International Transport Forum

New Entry in the Italian High Speed Rail Market

29

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NEW ENTRY IN THE ITALIAN HIGH-SPEED RAIL MARKET

Introduction

The purpose of this presentation is to examine a specific rail transport sector, namely high-speed (HS) rail, in Italy.

This analysis will cover the main features of the Italian HS system by studying aspects such as: the legislative framework, infrastructure, services, traffic data and market shares, in addition to regulatory matters.

The European context

In the early 1990s (Directive 91/440/EEC), the European Union launched a thoroughgoing programme to reform the rail sector, a programme which was notable for its socio-economic repercussions and for its economic and environmental sustainability aspects. The end result, which was initially to be reached by harmonising the various national systems and liberalising international transport at European level, was gradually refined until it achieved the declared aim of creating a single European rail space and an integrated, safe and interoperable market.

That target was to be achieved by constructing new lines, particularly high-speed lines, aimed at making rail travel genuinely competitive in relation to road and air transport over distances up to 700 km and beyond.

The HS network (speed ≥ 250 km/h – max. speed today 360 km/h with an operating speed of 300 km/h, in the near future 400 km/h with an operating speed of 350 km/h) is now the pride and joy of the European and Italian rail system.

Italian infrastructure

The Italian high-speed network was planned with a view to linking the most densely populated and highly productive areas of Italy, a country whose geographical configuration is long and narrow. Thus, the initial concept was to develop a Y-shaped system between Rome (with southern extensions towards Naples and Salerno) and Milan and Venice (via Florence and Bologna), capped by an east-west transverse line between Venice and Turin (via Padua, Verona, Brescia and Milan).

The Italian high-speed line currently in operation therefore connects the cities of**: Turin-Milan-Bologna-Florence-Rome-Naples-Salerno**, with additional operational sectors between **Milan and Treviglio** and between **Padua and Mestre** (dark blue line on the map).

Although the **Padua-Bologna** and **Verona-Bologna** sections (both shown in light blue on the map and to the north of Bologna) are not yet HS lines, they have been fully upgraded ready for integration into the high-speed network.

The network described above extends to about 1 000 km and has completed the project which was launched with the opening, in 1977, of the first section of the Rome-Florence Direttissima line.

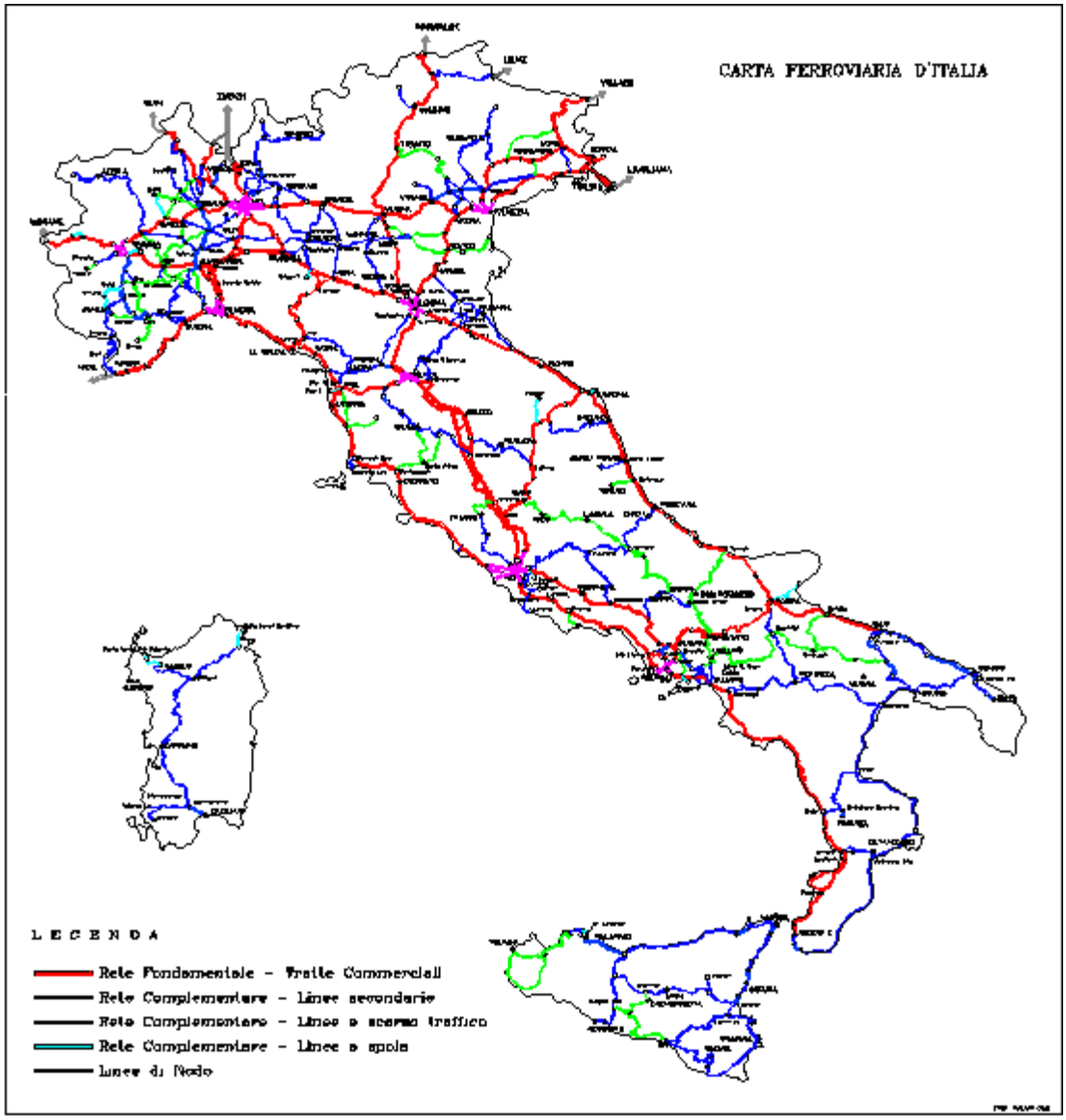
The following sections of the HS network will shortly be completed:

- about **200 km** between **Treviglio and Padua (via Verona)** (orange line on the map, to the east of Milan);
- additional lines – some new and some already in existence are being gradually upgraded with a view to integration with the rest of the HS/HC (high-capacity) system – along the **transalpine pass routes** connecting with the rest of Europe and on the Italian **Mezzogiorno** network, notably between Naples and Bari, Salerno and Reggio Calabria, and in Sicily between Palermo, Catania and Messina, and the Terzo Valico dei Giovi Milan-Genoa route (orange line on the map to the south of Milan).

Key: Anversa – Antwerp; Lione – Lyons; Parigi – Paris; Marsiglia – Marseilles; Lubiana – Ljubljana

The high-speed rail infrastructure is also integrated into the old conventional network in order to maximise potential rail traffic more effectively.

The conventional rail network in Italy consists of around 16 500 km of other lines and hubs, whereas regional interoperable and interconnected infrastructures amount to around 2 000 km.



Key: Rail Map of Italy
Basic network – commercial sections
Complementary network – secondary lines
Complementary network – low-traffic lines
Complementary network – shuttle services
Hub lines

Technical characteristics of HS lines

HS lines are constructed according to the most advanced infrastructural and technological standards in order to provide the best possible services in terms of **safety, speed and interoperability** with the principal existing railway lines and with the European HS network.

Innovative technological equipment of special importance developed by and/or adopted by the Italian HS system include the European Railways Traffic Management System (**ERTMS**), the HS-compatible control-command system

(**SCC-AV**), the mobile radiotelephony system **GSM-R** and the **25 kV AC** electric traction supply system.

The principal technical characteristics of the new infrastructure are as follows:

Traffic type	**Mixed** (passengers and freight)
Operating speed/max.	300 km/h/360 km/h
Minimum radius of curvature	5 450 m
Maximum cant	18%
Maximum axle load	25 t
Track bed width	13.6 m
Distance between track centres	4.5-5 m
Natural tunnel section	82 m^2
Supply new lines	25 kV AC 50 Hz
Supply urban sections	3 kV DC

Key features of the HS network

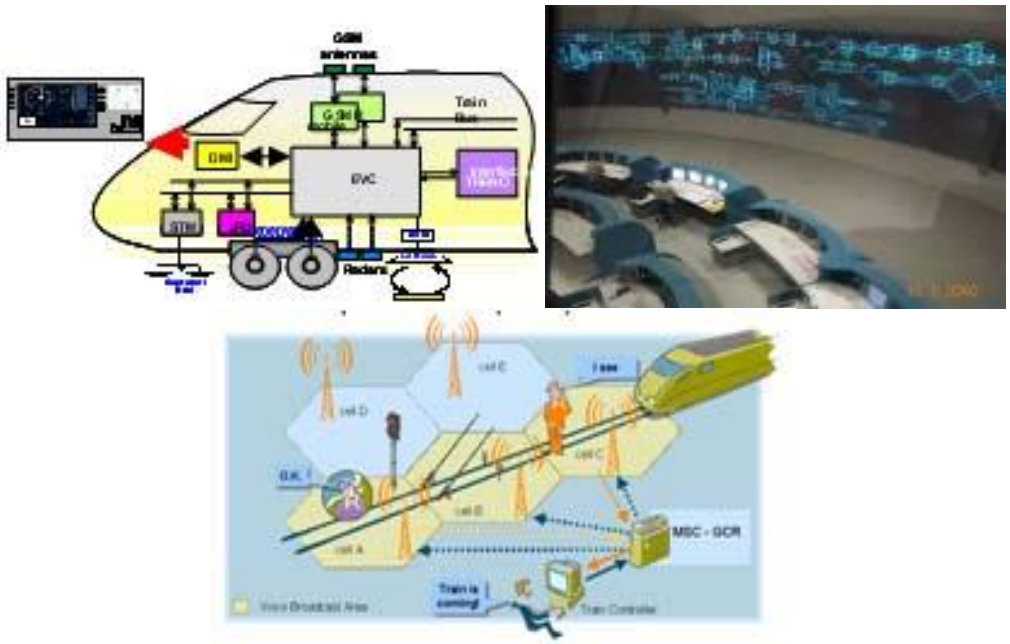
Based on Italian experience, some key factors to consider when planning and constructing an HS network are:

Major infrastructure projects, which facilitate the construction of an increasingly high-performance network.

Distances: HS rail is competitive up to a distance of 1 000 km provided that it is not interrupted by too many stops, otherwise optimal distances fall to between 500 and 700 km depending on the forecast operating speed. The latter factor is crucial for a proper cost-benefit analysis, a higher forecast operating speed implies significantly higher deployment costs.

Population: it becomes essential to connect the most populous and important cities in the country in order to justify the investment and achieve satisfactory socio-economic returns.

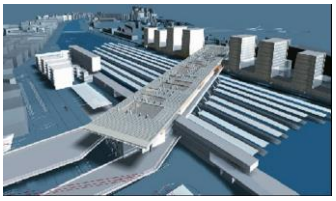
ERTMS – ETCS: these are the interoperable European standards in terms of rail infrastructure and on-board control-command and signalling (CCS) chosen by the European Union for the European high-speed network: they allow totally safe movement of high-speed trains, eliminating the possibility of disasters associated with human error (like the recent unfortunate one in Europe).



Capacity: this is normally measured by the number of trains that can circulate on the reference infrastructure in the chosen unit of time; however, the two main variables which are capable of increasing the value are the technical characteristics of the CCS system used and the type of traffic (specialisation of lines and types of service, especially in urban hubs).

Tolls: are payable on the entire network, but, of course, those on the HS network are higher and in part designed to compensate the infrastructure operator for the lower returns deriving from the reduced toll on the conventional networks. Italian Decree

No. 43T/2000 lays down the method of calculation. At any rate, this toll tends to cover only the direct and indirect costs of operating and maintaining the infrastructure.



Railway stations: a fundamental link in the network which makes it possible to increase the efficiency of the HS system, improve hub transit and increase the attractiveness and profitability of the rail network by integrating it with local urban public transport networks, the most highly populated areas and the commercial areas of cities.

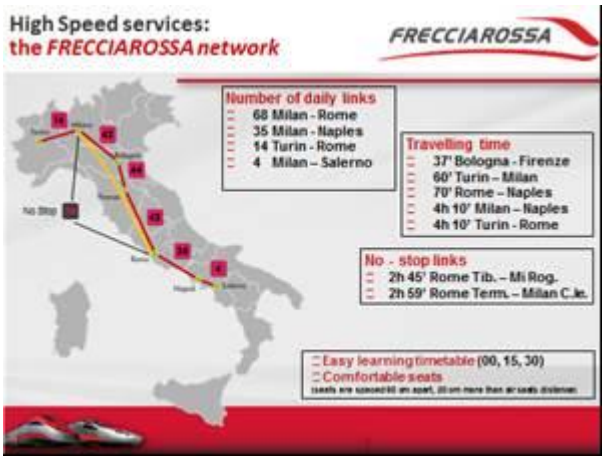
Trains

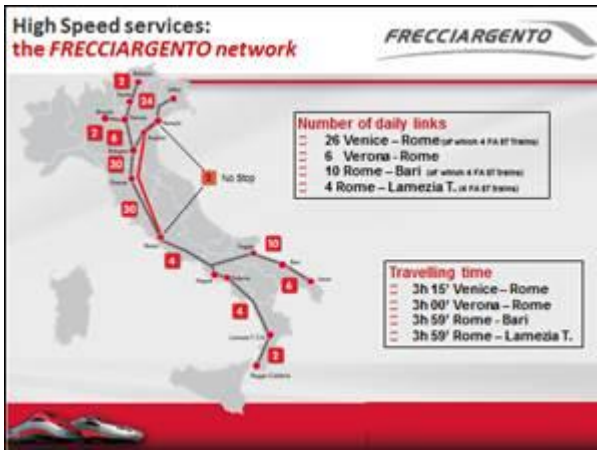
The rolling stock currently used on the HS lines in Italy is a new, interoperable design (standards are: kV 25 AC and kV 3 CC, ERTMS 2.3.D, minimum 7 coaches, operating speed 350 km/h). In line with this ongoing development of rolling stock, initiated with the Settebello and Pendolino trains and continuing up to the models currently operating (Bombardier ETR "Le Frecce" and Alstom AVS ITALO), we have now arrived at the new ETR 1000 commissioned by Trenitalia SpA, part of the Ferrovie dello Stato Italiane (FSI) group. The ETR 1000 is being built by Ansaldo-Breda and Bombardier in their facilities at Savona, Italy; it is designed to operate at a speed of 350 km/h and is currently in the testing phase.

Trenitalia SpA, part of the Ferrovie dello Stato Italiane group, and the "Frecce" trains

The trains operated by Trenitalia SpA, as part of the Ferrovie dello Stato Italiane group, are currently of three types known as "Freccia", each with a different cruising speed, destination and frequency.

The premium, dedicated HS services are operated by trains from the Frecciarossa and Frecciaargento fleet whose frequency and journey times are set out below:





Frecciabianca trains, on the other hand, are used on all other main lines not dedicated to high-speed trains.

The table below sets out the principal productivity indicators for Trenitalia for 2012 and the first half of 2013:

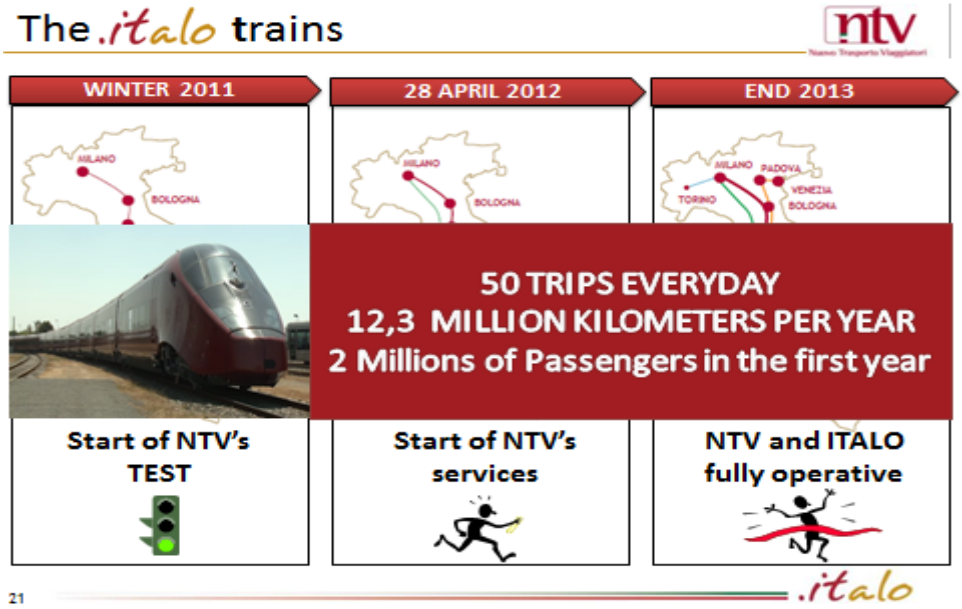
Description	**2012** (full year)	**2013** (1 January – 30 June)
No. of trains	over 60 000	over 32 000
Train-kms	over 30 000 000	over 16 000 000
Passengers carried	over 10 000 000	over 5 500 000

Nuovo Trasporto Viaggiatori (NTV) and the Italo trains

The new high-speed service operated by the company NTV with its ITALO trains came into operation on **28 April 2012** purely on the Naples-Rome-Florence-Bologna-Milan route.

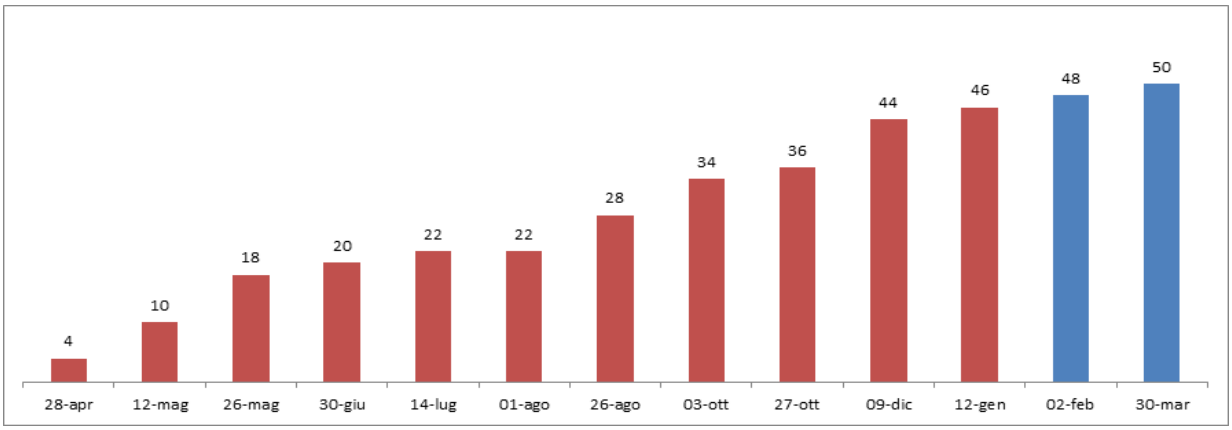
The Italo trains suddenly put their services on the market in competition with the incumbent operator, Trenitalia.

As the fleet came into service, the number of daily journeys increased. NTV was initially predicting that full operational mode would be achieved with the next change of timetable on 15 December 2013.



However, the market for NTV, and HS rail in general (as stated above), has grown faster than predicted, and it reached 50 journeys per day by 30 March 2013, in other words earlier than scheduled by the company itself.

Since their launch, the Italo services have developed as shown in the following chart in terms of delivery of rolling stock and number of journeys offered in the ramp-up phase:



Key: 28 Apr., 12 May, 26 May, 30 June, 1 Aug., 26 Aug., 3 Oct., 27 Oct., 9 Dec., 12 Jan., 2 Feb., 30 Mar.

Italo trains now link 10 Italian cities and 14 stations (Venice, Bologna, Rome and Milan each have two stations).

The principal productivity indicators for NTV for 2012 and the first half of 2013 are given below:

Description	2012 (28 April to 31 December)	2013 (1 January to 30 June)
No. of trains	6 488	8 682
Train-kms	4 197 661	5 692 764
Passengers carried	2 051 705	3 154 823

The high-speed system and the modal split

The numbers given above demonstrate that, despite the unfavourable economic climate and the economic crisis, which have, in general terms, held back transportation, high-speed trains have managed to increase the number of passengers carried.

The new competitor on the market has not had the effect of eroding the number of passengers carried by the incumbent but has generated supplementary traffic, thanks to a general reduction in fares, a better standard of services and an increased offer in terms of frequency and number of stations served.

In other words, rail has shown that it can compete successfully with road and air transport and even with conventional passenger rail services over medium- to long-distance high-traffic routes. It appears that there is also a willingness, especially in the first-class business and leisure sectors, to pay relatively high prices, with a resulting low elasticity of demand in relation to the tariffs needed to cover costs, even though there is a general shrinking of the relationship between first- and economy-class passengers.

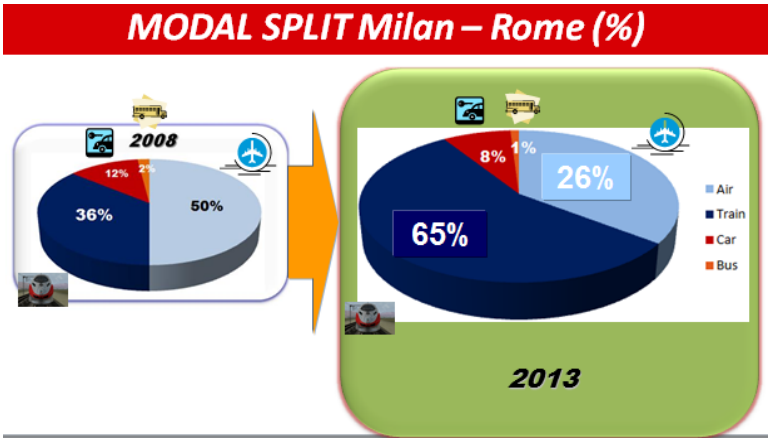
In terms of the overall split of transport demand, it is estimated that, between 2009 (the year that the HS network and modern HS services were launched in Italy) and 2012, the

modal share of HS rail increased from 39% (transfer of Inter-City and Pendolino customers to the new HS Frecce services then offered by the sole rail operator Trenitalia) to 54%, whereas the road share fell from 28% to 21% and the air share from 26% to 21%.

On the Rome-Milan route in particular, the increase in the modal shift is even more marked, both because the distance between the two major centres is ideal (about 700 km) and because the traffic is predominantly business traffic, where speed, frequency and service quality are key factors of its success. On this route, until 2008 (the year prior to the launch of the HS network and modern HS services in Italy) the modal share of air travel was not only dominant but also greater than the shares of all other forms of transport available to users.

Today, however, the modal share of HS rail has rapidly overturned the figures, despite the fact that the number of travellers between the two Italian cities has increased only slightly.

It is worth noting that the market share of rail transport has increased from 36% in 2008 (without modern HS services) to 65% for the first half of 2013, and this has been accompanied by a sharp fall in the modal share of air transport from 45% to 26%.



This last share, which some commentators believe can go no lower, is however, in our view, likely to fall even further. There are important developments in the pipeline which are capable of tipping the scales even more. For example, there is the forthcoming upgrade of the HS network (which should bring operating speeds over the whole network up to 300 km/h), the completion of the new underground station in Florence (which will cut journey time by about 15 minutes due to removal of the need to reverse) and Trenitalia's new interoperable ETR 1000.

Investment in high-speed rail is also having knock-on effects for the conventional network, either because it frees up sections which are useful for commuter or goods traffic, or because the greater speed equivalence thereby obtained increases available capacity. However, it is essential also to invest appropriately in urban hubs (a sector in which Italy is a world leader, not least because of the difficulties of crossing historically and culturally important cities).

It is the ability of high-speed trains to connect city centres that is creating new demand and new possibilities for work-related travel, including return journeys, due to reduced time frames and the resultant creation of macro residential areas as a result of increased regional integration (known as long-distance commuting: the HS network and trains in Italy have been dubbed "Italy's metro" because of their success in the first few years of operation), and because of increased tourism as a result of attracting visitors away from other modes of transport.

Rail system regulation

The high-speed rail system, which connects all the largest and most important Italian cities, is based on:

- interoperability, safety and advanced technology;
- reduced travel times (high operating speed);
- passenger service quality in stations and on board;
- environmentally sustainable development.

Italian experience shows, however, that the best results can be obtained only by liberalising competition on the market. Indeed, competition has brought the following benefits:

- reduction of minimum prices (-30%);
- improved offer quality and better returns;
- diversification of the services offered;
- increased number of stations served (also in urban areas);
- increased frequency;
- enhancement of the image of both competitors.

Unexpectedly – although not entirely – competition has not led to a loss of market share on the part of the incumbent but to a broadening of its passenger base, to the extent that it is genuinely possible to talk about market expansion.

Clearly, that expansion does not appear to have made significant inroads into the returns of the transport companies, resulting from the lowering of basic prices; rather, it has had a meaningful economic impact in terms of increasing the efficiency of both players, who have undertaken to produce more and better with limited resources.

Conversely, there has been a marked improvement in the financial situation of the network operator, given that fees for access to the HS infrastructure will amount to over EUR 300 million in 2013, as well as increased benefits for users.

However, development of this nature requires a regulatory framework which is geared to a liberalised market and an independent and powerful – but more importantly authoritative – regulator which can seamlessly oversee the process of growth and fair competition between the players.

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