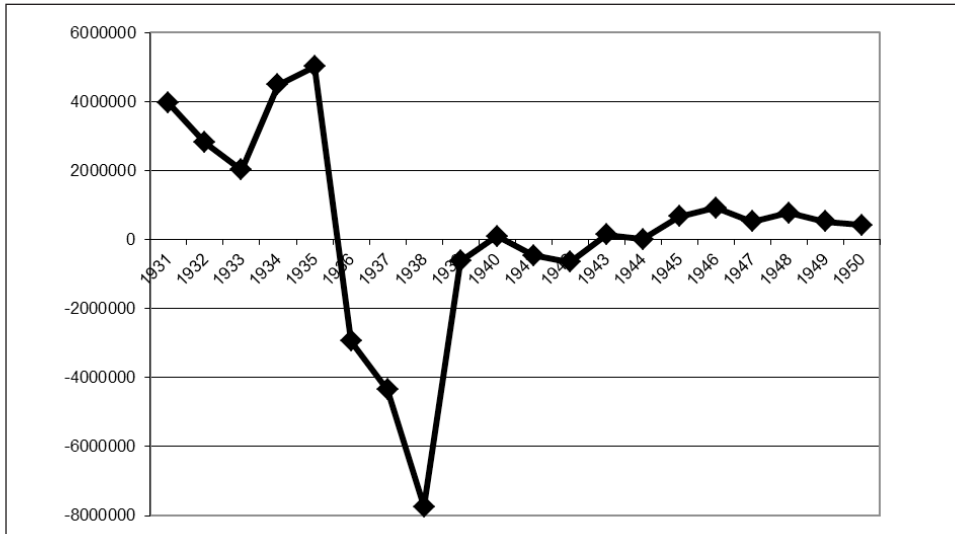
39. Lebrancón (2009).

40. Echevarría & Voltés (1990).

41. Estapé (1997).

42. Wilkins & Hill (1964); Catalan (1992).

CHART 3 • Real profits of Ford Motor Ibérica (1935 pesetas)



Source: Own work from *Anuario Financiero y de Sociedades Anónimas*, various years.

1920s. Later, in 1927, General Motors Peninsular (GMP) moved from Málaga to the Spanish capital, Madrid. Finally, in 1932, it moved once again, this time to Barcelona. The company rented premises in the tariff-free zone of the Catalan city and assembled Chevrolets and other GM models there until 1936. On the eve of the Civil War, the subsidiary of the firm led by Alfred Sloan designed a plan to build a new plant in Barcelona that would be able to assemble 20,000 vehicles a year and export 70% of its output.⁴³

The paradox of the Barcelona cluster during the 1920s and early 1930s was that the district developed even while local car manufacturers declined. The last attempts to create national brands were promoted in 1929 with Pescara and in 1935 with Rubí and Sitjes, but they met with no better luck than their predecessors. The contrast between Hispano-Suiza and its American rivals was pronounced: in 1934 the local hub-firm manufactured little more than a few hundred automobiles, while Barcelona’s American subsidiaries assembled over 12,000 vehicles.

In spite of the poor performance of local manufacturers, suppliers of both auto parts and of the labor force expanded and institutions evolved. Around 1935, there were no fewer than 4,000 people employed in the production of automobiles and their parts in the Barcelona cluster. During the Republican years, the Barcelona Automobile Exhibition opened its doors twice, in 1933 for its sixth edition and then in 1935 for its seventh.

43. Catalan (1992); San Román (1995), (1999).

The outbreak of the Civil War paralyzed both Ford's and GM's plans for expanding their Barcelona subsidiaries. Hispano-Suiza and Elizalde, like all the local firms with more than 100 employees, were collectivized and their activities re-directed to the production and repair of war material. GM workers attempted to manufacture a number of trucks and coaches under the brand Maratón but the lack of raw materials and parts made the task nearly impossible.⁴⁴ Ford's plant also focused on producing trucks and army demand, with similarly poor results: Ford Motor Ibérica's monthly production dropped from 300 vehicles in January 1936 to only 34 in January 1937.⁴⁵

The war ended on 1 April 1939 with the victory of General Franco. Both GM and the Fiat-related SIAT submitted proposals to the new government to build assembly plants in industrialized parts of Spain (basically in Catalonia and the Basque Country).⁴⁶ But neither company was allowed to proceed in the early years of the new fascist regime. In fact, since 1937 the nationalist officers had already been making plans to promote an autarkic automotive industry.⁴⁷ The original idea was to begin by building a factory to manufacture light trucks in Seville, a city that had been controlled by the rebel army since July 1936. After his escape from revolutionary Catalonia and throughout the war period, Hispano Suiza's main shareholder M. Mateu ran the company Hispano Aviación in Seville, repairing aircraft engines for Franco and the forces allied to him.

At the end of 1939 Franco's Ministry of Industry passed a law limiting the maximum stake of foreign capital in Spanish manufacturing firms to 25%. During 1940 a call to subsidize automobile investments, in which SIAT participated, was finally cancelled.⁴⁸ In September 1941 the public holding Instituto Nacional de Industria was created to promote autarkical firms. Its first president J. A. Suanzes was one of Franco's former colleagues and as an enthusiastic supporter of autarky he was decidedly against the acceptance of foreign capital.⁴⁹ Suanzes blocked further proposals by SIAT, who had sought to build a new production plant in the Basque Country or Catalonia with Fiat's technological support. And already in 1942 the INI presidency had decided to buy land in Madrid in order to establish the production of automobiles there.⁵⁰ At the end of World War II, INI made an offer to the engineer W. Ricart, who had spent seven years in Arese, Italy, as assistant production head of Alfa Romeo: the Spanish public holding would build a large factory

44. Ciuró (1970).

45. Echevarría & Voltes (1990).

46. Catalan (1992); San Román (1999); Tappi (2008).

47. San Román (1995); Estapé (1997); San Román (1999); Carreras & Estapé (2002).

48. San Román (1995), (1999); Tappi (2008).

49. San Román (1995), (1999).

50. Catalan (2006a).

in Madrid to produce light trucks and Ricart would supervise the operation. According to Nadal, Suanzes wanted to strengthen his project by using the Hispano Suiza plant in Barcelona for the construction of heavy trucks. The old Barcelona hub-firm had struggled during World War II under the burden of financing too many different types of production, from aircraft engines and canons to heavy trucks and engine-machines.⁵¹ Finally, in 1946, and under pressure from Suanzes, M. Mateu decided to sell the Barcelona factory to INI, which created the Empresa Nacional de Autocamiones S.A. (ENASA). The creation of this completely state-owned firm can be considered as the clearest outcome of early Francoist policy with regard to the motor industry. Enasa began by building heavy trucks in Hispano-Suiza's former premises in Barcelona while the new modern plant was being built in Madrid.⁵²

At the end of Civil War, as GM was denied permission to expand its Barcelona plant, it refused to continue assembling in Spain. Although this did not happen to Ford Motor Ibérica, the Dearborn subsidiary was granted very few licenses to import parts and assemble its cars, with the result that the Barcelona plant focused its efforts on the production of trucks and parts⁵³. It also provided inputs to new craft manufacturers such as the trolley builder Aurtarquía. The scarcity of steel and other metals and the fall in imports combined to cause marked underutilization of capacity. In fact, FMI employee numbers dropped from 540 in 1935 to 293 in 1942. According to Estapé, Franco's government tried to force Ford to relinquish two thirds of the capital of its Spanish subsidiary to local shareholders and to build a new plant in Navarre rather in Barcelona.⁵⁴ However, these proposals were not accepted by the American company, whose Spanish investment never completely recovered from the Spanish Civil War.

In the mid-1940s, FMI presented a plan to manufacture the Fordson tractor in exchange for permission to import cars, but negotiations with the Ministry of Industry did not lead to any final agreements. The upside was that as imports of parts were so scarce, the Ford subsidiary's use of local materials significantly increased. If 39% of the weight of a truck built in 1939 was composed of local materials, this proportion had increased to 76% by 1945. But at that moment Ford directly employed fewer than 300 people.⁵⁵ As Wilkins and Hill have observed, by July of 1946 all Ford's subsidiaries in Europe had reinitiated production except the Spanish and the German plants.⁵⁶ Moreover, between 1945 and 1949 Barcelona's production of Ford trucks was also very disappoint-

51. Nadal (2010).

52. López Carrillo (1998).

53. Estapé (1997); Carreras & Estapé (2002); Estapé (2003).

54. Estapé (2003).

55. Estapé (1997), (2003).

56. Wilkins & Hill (1964).

ing, with less than 1,000 vehicles constructed, and in the period after the Civil War Ford Motor Ibérica's real profits never reached the 1935 level (Chart 3). There was some improvement in the early 1950s, when the availability of raw materials and parts significantly increased, but Ford decided to sell some of its less profitable European subsidiaries. The former Spanish subsidiary, under totally domestic control since 1954, became Motor Ibérica (MI).

The severe scarcity of means of transport in autarkic Spain led many Barcelona entrepreneurs to launch projects to produce motorcycles, automobiles and parts. The question of motorcycles is not addressed in this article, but with regard to passenger cars, the most notable example of these initiatives was Eucort, the firm which was created by E. Cortés in 1945 and which remained in business until 1953.⁵⁷ In 1948 Eucort produced 148 vehicles, but the series were so short that the firm could not survive much longer.

Because both imported and domestically produced cars were not easily available, the demand for parts substantially increased. Around 1950, the third biggest cluster producer in terms of manpower was probably J. Clúa, a firm which manufactured engine heads and blocks for trucks and for passenger cars (see Table 2). Clúa himself was a former Hispano Suiza worker who had also been employed by the bus manufacturer Roca, where he'd begun to work in the production of diesel engines. Other significant firms manufacturing auto parts in the cluster before the 1950s were Auto Electricidad (petrol pumps and distributors), Artés de Arcos (lights and command instruments), Fundiciones Industriales (cylinders), Harry Walker (carburetors) and Soler Almirall (ball bearings). In 1950 and as Catalan business picked up, the Barcelona district already housed 131 factories and workshops manufacturing automobile parts.⁵⁸

However, Franco's early autarkic policy radically transformed the hub-firms of the Barcelona automotive cluster: the first, Hispano Suiza was converted into a second-class plant depending on the state-owned ENASA; and Ford's subsidiary became a completely Spanish private firm which did not have its own technology and which would instead produce light commercial vehicles and tractors for farming. Barcelona not only lost the world-renowned brand of quality car that Hispano Suiza had become, it did not achieve mass automobile production either. In 1950 only 637 automobiles were produced in the whole of Spain. Spain's position in the world ranking of car manufacturers fell from fifteenth in 1928 to eighteenth in 1950.

At the end of the 1940s, the failure of the autarkic project forced an about-turn in Franco's industrial policies. The year of 1948 was a turning point for the automotive industry, with the INI finally approving the use of

57. Ciuró (1970); San Román (1995), (1999).

58. Catalan & Monteagudo (2003).

Fiat's technology to build a new factory to manufacture cars in Barcelona's tariff-free zone, the Zona Franca.⁵⁹ The first promoter was the private investment bank Banco Urquijo, which was forced to accept that 51% of the capital of the manufacturing firm would remain in the hands of INI. The Instituto also succeeded in obtaining Fiat's technological support to build not just an assembly line but a complete manufacturing plant. Fiat, however, did not grant permission for the export of its licensed products from Barcelona.

The *Sociedad Española de Automóviles de Turismo S.A.* (SEAT) was finally created in 1950. The private shareholders subscribed 49% of the capital, with 7% stakes each for Banco Urquijo, Banco Hispano Americano, Banco de Bilbao, Banco de Vizcaya, Banco Español de Crédito, Banco Central and Fiat. While most of the banks placed Seat's shares among their Spanish customers, Banco Urquijo, Fiat and INI remained as the strategic shareholders. Moreover, the Spanish government also supported Seat by granting it the right to expropriate the land where the new plant was to be built, and allowing the company benefits associated with firms of 'national interest', which basically meant its exemption from the main forms of domestic taxation. Moreover, in 1952 SEAT obtained permission to import parts and equipment with tariff exemption, provided that 50% of its output would derive from local origin. In order to grant this permission, the government had to override certain autarkic policies and return to the legislation of the Republican years. In this sense, the end of Franco's autarky came hand-in-hand with the partial recovery of the 1930s policy of promoting local auto part production.⁶⁰

Renaissance and golden age under industrial policy, 1953-72

Spanish industrial policy during the 1950s sought not only to produce cars but to employ mostly local parts to do so.⁶¹ The first model manufactured by SEAT, the 40-hp 1400, was released in late 1953. During 1954, the first year of normal production, already 60% of the parts of the vehicles manufactured in Barcelona's Zona Franca were of local origin. The bodies, oil pumps and a few other components were still imported from Torino, but the rest of the vehicle was manufactured in Spain, mainly in the Barcelona district.⁶²

The promotion of local manufacturing meant that very few licenses were being granted to import either vehicles or auto parts. Scarcity was so acute

59. San Román (1999); Catalan (2006a); Tappi (2008).

60. Catalan (2006a).

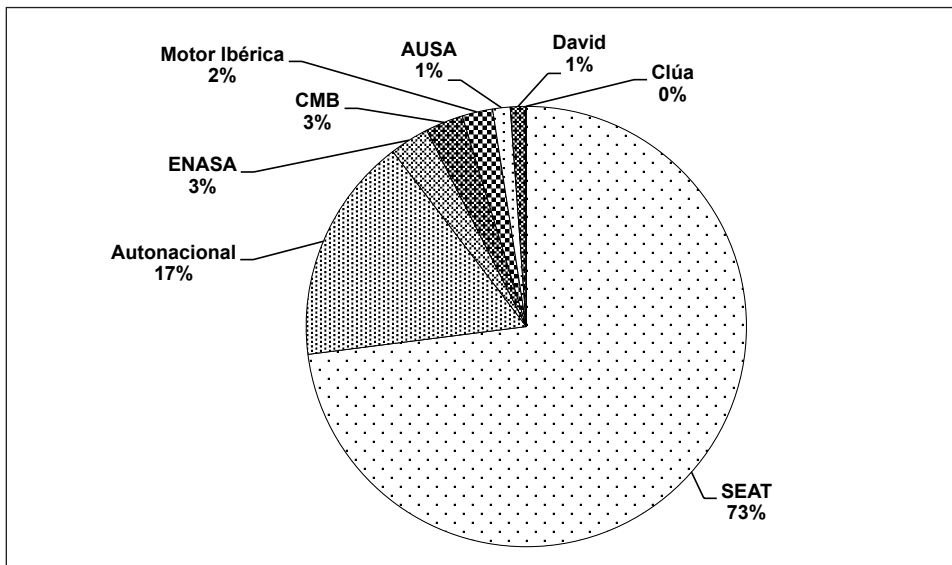
61. Catalan (2000); García Ruiz (2001); Sánchez (2004), (2006); Fernández de Sevilla (2007); Catalan (2010); Ortiz Villajos (2010); Fernández de Sevilla (2011); Sánchez (2011); Catalan & Fernández de Sevilla (2013).

62. Catalan (2006a), (2010).

that a new surge of initiatives both in manufacturers and component producers took place. It is easier to quantify the birth of new brands than the entrance of new auto parts manufacturers, but both experienced major expansion during the mid-1950s (Chart 2). The peak in the entrance of craft producers, who specialized in the manufacture of microcars, took place around 1955. Some of the most famous brands manufactured in Catalonia during these years were Aleu, Clúa, Biscuter, Jorsa and AUSA. These brands were rarely manufactured in series of more than 100 units but they contributed to the renaissance of the Barcelona cluster and became the basis of future spin-offs. One of the most well-known is Biscuter, which was produced by *Autonacional S.A.*⁶³ This company was founded in 1953 and employed around 300 people. It produced a total of five micro-car models equipped with 197 cc engines licensed by the Villiers Engine Company. At its peak, Autonacional claimed it would be able to manufacture as many as 10,000 vehicles a year; but in the final event it closed its doors, in 1957, when it was producing about 3,000 units annually. Since that year, the number of both established and new firms dramatically diminished.

The main reason for the collapse of new brand creation and the high mortality rate of established firms since 1957 was SEAT's release of the 600 Mod-

CHART 4 • Output shares of automobiles in the Barcelona cluster 1957
(motorbikes excluded)



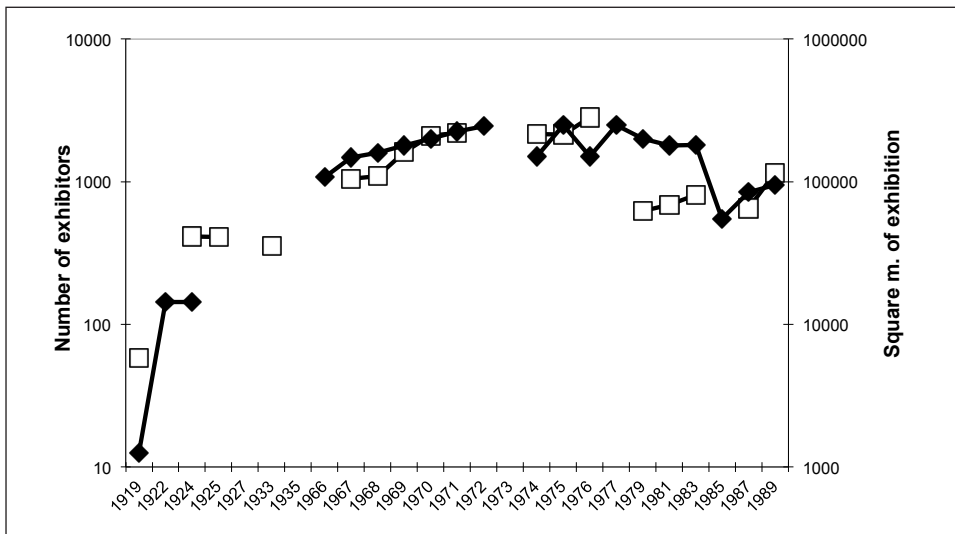
Source: Own work from Catalan (1992).

63. Ciuró (1970); Catalan (1992); García Ruiz (2001), (2003).

el, the first popular car mass-produced in the Barcelona district.⁶⁴ With its 21-hp engine (633 cc), the 600 Model only had half the power of Seat's 1400 Model, but its price was also nearly half the price of the other car (60,000 pesetas compared to 120,000 pesetas). In comparison to the Biscuter there was no possible competition: Autonacional's car sold for about half the Seat price (27,000 pesetas on average), but had less than one third of its engine power. Many motorcycle manufacturers in the Barcelona district also perished after 1957 (despite their earlier experience of remarkable growth from the late 1940s onwards). The Seat 600 was not only the first true 'people's car' being manufactured in the district but 97% of its parts came from locally-produced materials (including the body, which was produced in the Zona Franca factory). Although the royalty fee Seat had to pay to Fiat for manufacturing the 600 was slightly higher than the fee it had paid for its 1400 Model (about 4% of the vehicle's sales price), most of the parts were of local origin, which was in line with the industrial policies of the 1950s.

No other firm in the district recorded a success that could be compared to Seat's people's car, but the pioneer companies also prospered in the late 1950s. In 1957 Motor Ibérica produced 404 light trucks in Barcelona under the Ebro brand with Ford's licensing. Enasa manufactured 505 heavy trucks in the former Hispano Suiza plant under the brand Pegaso.⁶⁵ Even Elizalde

CHART 5 • Automobile Exhibition of Barcelona, 1919-89 (First 25 Shows)



Source: Own work from Gimeno (1999) and COCIN, *Memoria económica de Cataluña*, Barcelona, various years.

64. Solé (1994); San Román (1995); Catalan (2000); García Ruiz (2001); Catalan (2006c); Catalan & Fernández Sevilla (2013).

65. López Carrillo (1998); García Ruiz (2003).

tried to get back into automobile production. Throughout the 1950s, Elizalde had been producing aircraft engines as a partially state-owned firm under the name of *Empresa Nacional de Motores de Aviación S.A.* (ENMASA), but in 1959 it signed a contract with Daimler Benz A.G. which licensed the Barcelona plant to produce diesel engines and vans with the Stuttgart company's technology.⁶⁶

Auto part producers also enjoyed a period of expansion during the 1950s. The cylinder manufacturer *Fundiciones Industriales* (located in Vilanova i La Geltrú) and the producer of ignition systems *Auto Electricidad* increased their respective labor forces to over 500 employees each. In 1953 a group of local entrepreneurs and the Italian firm Carello created a joint venture to produce lights, filters and other parts under the brand *Faros Españoles S.A.* (FAESSA). In 1958 Ricart and a group of entrepreneurs obtained a license to produce hydraulic brakes under the brand Automoción S.A. In 1959 *Constructora de Equipos Diesel* (Condiesel) began to build a new plant in Sant Cugat, near Barcelona. The general trend during the 1950s and 1960s was licensing technology from European groups which participated with minor stakes in the firms. After the stabilization plan, the presence of foreign interest increased because the new law permitted foreign participation in as much as 49% of a company's capital.

Components producers significantly benefited from the lack of foreign competition and the increasing demand from manufacturers such as Seat, Enasa and Motor Ibérica. They often licensed technology from European firms and, very often, favored their participation as minority shareholders.⁶⁷ The main companies in this group were *Fundiciones Industriales*, *Auto Electricidad*, Harry Walker, *Condiesel*, *Artés de Arcos*, *Frape* and *Carner*. Other, more modest part producers which experienced significant growth during the early 1960s, were *Ficosa* and *Doga*.⁶⁸

Counting both manufacturers and auto part producers, at least 15,000 people were employed in the Barcelona automotive industry cluster in 1960 (more than three times the size of the cluster in 1936). Although the Madrid automotive industry had grown very quickly in the early years of Franco's regime (11,000 employees) and the Basque cluster had also expanded (9,000 employees), Barcelona maintained its position as the capital of the Iberian automotive industry, even while there was no real help for institutional development.⁶⁹ In fact, Seat, Enasa and Enmasa all had INI as their main shareholder but their headquarters were located in Madrid as a result of the centralizing pol-

66. Catalan (2006a); García Ruiz (2003).

67. Ortiz Villajos (2010); Tudela (2016).

68. Ficosa's history is analyzed in Catalan (2006b). Doga was born in 1958.

69. Catalan & Monteagudo (2003).

icy of the holding. Moreover, during the regime the Barcelona Automobile Exhibition was unable to open its doors until 1966, which meant that between its seventh and eighth editions there was a gap of more than 30 years (an unusual institutional weakness). However, from then until the crisis of the 1970s, both the number of exhibitors and the square meters of exhibits increased dramatically (Chart 5).

If we consider the hub-firms in the Barcelona cluster that employed more than 1,000 people in the early 1960s, three out of every four firms were managed from the Spanish capital. The only firm that had its headquarters in Catalonia was the fully privately-owned Motor Ibérica. The cluster's institutional development was therefore much less satisfactory than it had been in the pre-Civil War years. However, the cluster continued to benefit from Marshallian externalities: technicians moved from one firm to another, the number and size of auto part suppliers expanded and the cluster's specialized labor force also increased. In spite of the cluster's institutional shortcomings, the externalities made it possible for the district to survive and mature.

The Barcelona experience tends to confirm Klepper's theory on the importance of inheritance and spin-offs within automotive clusters, but with one notable difference:⁷⁰ although three of the four leading firms in Table 3 were spin-offs of pioneer hub-firms in the district (Enasa from Hispano Suiza, Motor Ibérica from Ford and Enmasa from Elizalde), the firm that emerged as the new district champion, Seat, had actually grown from nothing, under its own steam. Seat emerged in the early 1950s and was mainly the result of strategic industrial policy, yet it generated the most important externalities in the cluster and provided the main thrust for the cluster's revitalization. Therefore, its experience tends to confirm the hypotheses of Chang and other scholars who insisted in the need for industrial policy.⁷¹

In fact, Seat launched its 1500 Model in 1963 in order to renew its line in saloon vehicles, and its 850 Model in 1966, with the intention of upgrading the offer for its customers.⁷² During 1966, Seat manufactured more than 120,000 vehicles. When we compare this figure with the output of the other hub-firms in the Barcelona district, it becomes clear that the scale economies derived from Seat dramatically exceeded the production capabilities of the district's older established companies: in that same year Motor Ibérica manufactured just 5,772 vehicles (Ebro), Enasa's Madrid and Barcelona plants together only built some 10,260 vehicles (Pegaso trucks), and Enmasa assembled just 2,053 vehicles (Mercedes vans), even though this last firm also sup-

70. Klepper (1996), (2002), (2010).

71. Amsden (1989); Reich (1990); Chang (1993); Catalan (2000); Chang (2007); Ling & Chang (2009); Catalan (2010); Catalan & Fernández de Sevilla (2013).

72. Solé (1994); Catalan (2006c); Tappi (2008).

TABLE 3 • *Employment by leading firms and total employment in the automobile industry cluster of Barcelona, 1962 and 1976*

	1962		1976
SEAT	5,507	SEAT	27,053
ENASA	3,696	Motor Ibérica	4,722
Motor Ibérica	1,178	ENASA	3,616
ENMASA	1,000	CHAM Benz	1,422
Fundiciones Industriales	677	Condiesel	1,130
Auto Electricidad	635	Industrias del Mediterráneo	1,124
Estampaciones Metálicas Tió	449	Fundiciones Industriales	1,012
Industrias Men-Par	334	Autoaccesorios Harry Walker	987
Artés de Arcos	332	Bendibérica	901
Faros Españoles (FAESSA)	220	FAESSA Internacional	878
	13,784		42,845
TOTAL EMPLOYMENT IN THE DISTRICT	20,503	TOTAL EMPLOYMENT IN THE DISTRICT	55,131
SHARE OF 10 TOP FIRMS	0.672	SHARE OF 10 TOP FIRMS	0.777

Source: Own work from Catalan (1992) & Catalan (2012).

plied engines for the DKW plant in Vitoria-Gasteiz, in the Basque country.⁷³

During the 1960s Spanish industrial policy maintained strict import quotas on car imports and heavy protection on auto part imports.⁷⁴ Although the stake of foreign capital permitted in Spanish industrial firms had been increased to 49%, automobile investment was still subject to tough licensing laws. And in addition to favoring import substitution, the Ministry of Industry sought to promote manufacturing export. Minister Gregorio López Bravo urged Fiat to allow Zona Franca to export and an agreement was finally reached in 1967 by which Seat could export its vehicles from Barcelona in exchange for granting Fiat's Agnelli family a larger stake in the firm's capital: 30% (from just 7% before the agreement), while in INI's case the share would be reduced from 51% accordingly. Moreover, Turin also agreed to lower the royalty fees paid on Seat's models. And finally, INI's sale of capital helped to finance the investments required to produce a new model, the 124, which was launched in 1968.

73. Echevarría & Voltes (1990); López Carrillo (1998); Catalan (2006a).

74. Catalan (2000); García Ruiz (2001), (2003); Sánchez (2004); Catalan (2006c); Sánchez (2006); Fernández de Sevilla (2007); Catalan (2010); Fernández de Sevilla (2011); Sánchez (2011); Catalan & Fernández de Sevilla (2013).

During this golden age, the Barcelona district began to feel some of the disadvantages of mature clusters. Accelerated growth and diversification since the mid-1950s had increased the price of land in and around the city. Many auto part suppliers chose to build their new factories in towns in the main counties surrounding Barcelona (such as Baix Llobregat and Vallès), where land could be more cheaply bought. Moreover, rapid industrial growth also prompted labor mobilization and the emergence of a new union movement which aimed to improve wages and working conditions. Because free trade unions had been prohibited during the regime, labor disputes very often became both economic and political. As the largest manufacturer in the country, Seat became the main arena for class-related confrontation, even though the remaining firms in the cluster also experienced increasing levels of such conflict.⁷⁵

As Seat grew, the company's managers decided to solve the problem of cramped premises in Zona Franca by acquiring land near the town of Martorell, some 30 kilometers from Barcelona but still within the same province. The 1969 decision to purchase this land (in an area that would eventually also contain a motorway connecting the Spanish Mediterranean coast to France) clearly indicated Seat's desire to remain within the district, despite the cluster's growing labor conflict.⁷⁶ At first, the company had planned to use this land to build a production plant to manufacture its latest model, the 127 (another people's car which would replace the obsolete 600 Model); but the newly-appointed Minister of Industry, José María López de Letona, denied permission for building the plant (and Martorell had to wait until the early 1990s to get inaugurate its factory, after Seat had already come under the ownership of the Volkswagen Group). In fact, the 127 Model was finally produced in Zona Franca, where it began to be manufactured in 1972.

Mounting labor conflict in Zona Franca led to a strike in 1971 which ended with the death of a car worker at the hands of the Spanish police.⁷⁷ At the same time and in spite of the regime's political repression, Seat workers' wages also increased rapidly, fostered by clandestine union mobilization: the labor share in total Seat costs increased from 15% in 1969 to 22% in 1972. By then, the company was producing more than 300,000 vehicles a year and had significantly helped Spain become the ninth biggest automobile manufacturer worldwide (Table 4).

Motor Ibérica (MI) surpassed Enasa as the second hub-firm of the district. In 1965 the private firm decided to take on a new technological partner, replacing Ford with the Canadian Massey Ferguson, who accepted a 32% rate

75. Tappi (2008).

76. Catalan (2006c).

77. Solé (1994); Tappi (2008).

of participation in its capital.⁷⁸ MI's growth strategy combined to expand within the Barcelona cluster and also took over firms in other Spanish districts. In Montcada, on the outskirts of Barcelona, the firm bought the lion's share of the truck body manufacturer Bosuga. MI also decided to build a new assembly plant for both trucks and tractors in Zona Franca, close to Seat's plant. During the early 1970s, MI therefore had three large factories within the Barcelona district. In the rest of Spain, the company also bought large stakes in Avila's producer of vans (Fadisa), in Madrid's Aeronáutica Industrial (Avia), which manufactured vans and engines, and in the Basque auto parts producer Forjas de Asúa.⁷⁹ In 1972 the Motor Ibérica group was producing nearly 19,000 vehicles.

Enasa took over the van producer Sava, located in Valladolid. Although most of the new employment in Enasa was generated in the light trucks plant in Barajas (Madrid), the state-owned firm also decided to build new facilities in Barcelona's Zona Franca. Consequently, the three largest hub-firms in the cluster eventually became neighbors in the location of significant plants. The Enasa group manufactured 18,000 trucks in 1972 (including plants in Madrid, Barcelona and Valladolid). The group employed about 11,000 people all over Spain. Barcelona's plants accounted for 30% of total employment figures.

In 1969 Enmasa transferred its Barcelona plant, which produced Mercedes vans and road vehicle engines to Cispalsa.⁸⁰ Daimler Benz took the lion's share in this new firm and Enmasa and another INI's subsidiary, Endasa, participated with minor stakes. As well as Mercedes vans, Cispalsa manufactured engines for Vitoria's DKW and developed a diesel engine to be assembled in Seat's 1500 Model. In 1972 Cispalsa merged with Imosa to create the *Compañía Hispano Alemana de Productos Mercedes-Benz y Volkswagen S.A.* (Mevosa).⁸¹ The main stakes of the firm remained in the hands of the German companies located in Stuttgart and Wolfsburg. Mevosa produced about 11,000 vehicles in 1972 and employed more than 1,000 people.

The auto parts manufacturers also experienced substantial growth in the period leading up to the early 1970s.⁸² For instance, Fundaciones Industriales, which produced alloys for pistons and other motor components, increased its employees from 677 in 1962 to 1,102 in the mid- 1970s; and Autoaccesorios Harry Walker, which manufactured carburetors, expanded its labor force from 205 to 987 workers.

78. Echevarría & Voltes (1990); Estapé (1997).

79. Echevarría & Voltes (1990).

80. Catalan (2006a).

81. García Ruiz (2001); Catalan & Monteagudo (2003); García Ruiz (2003).

82. Ortiz Villajos (2010).

TABLE 4 - *Main producers of automobiles in 1950 and 1972 (thousands)*

		1950			1972
1	United States	8,003	1	United States	11,271
2	United Kingdom	784	2	Japan	6,299
3	Canada	390	3	Germany FR	3,817
4	USSR	359	4	France	3,328
5	France	358	5	United Kingdom	2,329
6	Germany FR	305	6	Italy	1,840
7	Italy	129	7	Canada	1,474
8	Belgium	49	8	USSR	1,381
9	Australia	38	9	Spain	696
10	Japan	32	10	Brazil	611
11	Czechoslovakia	31	11	Australia	473
12	Sweden	17	12	Sweden	355
13	Germany DR	9	13	Argentina	269
14	Hungary	3	14	Mexico	233
15	Netherlands	1	15	Czechoslovakia	184

Source: Own work from United Nations, *Statistical Yearbook*, various years.

Like the automobile manufacturers, the auto parts producers began to experience district disadvantages in the late golden age. One of the most serious strikes took place in the Harry Walker plants in 1970. Labor disputes and increasing land prices in Barcelona also favored the expansion of the industry to less developed municipalities within the district: Femsa, which manufactured generators, batteries and electrical cables, built factories in various locations in the province of Barcelona (namely, L'Hospitalet de Llobregat, Sant Joan Despí and Castellet i la Gornal).

The province of Barcelona had ten factories assembling cars during the 1970s and about 300 plants producing parts. It had a direct labor force of some 55,000 people. As Table 3 shows, throughout the late golden age the rapid expansion of the cluster was accompanied by an increasing concentration of employment within the largest firms in the district. These provided the cluster with key capabilities, benefiting from scale economies in production, distribution and management, confirming Chandler's thesis.⁸³ Importantly, they also took advantage of the classical Marshallian externalities that hundreds of auto part suppliers and thousands of workers could provide.⁸⁴

83. Chandler (1964), (1990), (1992); Chandler, Amatori & Hikino (eds.) (1997); Chandler (2005).

84. Marshall (1890); Catalan (2000), (2011a).

Coping with maturity, 1972-2000

The growing maturity of the Barcelona cluster coincided with the relaxation in nationalistic industrial policy by Franco's later governments and Spain's transition to democracy.⁸⁵ In 1972, Henry Ford II visited the future head of state Prince Juan Carlos and Franco's second-in-command, Admiral Luis Carrero Blanco, to ratify a marked shift in the automobile policy which had been negotiated with the Spanish Ministry of Industry, headed by López de Letona. On the one hand, the share of the compulsory use of domestic parts in automobile manufacturing was to be reduced from 90% to 60% for new passenger car assemblers. On the other hand, Ford was to be granted permission to build a new plant to manufacture engines and cars in Spain, with the promise that it would export more than 90% of its production.

Just months before Franco's death in 1975, SEAT took charge of AUTHI, a bankrupt British Leyland subsidiary located near Pamplona. Such a decision in the middle of the first oil crisis after the Yom Kippur War had as counterpart the Spanish government's veto to having General Motors in Spain.⁸⁶ Nevertheless, this agreement was not respected by the transition governments of UCD and, in the end, its European subsidiary Opel was granted permission to build a new factory, near Zaragoza, in 1979.⁸⁷ The new automobile policy also allowed all the assemblers to import up to 60% their auto parts. Import quotas for vehicles were also substantially reduced and the number of imported automobiles nearly tripled from 1978 to 1980 (increasing from 28,000 to 76,000 units). Finally, restrictions on foreign investment were completely relaxed.

The intensification of competition in the automotive industry took place while the Spanish economy was experiencing a dramatic slump. Incumbents in the automobile industry not only recorded dramatic labor cost rises in the period leading up to 1977, but also had to cope with mounting inflation and frozen prices. Moreover, the need to curb inflation (which reached nearly 30% in 1977) led to the adoption of very stringent monetary policies and income austerity with the Moncloa Pacts. This resulted in a dramatic increase in real interest rates. As many incumbents had borrowed to finance the mounting wage bill in the early years of the crisis, the cost of debt servicing rocketed.

SEAT's losses, which had been moderate until 1977, dramatically increased with the launching of the Fiesta model by Ford.⁸⁸ The latter was a slightly upgraded development of the 127 model, then the blockbuster of the

85. García Ruiz (2001); González de la Fe (2003).

86. Catalan (2007).

87. Germán (2001).

88. Pérez Sanchó (2003); Catalan & Fernández de Sevilla (2013); Catalan (2017).

Barcelona cluster's main hub-firm.⁸⁹ The major success of the Ford Fiesta in the medium-low segment of the Spanish market led to the multiplication of losses at SEAT, which was, moreover, handicapped by the cost of financing substantial increases in the wage bill, legal restrictions to fire redundant labor force, the obligation to buy 90% of their parts from local suppliers of inputs and the frozen prices of their outputs. As a result, INI decided to invite Fiat to take complete control of the company. After reaching an agreement in 1979, mounting losses of the Barcelona subsidiary and Fiat's new managers' preference for diversification led Turin to disinvest in Spain, bringing back the firm to public holding in 1980. At this time, the founding banks in Spain were also being faced by difficult times and SEAT entered the 1980s as a completely government-owned firm. Its output fell from about 360,000 vehicles in 1974 to less than 210,000 in 1981.⁹⁰

Motor Ibérica commercial vehicles sales slowed after 1974. Nevertheless, the company continued with its overambitious expansion plans after the first oil crisis. Within the Barcelona cluster, MI took a stake in the parts supplier Estampaciones Metálicas Tió. In the rest of Spain, it decided to buy the foundry of Los Corrales de Buelna, a property formerly owned by Authi that Fiat had decided not to acquire. Abroad, mainly in Mediterranean countries, MI created subsidiaries to foster its exports of Ebro vans, trucks and tractors. As the slump intensified in the late 1970s, MI's profitability was increasingly squeezed. In 1979 Massey-Ferguson decided to sell its 36% stake to Nissan Motor. Motor Ibérica officially recorded losses in 1980 for the first time since Ford had left the company in 1954.⁹¹ Its output of commercial vehicles (mainly vans and light trucks) decreased from 29,000 in 1974 to just 18,000 in 1981. The production of farm tractors also experienced a dramatic reduction.

Enasa's demand also declined after the first oil crisis. Official losses emerged already in 1976 and production continued to decrease in the period leading up to 1981. The output of vehicles (including all the Spanish plants) fell from about 20,000 in 1977 to less than 12,000 in 1981. In comparison with its main rival in the district, MI, the completely state-owned firm was more competitive in heavy commercial vehicles, from the legacy of the old Hispano Suiza. For instance, in 1981, MI produced 11,147 Ebro vans and exported more than 10%, whereas Enasa produced 3,940 vans and exported less than 1% of these. In contrast, Enasa's output of Pegaso heavy trucks, which had been produced for the first time in the former Hispano-Suiza works, was 3,819 with exports of 35%, while the Ebro heavy truck output was only 1,037, with 22% of its production sold in exports.

89. Tolliday (2003); Catalan (2010).

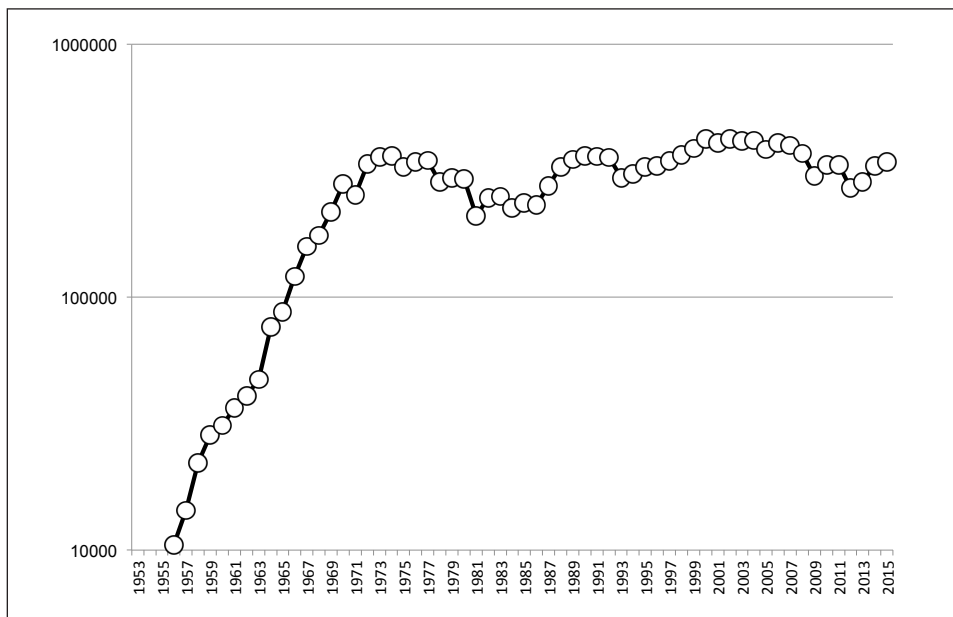
90. Solé (1994); González de la Fe (2003); Catalan (2011b).

91. Echevarría & Voltes (1990).

Under the absolute control of the public holding INI, Seat tried to deal with its dramatic crises by adopting a strategy mainly based on five points.⁹² First, average costs were cut by reducing the size of the labor force and by forcing its agencies to finance their own stocks. Second, exports were fostered with the development of Seat’s own sales network in Europe (until that moment most foreign sales had been made through Fiat’s agencies). Third, the search for an international partner led to the signing of a collaboration agreement with Volkswagen in 1982. Fourth, mounting losses, which rose to 26% of sales in 1983, were covered by repeatedly resorting to government subsidies. And finally, a remarkable effort was made to develop new products.

Giorgetto Giugiaro, who had already conceived the Volkswagen Golf and the Hyundai Poni, was hired to design a new Seat model for the low-medium segment.⁹³ Porsche was contracted to conceive the engine. As Fiat objected to Giugiaro’s participation on the project, the final development was made by Karmann. The three companies worked together with the Martorell R&D center, which was built on the land bought by Seat in 1969. The new model was launched in 1984 under the name “Ibiza”. The successive versions of the

CHART 6 • SEAT’s a brand output in Spain, 1953-2015



Source: Own work from SEAT, *Memoria*, and SEAT, *Informe*, various years.

92. Catalan (2011b).

93. Catalan (2010), (2011b).

Ibiza, a model conceived when the firm was completely state-owned, would remain the brand's blockbuster for nearly 30 years.⁹⁴

The government of Felipe González signed an agreement in June 1986 to sell 51% of Seat's capital to Volkswagenwerk A.G.⁹⁵ Moreover, the contract also stated that Wolfsburg's group would increase its share to 75% at the end of the year. The Spanish socialist government also agreed to assume any past debt from Seat. It has been calculated that for the Spanish tax payer the total cost of Seat's privatization (including previous subsidies) was nearly 2,000 million euro. On the other hand, VW agreed to invest some 3,000 million euro in SEAT and to maintain the company as an independent brand with its own distribution network.⁹⁶

In 1980, Daimler Benz took full control of Mevosa, formerly Elizalde. The following year, the name of the company was changed to Mercedes-Benz España. The Vitoria and Barcelona plants were restructured to prepare for the launch of the MB 100 van, which would become an export success in the late 1980s. Whereas the Basque plant assembled the van, the Catalan factory produced the engines, the gear boxes and other parts.⁹⁷

The prospect of a low-cost country entering the EEC also encouraged an increase of foreign investment in part manufacturers in the Barcelona cluster. For instance, Condiesel, the manufacturer of diesel fuel pumps established in Sant Cugat, was renamed Lucas (the brand name of the major stakeholder). In 1985, the brakes manufacturer located in Parets (which was founded by Ricart and his partners as Automoción S.A.) changed its name to Bendix España, to clearly show that it was a subsidiary of the American company.

Most of the Barcelona cluster recovered during the second half of the 1980s. The expectations due to Spain's adherence to the Common Market in 1986, and the world recovery that took place after the stagflation crisis combined to favor a new period of expansion in the manufacture of automobiles and their parts in the Catalan district. During this phase, the Barcelona hub-firms tended to adopt growth strategies characterized by three main features: externalization, product innovation and specialization.⁹⁸

Externalization became a strategy to decrease both inventory and labor costs. The aim was to imitate the success of Japanese manufacturers, and Toyota in particular, with its just-in-time system. An indicator of the intensity of such a process is the ratio of employment generated by the cluster's top ten firms. In 1976 they generated 78% of the employment in the cluster (55,131

94. Solé (1994); Llorente (1997); Díaz Ruiz (2010); Catalan (2011b).

95. Solé (1994).

96. Llorente (1997).

97. Catalan (2006a).

98. Llorente (1997); Catalan (2000); González de la Fe (2003); Díaz Ruiz (2010); Catalan (2011b).

people) (Table 3). In 1989 their share had fallen to just 58% (whereas total employment in the cluster was rather similar, at about 55,202 people) (Table 5).

Product innovation was also crucial at a time when the Spanish consumer could choose from a much wider range of products at a better price, as a member of the EEC. Seat launched the Ibiza model in 1984, and also presented new passenger cars in 1985 (the Málaga) and 1990 (the Toledo), all designed by Giugiaro in collaboration with the R&D center in Martorell and manufactured in the Zona Franca.⁹⁹ Moreover, Seat marketed both Volkswagen and Audi models, particularly the Polo, which was produced in Seat's plant in Pamplona. Nissan Motor Ibérica presented the four-wheel-drive model Nissan Patrol, which began to be produced in Barcelona's Zona Franca in 1983. The following year, it launched the Vanette van. In 1988, the former Motor Ibérica presented another van (Nissan Trade), a new light truck (Nissan) and improved the engines of its Patrol and commercial models.¹⁰⁰

Specialization was a requirement in large markets, such as the West-European one. Seat found its niche as the cheap, Mediterranean brand of the Volkswagen group. Nissan prioritized the production of four-wheel-drive vehicles, vans and light trucks, but scaled down its capacity to manufacture heavy trucks, agricultural tractors, truck tractors and buses. It succeeded in getting the lion's share of the 4x4 market in Spain. Mercedes Benz used its Barcelona plant to supply parts for its Vitoria factory.¹⁰¹ Enasa stopped its production of vans and light trucks, and tried to concentrate on heavy trucks, truck tractors and buses.

The 1990-95 slump interrupted recovery. The outbreak of the First Gulf War, moderately, and the collapse of the European Monetary System, in a more dramatic way, sank Spain into a new crisis. Among the automobile producers, Enasa was the firm that first experienced the slump, suffering a tremendous erosion of market share: the output of its blockbuster, the Pegaso heavy truck, fell from 6,300 units in 1988 to 2,900 in 1990. INI decided to privatize the firm, which was bought by Iveco, a subsidiary of Fiat.

Seat also suffered a dramatic slump, which reached its nadir in 1993, when nearly 1,000 million euros of losses were recorded in one year. The Volkswagen consortium had built a new plant in Martorell, which cost around 4,000 million euros and was mainly financed by credit. Spain had joined the EMS with a very optimistic parity of 65 pesetas per Deutschmark. Funds were borrowed in marks without exchange insurance.¹⁰² When Spain was unable to maintain its parity in late 1992 and its currency began to depreciate, the cost

99. Catalan (2011b).

100. Echevarría & Voltes (1990).

101. Barrientos (coord.) (2003).

102. Solé (1994); González de la Fe (2003).

TABLE 5 - *Employment by leading firms and total employment in the automobile industry cluster of Barcelona*

	1989		2010
SEAT	18,200	SEAT	10,369
Nissan Motor Ibérica	4,500	Nissan Motor Ibérica	4,500
Bendix España	2,047	Gearbox del Prat	1,085
Lucas Automotive	1,212	Delphi	1,052
IVECO-PEGASO	1,200	Fico Mirrors Barcelona	939
Mercedes Benz	1,000	Centro Técnico SEAT	918
FICOSA International	976	Doga	845
MAHLE	917	Plastal	777
Valeo Térmico	960	Kostal Eléctrica	750
FAESPA	850	Magneti Marelli España	700
	31,862		21,935
TOTAL EMPLOYMENT IN THE DISTRICT	55,202	TOTAL EMPLOYMENT IN THE DISTRICT	44,304
SHARE OF 10 TOP FIRMS	0.577	SHARE OF 10 TOP FIRMS	0.495

Source: Own work from Solà, Hernández & López (1990) and Actualidad Económica (2012), *Cuáles son, cuánto venden y quien manda en las primeras 5.000 empresas de España*, Iberform, Madrid.

of servicing the loan went up.¹⁰³ However, the main reason for the dramatic losses was that Martorell launched its first cars when European demand was dropping. Seat experienced dramatic over-production through its three plants in the Barcelona cluster (the old Zona Franca factory, the new Martorell plant, and a gear box factory in Prat del Llobregat) and its Pamplona/Landaben plant (mainly for VW products).¹⁰⁴

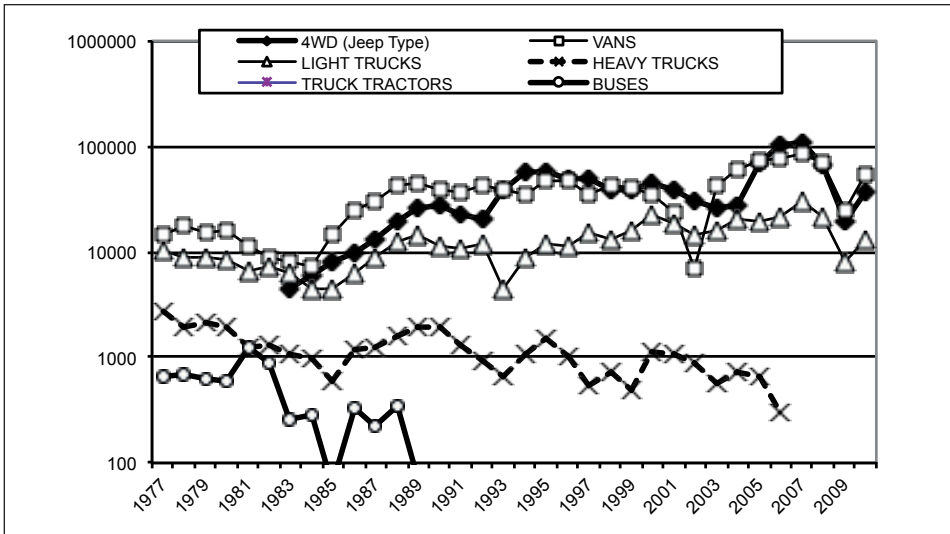
Nissan opened a new R&D center in Barcelona in 1990 (the second in the district, after Seat's Martorell center). In 1992, it launched a new compact people carrier, assembled in its Zona Franca plant: the Nissan Serena. However, the Japanese subsidiary was also hurt by the dramatic contraction of demand for its light trucks and vans. These were also tough times for Mercedes, whose Spanish output of vans fell from 28,000 units in 1991 to only 19,000 in 1993.

During the slump of 1990-95, the hub-firms in the Barcelona cluster continued with their previous strategies of innovating and increasing specialization. Externalization came to a temporary halt due to the need to use a huge, underutilized capacity. Moreover, the leading cluster companies tried to in-

103. Llorente (1997).

104. Catalan (2001b).

CHART 7 • Output of Motor Ibérica/Nissan in Spain, 1977-2010 (vehicles, agrarian tractors excluded)



Source: Own work from ANFAC, *Memoria*, various years.

crease flexibility by splitting some of their subsidiaries. Nissan Spain was divided into several companies, including *Nissan Motor Ibérica* (design and production of light vehicles and engines), *Nissan Vehículos Industriales* (trucks) and *Nissan Distribution Service Barcelona* (logistics). In addition to the R&D center, Barcelona kept two production plants in Zona Franca (where the Terrano, Patrol, Serena and Vanette Cargo models were assembled) and Montcada (body parts production).

In Barcelona, Iveco ended its heavy truck manufacturing (which continued in Madrid only) and specialized in buses and parts. Some of the cluster's plants were transformed into *Componentes Mecánicas S.A.* to focus on the manufacture of gear boxes. This was a joint venture of Iveco with ZF Friedrichshafen A.G.. Seat transferred its Pamplona/Landaben plant and some of its previous branches (financing, leasing and a few European agencies) to the Volkswagen consortium. Wolfsburg also centralized the buying of parts for the whole group and, under the leadership of Ferdinand Piech, implemented a policy of common platforms for the main brands of the consortium. The number of main brands had increased to four with the acquisition of Skoda, the Czech company.¹⁰⁵

105. Solé (1994); Llorente (1997); González de la Fe (2003); Díaz Ruiz (2010); Catalan (2011b).

The dramatic crises of the Seat brand, whose sales decreased from 362,360 vehicles in 1990 to only 290,155 units in 1993 (when a new 500,000-unit capacity plant had been opened), led Piech to ask for the support of the Spanish government. After some bargaining, the *Instituto de Crédito Oficial* lent 240 million euros and the Catalan regional government an additional 50 million euros to restructure Seat's Zona Franca facility. In exchange, the local political actors required the VW group's commitment to increase the share of Spanish domestic parts that Seat used in its vehicles. The share had decreased to 53% throughout the 1980s and early 1990s. The agreement stated that the share should increase to a minimum of 67%. This bargaining can be interpreted as a partial return to the policy of supporting local production, which had been abandoned since 1972.¹⁰⁶ In some respects, there was some path dependence in Spanish industrial policy in the very long-term. The sustained depreciation of the peseta from 1992 onwards helped VW to increase its purchases in Spain. An exchange of 85 pesetas per Deutschmark at the end of 1995 made it much easier to acquire parts for Seat's vehicles in Spain than four years earlier.

After substantial and repeated revisions of the peseta's parity in the European Monetary System, the Spanish economy experienced a new period of

TABLE 6 • *Main producers of automobiles in 2000 and 2012 (thousands)*

		2000			2012
1	United States	12,800	1	China	19,272
2	Japan	10,141	2	United States	10,329
3	Germany	5,563	3	Japan	9,943
4	France	3,348	4	Germany	5,649
5	South Korea	3,145	5	South Korea	4,562
6	Spain	3,033	6	India	4,145
7	Canada	2,962	7	Brazil	3,343
8	China	2,069	8	Mexico	3,002
9	Mexico	1,936	9	Canada	2,464
10	United Kingdom	1,814	10	Thailand	2,429
11	Italy	1,738	11	Russia	2,232
12	Brazil	1,682	12	Spain	1,979
13	Russia	1,206	13	France	1,968
14	Belgium	1,033	14	United Kingdom	1,577
15	India	801	15	Czech Republic	1,179

Source: Own work from OICA, *Production Statistics*, various years.

106. Catalan (2011b).

expansion until 2000. This led to a new phase of relative splendor of the cluster, which at the end of the century approximately recovered the peak levels of employment reached in the mid-1970s and around 1990. At the same time, Spain climbed to sixth position in the world rankings of automobile manufacturers (Table 6).

The leading firms in the district again benefited from the growing externalization of their production. Supplier parks were created on the outskirts of Martorell and in Zona Franca, to facilitate the extension of just-in-time processes.¹⁰⁷ The Nissan R&D center in Barcelona presented new versions of the Terrano four-wheel-drive model, Serena compact vehicle and Vanette Cargo van. In 1997, it was separated from its parent company to be transformed into the Nissan European Technology Center España. Seat, which had launched its Cordoba model in 1993 (the last to be designed by Giugiaro), presented the Alhambra compact model in 1996 (which was exclusively manufactured in Portugal) and the Arosa super-mini in 1997 (which was produced by Wolfsburg and Martorell). However, Seat's most successful model after the Ibiza was the Leon, which was launched in 1999. By this time, the company had hired a new Italian designer, Walter de Silva, who came from Alfa Romeo. Volkswagen tried to depart from the image of Seat as a cheap car by accentuating its sports and Mediterranean features. A new design center was created in the Barcelona coastal town of Sitges, which, together with Seat's R&D center in Martorell, employed over 2,000 engineers and technicians at the end of the twentieth century. In Seat vehicles manufactured in the Barcelona cluster, the proportion of local parts increased from 53% in 1993 to 72% in 1999. Seat's brand sales reached its zenith in 2000 (Chart 9).¹⁰⁸

The records of the Mercedes and Iveco plants in Barcelona were not comparable, but the production of engines and coaches tended to expand in the last few years of the century. Barcelona partially benefited from the success of the Vito van and the Mercedes Benz Class V, both of which were assembled in Vitoria. The output of coaches increased from only 200 units in 1994 to over 1,500 units in 1999. Iveco and Renault created a joint venture to manufacture coaches under the brand Irisbus in 1998. The following year, Renault and Nissan signed a strategic alliance by which the French company bought 37% of the Japanese group's capital. In 2000, Nissan began to manufacture the Almera Tino, its new compact vehicle. It was the first time that the subsidiary had assembled a passenger car in Spain. By that time, the Barcelona automobile industry cluster employed nearly 50,000 people.

107. Llorente (1997); Díaz Ruiz (2010).

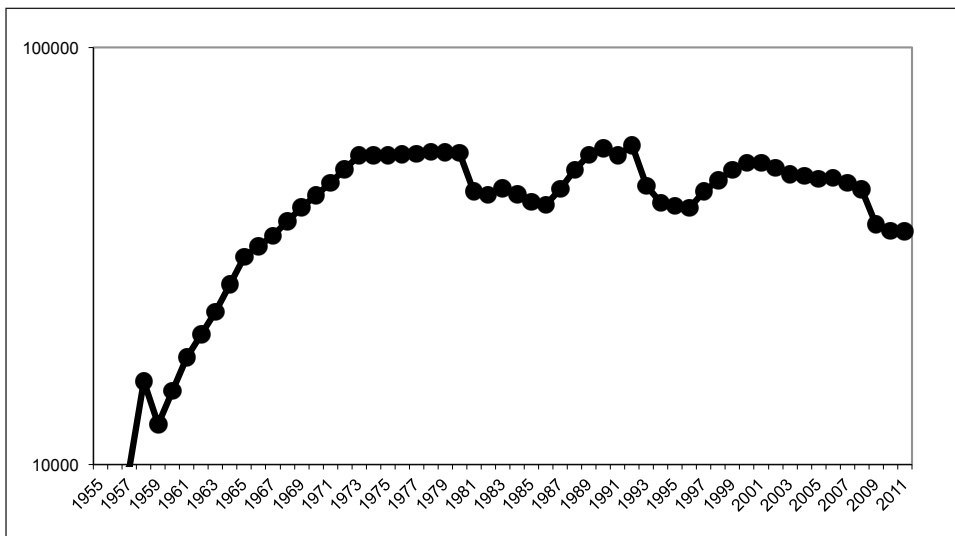
108. Catalan (2011b).

Old age's saturation, 2001-2015

In 2000, the rapid expansion of Western economies associated with the diffusion of technologies for processing and transmitting information collapsed. The US Federal Reserve reduced interest rates to encourage recovery and boosted a bubble in real estate, which prolonged artificial euphoria in the Western world until 2007. In the meantime, China was experiencing a much healthier expansion based on rapid industrialization. Reforms undertaken since the 1980s (including substantial depreciation of the yuan) plus adhesion to the International Trade Organization in the early twenty-first century transformed the country into a world creditor. Since the burst of the real estate bubble in the US and Europe, China has climbed to first place in the world rankings of automobile output (measured in number of vehicles). Other Asian economies and a few Latin American and East European countries also rose in the rankings, following comparable industrialization strategies. In contrast, Spain dropped from sixth to twelfth position in 2012 (Table 6). The Barcelona automobile-industry cluster experienced accelerated aging.

The premature old age of the cluster did not merit the attention of many analysts before 2008, because Spain recorded one of the most marked real estate bubbles since the full adoption of the euro. Spain's adhesion to the European Monetary Union led to a notable decrease in interest rate spread in

CHART 8 - *The life cycle of the Barcelona automotive industry, 1955-2011*
(number of employees)



Source: Own work from Catalan (2006 & 2011b) and IDESCAT (2013), "Persones ocupades a la indústria," www.idescat.cat.

relation to the main countries in the area, which encouraged import capital and growing indebtedness. The marked capital inflow contributed to eroding Spanish foreign competitiveness at a time when depreciation of the currency, the traditional way to adjust, was barred. Such a process could rarely be denied during the Great Recession which began in late 2007, but was hidden by the previous banking credit and real estate euphoria. In the meantime, multinational groups began to transfer production phases to Eastern Europe or even Asia, where labor costs were much lower.

Seat's share in its main market (Western Europe) increased from 2.3% in 1990 to 2.9% in 2000, but fell to 2.4% in 2007.¹⁰⁹ The collapse accelerated from then, and Seat's market share in Western Europe stood at only 2.1% in 2012. The opposite pattern occurred with the other cheap brand in the Volkswagen consortium, Skoda. Its share in the same market increased from 1.5% in 2000 to 3.1% in 2012. In 2009, Skoda surpassed Seat in sales on the former market, for the first time. This was particularly worrying because, in contrast with the Czech brand, the Volkswagen group did not make any substantial effort to promote its Barcelona subsidiary on other continents. VW's strategy of trying to improve Seat's image by strengthening its links with Audi rather failed. The brand's most successful model was still, until 2013, its people's vehicle, the Ibiza, which was first conceived when the firm was under local control and state-owned.¹¹⁰ Seat maintained its key position as the main hub-firm of the cluster, but its contribution to total employment in the district continued to decrease as externalization progressed.

In Barcelona, the manufacturing activity of Mercedes-Benz and Iveco tended to decrease throughout the twenty-first century. The Stuttgart firm experienced stagnation in its Spanish output of vans, which has remained below 75,000 units since 2000. The production of passenger cars performed a little better, with the manufacturing of the Viano model, but the German parent company decided to concentrate its Spanish activity in Vitoria. Similarly, the production of buses and coaches by Iveco substantially declined in the Barcelona district. In 1999, the output of the Italian company's Catalan factory was about 1,500 coaches. This figure had dropped to 254 vehicles by 2010.

Nissan Motor Ibérica's manufacturing activities had a more positive outlook in the Barcelona cluster. The total production of 4x4 vehicles (including the Pathfinder and Navara models) increased from 45,000 units in 2000 to 106,000 in 2007, but later dropped to just 19,000 in 2009. The output of vans (which are also produced for Renault and Opel) rose from 41,000 in 1999 to 86,000 in 2008, but fell to only 25,000 in 2009.

109. Catalan (2011b).

110. Solé (1994); Llorente (1997); Catalan (2010); Díaz Ruiz (2010); Catalan (2011b).

TABLE 7 - *Main producers of automobiles in 2012 and 2015 (thousands)*

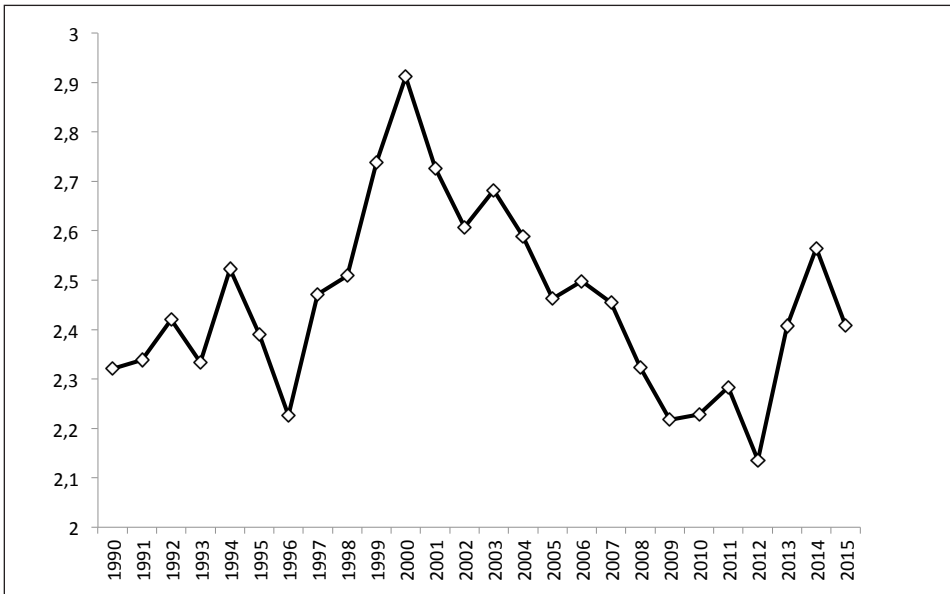
		2012			2015
1	China	19,272	1	China	24,503
2	United States	10,329	2	United States	12,100
3	Japan	9,943	3	Japan	9,278
4	Germany	5,649	4	Germany	6,033
5	South Korea	4,562	5	South Korea	4,556
6	India	4,145	6	India	4,126
7	Brazil	3,343	7	Mexico	3,565
8	Mexico	3,002	8	Spain	2,733
9	Canada	2,464	9	Brazil	2,429
10	Thailand	2,429	10	Canada	2,283
11	Russia	2,232	11	France	1,970
12	Spain	1,979	12	Thailand	1,915
13	France	1,968	13	U K	1,682
14	U K	1,577	14	Russia	1,394
15	Czech Republic	1,179	15	Czech Republic	1,304

Source: Own work from OICA, *Production Statistics*, various years.

Externalization within the parts suppliers of the cluster continued during the twenty-first century. The share in employment of the ten top firms declined to only 49% in 2010 (Table 5). Moreover, the activity of parts producers in the Barcelona cluster has tended to decrease since 2000. Most of the manufacturers substantially cut their number of employees within the district, well before the official beginning of the global financial crisis in 2007. Moreover, international groups such as Lear, Valeo, Eaton Livia and Delphi closed some of their Catalan plants during the first decades of the twenty-first century. Even Barcelona's Ficosa group, which was founded in 1949 and has about 8,000 employees worldwide, decided to transfer some of their lower added value activities out of the district.¹¹¹ Nevertheless, this group, which is one of the few under local control, maintains its R&D center in the cluster. It is also developing new technology in cooperation with Seat and Sanyo. Ficosa together with the windshield washers' manufacturer Doga and the main assemblers of the district, has contributed to the creation of a new specific institution within the cluster, the Ciac (see main text below).

In short, the Spanish automobile industry as a whole, and the Barcelona district in particular, has declined significantly since 2000, with marked un-

111. Catalan (2006b).

CHART 9 • SEAT share in Western Europe's new registration of passenger cars, 1990-2015

Source: Own work from ACEA, *New registrations in Western Europe (EU=15+EFTA)*, various years.

derperformance in relation to Eastern Europe and Asia. Foreign control of key manufacturers and suppliers within the cluster has had a negative influence in the era of 'de-location'. However, there are a few reasons for not being too pessimistic. The worst moment of recession was 2012. Since then, recovery began to take place both in Barcelona and Spain. Spanish production jumped from less than 2 million vehicles in 2012 to 2.7 million in 2015. Spain's place in the world ranking of producers improved again from twelfth in 2012 to eighth position in 2015 (Table 7).

Seat's output also began to recover. The production of Seat's models in Martorell rose from 270,514 units in 2012 to 342,907 in 2015.¹¹² Moreover, the output of the Catalan plant included 134,170 units of Audi's Q3 model. Seat's market share in Western Europe's new registration of passenger cars expanded again from 2.1% in 2012 to 2.4% in 2015 (see Chart 9).¹¹³ Last but not least, the Leon model, a higher spec added value category vehicle than the Ibiza model, has replaced the latter as the main blockbuster product of the firm.

Nissan Motor Ibérica is assembling around 130,000 vehicles per year in Barcelona. Its output includes Navara 4x4 and pickup models. In 2015 a new

112. SEAT, *Informe Anual*, various years.

113. ACEA, *New registrations in Western Europe (EU15+EFTA)*.

model, Pulsar, with an output of 36,000 units was launched. The Japanese company allied with Renault is also assembling its NV200 van in its plant in Barcelona's Zona Franca, including a promising electric version.

A few firms joined forces and finally the Automotive Industry Cluster of Catalonia (CIAC) was created in April 2013. The five founding companies were the two main assemblers (Seat and Nissan) and three part producers of local origin (Ficosa, Doga and Gestamp). Since then, more than 150 firms established in the region have joined the Ciac. Barcelona's cluster manufactures more than half a million vehicles per year and it is still the main automotive-industry district in Spain, with a share of more than 20% in number of vehicles produced.¹¹⁴

Conclusions

The life-cycle of Barcelona's automobile industry cluster has lasted more than a century. Spain, which was only a marginal automobile producer until 1950, had climbed to sixth place in the world rankings by 2000, mainly due to the development of this cluster. In spite of growing maturity, the Barcelona cluster has succeeded in maintaining its position as leader among the Spanish automobile districts up to now. During the last few decades of the twentieth century, the Barcelona automobile cluster did not experience a decline as marked as that of Detroit in the USA or the West Midlands in Britain.

There are four key reasons for the relative success of the Barcelona cluster, in the following order of importance: externalities; strategic policy; hub-firm capabilities; and institutions. The main reason for the good performance of the cluster in the long term was the set of externalities created in the Catalan capital, which were mainly of a Marshallian type. Previous to the foundation of Hispano-Suiza in 1904, there were at least six attempts to construct cars in Barcelona. Before Elizalde began to produce cars in 1915, it had been manufacturing parts since 1909. Before Ford decided to transfer its Spanish plant to Barcelona in 1923, the Dearborn firm had been assembling cars in Cadiz, with very poor results. Similarly, in 1948 Fiat supported the creation of SEAT in Barcelona because it could rely on specialized suppliers that were based there, a qualified labor force and the diffuse knowledge of the automobile industry. Recoveries after the stagflation crises and the early 1990s slump were also favored by the fact that the automobile builders in the cluster could externalize production phases to their suppliers in the district.

The second key cause of the satisfactory performance of the Barcelona cluster was the adoption of strategic policy. Previously to the Civil War, tax

114. ANFAC (2016), *Informe anual 2015*, Madrid.

rebates forced Ford to increase its use of local parts. Under Franco, success in mass production was due to the creation of SEAT, which was a joint venture between public and private capital. SEAT was, in fact, the firm that really placed Spain among the ten top world producers of cars. The political project that led to its creation not only attempted to undertake mass production of cars, but also wanted to promote the use of locally produced parts. As a result, the first people's car in Spain, the Model 600, used more than 90% locally produced parts. This favored tremendous expansion in the Barcelona cluster during the golden age after the Second World War. Similarly, after the early 1990s crises, a deal was agreed with Volkswagen to increase the use of domestically produced parts, bringing SEAT's use of local parts from 53 to 72% between 1995 and 1999.

The emergence of hub-firms, which performed as leaders of the district, can be considered the third reason for success. Hispano-Suiza and Elizalde provided the cluster with organizational capabilities in the fields of R&D, production and marketing. Ford was able to benefit from economies of scale in production by introducing assembly lines for the first time in the district. The three firms also trained a labor force and created a network of suppliers before 1936. The legacy of these hub-firms contributed to the future achievements of their successors: Enasa, Enmasa and Motor Ibérica under Franco's regime, and Iveco, Mercedes Benz and Nissan afterwards. All of these companies can be considered successful spin-offs of the pioneering hub-firms. As a result of these firms, the cluster could produce a considerable range of products: passenger cars, buses, vans, light and heavy trucks and four-wheel-drive vehicles. However, it should be stressed that the triumph of mass production was the responsibility of a newcomer: Seat. This company was not a spin-off, but the result of adopting a nationalist policy.

Institutions also mattered, even if they were the least significant factor. In the beginning, local institutions, inherited from the successful First Industrial Revolution in Catalonia, helped to train technicians and qualify employees. A very significant role was performed by the Industrial Engineering School of Barcelona, which was the only one of its type that had survived at the end of the nineteenth century in Spain. Another important institution was the Automobile Exhibition of Barcelona, which officially took place for the first time in 1919. Before the Civil War, the Exhibition hosted more than 400 local and international exhibitors. However, Franco's regime substantially weakened Catalan local institutions. Regional government came to an end. Enasa (formerly Hispano-Suiza), Enmasa (formerly Elizalde) and Seat located their headquarters outside the cluster, in Madrid. The Automobile Exhibition of Barcelona did not open its doors again until 1966, which meant that between its seventh and eighth editions there was a gap of over 30 years. In spite of such a dramatic weakening of local institutions, the clus-

ter experienced a sustained renaissance between the late 1950s and the early 1970s.

The Barcelona cluster experienced a marked long-term decline during the start of the twenty-first century. From 2000, both manufacturers and part suppliers recorded sustained decreases in output and losses in employment. This coincided with the adoption of the European single currency, which led to the reduction of interest rates, growing indebtedness, increasing capital imports and, as a result, the erosion of competitiveness.

The worst moment of the Great Recession for Spain was the year 2012, when its automotive industry dropped to twelfth position in the world rankings of automobile producers, as a result of the burst of the bubble, heavy indebtedness and the adoption of excessively restrictive macroeconomic policies. Later recovery began and Spain climbed newly to eighth position in 2015. The Barcelona cluster also recorded a significant improvement. It is still the main Spanish automotive-industry district and produces again more than half million vehicles per year. The cluster is also experiencing some institutional renewal with the creation of the CIAC, which coordinates around 150 firms located in the Barcelona automotive-industry district.

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The Life-Cycle of the Barcelona Automobile-Industry Cluster, 1889-2015

ABSTRACT

The life-cycle of Barcelona's automobile industry cluster has lasted more than a century. The main reason for the good performance of the cluster in the long term was the externalities created within the district, which were mainly of a Marshallian type. The second key cause of its satisfactory performance was the adoption of strategic policy. The emergence of hub-firms, which performed as leaders of the district, can be considered the third reason for success. Institutions also mattered, even if they were the least significant factor.

KEYWORDS: automobile industry, clusters, districts, strategic policy, Barcelona

JEL CODES: N63, N64, O14, O25, L52, L62



El ciclo vital del clúster de la industria de la automoción de Barcelona, 1889-2015

RESUMEN

El ciclo vital del clúster de la industria de la automoción en Barcelona ha durado más de un siglo. La principal razón de su exitosa trayectoria a largo plazo residió en las externalidades de tipo marshalliano que emergieron en el seno del distrito. La segunda clave del éxito fue la adopción de políticas industriales estratégicas. La aparición de empresas líderes en el distrito potenció los anteriores factores. En cambio, las instituciones, aunque también desempeñaron un papel positivo, constituyeron la causa menos significativa del éxito.

PALABRAS CLAVE: Industria del automóvil, clústeres, distritos, políticas estratégicas, Barcelona

CÓDIGOS JEL: N63, N64, O14, O25, L52, L62