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Long Term Implications of HSR on Small cities: Ciudad Real and Puertollano revisited 25 years after the arrival of the HSR

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Abstract

Up to 10-15 years after the arrival of the HSR to two small and isolated Spanish cities a considerable amount of studies about the territorial and urban impacts/implications of HSR were done based on the cities of Ciudad Real and Puertollano. Their distance to major cities (at least 200 km to any cities of more than 100.000 inhabitants) made it easy to try to isolate the impacts/implications due to HSR from those derived from other reasons.

The paper does the same analyses that were undertaken 15-10 years ago, to evaluate those implications/impacts that have been consolidated on a greater long-term perspective and those which have changed and/or disappeared (less permanent more variable).

These two cities are compared to other similar ones, as it was done in *Serrano, R, Garmendia, M, Coronado, J.M, Pillet, F. y Ureña, J.M.* (2006) **Análisis de las consecuencias territoriales del ave en ciudades pequeñas: Ciudad Real y Puertollano**, Estudios Geográficos, vol. LXVII, n. 260, pp. 199-229. (ISSN-0014-1496) and even previously in *Fariña, J, Lamiquiz, F y Pozueta, J.* (2000) **Efectos Territoriales de la implantación de infraestructura de accesos controlados**, Madrid, E.T.S. Arquitectura, Universidad Politécnica de Madrid, Cuadernos de Investigación Urbanística, n. 29.

The policies/strategies implemented in these two cities are also revisited, as it was done in *Ribalaygua, C., Ureña, J.M., Coronado, J.M., Escobedo, F., Guirao, B., Menéndez, J.M., Rivas, A. y Rodríguez, F.J.* (2004) **"Alta Velocidad, integración metropolitana y proyectos territoriales. El caso de Ciudad Real y Puertollano", URBAN**, n. 9, pp. 30-44.

The two conclusions derived from revisiting these analyses undertaken 10-15 years ago in these two HSR cities show that:

The change in growth tendencies produced shortly after the HSR arrival:

- a positive change in the tertiary city of Ciudad Real between 10 and 20 years after the arrival of HSR, that tends to be maintained after these first 20 years, with a slight diminution tendency.
- a negative change in the industrial city of Puertollano until 10 years after the arrival of HSR that tends to be maintained between 10 and 20 years and worsens between 20 and 25 years

The projects/strategies being developed 10-15 years after the HSR arrival can be classified in the long term into three groups:

- those that tried to change the territorial model in general are having big difficulties,
- those that adapt the station urban surroundings in general are being more successful -the success of those that tried to attract new activities in general is greatly influenced by the type of city (industrial vs tertiary) and the national overall economic dynamism (economic cycle).

Keywords: *high-speed rail, long term effects, urban systems, small cities.*

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1. Introduction

This section is dedicated to explain the context of the research presented in the paper. In April 1992 Spain inaugurated its first 471 km of High-speed Rail (HSR), the Madrid-Seville line. This line was going to serve only these two cities and Cordoba, but in 1989 Ciudad Real and Puertollano were also included in the project, because it had to pass close to them anyway. These two cities had been for two centuries distant from the main Spanish transport corridors.

Shortly after the HSR services were in place a new medium distance HSR service was created to connect Ciudad Real and Puertollano only to/from Madrid reducing this travel distance by two thirds and opening up the possibility of daily commuting to/from Madrid with a HSR travel time around one hour. This made that these two small cities improved tremendously their connection to Madrid (around 20 services per day and sense), to the other cities in the corridor (ten services per day and sense) and through them to other cities/regions.

The implications derived from HSR (an only passenger railway service) in these cities described in literature (Urena, 2002 & 2002a; Ribalaygua, et al., 2003 & 2004; Ureña, et al., 2005; Menéndez, et al., 2006; Serrano, et.al., 2006; Garmendia, et al., 2008, 2009, 2011 & 2011a; Ureña, et al., 2009; Ureña, 2012) can be synthesised in the following:

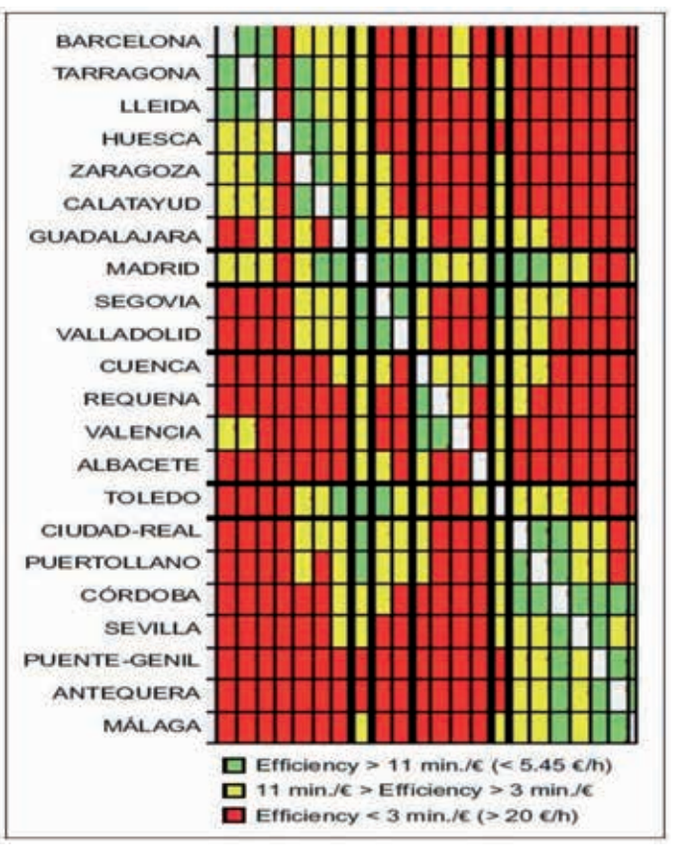
- Growth expectations not fulfilled. An important population growth was expected, as if they were suburban metropolitan cities (with campaigns in Madrid of "Come to live at Ciudad Real").
- Time distances to other main settlements in the province are equalized to those to Madrid and Cordoba.
- Generation of high professional level commuters (twice as many from Ciudad Real and Puertollano to Madrid than reversely).
- Attraction of quality services (health, university, etc.) to these cities, with high qualified professionals commuting from Madrid.
- Development projects related to transportation and leisure (Airport, Golf and Gambling tourist destination) and to economic activities.
- Location of inhabitants within the two cities were not substantially influenced by the location of HSR stations.

The enlargement of the Spanish HSR network with ulterior lines (see Figure 1), Córdoba-Málaga,Madrid-Barcelona, Madrid-Valencia and Alicante and Madrid-Valladolid-León and MadridValladolid-Zamora, improved the connectivity of these two small cities with direct HSR services to most of the cities along these new lines (all except Segovia, Valladolid, León and Zamora) providing a great efficiency of HSR, only behind Madrid (see Table 1)[1]. In a certain sense, these connectivity improvement has made these two small cities become cities in movement, with their inhabitants traveling frequently to other places for multiple purposes.

1 The HSR tunnel connecting Atocha and Chamartin Madrid stations, to be inaugurated soon, will allow direct HSR services from Ciudad Real and Puertollano to the cities along the North (Segovia, Valladolid, Palencia) and Northwest (Zamora) lines, improving even more the connectivity of these two small cities.

Figure 1: High Speed Rail Lines in Spain 2017: Madrid-Seville, present HSR lines in operation and under construction, and conventional lines adapted to HSR

Table 1: Useful minutes at destination per euro of all possible links using HSR



Source: Coronado, et.al. (2013)

Ciudad Real has a high proportion of HSR passengers per year in relation to its population (13.3 HSR passengers per inhabitant) and also important although smaller Puertollano (10.0 HSR passengers per inhabitant). This amount of HSR passengers diminished around 20% during the crisis years and has recovered during the recent economic recovery years.

In general, studies on the implications of new transportation investments are undertaken prior and shortly after the investment. The opportunity of reassessing the implications several years later diminishes, since other factors mix up with the new transportation investment; for this reason, ex-post long-term studies are scarce. Nevertheless, since Ciudad Real and Puertollano are still relatively isolated, 200 km to the nearest city above 100.000 inhabitants, the short/longterm comparison may sound more useful, since fewer factors mix with the HSR.

2. State of the art

This section reviews the scientific literature on the subject of comparing the short and long-term implications of new transportation infrastructures.

In several countries, Environmental Assessment, as an internationally accepted methodology, has to evaluate immediate and long-term effects of construction and operation of major proposed transport infrastructure projects on the environment (Goodenough and Page, 1994) and major spatial plans (Ureña and Español, 2006). In other countries, Territorial Assessments are also compulsory with similar immediate and long-term evaluation requisites. Their interest is their requirement to evaluate not only immediate but also long-term envisaged effects, and, as a consequence, to find mitigation measures.

There are many ex-ante evaluations of expected immediate and long-term effects, there are fewer short-term ex-post measurements of produced effects after the operation of new transport infrastructures and even fewer long-term ex-post measurements of produced effects. Long-term effects studies are frequently theoretical, without empirical basis (Bonatti & Campiglio, 2013).

Ojha, Vrat and Sharma (2016) proposed a System Dynamics approach to explore long-term implications (25 years) of quality of Highways on manufacturing growth, by exploring 8 highway maintenance/repair/construction scenarios and considering that improved highways will produce growing manufacturing and additional movement of goods, and thus, increased deterioration of highways, several refeeding loops (see Figure 2).

Figure 2: Relations between Highway quality and length and Manufacturing output

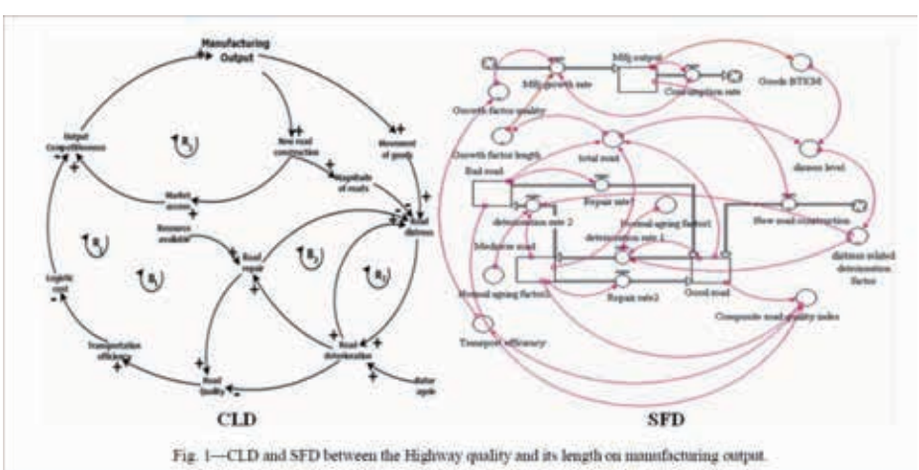


Fig. 1—CLD and SFD between the Highway quality and its length on manufacturing output.

Source: Ojha, Vrat and Sharma (2016)

These studies help planners to envisage the long term implications of policies, while their problem is that their internal rationale is based on ex-ante observations (regressions, etc.), but no ex-post measurements.

Elaborated ex-ante studies on the implications of major new transport infrastructures have to consider several aspects (Vickerman, 1994):

- The uncertain impact of transport infrastructure since improvements in external connections are usually two way, due to small contribution of transportation costs on total goods costs (3-4%) and due to transport can clearly be substituted for other inputs.
- The effects have to be considered on a multiregional basis.
- The implications continue to depend on how individual decision-makers and policymakers respond to the opportunities presented.

Thus, an added recommendation is to consider both objective (data) and subjective (policies, strategies) analysis.

The few long-term ex-post studies frequently use comparative studies to explore the implications. Berger & Enflo (No Date) explore Short- and Long-Term Impact of Railroads comparing cities that gained access to the railroad network to cities that did not. Berger & Enflo (No Date) indicate as additional precaution that has to be taken into consideration in these comparative studies, that it is not straightforward to identify the impact of infrastructure, because investments are typically allocated to already growing areas; thus comparisons have to ensure that they include growing cities (with transportation demands) and not growing ones (without much transportation demand). Comparing cities that gained and not gained early access to railway in Sweden, 1855-1870, Berger & Enflo (No Date) concluded that cities with early access to the railroad network:

- property values were higher, manufacturing employment increased, establishments were larger, and more information was distributed through local post offices, - continued to grow faster for
- a better part of the 20th century,
- today are substantially larger compared to initially similar cities.

Combination of ex-ante and ex-post analysis to determine the influence of transport infrastructure investment are starting to be used, although ex-post assessments are often performed only a few years after complete implementation of projects, often 3 to 5 years (Griskeviciute-Geciene & Lazauskaite, 2011). On top, ex-post analysis are frequently done in the form of Cost/Benefit analyses concentrating on determination of direct effects having monetary values, such as the reduction of travel time value, vehicle operating or infrastructure maintenance costs, without determination of more wide scope of socioeconomic indirect effects (Griskeviciute-Geciene & Lazauskaite, 2011). Best practices in several countries include direct and indirect aspects on ex-post analyses (see Figure 3).

The optimum would be to combine along time three types of studies. First, ex-ante studies on immediate and long-term expected effects. Second, ex-post studies shortly after infrastructure operation on immediate measured effects, and compare them with the expected immediate effects. And third, ex-post studies long after infrastructure operation on the long-term measured effects, and compare them with the expected long-term effects and with the measured shortterm ones. This will highlight the differences between expected and measured effects. This will also allow to refine methodologies for ex-ante evaluations, by trying to deduct differences between predefined rationales and realised rationales.

Figure 3: Summarized criteria of ex-post assessment on transport infrastructure projects

Object / Criteria	Cities bypasses	Motorways, highways (major projects)	Streets-Road networks connections	Bridges, viaducts
Direct Impacts				
Travel Time Savings	-	+	+	+
Vehicle Operating Cost	+	+	+	+
Safety	+	-	+	-
Induced travel	-	+	+	+
Service Quality	-	-	+	+/-
Environmental Impacts				
Noise	+	+/-	+	+/-
Emissions	+	+/-	+	+/-
Nature and landscape	+/-	-	+/-	+/-
Natural resources	-	-	+/-	+/-
Economic Indicators				
Investment costs	+	+	+	+
User benefits	+	+	+	+
Indirect Social Economic Impacts				
Land Use	+/-	+/-	-	-
Modal shift	-	-	-	+/-
Employment	+	+	+	+
Social Inclusion	-	-	+/-	-
Reliability	-	-	+/-	+/-
Accessibility	-	+	+	+
Efficiency and Output	-	+/-	-	-

Source: Griskeviciute-Geciene & Lazauskaite (2011)

Serrano, et.al. (2006) suggested that the implications of the HSR in Ciudad Real and Puertollano should consider the following time scenarios, improving what was prior done/proposed by Fariña, et.al (2000):

- Before there was any idea of having the new infrastructure.
- When it was known that the new infrastructure will exist but still is not in operation.
- When the new infrastructure is being built.
- Shortly after the new infrastructure was in operation.
- During the first ten years of operation of the new transportation infrastructure.

The aim of this paper is to add another time lapse, 15 more years of operation of the new infrastructure (up to 25 years since initial operation). This is important because, as Serrano, et.al. (2006) suggested, research should be aware that the effects of new transport infrastructures on transport would take place rapidly, while territorial effects will take longer.

Assessing the implications of new transport infrastructures long after their complete implementation (i.e. 25 years later) has the added problem that other factors mix up with the new transportation investment, and this exerts greater difficulty to ex-post long-term studies. Another problem is that data/statistics may change, due to change on collection/elaboration criteria or even due to collection cancellation.

3. Statistical Data Comparison over 25 years

The paper tries to do the same analyses that were undertaken 15-10 years ago, to evaluate those implications/impacts that have been consolidated on a greater long-term perspective and those which have changed and/or disappeared (less permanent more variable).

Ciudad Real and Puertollano are compared to other similar cities, as it was done in *Serrano, et al.* (2006) and previously in *Fariña, J, Lamiquiz, F y Pozueta, J.* (2000). Ciudad Real is compared to other small provincial capitals and Puertollano to other small industrial cities, in both cases cities which are neither close to the seaside nor to the five bigger Spanish metropolitan areas (at least 80 km in both cases) –see Table 2-.

TABLE 2. Cities compared with Ciudad Real and Puertollano

CIUDAD REAL	PUERTOLLANO
Albacete	Andújar
Ávila	Baeza
Badajoz	Bailén
Cáceres	Bolaños de
Cuenca	Carolina (La)
Huesca	Daimiel
Jaén	Linares
León	Manzanares
Lérida	Pozoblanco
Lugo	Solana (La)
Orense	Úbeda
Palencia	
Soria	
Teruel	
Zamora	

Fuente: Fariña, et. al., 2000.

None of the cities compared had HSR at the previous two comparison moments, while now some of those compared with Ciudad Real have HSR. This is the case of Albacete (2010), Cuenca (2010), Huesca (2005), Lérida (2003), Orense (2011) and Zamora (2015).

Statistical comparison was done through four aspects, first, population elaborated by the national statistical institute, second and third, market share and touristic index elaborated by Banesto and La Caixa banks and forth, housing numbers, building years and empty ones elaborated by the national statistical institute and housing price elaborated by the Ministry of Development.

Fariña, et.al. (2001) did the comparison of population during the first 5 years of HSR existence (from 1992 to 1996), a very short period; while the market share and the touristic index was only studied one year prior the existence of HSR (1991).

Serrano et al (2006) did the comparison of:

a. The demographic evolution in order to consider if the processes are different in three different stages: first, before even knowing about HSR existence (1975 – 1986), second, when decisions have been taken but the infrastructure is not finish (1986 – 1991), and third, during the first ten years of existence (1991 – 2001).

b. The evolution of economic variables (market share and tourism indexes) between 1991 and 2002 – 2003.

c. The age, use and price of housing between 1991 and 2001.

The paper presented here is able to do the comparisons along more years but only with fewer variables. At present, population data is available, market shares and touristic indexes data have been discontinued, data about housing numbers, building years and empty ones are available and finally housing prices data by municipality offered by the Ministry of development have been discontinued. Thus statistical comparison cannot be undertaken for the long term in many of the initially selected variables, it could only be done with the same data and sources for population and housing (except prices). This paper, shows the initial results of a comparison only of the population data.

3.1 Population Comparison over 25 years

The comparison of Ciudad Real with all the other selected provincial capitals (see Table 3 and Figure 4) shows that it has a total growth greater than all the other capitals except Albacete. Albacete is the biggest one, which more than doubles Ciudad Real population size.

During the period prior to the arrival of the HSR, when it was already being built (1981-1991) Ciudad Real grew more than all the others, except one (Lugo). During the period just after the HSR (1991-2001) it grew more than all of them, except one (Albacete). During the fourteen years later (2001-2014) it grew more than all of them, except one (Cuenca).

TABLE 3

Population evolution of capital Cities compared to Ciudad Real (base 100 year 1991)

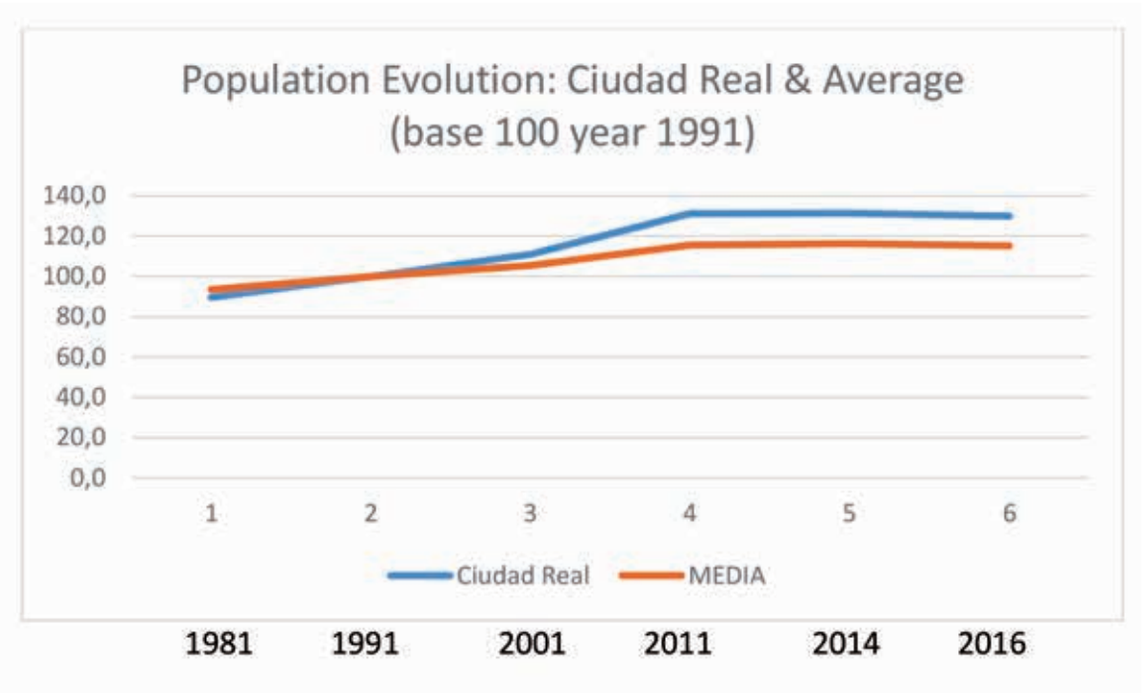
Municipality	1981	1991	2001	2011	2014
Albacete	90,1	100	114,5	131,5	132,7
Ciudad Real	89,6	100	110,9	131,3	131,4
Cáceres	96,3	100	110,9	127,4	128,5
Teruel	99,1	100	109,4	121,7	125,2
Badajoz	93,6	100	109,2	123,3	123,1
Jaén	93,4	100	109,0	112,4	112,2
Soria	99,0	100	108,6	123,1	122,1
Cuenca	97,6	100	108,2	130,3	130,2
Ávila	90,8	100	108,1	127,7	128,2
Lugo	88,9	100	106,2	117,1	118,4
AVERAGE	93,5	100	105,4	115,6	116,2
Huesca	100,5	100	104,7	115,9	119,0
Orense	93,5	100	104,6	103,4	104,0
Palencia	95,1	100	102,5	102,1	103,0
Zamora	92,6	100	100,6	100,5	99,9
Lérida	97,8	100	100,1	121,9	124,2
León	91,1	100	90,9	90,8	90,0

Source: Instituto Nacional de Estadística

Ciudad Real also grows more than the average of these cities (see Figure 4).

Figure 4:

Population Evolution: Ciudad Real and Average of Compared Citie



Source: Instituto Nacional de Estadística.

It seems that the provincial capital city of Ciudad Real, the first stop of the Madrid-Seville HSR line, an administrative, service and university city, has taken a positive growth path in comparison to other similar provincial capital cities. Nevertheless, while during the 20 first years after the arrival of the HSR, its comparative growth seems to increase in comparison to the average of the other cities, during the last four/six years this positive growth difference seems to be maintained (see Figure 4).

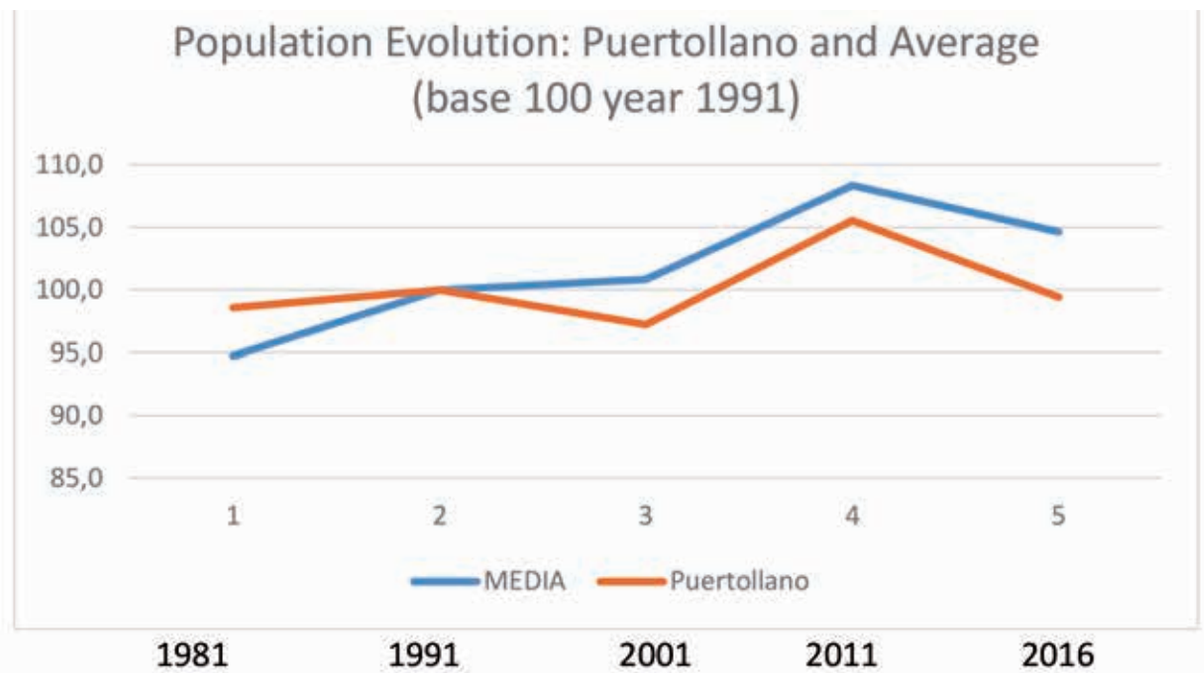
In the case of Puertollano its comparison with the other selected industrial cities (see Table 4 and Figure 5) shows that its total growth is smaller than all the other cities except one (Baeza). During the period prior to the arrival of the HSR, when it was already being built (1981-1991) Puertollano grew less than all the others, except two (Daimiel and La Carolina). During the period just after the HSR (1991-2001) it grew less than all of them, except for two (Baeza and Manzanares). During the sixteen years later (2001-2016) it grew less than all of them, except three (Bailén, Andújar and Linares).

TABLE 4. Population evolution of industrial Cities compared to Puertollano (base 100 year 1991)

	1981	1991	2001	2011	2016
Bolaños	98,6	100	110,6	124,0	119,1
Úbeda	89,8	100	101,5	112,2	109,0
Pozoblanco	88,1	100	106,2	114,8	112,0
Solana (La)	96,0	100	106,2	116,9	113,7
Bailén	92,9	100	105,5	111,5	107,6
Daimiel	100,3	100	105,4	115,2	113,5
MEDIA	**94,7**	**100**	**100,8**	**108,3**	**104,6**
Baeza	83,7	100	86,3	92,8	91,0
Manzanares	96,7	100	96,3	105,0	100,8
Andújar	97,6	100	105,9	109,2	106,1
Carolina (La)	100,7	100	101,8	108,3	107,1
Linares	93,4	100	98,9	104,6	100,7
Puertollano	**98,6**	**100**	**97,2**	**105,5**	**99,4**

Puertollano grows less than the average and during the last few years it seems to reduce even more its comparative growth (see Figure 5). The industry of Puertollano is monothematic and based on petroleum energy, a sector with decreasing employment ration, while the other cities industries are more diversified.

Figure 5: Population Evolution: Puertollano and Average of Compared Cities



Source: Ribalaygua, et.al. (2004)

It seems that the industrial city of Puertollano, the second stop of the Madrid-Seville HSR line, has taken a negative growth path in comparison to other similar industrial cities. A transportation means only for persons, together with the proximity of Ciudad Real also served by HSR is reducing and or extracting the dynamism of this industrial city. In this bipolar setting, HSR seem to extract from Puertollano and add to Ciudad Real.

Comparing the population findings of the analysis undertaken 10 years ago by Serrano, et. al (2006)[2] with those of the present longer term analysis the findings are not identical but similar; thus, it could be argued that the usefulness of long term population evolution analysis is not crucial. Nevertheless, longer term analysis suggests that the growth population dynamism of Ciudad Real (the administrative city) is maintained in relation to that observed post HSR but ten/fifteen years earlier, while that of Puertollano (the industrial city) seems to worsens in relation to that observed ten/fifteen years earlier. Thus the longer term population analysis does provide some additional qualitative differences.

4. Comparison of strategies

Usually, cities with new HSR connections attract/generate many urban projects, from the city itself, of from external/foreign investors trying to take advantage of the accessibility and image improvements. The policies/strategies implemented in these two cities are also revisited, as it was done ten years ago, ten years after the existence of HSR in *Ribalaygua, C., Ureña, J.M., Coronado, J.M., Escobedo, F., Guirao, B., Menéndez, J.M., Rivas, A. y Rodríguez, F.J.* (2004) **"Alta Velocidad, integración metropolitana y proyectos territoriales. El caso de Ciudad Real y Puertollano", URBAN**, n. 9, pp. 30-44.

Ribalaygua, et.al. (2004) studied the effects of HSR upon this HSR corridor ten years after it started to operate. They considered mobility and territorial structures, and made special attention on big projects that can only be understood under their close link to HSR. Here we are interested in their findings in relation to the main projects and to global planning criteria.

The relevance of comparing projects 10 years and 20/25 years is what Ribalaygua, et. al (2004) indicated that mobility changes may happen rapidly (few years after HSR), while changes on territorial structures need more time to happen.

Around ten years after the arrival of HSR the implications that were considered relevant were called "Effects on urban planning and the appearance of territorial scale projects" (Ribalaygua, et.al., 2004).

In relation to the municipal development urban plans, Ciudad Real renewed his in 1988, and a new one was approved in 1997, while Miguelturra, an adjacent town of 10000 inhabitants functionally integrated in the Ciudad Real socioeconomic dynamism, approved a new municipal development urban plan in 1994. On the contrary, Puertollano only started a new planning document in 2002, 18 years after the previous plan dating from 1984, and ten years after the arrival of High Speed Train.

In the case of Ciudad Real, the urban analysis done by Fariña et al. (2000) concluded that the impact of HSR in planning was very important, although not by itself and the opportunities it created, but because of the new locations of the tracks and the station. In fact, the stronger effects in the city were located in the old railway brownfields, transformed into residential land.

Ribalaygua et al. (2004) indicated that the new urban plan defined a city three times bigger than the 1987 plan, with a combination of very high and very low-density areas. As a result, four main urban spaces appeared: the compact urban nuclei of Ciduad Real and Miguelturra, a

2 *These are the conclusions/findings on this aspect by Serrano et al (2006) "Del análisis demográfico entre 1975 y 2001 se puede concluir que Ciudad Real mejora claramente su ritmo de crecimiento a partir del AVE en comparación con la media de las capitales similares, pasando de crecer solo un poco más que la media antes del AVE a crecer el doble que la media después del AVE; mientras que Puertollano empeora claramente su ritmo de crecimiento a partir del AVE en comparación con la media de las ciudades similares, pasando de crecer algo menos que la media antes del AVE a ser el núcleo que más decrece después del AVE."*

tourism destination called "Reino de Don Quijote", and the future private airport and its industrial area. This last project was approved as 'Singular interest project' an exceptional planning legal figure of the Regional Land Use Law, and therefore was assumed by the city planning (FIG).

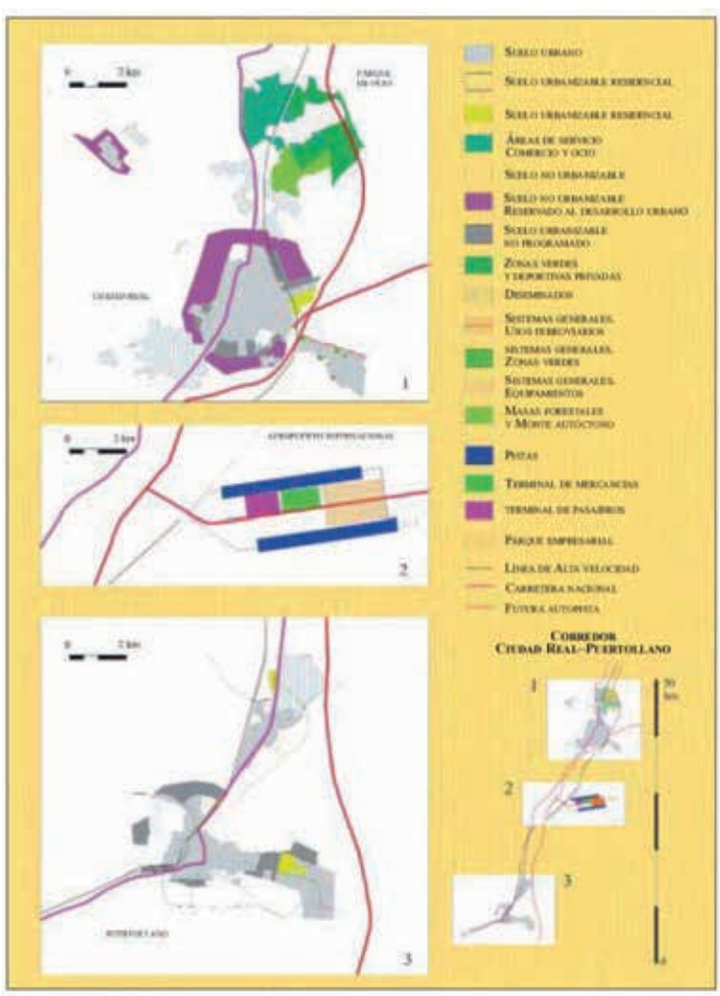
Nevertheless, the urban patters, building typologies and distribution, etc. created with the new urban plan of Ciudad Real did not take into consideration the opportunities that may have appear between the new station and the existing city centre. The plan left several barriers between the city centre and the station (a park, and old prison, etc.) and there were no intervention planned to improve this connection. On the contrary, on the other side of the tracks, new lands for tertiary and industrial activities was reserved.

In 2011 Ciudad Real started to revise its municipal development urban but the real sate crisis started in Spain in 2008 stopped its elaboration process as its growing in population and urban land previsions soon were found oversized (66000 new dwelling units, and housing for a population of 184.000 inhabitants (Rodríguez-Doménech, 2012).

Urban Development Planning documents seem to maintain a hope that these HSR cities will grow importantly, but reality doesn't follow, maintaining slow growth rates, and thus making it much less urgent to approve new development plans. Ciudad Real approved its new Urben Development Plan just before the Spanish real state crisis, thus with abundant new possible urban expansion, which is still able to cope with today's urban growth, thus there little need to approve a new urban development plan.

Figure 6:

Urban Development Plans: Ciudad Real-Miguelturra, Puertollano and airport area.



Source:

Ribalaygua, et.al. (2004)

Ribalaygua, et.al. (2004) consider three territorial scale projects: Airport, El Reino de Don Quijote Kingdom and the "Polígono Industrial Avanzado".

At that moment, the airport was at the time in its initial building phases besides the HSR line (see Figure 6). The expectations were very important: a relevant air cargo activity thanks to the space availability and the size of the infrastructure big enough for the biggest existing planes and space for freight warehouses. Also, the arrival of low cost passenger companies was expected, thanks to the high speed connections to Madrid, even a High Speed Rail station in the airport was planned. The terminal was also going to be connected with a new crossing point of two motorways linking Lisboa with Valencia and Madrid with Cordoba, and also the connection with conventional rail was envisaged.

It was expected that the airport would have had an important potential market, due to land availability and an uncongested air space and due to its location besides a motorway crossing point and the HSR. This will allow, the airport promoters thought, would open up opportunities for merchandises and passengers traffics.

Today the airport is completed, has been in operation for about four years and then it was closed. The important financial depth of the airport and the important involvement of the regional Caja de Ahorros has meant that, following the airport's closure, it has been sold at a much lower price and is in the process of being reopened, although it is not still sure when this reopening will take place. The new project is mainly oriented to freight and plane maintenance services, with a new big hangar under construction at this moment. The second consequence is that the regional Caja de Ahorros has been absorbed by a conglomerate of other public Banks.

In the meantime, some of the activities that were thought for this airport have been attracted by other airports (heavy plane maintenance by the Teruel Airport, European War Helicopter by the Albacete airport, etc.). The huge industrial area that was established and furbished besides the airport is totally empty.

The Don Quijote Kingdom Tourist destination was described by Ribalaygua, et.al. (2004) as a residential land that was already considered in 1997 city urban plan. In 1999 its surface was significantly increased (doubled) when a new leisure development project was proposed to the city council with hotels, a thematic park, golf courses and 6000 new housing units. It was a real state land development that should have increased substantially the residential land of the city and that may have change its urban structure, because this new development is 8 km apart from the existing nucleus, divided by the high-speed line, with the casinos and thematic park in one side and the golf courses in the other (see Figure 6). When Ribalaygua et al.(2004) wrote their article, the smaller golf course and some of the infrastructure was under construction, while permits were expected to start building the first residential developments.

Nowadays only a small part of the infrastructure investment (streets) is done and no houses (6.000 were planned) have been built and from the Tourist facilities (Casinos, thematic park and 36 holes Golf Course) only a 9-hole golf course is in operation. The developers have gone bankrupt and there are no news about possible plans for the half urbanized land.

The Polígono Industrial Avanzado located besides the HSR station was described by Ribalaygua, et.al. (2004) as a 24 hectares industrial area also besides an existing one by the traditional road to the east. This new Advanced Industrial Area was supposedly proposed for activities/ businesses interested to develop new technologies and services and making use of the near university campus and its privileged accessibility. This initiative received substantial financial support by the EU due to its proximity to HSR and to being linked to new technologies.

Nowadays, this Polígono Industrial Avanzado is just above 50% occupied and activities do not have the additional expected technology role. Nevertheless, in other parts of the city (by the University Campus) a few industrial/consulting activities have been located, as if in this small city proximity to the HSR station is not necessary since all the city is close to the station. This lack of need to be close to the HSR station was already stated by Garmendia, et.al., (2008) for residential location.

Nevertheless, other high technology related activities are developing at Ciudad Real in more conventional locations, not in these territorial projects, for instance the University and the new provincial hospital. These activities are getting consolidated, but not without some problems, since the public expenditure reduction in parallel with a reduction of demand is probably meaning that they are having less demand, since some of the persons that demanded them can now solve their demand in higher class markets such as Madrid.

The conclusion that can be raised is that this city of Ciudad Real, although its great personal accessibility improvement via HSR, is only being able to change its traditional role at a very small pace, much smaller that it was expected, and over the existing urban land more so that along peripheral new development projects. It has to be considered that both the airport and the Don Quijote Kindom have a peripheral location.

In relation to Puertollano, Ribalaygua, et.al. (2004) did not consider any additional territorial projects. Nevertheless, Puertollano has had several small size development initiatives, all of them were initially proposed more than 10 years after the arrival of the HSR. These initiatives are an industrial incubator, a technical school of plane pilots, several solar panel factories, etc. most of them have lasted only a few years.

5. Conclusions

The two conclusions derived from revisiting these analysis undertaken 10-15 years ago in these two HSR cities show that:

The change in the growth tendencies produced shortly after the HSR arrival:

- a positive change in the tertiary city of Ciudad Real between 10 and 20 years after the arrival of HSR, that tends to be maintained after these first 20 years, with a slight diminution tendency.
- a negative change in the industrial city of Puertollano until 10 years after the arrival of HSR that tends to be maintained between 10 and 20 years and worsens between 20 and 25 years

Thus, although some differences appear between the population analysis undertaken 10/15 years ago and those undertaken at present, no great differences are shown, thus longer term population analysis do not seem to be crucial. Nevertheless, this is what happens with a 25 year long term period of study, what this does not demonstrate is that analysis undertaken with longer periods may not show greater differences. An additional consideration if that the analysis has only been undertaken with population total numbers, additional analysis of population age, employment, education level, etc. may provide other evidences.

In relation to projects/plans, the conclusions of this study seem to point out that the projects/ strategies being developed 10-15 years after the HSR arrival could be classified in the long term into three groups:

- those that tried to change the territorial model in general are having big difficulties, with a possible subdivision:
  - those already totally built and related exclusively to transport (airport) may have a difficult but comparatively better promising future
  - those not totally built and related to attracting new activities (leisure) may have a much more difficult future if any.
- those that adapt the station urban surroundings in general are being more successful, although lack to attract new technologies
- those that tried to attract new activities in general their success is greatly influenced by the type of city (industrial vs tertiary) and the national overall economic dynamism (economic cycle).

Thus, it seems that the analysis of plans/projects provides additional relevant conclusions.

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