



# Delusions of success: costs and demand of high speed rail in Italy and Spain

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



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-  Introduction and aims
-  Case stories
-  Supply, demand and costs
-  The forms of delusion

From Flyvbjerg et al., 2003 on, we know that megaprojects are problematic because there is a constancy in **demand overestimation** and **cost overruns**.

But, on the other side, we have **aspects of success** among megaprojects, including the most contested and problematic ones.

In the paper, we analyse two significant cases of **delusion of success**, namely Italian and Spanish HSR programmes.

Both are “famous” for some elements of success and insuccess:

- **Italy** → excellent demand performances, but worst case for construction costs
- **Spain** → huge network and general success, but largely out-of-scale and scant demand

## Introduction and aims

Thesis: the *delusion of success*





The two cases show that the “megaproject issue” consists in a mismatch which is not formal (that forecasts are wrong and/or falsified), but mostly substantial: **the planning choices behind megaprojects do not match with the potential demand.**

We recognize three phenomena behind the *delusion of success*:

Overinvestment  
Overdesign  
Overquality

→ **Deliberate design of megaprojects to be «excessive»** rather than a simple overestimation of real needs.

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## Case stories

### Italy

The project of the HS lines dates back to 1996:

- A **new network** of lines, starting from the backbone Turin – Naples, but reaching the main Italian cities
- An investment of approx. **13 b€**
- The **concession** of the construction and exploitation of the lines MI-NA, TO-VE, MI-GE, to a mixed company (TAV SpA, 1991), with **60% of private capitals**.



## Case stories

### Italy

The story went slightly differently:

- Turin – Salerno has been completed, much later than expected.
- The investment was approx. **32b€!**
- **Not a single Euro** of private money was invested

Why?

**High speed** → “**High speed / High capacity**” (AV/AC).

- Interconnected to the rest of the network
- Suitable for cargo traffic



## Case stories

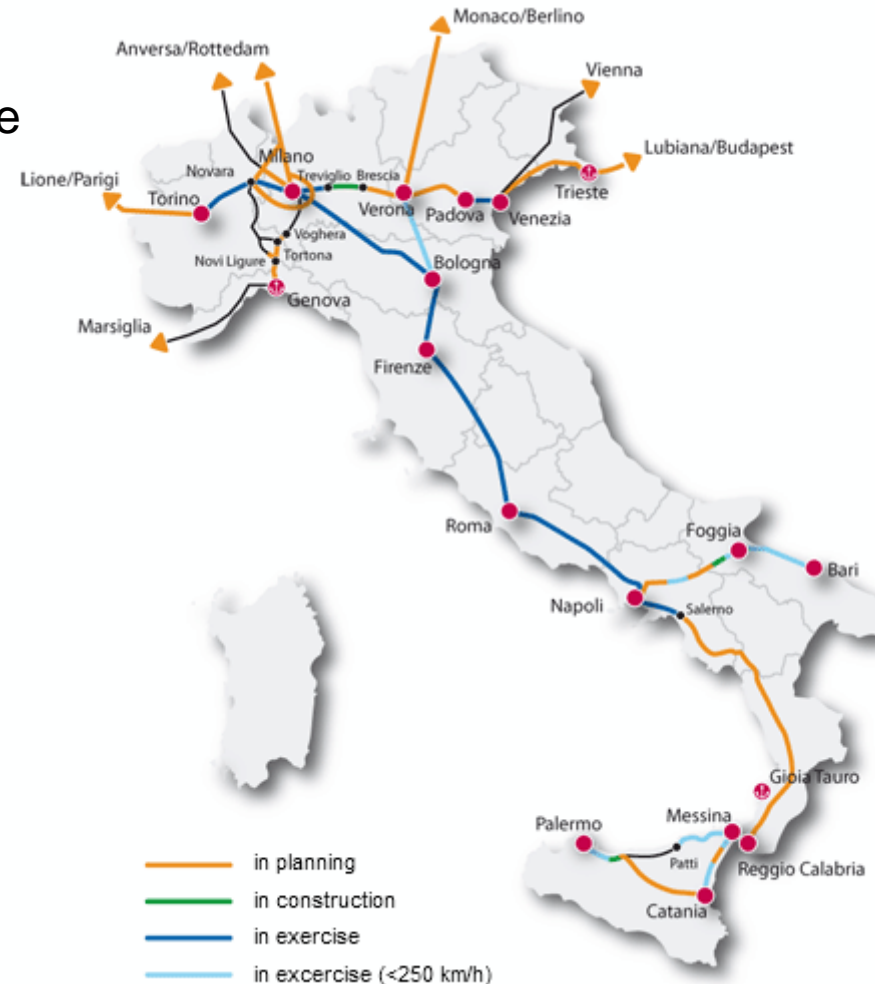
### Italy

However, something happened in the meantime...

...Italy became The only case of **head-on direct competition** in a HS service and one of the few in general.

The national rail company (**Trenitalia**) is competing since 2012 with **NTV** (a.k.a. **Italo**), a private newcomer with some 25 trains in operation.

→ Large scale competition on high-speed (but also on conventional) tracks





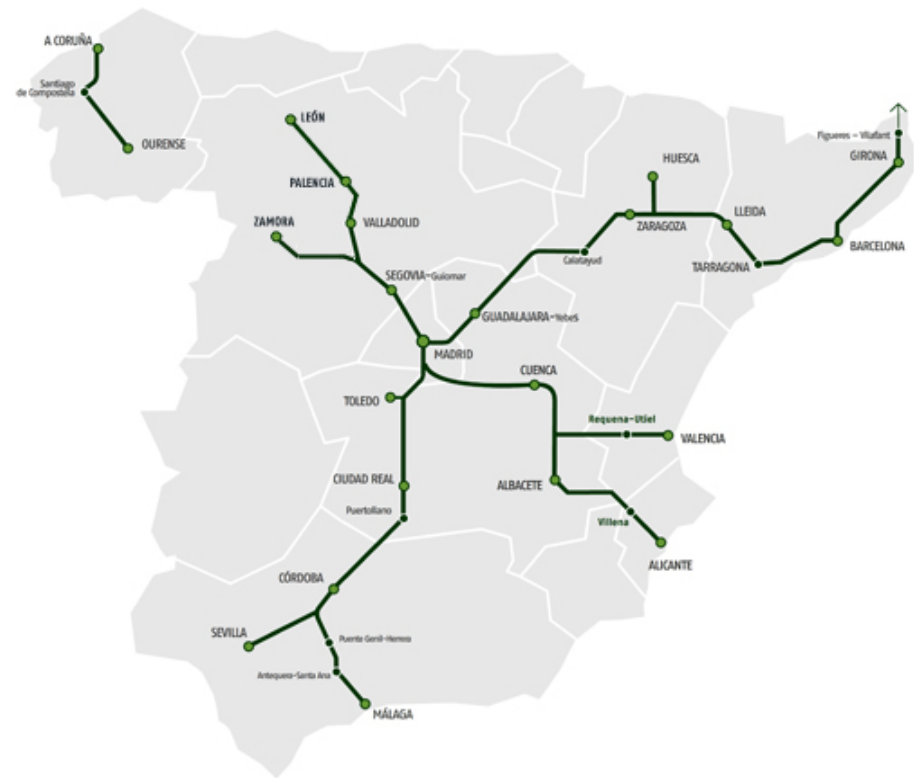
## Case stories

### Spain

The first high-speed railway entered into service in 1992, between Madrid and Seville.

Nothing happens until 2000, when the new Aznar government puts HS rail development at the centre of transport policy. Currently, after a period of dynamic development and public investment, there are 4 high-speed rail corridors in operation all centered in Madrid.

**The goal was to connect all provincial capitals with Madrid within 4hrs travel.**



## Case stories

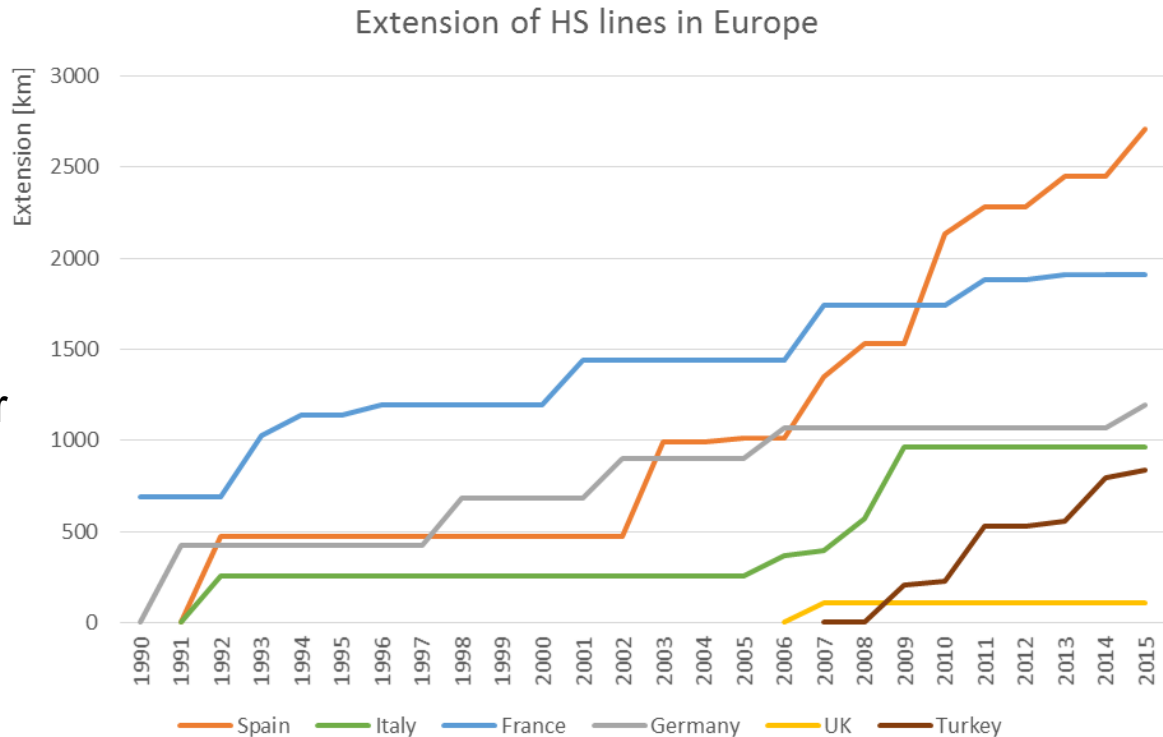
### Spain

This resulted into the most impressive HS network development in the worlds, per inhabitant, and second after PRC (46 M inhabitants vs. 1375...).

This goal and the routes designed by the plan were **not supported by mobility needs or congestion cost mitigation** objectives, but **by the administrative role of cities as provincial capitals** regardless their population, their travel demand to/from Madrid and the presence of other modes of transportation already serving the route.

→ ~~Transport policy?~~ →

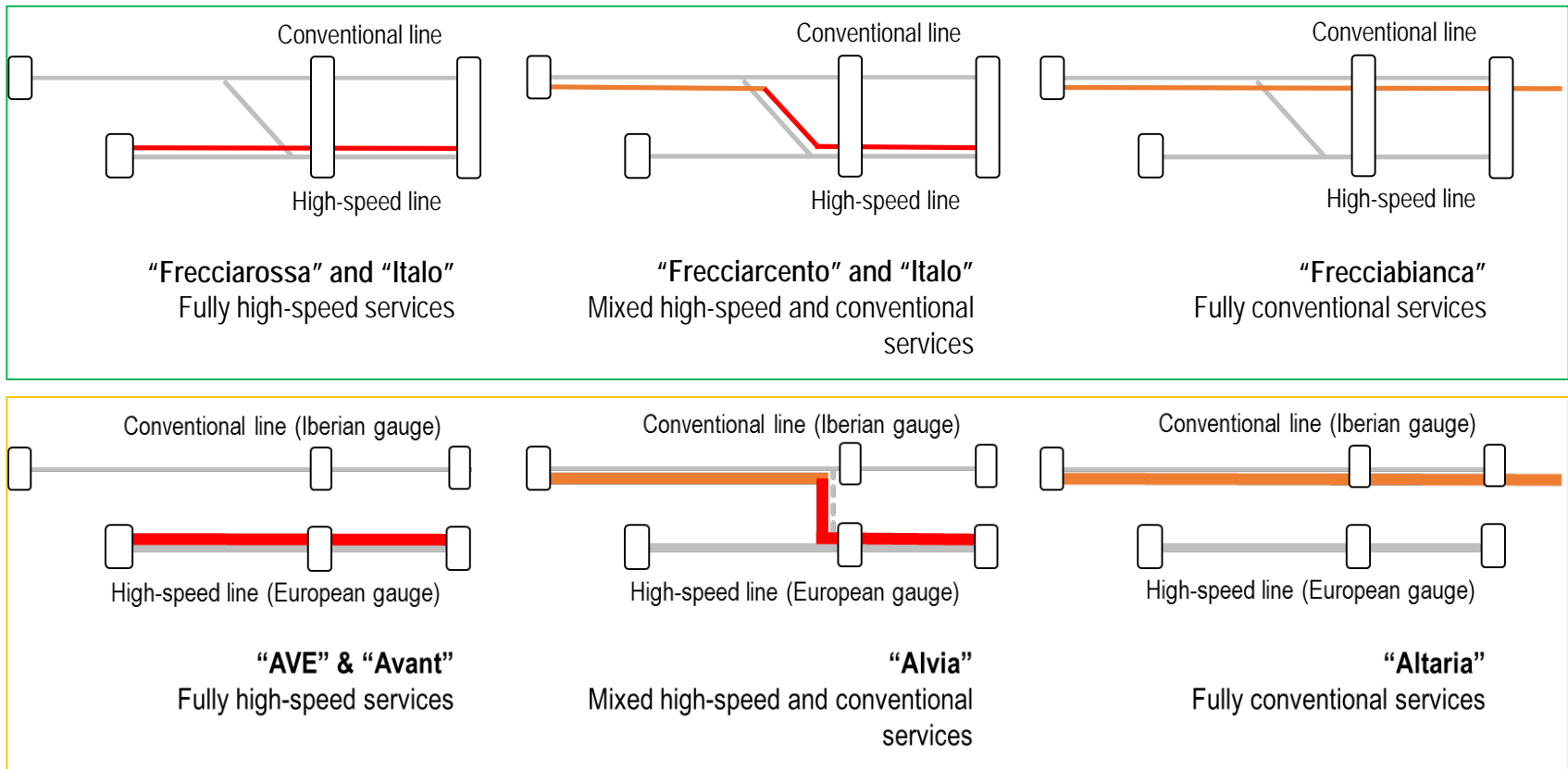
→ Political project!







## Case stories

### Similar supply models

Both in IT and SP mixed high-speed services exist, but Spanish network is totally separated from conventional one, except for few stations. Also, SP lines are dedicated to passenger trains only.




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## Demand and costs

### Aggregate figures

Some figures for the entire HS business in IT and SP.

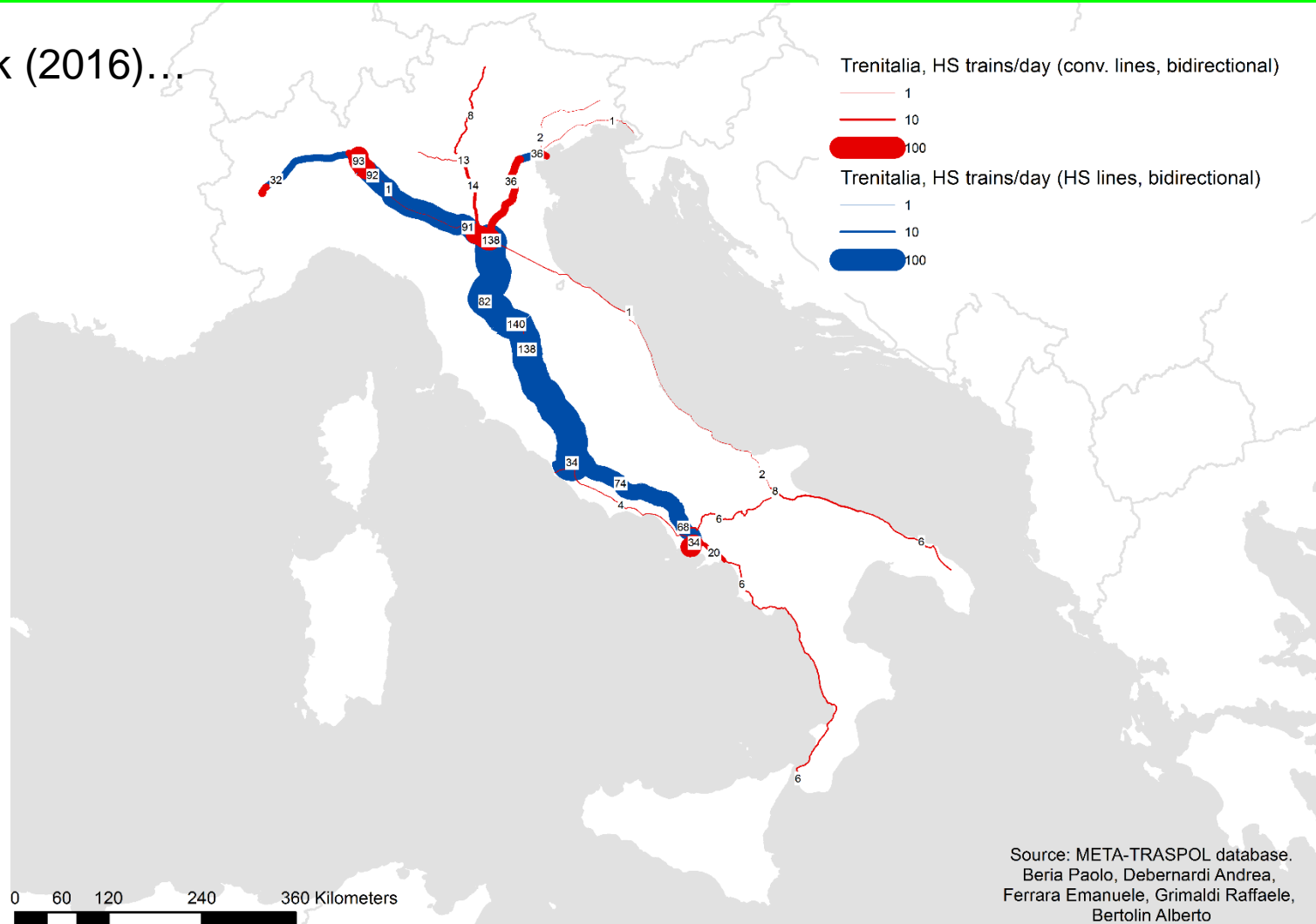
	2010	2013	2015	CAGR 13-15
<b>Million passenger HS</b>	18.7	32.4	40.3	+10.73%
<b>Million passenger-km HS</b>	11610	15090	18270	+10.03%
<b>Million pax*km/km</b>	<b>12.1</b>	<b>15.7</b>	<b>19.0</b>	
<b>Million trains*km HS</b>	n.a.	65.9	67.4	+1.13%
<b>Load factor (Trenitalia)</b>	n.a.	231.2	283.1	
<b>Load factor (NTV)</b>	n.a.	219.2	225.0	

	2008	2013	2015	CAGR 13-15
<b>Million passenger HS</b>	16.3	21.3	26.1	+7.0%
<b>Million passenger-km HS</b>	5483	8154	10027	+9.9%
<b>Million pax*km/km</b>	<b>2.3</b>	<b>3.6</b>	<b>3.9</b>	
<b>Million trains*km HS</b>	32.03	45.03	n.a.	
<b>Load factor</b>	171.2	181.1	n.a.	

# Demand and costs

## Supply: the effect of competition in Italy

### Trenitalia network (2016)...

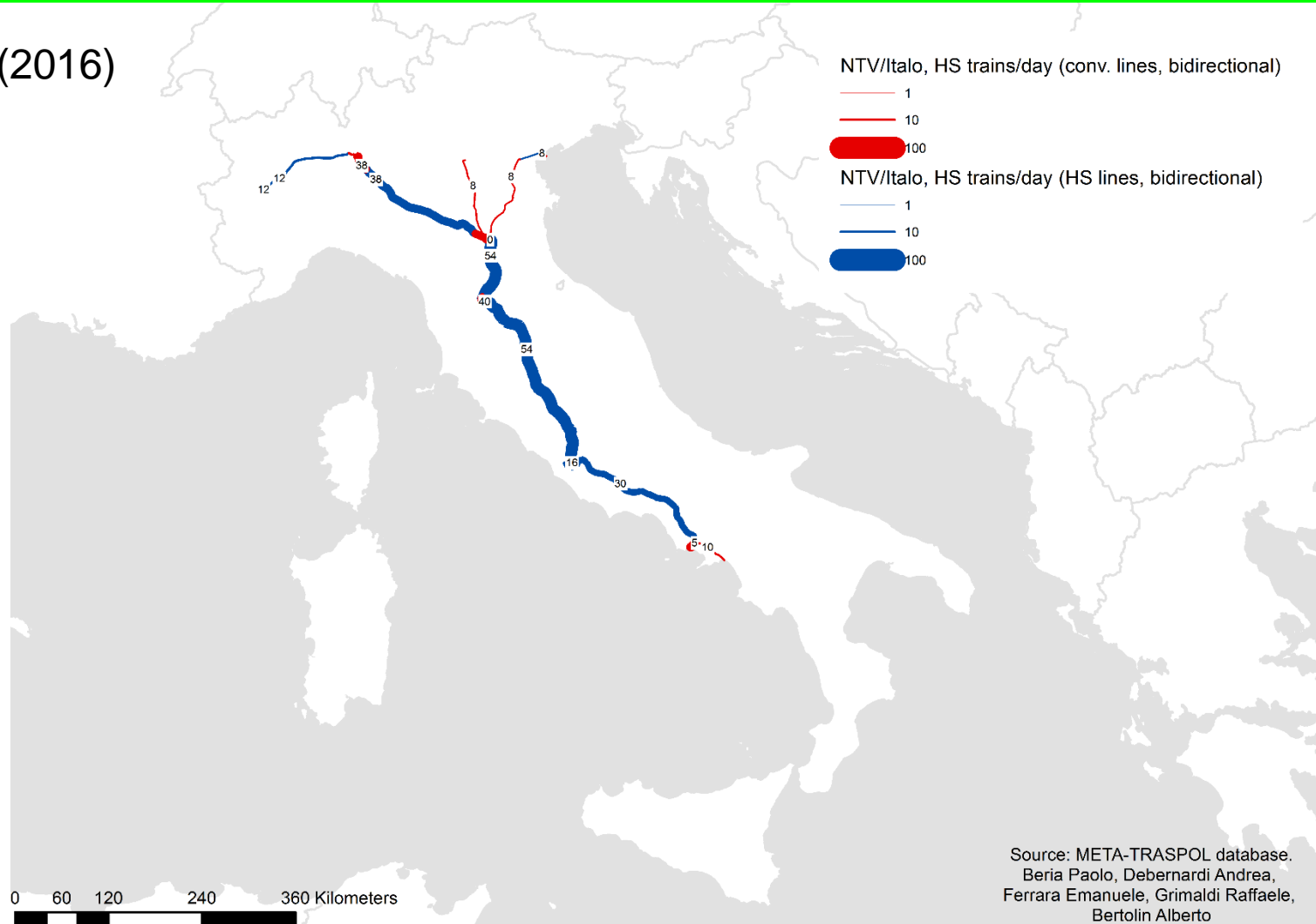


Source: META-TRASPOL database.  
Beria Paolo, Debernardi Andrea,  
Ferrara Emanuele, Grimaldi Raffaele,  
Bertolin Alberto

# Demand and costs

## Supply: the effect of competition in Italy

... and NTV one (2016)



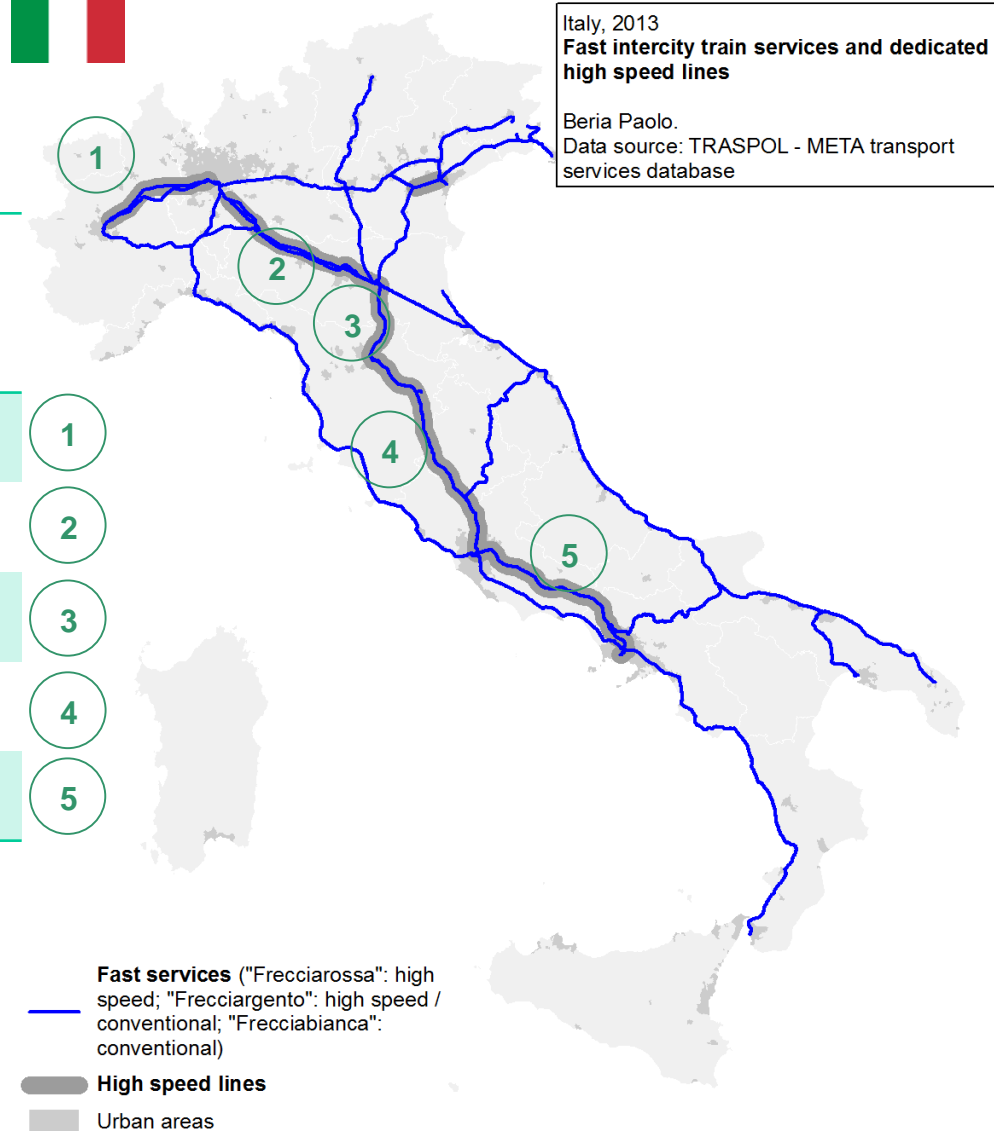
Source: META-TRASPOL database.  
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# Demand and costs

## Demand per line - Italy

### Demand per line segment

Line section	2010 Trenitalia [Mpax]	2013 Trenitalia + NTV [Mpax]	Increase
Torino - Milano	1.5	4	+167%
Milano - Bologna	6.5	13	+100%
Bologna - Firenze	11	18	+64%
Firenze - Roma	9.5	17.5	+84%
Roma - Napoli	3	7.5	+150%





# Demand and costs

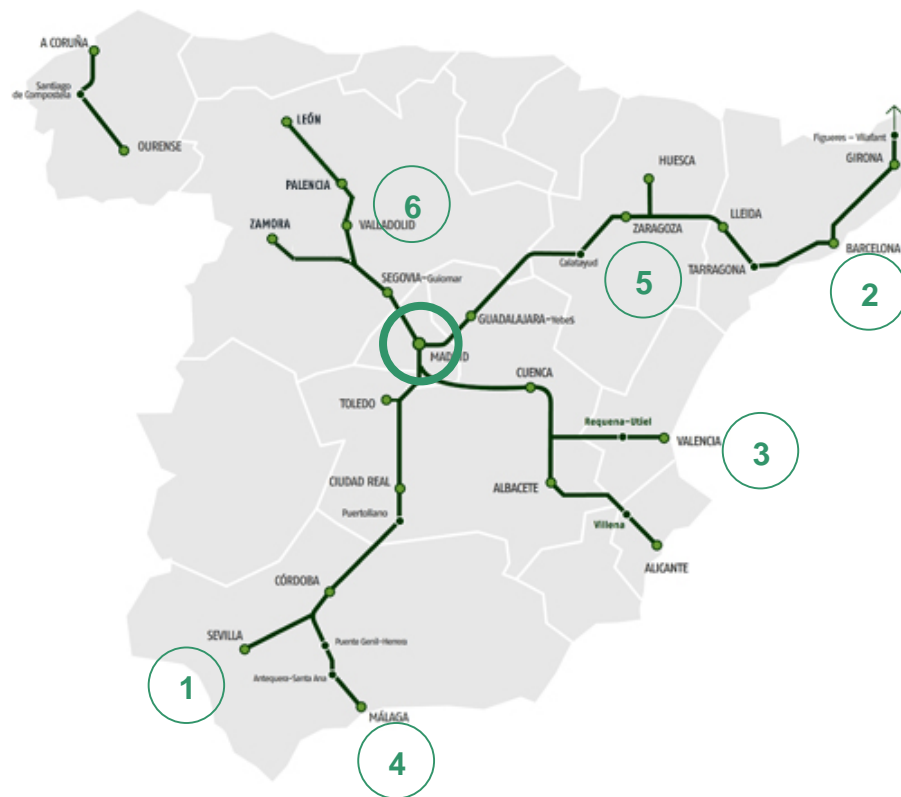
## Demand per line - Spain

### Demand per O-D (~line)



Line section	2012	2013
Madrid-Sevilla	2.1	-
Madrid-Barcelona	2.7	3.1
Madrid-Valencia	1.8	1.9
Madrid-Málaga	1.4	1.3
Madrid-Zaragoza	1.2	1.2
Madrid-Valladolid	1.1	1.2

- 1
- 2
- 3
- 4
- 5
- 6







**Demand and costs****Costs**

Costs are incomparably higher in Italy

<b>Section</b>	<b>Investment cost</b>	<b>Cost per km*</b>
	M€	M€/km
<b>Turin – Milan</b>	7,653	54
<b>Milan – Bologna</b>	7,043	31
<b>Bologna – Florence</b>	5,720	68
<b>Rome – Naples</b>	5,905	24

<b>Section</b>	<b>Investment cost</b>	<b>Cost per km*</b>
	M€	M€/km
<b>Madrid-Andalucía<sup>a</sup></b>	5,584	8.9
<b>Madrid-Barcelona<sup>b</sup></b>	7,541	10.8
<b>Madrid-Levante<sup>c</sup></b>	5,882	9.2
<b>Madrid-Valladolid</b>	3,871	21.5

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## The forms of delusion

Where is the problem?

Literature on megaprojects generally refers to two problems: **optimism bias** in the demand estimations and **cost overrun** with respect to investment cost forecasts.

However, not all projects present these problems and may *appear* as a success:

- SPAIN, but to a certain extent also ITALY, had **no significant cost overrun**.
- ITALY show very good demand figures, **above forecasts**, thanks to head-on competition developed since 2012
- BOTH systems work well and substantially changed the mobility in the respective countries.

*So, where is the problem?*

→ **we need a more structured approach to study megaprojects, going beyond formal mismatches (that forecasts are wrong and/or falsified), and questioning also about substantial planning and design choices.**

## The forms of delusion

### The forms of delusion – 3 Os

We classify the problems behind such delusions of success of HSR project into three forms, namely:

1. (the risk of) **overdesign**;

→ Excessive technical characteristics or performances

2. (the threat of) **overinvestment**;

→ Planning too many investments with respect to potential demand

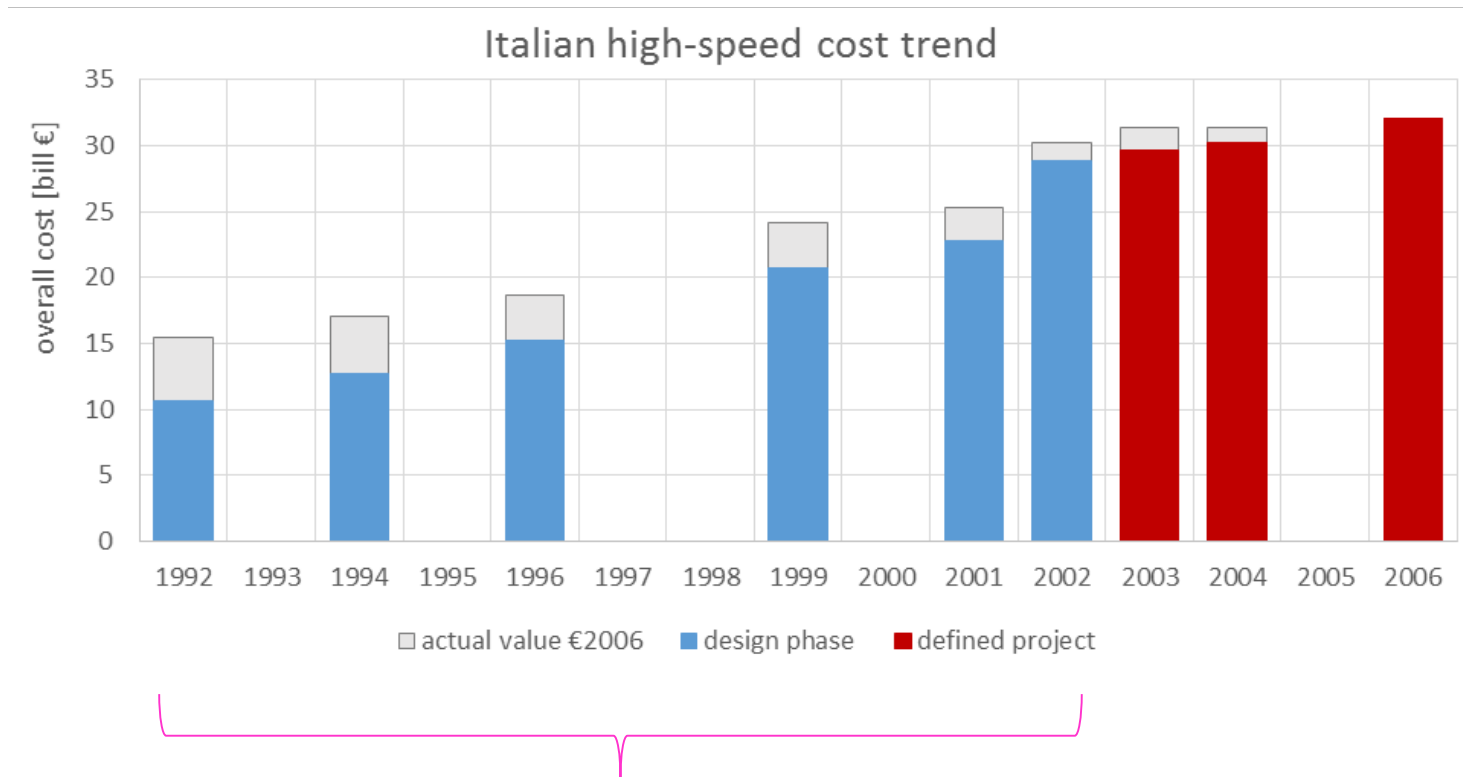
3. (the temptation of) **overquality**.

→ Monumentalism, expensive materials, etc.

# The forms of delusion

## 1. Overdesign

Italian case is well known for extremely high construction cost:



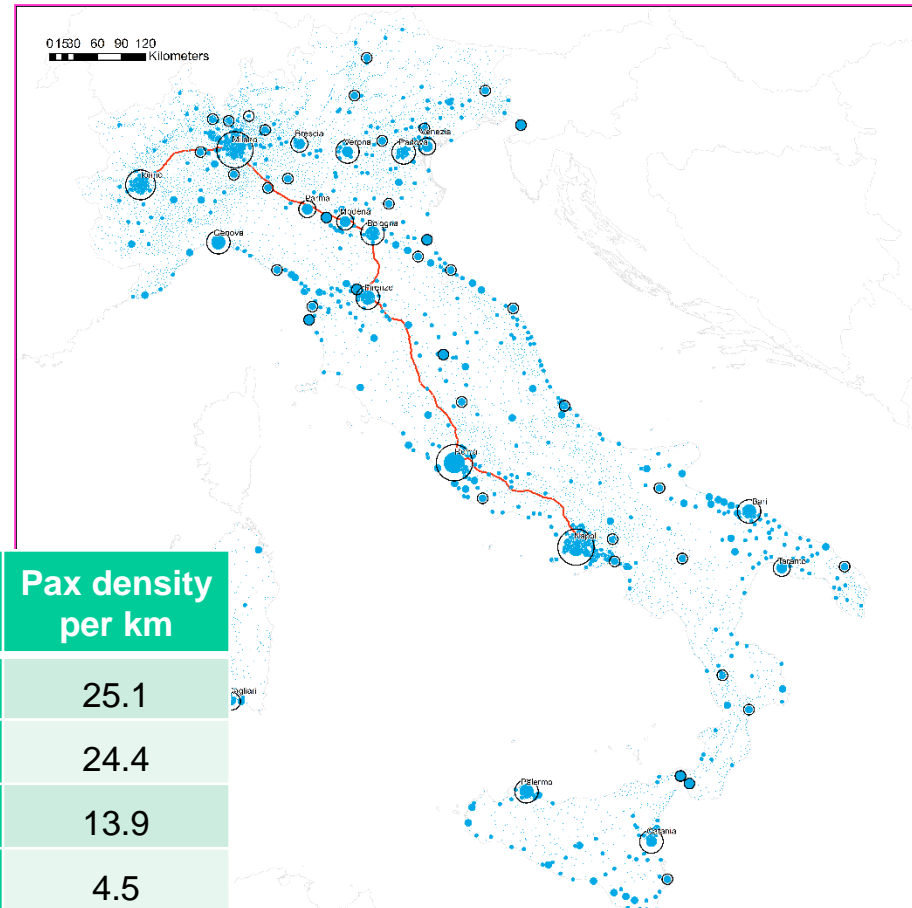
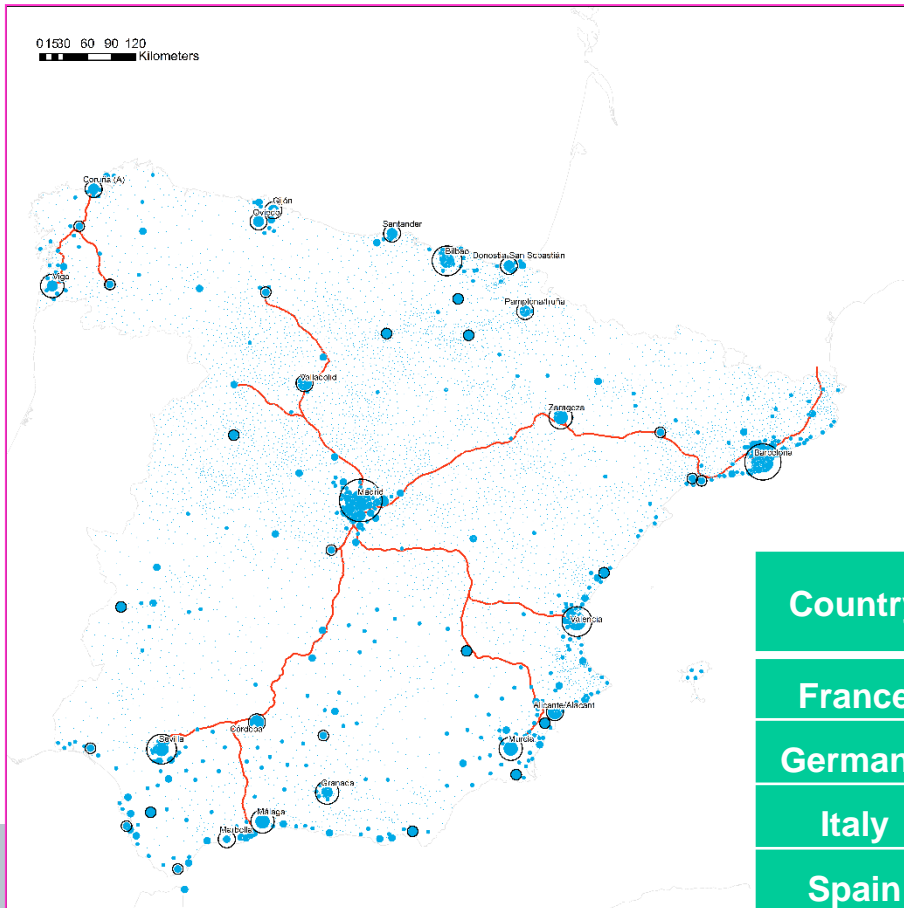
Italian HS has been **deliberately designed as expensive!**

# The forms of delusion

## 2. Overinvestment/1 - network

Spanish HS project is simply overdimensioned with respect to population and potential demand.

It ignores the characteristics of markets and of geography.



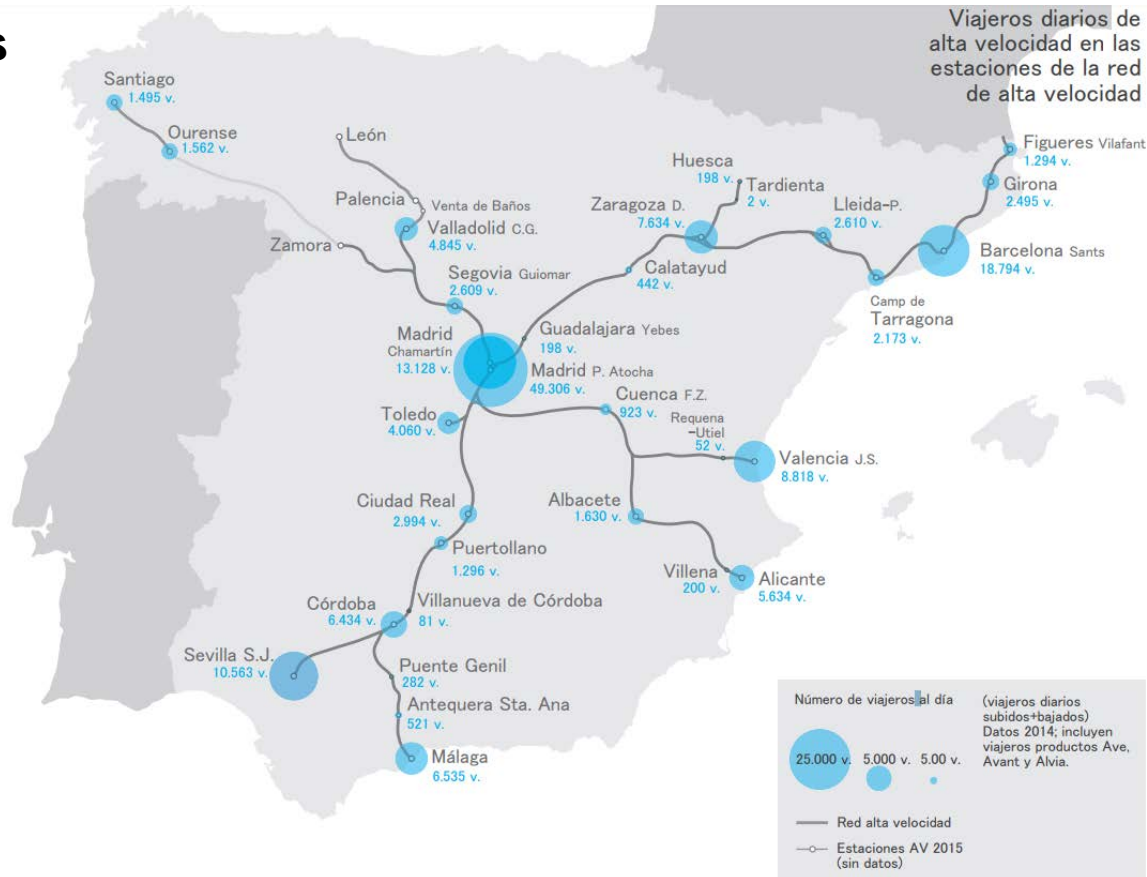
Country	Pax density per km
France	25.1
Germany	24.4
Italy	13.9
Spain	4.5

# The forms of delusion

## 2. Overinvestment/2 - stations

Spanish HS project is simply overdimensioned with respect to population and potential demand.

Many stations host just **hundreds of HS passengers** per day (incl. regional HS trains Avant).





## The forms of delusion

### 3. Overquality

Megaprojects tend to be excessively “monumental”, **overcoming functionality and becoming uselessly expensive.**



Jomokogen station (JP)



Zaragoza Delicias station (ES)

## The forms of delusion

### 3. Overquality

Megaprojects tend to be excessively “monumental”, **overcoming functionality and becoming uselessly expensive.**



Jomokogen station (JP)



Zaragoza Delicias station (ES)

## The forms of delusion

## 3. Overquality

Megaprojects tend to be excessively “monumental”, **overcoming functionality and becoming uselessly expensive.**

<i>station</i>	<i>cost (station only)</i>	<i>surface (sqm)</i>	<i>tracks</i>		<i>cost €/sqm</i>	<i>Passengers/year</i>
Firenze Belfiore	350 M€	48,700	4	underground	7,187	not existing
Torino Porta Susa	79 M€	37,000	6	underground	2,135	9 000 000
Napoli Afragola	61 M€	38,000	6	greenfield	1,605	not existing
Reggio Emilia AV Mediopadana	79 M€	20,000*	4	greenfield	3,950	600 000

\*: estimated

<i>station</i>	<i>cost (station only)</i>	<i>surface (sqm)</i>	<i>tracks</i>		<i>cost €/sqm</i>	<i>Passengers/yea (2015)*</i>
Zaragoza-Delicias	238 M€	44,000	10	greenfield	5,407	2.854.500
Málaga-María Zambrano	134 M€	51.400	11	greenfield	2,607	2.491.600
Camp de Tarragona	28 M€	54.107	8	greenfield	0,517	821.800
Girona	31 M€	28.720	4	greenfield	1,08	1045100

\*: including passengers of long distance conventional services.

## The forms of delusion

### Drivers to delusion

We recognise two main drivers for *planning optimism*:

#### 1) The rules of the planning process:

- ✓ no compulsory CBA,
- ✓ lack of transparency in decisions,
- ✓ supply-side only planning (no consideration of demand and its characteristics),
- ✓ asymmetric information among decision maker and proponents

#### 2) The actors and their goals:

- ✓ the railway managers are biased in favour of overinvestment also used to modernise the networks,
- ✓ the State uses the **transport megaprojects as political projects** (e.g. in Spain to affirm the centrality of Madrid, in Italy to support the development of the South)
- ✓ Political consensus tool, at least during the 2000s
- ✓ National prestige
- ✓ Foster national industry

From *transport projects* to *political projects*!

- Centralisation
- Territorial cohesion
- Public expenditure in underdeveloped territories
- National industry support

*Thank you for your attention!!!*



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