Chapter 15
A Model of Development of Transport Between Spain and France: Between Recovery, Imitation, Improvement and Divergence

Jean-Pierre Wolff

Abstract In Europe, when we compare public policy transport-wise, we immediately notice the opposition between Latin and Mediterranean countries on the one hand, and Northern European countries on the other. Although this opposition should be more nuanced, it is also very real in terms of the roles of public and private entities and the perceptions and practices of the populations. Nevertheless, in Mediterranean countries, taking just the examples of Spain and France, some elements link these two countries, while others clearly differentiate them. This proposal demonstrates Spain's policy of catching up with and overtaking another country, France, which was considered as a model of public policy for community, mobility and transport.

Keywords High-speed lines · Railway policy · Delay · Recovery · Technical differences

15.1 Introduction

The matter of transport is closely linked to that of land, and more particularly their function. Transport infrastructure takes part in social organization and the economic development of all territories. High-speed railways are part of a historic continuum of journeys and transport that have taken place over two millennia in the regions along the Mediterranean. Without going into the development of infrastructure after the Roman period in depth, we should stop briefly to look at the last four centuries, which have shaped certain Mediterranean territories that over time were incorporated into Spain and France. These two states that were constructed over many

J.-P. Wolff (✉)
University of Toulouse Jean Jaurès, Toulouse, France
e-mail: wolff@univ-tlse2.fr

R. C. Lois-González (ed.), *Geographies of Mediterranean Europe*, Springer Geography, https://doi.org/10.1007/978-3-030-49464-3_15

centuries by the reinforcement of a strong central power have always encouraged control of their territory by creating transport infrastructures, constituting one of the foundations of this national construction.

First of all, let us be reminded that during the seventeenth and eighteenth centuries, main roads were built so as in the second half of the nineteenth century, when railway lines encouraged and accelerated this transformation both in the political and economic systems. This process is not unique to Spain and France; it concerns all the European states that were founded around the concept of the nation state. Admittedly with great nuances between them, on one hand are the states with the oldest political-administrative structures that are already centralized, and on the other hand the new states that wish to reinforce their recent and still-fragile unity. But for all these states, the modernization of existing transport infrastructure and especially the creation of a railway network strengthened their foundation and allowed more ambitious economic development, brought by the Industrial Revolution. A century later, two other means of transport appeared—road and air—which would compete head on with rail travel as of the 1930s for the former, and from the 1980s/1990s for the latter. This development of road networks, motorways and airport infrastructure pertains to these planner states' desire for modernization of the states that were rebuilt on the rubble of Europe in the aftermath of the Second World War. In the 1960s and 1970s, all the power of the developer states, guarantors of the economic and social modernization policies, reached its peak and both the car and the aeroplane symbolized the efficiency that nothing could slow down or stop, in spite of the warnings from the Club of Rome regarding the environmental plan at the end of the 1960s (Meadowsn et al. 1972).

The redistribution of maps on a global scale with the rise of South East Asia and the consequences of the oil crisis in the 1970s led to a very severe economic crisis that shook the foundations of this demiurge state with the end of the Trente Glorieuses. The only possible way out for Western countries seemed to be based on opening up and modernizing markets, proposed by the triumphant liberalism that questioned the planning and ordering state during the last quarter of the twentieth century. This rising power of economies that were ever more integrated to the European and global levels accentuates the competition between the different modes of transport. The almighty power of Délégation à l'aménagement du territoire et à l'action régionale (DATAR [Delegation for Land Development and Regional Action]) in France, which had greatly participated in the modernization of France after the Second World War, began to withdraw as of the 1980s. In Spain, the end of the Civil War in 1939, the end of Franco's regime in 1975 and, above all, its entrance to the European Union removed this country from economic isolation, and this translated into modernization at a steady pace until the outbreak of the economic crisis in 2008. With the collapse of the Francoist state, the regional autonomies asserted themselves around the constitution of regional powers that are much stronger than in France. At the beginning of the 1980s, however, the regional powers had known the setup of a tentative regionalization of implementation but not of decision-making. In this new phase of the history of these two countries, which were becoming more and more integrated into Europe, the question of infrastructure and their

regeneration to increase their efficiency is more and more present, as it is globally and recurrently for all countries and territories. We will analyse the processes that will be part of the modernization of railway infrastructures, which underwent a period of decline that began in the 1930s, amplified after the Second World War in the 1950s and that tried to resist competition from both the car and the aeroplane by adopting a concept born in Japan: high-speed rail travel. In 2017, the 25th anniversary of high-speed rail in Spain (Alonso et al. 2017) and the 35th anniversary in 2016 in France constituted important milestones to revisit the development of high-speed rail in these two countries.

Throughout history, different transport infrastructures have always participated in the development of territories. Without these infrastructures and whatever the territory considered, the chances for socio-economic development are limited even if the transport infrastructures are not the be all and end all of territorial development (Association des villes TGV 1991). The presence of a railway line, a motorway or an airport does not systematically guarantee economic development (Offner 1993). For infrastructure to be a relevant tool for the socio-economic growth of territories, they should be accompanied by strategic public policy for development, associating even more so often public and private entities more and more (Troin 2015). Our aim is to analyse only the ongoing processes in the expansion of the high-speed railway in recent decades in Spain and France. Admittedly, this is not the only type of infrastructure that has been the subject of significant investment and by broadening our field of research, the motorway and airport infrastructures mobilized, from the 1950s/1960s, the attention of states in this effort to modernize in Europe. However, even if in this approach the observation of the motorway systems between both countries is far from irrelevant, we will not tackle this matter in this work. Indeed, and unlike the development of the high-speed rail, neither Spain nor France have encouraged the emergence of a motorway system in Europe, unlike the role these two countries played (and that Spain continues to play) for high-speed rail. We will therefore focus on high-speed rail, which comes in two forms: the high-speed line (HSL) and the high-speed train (HST). We will leave aside the versions of high-speed rail such as high-capacity lines that allow speeds of up to 250 km/h to be reached and only accommodate mixed traffic (freight and passengers), and instead we will focus solely on HSL. Nor will we deal with classic or traditional lines, some of which may have HSTs operating on them, and which allow the reduced effect of the high-speed rail to be diffused in the regions that do not have an HSL service.

15.2 HSLs at the Heart of Multiple Issues

To tackle the questions linked to the decline and renovation of railways, we must present the geographical, socio-economic, environmental and ideological frameworks in which they have been inscribed in recent decades. When discussing the matter of railways, geography plays an important role. Railway development has

always had to take into account morphological and topographical constraints, and in fact trains cannot overcome slopes of more than 3% without a rack and pinion. A lack of adhesion due to the rail/wheel system or metal on mental greatly puts this mode of transport at a disadvantage compared to the road system, where the adhesion of tyres/road is clearly superior, allowing slopes of up to 12% to be overcome. Classic railway lines have always had to adapt to uneven terrain by following the low parts of valleys, or by constructing tunnels, bridges and viaducts. This railway technique was inherited from the start of the nineteenth century and has been improved upon by increasing the commercial speed of passenger trains to a limit that seemed difficult to surpass without the high-speed revolution that emerged in Japan after the Second World War. This was based on the design of new materials suitable for high speeds of up to 250 or 300 km/h, even 400 km/h, for example in China on the Shanghai-Beijing HSL since 2017, and new infrastructure based on research of even longer straight profiles to reach even higher speeds. Spain's morphology and orography do not facilitate the construction of HSLs. The numerous mountain ranges surrounding the Meseta hinder Spain much more than France, where HSLs have, up till now, been implemented almost exclusively in lowlands and valleys, greatly simplifying their construction. Meanwhile, in Spain most of the coastal areas and ports are cut off from the inland regions and the capital, Madrid, which is in the very centre of the Meseta, having required the construction of numerous tunnels and viaducts. By means of illustration, we observe that 58.38% of the Ourense to Santiago de Compostela route in Galicia is constructed in tunnels (35.84%) and viaducts (22.54%). Other Spanish HSLs, without having such linear road structures, have around 20–40% of their lines through tunnels and viaducts (Fundación de los Ferrocarriles Españoles 2017, p. 79).

This type of infrastructure involves significant costs, which can slow down, limit or even cause some projects to be reconsidered. For HSLs, the costs can vary greatly depending on the commercial speeds aimed at, the technical difficulties to be overcome linked to topography, the weight of expropriations on the future route and the environmental measures selected. The specific costs per kilometre of the first HSLs (Paris–Lyon in 1981: € 4.4 m; Madrid–Seville in 1992: € 7.2 m; Paris–Le Mans in 1989 and Paris–Tours in 1990: € 7.4 m; Madrid–Lerida in 2003: € 10.3 m [González Franco 2015]) seem low compared to more recent implementations (Perpignan–Figueres: € 21.5 m in 2011; Madrid–Valladolid: € 21.7 m in 2008; Tours–Bordeaux in 2017: € 25 m; Le Mans–Rennes in 2017: € 16 m) or compared to the Valencia–Castellón projected, estimated at € 19 m. These costs are linked not only to the geomorphological characteristics of the territories crossed (in particular the length of tunnels and viaducts)[1] but also to inflation during this period, in which environmental demands were becoming more and more present. The HSLs are financed by different stakeholders: the state, regional communities, Europe and, particularly in Spain, the network owner and sometimes private entities. Financial arrangements

[1] For the Figueres–Perpignan HSL with a length of 40 km, the twin-tube tunnel was developed along 8 km. For the Madrid–Valladolid HSL, with a length of 161 km, 42 km of tunnel were constructed.

are complex due to the multiplication of projects and the depletion of public financing. HSL costs are high and some consider them disproportionate compared to the predicted socio-economic returns. They must be compared to those of motorway infrastructure that can reach considerable sums, especially those that are in territory that is complicated due to the terrain and/or urbanization. These motorways are financed either by the state or by private companies and can be easily paid for through toll fees. The price of constructing motorways has also risen sharply in line with general inflation, though also due to the increase in environmental requirements relating to the integration of landscapes and new obligations in terms of road safety. This is how the motorway project between Lyon and Saint-Etienne rose to € 25 m/km. We can also think of the motorway construction between Cruseilles and Saint-Julien-en Genevois in Haute-Savoie, which reached € 44 m/km.

Amongst the euphoria caused by the construction of the first HSLs in France and Spain, the question of costs did not challenge the new HSL projects. It is necessary to return to the optimism that accompanied these projects in early developments. Trains were reborn by providing solutions to congestion on motorway networks and at many airports, all by efficiently tackling pollution and imported fossil fuel consumption, which is expensive and limited in time, and for a cost that was competitive with other means of transport. Furthermore, significant time reductions were made possible by this new railway infrastructure. This is how the duration of journeys made by the fastest trains reduced between 1967, 1986 and 2017 for Madrid–Barcelona from 11 h to 6 h 30 min to 2 h 30 min (HSL 621 km), at an average speed of 242 km/h; and for Paris–Marseille from 4 h 52 min to 3 h 50 min and 3 h 5 min (HSL 752 km), at an average speed of 246 km/h. Subsequently, and especially in France, the usefulness of HSL was challenged as state budget resources decreased. Increasing costs aggravated by the state's increasingly weak support and public objection to high-speed railways would become an increasingly important parameter in determining whether new projects would be launched or not. In Spain, criticism emerged much later than in France. The 2008 economic crisis and the emergence of the radical left-wing party Podemos constituted the first truly significant challenges to high-speed rail. In general, for these two countries, cost inflation since the first implementations is based not only on overall inflation but also on growing awareness of countryside integration and environmental protection, which can greatly increase the costs of infrastructure.

The environmental issue must encourage the development of heavy-duty railways, which are much less polluting than road travel, and especially air travel (passenger per kilometre; Bonnafous 1999). However, the flexibility of road travel, which allows it to serve all territories without the load being interrupted, and the commercial speed of air travel to bridge the distance between large metropolises have greatly challenged the outdated and uncompetitive train, so much so that environmental aspects are discredited. However, alongside fossil-fuel powered trains still operating using fossil fuels along non-electrified lines and that emit contaminating gases into the atmosphere, most traffic is provided by electric locomotives that do not pollute the air. But the debate is shifting to the production of this electrical energy, and in certain countries it can come from coal, oil and/or nuclear to

different extents. Currently, as the vast majority of electricity used in France does not come from renewable sources, the defenders who lobby in favour of road and air travel criticize trains because, even if it is not always the case, it consumes energy from nuclear sources, while strongly supporting the development of the electric car that operates using the same energy. Even if scientific analysis highlights the environmental advantages of rail travel, popular opinion does not see it this way, because HSL projects are more and more stigmatized as being detrimental to the environment and in particular due to the damage caused to landscapes and different biotopes. This environmental criticism of high-speed rail is also a societal and ideological dispute because these important projects above all favour large public works groups (Wolff Jean-Pierre 2016). These strong reactions have been expressed much more in France than in Spain. No matter what precautions are taken, the construction of an HSL, just like a motorway or an airport, inevitably affects the environment and landscapes. However, when construction and maintenance of infrastructure is taken into consideration, the polluting emissions per passenger/km are 255.114 and 7 geqCO_2 or 36 times lower for HST than for aeroplane 16 times less than car (Mathieu, Pavaux and Gaudry 2012). But the line and the number of road structures (bridges, viaducts, embankments and trenches) do not only impact construction costs but also (and especially for environmental defenders) the landscape. The infrastructure consumes a lot of space: a dual carriageway 34 m in length; a divided highway, 25 m; a standard two-lane road, 10–15 m; a single-lane railway, 6 m; a double railway 10 m; an HSL 14 m; an HSL on an embankment, 10–15 m in height with 80 m of ground coverage; and for airports, several hundred to thousands of hectares (the Notre Dame des Landes airport project, 1650 hectares).

There are also the processes of ‘nimbysation’ that are fed as much by the consequences of a project as much as ideologies and policies that may lead to conflicts of varying degrees depending on local associative and political mobilizations (Lolive 1999). The environment is holding more and more major infrastructure projects hostage, blocking, delaying or cancelling certain ones for which the socio-economic usefulness is not to blame. In general, motorways have provoked much less opposition than HSLs. Should we see this as a simple time lag in understanding of environmental and landscape devastation caused by these implementations or the effects of a power imbalance between the lobbying, on one side car manufacturers and public works and on the other the stakeholders in the railway system? It is also symptomatic to see a railway service and/or the railway infrastructure dismantled after a motorway is put into operation. Let us remember that with the complete opening of the A75 motorway in 2010, the decline of railway services accelerated, plunging the Clermont-Ferrand–Béziers and Clermont-Ferrand–Nîmes lines into a state of general neglect, a forerunner of a planned closure. In the name of respect for the environment, populations would be entitled to demand maintenance and improvement of existing railway lines when motorway infrastructure is implemented that doubles it. This right should be written into the constitutions of all European countries, to give populations the choice between two very different modes of transport and to conform to the environmental policies supported by the European Union or international examples such as the COP21. In Spain, the

single-rail, non-electrified Madrid-Aranda de Duero–Burgos line, a route also served by the free A1 motorway, has caused the abandonment of the latter due to the railway links between Madrid and Burgos in favour of the Madrid–Valladolid–León HSL. Without awaiting the opening of the Almeria-Murcia motorway in 1992, the railway line between these two towns was closed in 1985 as part of the state railway line closure programme. In these four cases, the State's choice is clear. By opening a free motorway and no longer investing in railway infrastructure, short- to mid-term abandonment of the railway line is guaranteed. This type of situation is unthinkable in a country like Switzerland where railway culture and recourse to referendum for all projects, and in particular those linked to transport infrastructure, guarantee not only the survival but also, beyond this, the development of less important lines.

Finally, with regard to the ideological plan, we can observe situations there that are also very varied according to the temporality and the country. The development of a high-speed railway, first of all in Japan and then in France, was done thanks to the preponderance of the scientific technocracy, encouraged by even more powerful states at the end of the Trente Glorieuses. Ideologically, we can speak first of all not only of support but also of a political and social demand for high-speed railways, a guarantee of economic development. In Europe, high-speed railway was chosen at the end of a cycle of prosperity and it was implemented during a period marked by various economic crises with significant social consequences, with a sharp increase in unemployment and the first disruption to the belief in unlimited scientific and technological progress. In France, faced with the difficulties of improving railway speeds based on technology at the time, a new technology based on rail and air travel was tested on an experimental section, 18 km to the north of Orléans. It was an Aerotrain invented by Bertin, which then inspired Maglev trains. Despite the speed of 417 km/h, reached in 1974, the Bertin aerotrain would very quickly be abandoned in France due to issues surrounding insertion in urban areas, because it circulated on a concrete rail supported by pylons around 10 m high, and above all because of the SNCF's (Société nationale des chemins de fer français) opposition. The organization said it would not support the development of an innovation in which it did not have the initiative (Fourniau 1988). The reticence of SNCF engineers when faced with this innovative technology pushed the national company to revolutionize their trains, inspired by the Japanese Shinkansen. This era, which basks in unlimited progress, little by little is being even more often called into question by scientific and technocratic expertise that condemn the projects of nuclear power plants, the creation of large-scale road and motorway infrastructure in urban areas and generally all types of imposing transport infrastructure. Nevertheless, the dispute will be very different depending on the country and region, as we will illustrate in our development.

It is obvious that the geographical, environmental, economic and ideological elements interfere more or less with one another in infrastructure projects. But two parameters play a decisive role, namely the issue of finance and political will. In the absence of these two elements, the projects have no chance of coming to fruition. Nevertheless, it is still necessary to have the political will to support them. An HSL

project in the lowlands, which is inexpensive due to its route and its implementation, will never come to light if there is no political will uniting the stakeholders with different interests to defend it and undertake it. Meanwhile, relatively expensive projects will be carried out following strong engagement of all involved stakeholders.

15.3 HSLs: Spain's Late Catch-Up and the End of France's Supremacy

Even if we only study the HSLs, we can recall the main characteristics of motorway infrastructure, and from this we can learn some lessons to be applied to the high-speed railway network. In fact, in 1970 the situation of motorway networks (Spain with 200 km and France with 1540 km) was very different to that of other networks (Germany with 4450 km and Italy with 3900 km). For HSLs, the situation was very different. The high-speed technology developed in Japan in the 1960s with the inauguration of the Shinkansen in 1964 on the Tokyo–Osaka line was taken up in Europe and particularly in France in 1981 with the first journey of the first HSL, the Lyon–Paris line (Lamming 2012). Nevertheless, with the end of the Franco regime in 1975, joining the European Economic Community in 1986, which would become the European Union in 1993, and the steady modernization of Spain, the first LGV (Ligne à grande vitesse) was put into service in 1992, between Madrid and Seville, for the Universal Exposition that was held in that same year in the Andalusian capital. That is 11 years after its appearance in France, which is little considering the challenges that Spain was already facing in terms of catching up with the level of motorway networks and airport infrastructures, which were essential for the development of a key sector for the economy at that time: tourism.

In both states, after an all-car policy with the implementation of an important motorway network, Spain (16,200 km) and France (12,000 km), rivalling and largely exceeding for Spain those of two pioneer states—Germany (13,000 km) and Italy (6500 km)—the priorities in the matter of infrastructure moved towards high-speed rail. Currently, the HSL network in France (Fig. 15.1) like in Spain (Fig. 15.2) is centred around Paris and Madrid. The political will that established high-speed rail is very strong and it is still currently present in Spain, whereas in France it has been greatly dampened. The finding offered on classic rail travel that it could no longer rival competition from cars for short and medium distances and aeroplanes for mid-length routes has encouraged the emergence of high-speed rail to counter mainly air travel. The tunnel effect, with few or no stops between two cities, a journey time of close to 3 h maximum and on-board service reminiscent of that of classic major airlines, allowed competition with aeroplanes with near disappearance of flights between Madrid and Barcelona, Seville, Valencia and Zaragoza in Spain, and between Paris and Brussels, Geneva, Lyon, Marseille, Nantes, Rennes and Strasbourg in France. High-speed railway travel is equally developed for short and

Fig. 15.1 The French high-speed line railway network in 2017 (RFF (Réseau ferré de France) and SNCF (Société nationale des chemins de fer français) network)

medium distances, reducing journey times in metropolitan regions in a very noticeable way by complementing renovated regional railway services.

In France and Spain, a policy was put in place to set a framework for developing high-speed rail. After the first HSL was implemented in France, in 1992 the state launched the Schéma directeur national des LGV ('National High-Speed Line Policy'), the aim of which was to provide the territory with fast connections, both by road and rail (Bellet and Gutiérrez 2011). The aim set was that all citizens would find themselves at a maximum of 1 h or 50 km from access to a motorway or an HST railway station. First of all, 3500 km of HSL are planned but without a temporal or financial framework in which to complete them. The aim for this period is to provide France with 16 HSLs, with a total of 4700 km upon completion. Within this context, we can also mention a project that was subsequently largely contested and for which a recent episode has just occurred. The Inter-Ministerial Committee for Regional

Fig. 15.2 The Spanish high-speed line railway network in 2017 (ADIF (Administrador de infraestructuras ferroviarias))

Development (the *Comité interministériel d'aménagement du territoire* or *CIADT* in French) of 1992 had selected the Bordeaux–Toulouse–Narbonne HSL project. This high-speed rail link was known as the 'Two Seas HSL'. This link drew the attention of the Aquitaine, Languedoc-Roussillon and Midi-Pyrénées regions. But during the Inter-Ministerial Committee for Regional Development and Competitiveness (CIADT) of December 2003, the project was revised downwards, and only plan for an HSL between Bordeaux and Toulouse was kept (Castan 2008). Beyond this down and until Narbonne, only an improvement in existing infrastructure was kept. This objective, removed by governmental choices at the time, was based on the prohibitive costs of the eight HSLs that were planned.[2]

[2] It involved the following HSLs:

- Rhin–Rhône (Dijon–Mulhouse)
- South-Europe–Atlantic (Tours–Bordeaux–Spain)
- Brittany–Pays de la Loire
- Est (second phase and interconnection with the German ICE network)
- Catalonia–Italy (Perpignan–Figueres, bypassing Nîmes and Montpellier, HST towards PACA and Nice)
- Lyon–Turin
- Bordeaux–Toulouse
- Interconnection of HSTs with the south of the Ile-de-France

The National Plan for Transport Infrastructure (*Schéma national d'infrastructure des transports* or SNIT in French) created in 2010 within the framework of the Grenelle Environment Forum[3] planned the creation of around ten HSLs to be put into construction before 2020, of which only three were started and were completed in 2017 (Bordeaux–Tours, Le Mans–Rennes and Nîmes–Montpellier). All the others were completely abandoned or suspended and one is in a very precarious situation (Bordeaux–Toulouse). The SNIT was called into question in 2012 with the arrival of a new left-wing presidential majority. To bury the railway section of the Grenelle Environment Forum, the Duron Commission in 2014, the Court of Audit and the government did not stop attacking the HSL projects, which were either suspended or totally buried. With the arrival of a new presidential majority around president Macron, even the Bordeaux–Toulouse line was called into question!

Before drawing an overall assessment of the development of high-speed rail in France, which we will present later, it is necessary to take stock of this network at the end of 2017. HSL construction began with the Lyon–Montchanin section in 1981, then Montchanin–Paris in 1983, allowing the Lyon–Paris link to be inaugurated almost 10 years before the first HSL in Spain, between Madrid and Seville in 1992. For these two countries, these two first lines constituted the first milestone in the development of high-speed rail in Europe. Looking at the opening dates, development took place first of all in France, with the opening of numerous HSLs until 2001, whereas in Spain after the first HSL was put into service in 1992, it was not until 2003 that other HSLs were implemented and since then one or two HSLs were opened on average every 2 years (Table 15.1). After 2017, in France, which saw the inauguration of three HSLs, all the other projects were suspended or buried.

Table 15.1 List of HSLs in France (RFF (Réseau ferré de France) and SNCF (Société nationale des chemins de fer français) network)

Route	Year
Paris–Le Mans	1989
Paris–Tours	1990
Lille–Paris	1993
Channel Tunnel	1994
Brussels–Lille	1997
Lyon–Valence	1994
Marseille–Valence	2001
Est HSL first phase	2007
Figueres–Perpignan	2011
Rhin–Rhône HSL	2011
Est HSL second phase	2016
Le Mans–Rennes	2017
Bordeaux–Tours	2017
Montpellier–Nîmes	2017

[3] In this SNIT, 25 major projects, including several HSLs, were to be carried out within 30 years, but facing the predicted cost of 245 billion, many were very quickly postponed or abandoned.

Between 1981 and especially 1989 and 2001, numerous HSL inaugurations followed the commissioning of the Paris–Lyon line. Chronologically, we can mention Paris–Le Mans in 1989, Paris–Tours in 1990, part of the desire to develop and rebalance regions, then Paris–Lille in 1993, the Channel Tunnel in 1994, Lyon–Valence in 1994, Lille–Bruxelles in 1997 and finally Marseille–Valence in 2001, completing the Marseille–Paris link. These seven openings from 1989 to 2001 correspond to that very strong political will to provide France with an HSL network, relayed by all political parties and in particular by the environmentalists. The population sees a revival of the modernization of the country that had been called into question by the end of the *Trente Glorieuses*. This period is supported by the Pasqua Land Planning Law that, like Spain's plans, foresaw development that would bring high-speed rail closer to the population.

In Spain, the Ministry of Public Works and Transport[4] launched many transport infrastructure development schemes in order to modernize the country. These are the Railway Transport Plan (*Plan de Transporte Ferroviario*), the Executive Plan for Infrastructure (*Plan Director de Infraestructura* or PDI), the Strategic Plan for Infrastructure and Transport (*Plan Estratégico de Infraestructura y Transporte* or PEIT) and the Plan for Infrastructure, Transport and Housing (*Plan de Infraestructuras, Transporte y Vivienda* or PITVI) (Ministry of Public Works and Transport 2012). This stack of plans produced a significant change to the Spanish railway network.

The *Railway Transport Plan* of 1987 not only corresponds to that desire to save the railways from air and road travel, but also more specifically it responds to the backlash from the Spanish people following the abandonment of around a thousand kilometres of railways in 1985. As in other European countries, the closure of these railway lines was caused by trains' lack of competitiveness, due to the lack of interest provided by policies to railways. It was a question of slowly modernizing certain classic lines with electrification, the doubling of certain single-track lines and/or rectifying the section to raise the commercial speeds of passenger trains on the most important routes (Villalón 2017).

The 1993–2007 Executive Plan for Infrastructure by the Ministry of Public Works, Transport and Environment sought strategic planning of transport by highlighting a comprehensive and multimodal approach to transport infrastructure.

The Plan for Transport Infrastructure, under the responsibility of the Ministry of Public Works and Transport (2000–2007), highlighted the development of high-speed rail, 8 years after the inauguration of the first HSL between Madrid and Seville in 1992. The HSL and railway projects received the most significant part of investment compared to other transport infrastructure, namely 42.8% compared to 25.1% for roads, and the rest divided between airports and ports (Ministry of Public Works and Transport 2000–2007).

The Strategic Plan for Transport Infrastructure was settled to cover the 2005–2020 period and in particular it planned the implementation of 10,000 km of HSL by

[4] This ministry is in charge of public works.

2020, inscribed in four major objectives: economic development, strengthening of social and regional cohesion, environmental improvement and safeguarding transport services. For the Ministry of *Fomento*, in the Strategic Plan for Transport Infrastructure, transport infrastructure is considered as an essential support that allows people to have access to high-quality transport and, at the same time, to an effective instrument in encouraging economic development and regional cohesion.

The Plan for Infrastructure, Transport and Housing takes over from the Strategic Plan for Transport Infrastructure and runs over the 2012–2024 period, taking two important elements into account. The first is linked to the severe economic crisis that affected Spain since 2008 and the second to the new definition of the Trans-European Transport Networks (TEN-T) decided upon in December 2013, which modified the plans defined during the European summits held in Corfu and Essen in 1994 (Boira i Maiques 2010). This is a streamlining of investments in infrastructure that does not question them but spaces them out over time to take the country's difficult situation into account in the economic and social plan.

Even if this proliferation of plans, which often corresponds to political and governmental changes with alternation between the Spanish Socialist Workers Party (*Partido Socialista Obrero Español* or PSOE in Spanish) and the People's Party (*Partido Popular* or PP in Spanish), has had the consequence of delaying many projects, there remains a very strong desire to modernize Spain by constructing new infrastructure. In fact, while presidents Aznar, Zapatero and Rajoy had deeply entrenched political positions on social matters, the fact remains that they have always enthusiastically defended the high-speed policy, in their eyes a guarantor of Spain's overall success in the European context (López Escolano 2017). Spain's determination to overcome its delay in terms of airport, motorway, rail and port infrastructure, to accelerate its economic development and to increase its people's quality of life has been clearly displayed since the end of the Francoist regime. European funds play an important role in these modernization programmes and the creation of new infrastructures, allowing it to rise in just a few decades to the highest place on the European ladder for the length of the motorway and HSL networks (Audikana 2011). For Germà Bel (2010), this model of infrastructure development is based on a purely administrative logic relating to regional development, leading to serve all provincial capitals (the equivalent of a *département* in France) and by being linked to a motorway system and a high-speed railway. With the 2008 crisis, more and more opponents came forward facing a certain overbidding in terms of transport infrastructure, some of which are little used (motorways and HSLs) or not open to the public (airport; Lois González and Pazos Otón 2015). During the autonomous communities' electoral campaign in 2007, in a speech Rajoy made in Badajoz, he reaffirmed this desire to reach all the provincial capitals with HST and at 350 km/h, as other politicians belonging to the main political parties after the end of the Franco regime had done before him, albeit in different contexts (Cruz Villalón 2017).

Spain's situation in terms of high-speed rail is notable for the inauguration of three sections of HSL in 2015, which will be completed in coming years by other openings (Tables 15.2 and 15.4). Unlike France, at the end of 2017, the HSLs are

Table 15.2 List of HSLs in Spain (ADIF (Administrador de infraestructuras ferroviarias))

Route	Year
Madrid–Seville	1992
Madrid–Lleida	2003
Huesca–Zaragoza	2005
(Madrid)–La Sagra–Toledo	2005
Lleida–Camp de Tarragona	2006
Camp de Tarragona–Barcelona	2008
Córdoba–Málaga	2007
Madrid–Valladolid	2008
Madrid–Valencia	2010
Figueres–Perpignan	2011
La Coruña–Ourense	2013
Albacete–Alicante	2013
Barcelona–Figueres	2013
Valladolid–Zamora	2015
Valladolid–León	2015
Vigo–Santiago de Compostela	2015

under construction and others are in planning stages, and therefore here we present a progress report on the network that will be gradually redone in a few years for new implementations. After having opened the first line between Madrid and Seville in 1992, around 10 years later a long series of developments began, firstly with the inauguration of the Madrid–Lleida HSL in 2003, the start of the HSL towards Barcelona, which began operating in 2008 following the implementation of the Lleida–Camp de Tarragona and Camp de Tarragona–Barcelona lines in 2006, and which would very quickly replace the first HSL in terms of passengers. Two short HSLs were inaugurated in 2005: one is La Sagra–Toledo (20 km), which branches off the Madrid–Seville HSL, and the other is Huesca–Zaragoza (80 km). It has a single rail and is often laid close to the classic Iberian gauge line (1668 m). The Córdoba–Málaga HSL was opened in 2007, making Málaga the first Mediterranean port to be connected with Madrid, before Barcelona and Valencia. In 2008, the Madrid–Valladolid HSL began operating, 2 years before the Madrid–Valencia HSL in 2010. Then the Figueres–Perpignan line opened in 2011, allowing a cross-border link that preceded the opening of the Barcelona–Figueres HSL, which opened in 2013. In this same year, two HSLs were inaugurated. The first (Albacete–Alicante) offered a new Mediterranean rout to Madrid, and the second is the first stage of the high-speed line in Galicia, with the La Coruña–Ourense HSL, a section that is not yet linked to the HSL network, but that will without doubt be connected in 2020. In 2015, three lines were opened in the west of the Iberian Peninsula: Valladolid–Zamora, Valladolid–León and Vigo–Santiago de Compostela, connected to the La Coruña–Ourense HSL.

Table 15.3 gathers the opening dates of HSLs constructed in Spain and France in just over three decades (1981–2017). We have grouped HSL inaugurations into five major periods to facilitate a dynamic and comparative reading of the development

Table 15.3 Delays and catch-ups in HSL development (ADIF, RFF and SNCF network)

Lyon–Montchanin	(1981):		
Montchanin–Paris	(1983):		
Le Mans–Paris	(1989):		
Paris–Tours	(1990):		
Lille–Paris	(1993):	Madrid–Seville	(1992):
Channel Tunnel	(1994):		
Lyon–Valence	(1994):		
Brussels–Lille	(1997):	Madrid–Lleida	(2003):
Marseille–Valence	(2001):	Huesca–Zaragoza	(2005):
HSL Est first phase	(2007):	Lleida–Barcelona	(2006):
		Madrid–Valladolid	(2007):
		Seville–Málaga	(2008):
		Madrid–Valencia	(2010):
Figueres–Perpignan	(2011):	Figueres–Perpignan	(2011):
Rhin–Rhône HSL	(2011):	La Coruña–Ourense	(2011):
		Motilla–Alicante	(2013):
		Barcelona–Figueres	(2013):
		Olmedo–Zamora	(2015):
Est HSL second phase	(2016):	Valladolid–León	(2015):
Le Mans–Rennes	(2017):	Vigo–Santiago de Compostela	(2015):
Bordeaux–Tours	(2017):		
Montpellier–Nîmes	(2017):		

Table 15.4 List of HSLs in Spain under construction and planning (ADIF)

Basque Y
León–Oviedo
Ourense–Zamora
Burgos–Palencia
Badajoz–Plasencia
Antequera–Granada
Alicante–Valencia
Tarragona–Valencia
Logroño–Pamplona

of the high-speed networks in both countries. The first phase only includes a development done in two stages in France, with the Lyon–Montchanin section in 1981 and Montchanin–Paris in 1983, giving birth to the first Paris–Lyon HSL, which marked the birth of high-speed rail in Europe. The second period saw the implementation of an HSL network departing from Paris, then successively Le Mans–Paris in 1989, Paris–Tours in 1990, Lille–Paris in 1993, and the Channel Tunnel and Lyon–Valence in 1994. The first Spanish HSL, Madrid–Seville, which was inaugurated in 1992, is included in this second group. In the third period, alongside the continuing openings in France with the Brussels–Lille HSL in 1997, Marseille–Valence in

2001 and the first phase of the Est HSL, we can identify the beginnings of a network in Spain with Madrid–Lleida in 2003, Huesca–Zaragoza in 2005, Lleida–Barcelona in 2006, Madrid–Valladolid in 2007 and Seville–Málaga in 2008. The fourth phase involves Madrid–Valencia in 2010 and Figueres–Perpignan, the Rhin–Rhône HSL and La Coruña–Ourense in 2011, which saw the continuation of the implementation of an HSL network with the construction of a trans-border section between Perpignan and Figueres. The fifth and final period includes the following HSLs: Motilla–Alicante and Barcelona–Figueres in 2013, Olmedo–Zamora, Valladolid–León and Santiago–Vigo in 2015, the second phase of the Est HSL in 2016, and Le Mans–Rennes, Bordeaux–Tours and Montpellier–Nîmes in 2017. This last period demonstrates sustained development of HSLs in the two countries, but it does not indicate that it is the end of HSL in France, at least for a more or less long period of time, while in Spain numerous works continue and projects are being studied and selected.

In 2017, Spain had 3240 km of HSL and 1500 km are either under construction or in planning stages.[5] Meanwhile, France only has 2690 km and nearly all the projects that had been selected, some since 1992, have been abandoned or suspended awaiting decisions that are ever more delayed in arriving. Not only has Spain caught up, but also it has largely surpassed France in terms of high-speed rail services. The lack of French governments' political will for almost the last 10 years and the SNCF's reluctance to launch new projects due to its 45 billion euros of debt have led to cities such as Toulouse and Nice and their one million inhabitants being left behind, while smaller towns, such as Valence, Avignon, Laval, Reims and Besançon, to name just some of these small-to-medium settlements situated on existing HSLs, benefit from high-speed rail (Facchinetti-Mannone 2010).

15.4 Overtaking and Divergences Between Spain and France

By looking more carefully at the development of the first HSL in each country, we realize that their political will is not constructed on the same foundations. In Spain, the state has chosen to firstly link Madrid and Seville, and not the two economic capitals, Madrid and Barcelona. However, the Olympic Games given to Barcelona by the president of the International Olympic Committee, the Catalan Juan Antonio Samaranch (1980–2001), a native of the city, constituted an additional argument for the economic position of these two cities. However, the Andalusian capital was supported by the socialist president of the Spanish Government, Felipe González, who comes from the province of Seville, who had used all his political weight in favour of the success of the Seville Universal Exposition, and also for the development of this first HSL. Alongside this local support for Seville as the first destination of an

[5] This text was written in 2018. It does not take into account the HSLs put into service after this date. In 2019 will be inaugurated Antequera–Granada (122 km) and Venta de Baños–Burgos (87 km).

HSL in Spain, politically the Spanish state recognized the historic debt that it had to Andalusia. Through this investment, it tried, to an extent, to make its absence in the development of this southern province forgotten, after leaving it behind for far too long. The aim was to boost the Andalusian economy, which lagged far behind other regions of Spain. On the other hand, the first HSL in France connected the two main economic centres—Paris and Lyon—which were strengthened to the detriment of less-developed regions. It was not until the development of the LGV Atlantique towards Mans and Tours that a policy of regional rebalancing and economic catch-up was put in place, with the creation of an LGV that would participate in the development of the Atlantic coast.

If we evaluate the first Spanish LGV, Madrid–Seville, inaugurated in 1992, we realize that it has transported 74 million passengers in 25 years, of the 357.5 million users of the entire Spanish LGV network. This figure may seem significant, but it should be carefully re-evaluated when we compare it to the 52.3 million travellers who have travelled on the second LGV, Barcelona–Madrid, in just 9 years since it opened in 2008, that is, 16 years after the Madrid–Seville line. In Spain, it is the Barcelona–Zaragoza–Madrid LGV that is by far the most profitable. The others are in a much less healthy situation. The profitability of this LGV has further increased because between February 2016 and February 2017, numbers of users increased from 6.3%, compared to the previous period, with more than 7.47 million users, that is, 440,000 more than the previous year. More precisely, 3.8 million passengers have travelled the Barcelona–Madrid direct route.

Transport infrastructure is part of ecological, environmental, ideological and societal approaches, while being highly dependent on their costs and their socio-economic impacts on the people and regions concerned. Amongst these elements, sustainability (both environmental and financial) is more and more highlighted, both by citizen associations and communities. Infrastructure and, in particular, projects are more and more often instrumentalized by different pressure groups. The perception of these issues is overall still very different between these two countries, for historical reasons of economic catch-up, and this is particularly true for LGV projects.

Over the last 20 years, new LGV projects have been criticized in France for a series of reasons, defending private interests as well as natural environments or anti-globalization ideologies. The infringement of property rights and the inconvenience of LGV in its immediate environment reinforce the process of ‘nimbysation’ (Sauvée 2000), fuelled by the controversies provoked by the damage caused to the countryside by such major infrastructure. But more recently, these projects have been criticized in terms of costs and their socio-economic profitability, not only by anti-globalization and environmental associations but also by the state and SNCF, which suffers from dizzying debt. SNCF’s position is understandable because the state requires it to return to a state of financial balance while renovating the main lines on the traditional network, but without wanting to lighten the weight of its debt nor giving it the same tools that other modes of transport have. Despite its words at the COP21, the state is more or less abandoning railways, leaving them adrift to be liberalized. After the left’s return to power in 2012, reluctance was instilled in the

highest levels of government with regard to railway projects. The Ministry for the Environment's abandonment of the 'ecotax' for heavy-goods vehicles in 2015, the flagship measure of the Grenelle Environment Forum voted for by all the deputies in 2009 and that was supposed to come into force in 2014, is one of the greatest failures of public policy in France. It was a huge challenge to the decisions of the COP21 by France (Plancher 2011).

Under the Hollande presidency, HSLs, which had only been challenged by environmental, third-world and special interest groups, received an unexpected boost to their difficult financial situation and above all to faltering will from the state. But with the government's step back from railway transport, the € 3.3 billion motorway relaunch plan was promoted in 2015, and the new motorway construction plan in 2015, brought by Vinci. France's turnaround in favour of roads reinforces its defeatist attitude towards railroads, and contrasts with that of Spain, which is building HSLs for the next century (Bellet, Alonso and Casellas 2010). There is also a very clear opposition between the two countries, namely Spain's consistency in continuing to develop HSL, despite budgetary difficulties that are much more severe than those in France. Spain is holding onto the developing projects selected by various governments through the successive plans handed down to promote public transport, unlike France that has abandoned almost all its commitments under a left-wing government, after getting carried away with promoting HSL and urban public transport such as tramways, and is restrained by the laws of the Grenelle Environment Forum under a right-wing government. This is not to mention what has been happening since the election of Emanuel Macron to the presidency in 2017. He announced that, in order to restore public accounts, all ministries and also communities will have to economize substantially, and that this will be done to the detriment of environment and public transport, in particular rail. We should recall that Emanuel Macron liberalized public road transport with the hope of destabilizing the regional, interregional and national railway network, due to its high costs that are borne solely by the SNCF, unlike coaches that use infrastructure without paying all the charges due.

In this area, Spain, which is developing a high-speed network with still-fragile socio-economic profitability, is maintaining its course in favour of this mode of public transport, the effects of which will be part of temporalities that go beyond the century. This desire to serve all the provincial capitals may seem extreme, but it is part of the European recommendations on the matter of reducing atmospheric pollution and limiting the use of congested road networks. So eventually, if a swing towards cars, intercity coaches and aeroplane comes above, this effort will not have been in vain in terms of the environment, safety and socio-economic development. Many HSLs are under construction and others are in planning stages (Table 15.4).

For now, HSL as a whole, both in France and in Spain, is made solely for passenger traffic, but now the circulation of freight trains is no longer a taboo on certain HSLs, in particular on those that are not saturated by high-speed passenger train circulation. The question of freight is posed in both countries. It is indirectly linked to the development of the LGV network, consuming possible investment in railway, and to the national policies facilitating road travel through the significant extension

of motorway networks. In fact, railway freight in Spain (5%), like in France (9%), represents a very small part of overland freight compared to the road's great supremacy, and it is very far behind the market shares recorded in Germany (23%) or in Switzerland (40%). Nevertheless, this country adopts the objectives of the *White Paper* (European Commission 2011) in which, by 2030, 30% of freight travelling distances greater than 300 km must be carried by rail, and at least 50% by 2050. This seems difficult to achieve, but Spain, which has always been a star European pupil, is investing in rail and in particular in HSL, while failing to do the same for the conventional network in order to increase the share of freight (Albalate and Bel 2011). Between 2007 and 2013, the European Union has granted Spain € 4.4 billion euros, 95% of which were assigned to HSL construction. During the same period, the European Union only granted € 645 million to France, which has been used for various projects, not just HSL projects (Cour des comptes européennes 2016). After these investments in passenger transport, Spain is showing a willingness to transfer some of its road freight to rail and maritime cabotage. Despite some significant delays, the Mediterranean corridor is a relevant example of this. Since its beginning in the 1920s, it has been part of the development of goods traffic and more specifically transporting citrus fruits towards France and other European countries. Nowadays, freight is still a reason for constructing this Mediterranean corridor, but the development of passenger transport has become a priority imposed by the vigorous urbanization of the Mediterranean coast compared to the rest of Spain. However, for reasons that are not only economic but also political—on the one hand, the representatives of the central state defending the Madrid HSL railway to reinforce this functional and institutional unity of the country, and on the other hand, stakeholders from Autonomous Communities, cities and major economic groups with various interests, diverging and/or converging on certain points—the tensions are significant. This Mediterranean corridor is suffering from the consequences, and its development is advancing slowly (Boira i Maiques 2010).

As for France, its geographical position is very different from that of Spain, and the issues are not the same. It is integrated into the European market, connected by a network of motorways, conventional railway lines and HSL to London, several cities in Benelux, Germany and Switzerland, which guarantees its function as a crossroads, unlike the Iberian Peninsula that is on the fringes of this economic Europe. It occupies a strategic geographical position that it uses depending on its interests, without particular concern for its neighbours. An illustrative example of this point involves the interruption of high-speed rail's continuity in the South of France, due to a lack of political will from French governments, who advance very slowly in projects of such importance, not only for the region of Occitan and Spain, but also more generally for European construction. Linking French and Spanish HSLs, on one side between Montpellier and Perpignan and on the other between Bordeaux and Irun, seems to be self-evident, for both economic and human reasons (Fig. 15.3). This blocking by France seriously impacts the full integration of the Iberian Peninsula, and this is partly reflected by dense traffic of heavy-goods vehicles at the two motorways crossing each end of the Pyrenees (10,000 trucks per day

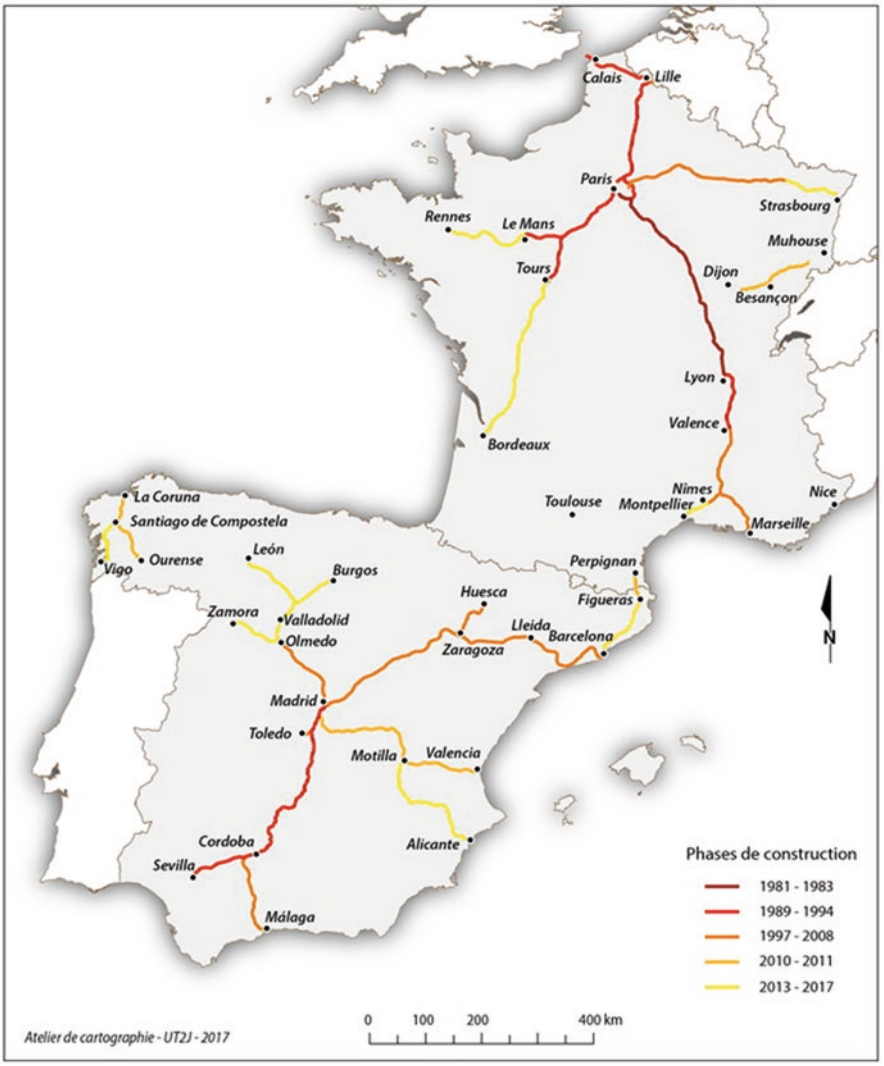

Fig. 15.3 HSL openings in Spain and France: the situation in 2017 (ADIF, RFF and SNCF network)

for each of these routes),[6] negatively impacting the environment and the safety of these roads.

Another difference between the two countries involves the implementation of HSL projects. In France, if strong hesitations are put forward, the project is immediately stopped awaiting better days. In the same situation, Spain will begin the

[6] Pyrenees Traffic Observatory.

works with an extended schedule and a reduced scope. For example, for the Venta de Baños–Burgos HSL (87 km), which will be operational in 2019 with a single track instead of the two that were planned, all the structures are calibrated to receive the second rail when finances allow it, or when it becomes necessary. Between Valladolid and León (85 km) on the Valladolid–Palencia–León HSL (165 km), opened in 2015, only the infrastructure is planned to accept a double track. In France, the construction of an HSL cannot be conceived unless a double track is selected from the start and then constructed. If there are insufficient returns on a project, it is immediately abandoned. The ADIF and the SNCF are opposed in two antithetical viewpoints, as are the technocratic and political powers of these two countries in a determining role for this high-speed railway policy. Spain, precisely to make high speed available to numerous towns, does not hesitate to demonstrate greater flexibility in terms of technical standards that seem sacrosanct.

This is how, with the 2008 crisis, the works have been staggered to reduce financial pressure. One of the most revealing examples of this, alongside LGV, involves the development project for the new large multimodal station of La Sagrera in Barcelona on the LGV that links the Catalan capital with Perpignan. Upon completion, this station should replace Barcelona Sants as the city's main station, but the works were suspended for many years following the economic crisis. In 2017, this large, phantom project began to gradually restart. There is no similar situation in France. When the decision to build a station is taken in the study phase of a project, it will be carried out, even if it can be considered as useless, badly conceived or very badly located (Montpellier LGV). The position of the French state and the railway technocracy is very focused on what should and should not be carried out; it is a tautological vision of railway.

By looking at the map of high-speed railway links in Spain and France, we realize that all the lines are very much centred around the capitals. Those that are not, or that are no longer this way, such as the Basque Y that is under construction or the Rhin–Rhône HSL, do not as of yet support significant traffic. The branch of this East–West HSL (south of Alsace and German-speaking Switzerland) towards Paris sees a much heavier volume of traffic than the South–North route, from Alsace and Germany towards Lyon and the Mediterranean, which had been the reason for implementing this HSL, which should have avoided Paris for the first time! (Datar 2012). For our analysis, let us add that unlike other European countries such as Germany, Belgium, the Netherlands and the United Kingdom, no HSL connects the Spanish and French networks. However, in 2011, a first HSL, Perpignan–Figueres, which was isolated at the time of its launch, symbolically crossed the Pyrenees through the Perthus Tunnel. It was not until 2013 that Perpignan was connected to Barcelona and the rest of the Spanish network. At present, and probably for another one or two decades, Perpignan remains isolated from the French network, because although the extension between Nîmes and Montpellier came into service in 2017, the construction of the missing section is no longer topical. On the Atlantic coast, although the Basque Y is 70% complete, the extension from Bordeaux towards the border is suspended, despite the conclusions from the Great South–West Railway Project (*Grand projet ferroviaire du Sud-Ouest* or GPSO in French), provided by

RFF and more or less abandoned by the socialist government in 2016. France is responsible for blocking the continuity of the high-speed railway. It is essential for Spain to be linked to the rest of Europe. France and the SNCF are abusing their key position to delay Spanish requests.

The willingness displayed in Spain, which materialized as the creation of HSL to serve mid-sized towns such as Granada, La Coruña and Toledo, and even those as small as Huesca, is totally absent in France. Even cities the size of Nice and Toulouse are today no longer guaranteed to be directly serviced by high-speed rail. It is a divide in the perceptions of high speed between the two states. In Spain, it is synonymous with development. In France, it is more and more often considered an economic burden, associated with SNCF's € 45 billion deficit in 2018.

Another distinction between the two countries involves the recourse to European financing and more generally the role that two states play in relation to the European Union. Both countries have a very different view of Europe. Since Spain's integration into the European Economic Community in 1986, Europe has been an essential point of reference, especially in terms of socio-economics, politics and ideology. Europe has largely helped Spain, as has been the case for countries that were in the same situation of lagging behind in development, compared to the standards embodied by the founding countries of the European Community. Spain has been able to acquire effective engineering to benefit from the consequences of the different European financing plans. France has an ambiguous position with respect to Europe, in which vestiges of the nationalist and isolationist policies of the Gaullist period persist both on the right and on the left of the current political spectrum. Spain was and continues to be a good student. In contrast, France often defies and mistrusts Europe. In terms of rail infrastructure, Spain claims the support it receives from Europe; meanwhile France wants to erase all references to this European financial aid from its railway projects. These two countries' positions towards Europe are also found at the heart of their national railway companies. From the beginning, SNCF has delayed the European policy of opening up the national network to other railway stakeholders, while at the same time it benefits from the liberalization of the European rail market through its subsidiary, Keolis. In 2014, SNCF controlled 8% of the regional market guaranteed by private companies in Germany (Mofair and Netzwerk 2015). Unlike SNCF, ADIF is involved in the opening processes wanted by Brussels.

Spain's massive investment in high speed is not only a response to its desire to modernize the country, but also to its involvement in a large European rail network, which involves the development of two missing segments, Perpignan–Montpellier and Irun–Bordeaux. The Spanish high-speed network was in part made thanks to Europe and this is made loud and clear. High-speed rail reinforces this Europeanization of Spain, just as the motorway network had done before. Spanish high-speed rail symbolizes this attachment to Europe and the values it holds since this country was integrated into it. This is undoubtedly the most important ideological divergence from France, in its use/management/recovery of high-speed rail in a European supranational design, underlining the desire of this country to insert itself more and more into this Europe under construction (Audikana 2012).

High-speed rail is also part of an important industrial policy, which can only be developed through the expansion of the interior market, and above all by the growth of exportation opportunities. In the 1970s, SNCF and ALSTHOM[7] came together to launch the train that was supposed to save railways from air travel. The high-speed train revived the declining railway industry and participated in the development of the network and the different speed records broken by trains, the latest being 574 km/h in 2007. This aimed to highlight the French railway technology developed by ALSTOM, which serves to showcase this French rail technology for exportation. During the successful rise of this train, almost no-one spoke out against it, even if some criticized the abandonment of the conventional network, which was sacrificed in the name of an all-HST network, which allowed SNCF to recover an economic dynamism that it had not seen before. In 1992, at the time of the opening of the Madrid–Seville HSL, Spain turned to France to obtain the high-speed trains that would connect these two cities. Then, Spain also contacted Germany for safety materials, and then to acquire SIEMENS high-speed trains, in this process of anchoring itself in Europe, which, with its financing, allowed the launch of the construction of the HSL network. Spain's policy of acquiring from two of Europe's major constructors allowed it to acquire technologies that it had not mastered.

In this industrial field, Spain is in the process of catching up as a manufacturer, discovering high-speed rail. This country is no longer content to buy foreign materials. It is now able to construct high-speed trains that in the mid-term can compete with other European equipment. Although France was far ahead of Spain, having already exported its high-speed train not only to this country but also to South Korea in 2004, to Italy for the new company *Nuovo Trasporto Viaggiatori* in 2012 and to Morocco for its first LGV in 2018, it is no longer alone in this export market. In fact, the final step for Spain is to also build equipment suitable for high speed thanks to the mobilization of a railway industry in full restructuring with TALGO[8] as the leader and CAF[9] as an outsider. Thus, in the latest call for tender, launched by RENFE to buy 30 new HSTs in 2017, the AVRIL model produced by TALGO was selected. While TALGO was best known for its carriages, which are adaptable to different track widths, and the development of the high-speed tilting train, this company had not yet manufactured an HST. Although TALGO was already well positioned in several foreign markets in terms of exportation, it has now also won the Mecca–Medina high-speed rail contract, with the delivery of 36 high-speed trains, and in 2017 it was pre-selected for the future London–Birmingham high-speed line (HS2). Of course, the merger between ALSTOM and SIEMENS in autumn 2017, in favour of the latter, announced further restructuring in the rail industry that in Spain could lead to a marriage between CAF and TALGO.

[7] ALSTHOM created in 1932 and originally Als-Thom formed from Alsace and Thomson. In 1998, after many changes in the company's activities, the company's current name was adopted.

[8] TALGO, Tren Articulado Ligero Goicoechea Oriol, specializes in active and/or passive tilting trains.

[9] CAF, Construcciones y Auxiliar de Ferrocarriles, is particularly active in constructing metro systems, tramways and light rail.

All rail engineering benefits from the development of HSLs and the two countries have well understood the benefits of constructing an HSL network, giving national companies a domestic testing ground before tackling other international markets. In around 30 years, Spain has gone from being consolidation ground for German and French railway companies, to an export powerhouse of railway know-how, which was acquired in just a few years. Catching up and imitation are in full force in this industry. France is losing its supremacy in high-speed rail to other countries such as Germany, Spain and especially China. The end of HSL projects is likely to further undermine France's lead over its neighbours. The purchase of the Eurostar fleet within the framework of the renewal project, of which SNCF is the majority shareholder, after several years of blockage imposed by France and SNCF on the SIEMENS high-speed train, shows the decline of French stakeholders in the field of high-speed rail. This mistrust of exports is based on a challenge to this high-speed model in France by SNCF and the state. For Spain, constructing an extra thousand kilometres gives TALGO time to assert itself as a serious competitor in high-speed rail, and as a versatile railway stakeholder.

15.5 Conclusion

After having been the first to launch in European high-speed rail and having taken the lead over other countries, especially compared to Spain in the 1980s and 1990s, with the important project of weaving a web that reproduces the Legrand scheme of the nineteenth century, France is no longer at the top of European countries in terms of the length of its HSL network. Spain, which acquired its first LGV in 1992, imitates France's desire to have an HSL network centred around its capital, Madrid. It then very quickly caught up with France and now it largely exceeds it in terms of the length of lines built, both those under construction and in planning stages. While France has suspended its HSL programme, Spain is pursuing this voluntarist dynamic of meshing the national territory from its capital. While the HSL network in Spain spanning out from Madrid seeks, as was indicated by the former president of the council, José Maria Aznar, to 'sew Spain with steel cables', in France the last two governments have again turned away from the steel cables that give way to motorways and airports to connect several major cities such as Nice and especially Toulouse with Paris and the rest of Europe.

Ideologically, HSLs are part of different plans; if we leave aside the centralism of the networks, the French one is primarily economic while the other is essentially political–institutional through a very strong policy of development. This essential difference is reinforced by the institutional evolution that has taken place since the end of the Franco regime. High-speed rail and motorway infrastructures reinforce this unity of the state in a context where certain regions have very large margins of autonomy. The matter of economics is not forgotten, but it is based too much on the paradigm that still too often associates high-speed railways with local development without deepening the limits of an outdated model. In France, the situation has

completely changed in the last decade. The abandonment of HSL projects has replaced the enthusiasm of the last decades of the twentieth century, in the name of strict economic realities, rather quickly forgetting the economic and environmental externalities related to the development of the HSL network.

In Spain, in the name of this very strong policy of investment in transport infrastructure that above all aims to strengthen territorial cohesion, all provincial capitals are directly connected to Madrid by train with the exception of Teruel, capital of the province of the same name, which is located in the south of Aragón at the very low density of 9 h/km^2. From this perspective, it is not unthinkable that one day, like Huesca in the north of Aragón, this town will be linked to Madrid with a modernized, improved speed route. Despite the reservations they generate, HSLs are going to continue to reinforce the regional cohesion that the statute of autonomy puts at risk by granting all the autonomous entities the responsibility for regional development policies. HSLs returned order to this centrifugal tendency.

References

Albalate, D., & Bel, G. (2011). Cuando la economía no importa: Auge y esplendor de la Alta Velocidad en España. *Revista de Economia Aplicada, 55*, 171–190.

Alonso, A., Gutiérrez, H., Silva, R., & Clemente, Y. (2017, Abril 4). *El AVE cumple 25 años: de Madrid-Sevilla a la liga mundial de la alta velocidad*. El Pais

Association des villes TGV. (1991). *TGV et aménagement du territoire, un enjeu majeur pour le développement local*. Paris: Syros Alternatives.

Audikana, A. (2011). Le pari de la grande vitesse espagnole. *Flux, 1*(83), 83–95.

Audikana, A. (2012). *La politisation de la grande vitesse espagnole (1986–2011): construction d'un mythe, production d'un consensus, émergence d'une controverse*. PhD thesis, Université Paris-Est.

Bel, G. (2010). *España, capital Paris, Porqué España construye tantas infraestructuras que no se usan? Una respuesta económica a un problema político*. Barcelona: Destino.

Bellet, C., & Gutiérrez, A. (2011). Ciudad y ferrocarril en la España del siglo XXI. La integración de la alta velocidad en el medio urbano. *Boletín de la Asociación de Geógrafos Españoles, 55*, 251–279.

Bellet, C., Alonso, M. P., & Casellas, A. (2010). Infraestructuras de transporte y territorio: los efectos estructurantes de la llegada del tren de alta velocidad en España. *Boletín de la Asociación de Geógrafos Españoles, 2*, 143–163.

Boira i Maiques, J. (2010). L'Eix Mediterrani: entre les dinàmiques locals i la perspectiva megaregional. *Documents d'anàlisi geogràfica, 56*(1), 91–10.

Bonnafous, A. (1999). *Les transports et l'environnement: vers un nouvel équilibre*. Paris: La documentation française.

Castan, P. (2008). *Les liaisons ferroviaires entre Bordeaux et Toulouse, de la construction de la 1ère ligne à la LGV*. CEREM: Marestaing.

Cour des comptes européennes. (2016). *Le transport ferroviaire de marchandises dans l'UE: toujours pas sur la bonne voie*. Luxembourg.

Cruz Villalón, J. (2017). La política ferroviaria en España. Balance de su planificación y ejecución de los últimos treinta años. *Boletín de la Asociación de Geógrafos Españoles, 74*, 333–359.

Datar. (2012). *Les effets de la grande vitesse ferroviaire en France* (Territoires en mouvement). Paris: La documentation Française.

European Commission. (2011). *Feuille de route pour un espace européen unique des transports – Vers un système de transport compétitif et économe en ressources.*. Brussels.

Facchinetti-Mannone, V. (2010). *Les facteurs d'implantation des activités autour des nouvelles gares TGV périphériques (comparaison Espagne/France).* Colloque international "Gares et territoires de la grande vitesse ferroviaire", Dijon.

Fourniau, J. M. (1988). *La genèse des grandes vitesses à la SNCF. De l'innovation à la décision du TGV sud-est* (Rapport INRETS, 60). Arcueil.

Fundación de los Ferrocarriles Españoles. (2017). *Atlas High speed rail in Spain*. Madrid: Fundación de los Ferrocarriles Españoles.

González Franco, I. (2015). Efecto de la velocidad de diseño en el coste de construcción de la infraestructura. 360. *Revista de alta velocidad, 3*, 33–53.

Lamming, C. (2012). *Trains – Histoire des chemins de fer, développement des locomotives, apogée des trains à grande vitesse*. Paris: Lodi.

Lois González, R. C., & Pazos Otón, M. (2015). Logiques urbaines et politiques de transport en Espagne: du consensus au conflit. *Sud-Ouest Européen, 40*, 85–99.

Lolive, J. (1999). *Les contestations du TGV-Méditerranée*. Paris: L'Harmattan.

López Escolano, C. (2017). *Valoración de las transformaciones territoriales en la España peninsular mediante el estudio de la red viaria, indicadores de accesibilidad y de potencial de población*. PhD thesis, Universidad de Zaragoza.

Mathieu, G., Pavaux, J., & Gaudry, M. (2012). *Evaluation de la contribution du réseau et de la politique ferroviaire à l'objectif du facteur 4 pour les déplacements de voyageurs à moyenne et longue distance* (Rapport GM Consultant, JP Conseil and Marc Gaudry/inc). Paris: ADEME, FNAUT, FNE, RFF.

Meadowsn, D. H., Meadowsn, D. L., Randers, J., & William, W. B. I. I. I. (1972). *The Limits to Growth. A report for the Club of Rome's project on the predicament of mankind*. New York: Universe Books.

Ministry of Public Works and Transport. (2000). *Plan de Infraestructuras de Transporte (PIT) 2000–2007*. Madrid: Ministry of Public Works and Transport.

Ministry of Public Works and Transport. (2012). *Plan de Infraestructuras, Transporte y Vivienda (2012–2024)*. Madrid: Ministry of Public Works and Transport.

Mofair and Netzwerk. (2015). *Wettbewerber-Report Eisensenbahn 2013–2014*. Heildelberg, 105 p.

Offner, J. M. (1993). Les "effets structurants" du transport: mythe politique, mystification scientifique. *L'Espace géographique, 3*, 233–242.

Plancher, B. (2011). *La fin de l'écotaxe marque un coup d'arrêt pour les projets de rénovation et de construction de nouvelles lignes ferroviaires. C'est un véritable scandale financier de plus d'un milliard d'euro, causé par un coup de tête de Ségolène Royal* (VRT no. 139, 21/11/2011).

Sauvée, S. (2000). *Mobilisation contre les infrastructures d'intérêt général: le cas du projet de TGV Ouest*. Paris: L'Harmattan.

Troin, J. F. (2015). TGV et métropolisation: rêve ou réalité? *Géotransports, 5–6*, 45–55.

Villalón, J. C. (2017). La política ferroviaria en España. Balance de su planificación y ejecución de los últimos treinta años. *Boletín de la Asociación de Geógrafos Españoles, 74*, 333–359.

Wolff, J. P. (2016). L'inéluctabilité des conflits liés aux infrastructures de transports? Infrastructures de transports et conflits dans le Sud-Ouest européen. *Sud-Ouest Européen, 40*, 5–11. Wolff J-P. (scientific editor).