

Inter-Regio rail services, an opportunity for a structured transport system

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Abstract

The issue of passenger transport on medium and long haul distances is becoming actual as a consequence of the innovations and digitalisation affecting also this specific sector.

The digitalisation process and the progressive liberalisation of both rail and bus services, is bringing to the start-up of new transport services and to the change of users' habit.

This paper wants to underline, instead, the role that a planned and structured Inter-Regio rail service could play in the segment of medium/long haul rail transports that are historically and naturally the market of train.

The dissertation will have a planning/governance point of view and will focus on the case of North Italy where, in the last decade, after a strong process of transfer of competences to the regions, the trans regional service has become poor and unstructured although it was carrying out an effective service also outside the main transport axes.

The reactivation of profitable medium haul rail lines under service contracts, allows the development of a balanced transport system as a whole (on regional and multi regional scale), where the incomes of the main lines and the network effect sustain also the minor services.

To reach this scenario a review of the rules for market profitable services is needed, as a new governance structure for planning and funding the transport system and new mechanisms for service commitments pushing towards efficiency.

Keywords: Inter-Regio trains, regionalisation, coordination, efficiency, planning, governance

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Introduction

The issue of public mobility is passing through a particular political period characterized by the crisis of public finance and the increasing attention to environmental and social needs.

The difficulties in developing an effective transport system to grant the right to mobility of citizens, is not simple since the lack of resources that fleece the public administration. But the liberalization itself of this sector is not enough to grant an effective transport system accessible by everyone.

Surely the liberalizations of transport sector, the development of innovative transport modes (mainly helped by heavy digitalization process) and the attention of states to strengthen their public enterprises, helped the development of new modes of mobility all running in the light of economic efficiency.

It's important to remark that the economic sector of public transport is a market failure. In fact the demand is generally low and not able to cover the costs of running service, but also where a significant demand exists the critical point becomes the offer. In fact, due to the relevant infrastructural constraints, it's impossible to have a multitude and a diversification of transport offer. Therefore it is impossible for the consumer to choose the most suitable product for him since quantity is strictly constrained.

It's clear that the public intervention in governance, planning, funding and regulation is fundamental to develop a transport system. But public funding are limited and it's important to allocate them in the best way possible. Some market rules and good planning practices could help in this, but need a strong public governance especially to contrast the current situation that is the result of historical sedimentation of processes.

This dissertation will focus on the Inter-Regio rail services in the north of Italy where, in the last decade, we observe a progressive weakening of subsidized train services while, at the same time, market-train service were experiencing important investments (high speed and intercity).

The paper wants to highlight the results of this process of increased of market trains and disinterest of public governance to the theme, that didn't lead neither to an effective transport system nor to an efficient new allocation of public subsidies.

The theme is important in the field of studies of medium/long haul transport policies, because journeys around 200-400 kms are historically the market segment of the train and still it's a sector (outside big metropolitan areas) where a rail transport system could be efficient both in economical and transport points of view.

The questions leading the dissertation are:

- Which is the strategy of public governance for this changes?
- What's happened in terms of timetable at any change of strategy?
- What's the result in terms of travel solutions (costs/travel time)?
- What's the effect in terms of number of passengers?
- Who had/has other interests against a strong planned and subsidized train service?
- Which market rules could be useful to regulate and bring inside the train service market?

The paper try to propose also some possible ways of solution to solve this stall where railways seems to abdicate to Inter-Regio market, limiting the interest to lucrative in-house service contracts and flagship high speed trains.

For the development of an efficient rail service has become fundamental a strong political guidance with clear strategic ideas of mobility system and able to re design the sector rules, passing by the commitment of services, the regulation of market service, planning and fares competences.

Methodology

The aim of this paper is to bring the attention to the important role that a trans-regional railway system can play in the development of an efficient and competitive public transport network.

The main research questions are the followings:

- Is the liberalisation of medium distance railway service bringing efficiency in this market segment?
- Does it provide advantages for travellers and grant the right to mobility?
- How can trans-regional train service contribute to a efficient transport system?

The dissertation analyses the evolution of the governance for trans-regional railway service in Italy, highlighting the results in terms of efficiency, demand and competitiveness of the service. After a general understating of trends and current situation, the paper point out some key point to be tackled for the redevelopment of this services and propose some new strategies.

In December 2005 an important cut of this level of service was carried out under the new governance of Ferrovie dello Stato, with the aim to bring back efficiency in the national railway system at that time suffering of serious financial problems. After a decade it is therefore possible to sum up the result of these policies that have been for sure positive for the national rail operator that today is proud of its financial stability (even if not only for this reason).

Public planning governance and demand of passengers today tackle, instead, the opposite situation. In fact, we have assisted to a general loss of efficiency and competitiveness of this level of service, generating higher social costs due to the increase of public subsidies and deterioration of travel solutions. The lack of public governance and strategy for the railway service, the unexploited coordination between regional planning activities and the missing control on the market trains define today a situation of disorder and impossibility to develop a modern integrated rail service that, according to the best practices, joins efficiency in production with effectiveness of the service.

The paper is written from a public planner point of view, and tries to highlight the effects in terms of variation of demand and costs of the railway service.

We tackle the issue from a qualitative point of view since most of the subjects are related to timetable planning and operative organisation of service. The paper point out the governance issues of trans regional trains by different historical phases, to better explain the progressive deterioration of this service, trying to highlight the changes in terms of timetable integration, number of travellers and costs.

To understand the quantitative part of the topic, we mainly reasoned on efficiency, here seen through the public subsidies to the service, and number of passengers, since public contribution is roughly the difference between productive costs and fares incomes. For a complete analysis, more data are necessary even not strictly regarding the transport system, but this paper is focused on the effectiveness and efficiency of the trans regional train service, therefore the analysis has been limited to pure transportation data. Unfortunately, we have not been able to access detailed data of productive factors/costs for railway

enterprises as for fares incomes of the IR service in exam, but available data on contract services, subsidies and number of passengers, show already important trends, especially if seen with a public planning view.

We used official passengers data provided by regional governments. Unfortunately, the format and organisation of data is not standard, therefore it hasn't been always possible to have a perfect comparisons between them. Some mismatch in periods of surveys are present, especially for the ones used by the software Orario_Grafico.

The analysis is focused on the North-West regions of Italy, due to the relevance of this theme in their railway network and for the availability of data. The data of number of passengers have been provided by the transport department of Regione Lombardia (Milan) and therefore includes only the information with regional territory of interests. The elaboration of this official data has been conducted in collaboration with the technicians of the transport department who also provided a personal specific software "Orario_Grafico" (developed by Giorgio Stagni) to draw graphical timetables and diagrams.

1. Historical structured Inter-Regio system

Birth and development of Inter-Regio services

The first real timetable revolution of the Italian railways happened in 1985 when took place the first phase of the development of the new medium distance train network in northern Italy followed, in other phases, by the activation of the regular timetable of fast trains along the main national lines.

This revolution has been rewarded by a great success in terms of numbers of passengers pushing the national rail operator to increase the frequencies and update the rolling stock.

Interregionali (IR: Inter-Regio) trains were offering fast connections across big/medium cities (regional and provincial administrative centre) and other main towns; medium distance trains (150-400 km) officially existing since 1993 but the successors of *Espressi* (express trains). They were accessible with the standard fare and part of structured train system, were offering good travel solutions around Italy, fast and at controlled “social” price.

The first level of service was, instead, represented by the *Intercity* (IC), running along the main national axes and connecting regional administrative centres and main national poles. IC trains offered more additional service, adopted faster and more comfortable rolling stock and a different fare system more expensive than the standard one.

Intercity and Inter-Regio built up therefore the structure of public mobility system defining the nodes along the main routes. The structure and nodes of these services is still visible today on certain line to confirm the goodness of the project.

A first important change to the system took place in 1996 with the launch of the new flagship fast trains called *Eurostar Italia* (ES*), carried out with new high-speed rolling stock forecasting the opening of high speed line along the backbone Milan – Rome. Therefore fast services switched from Intercity to Eurostar offering higher comfort and fastest travel times.

Intercity were downgraded to a second level service, very similar to the IR one but maintaining different fares and generally overlapping them in a disordered timetable.

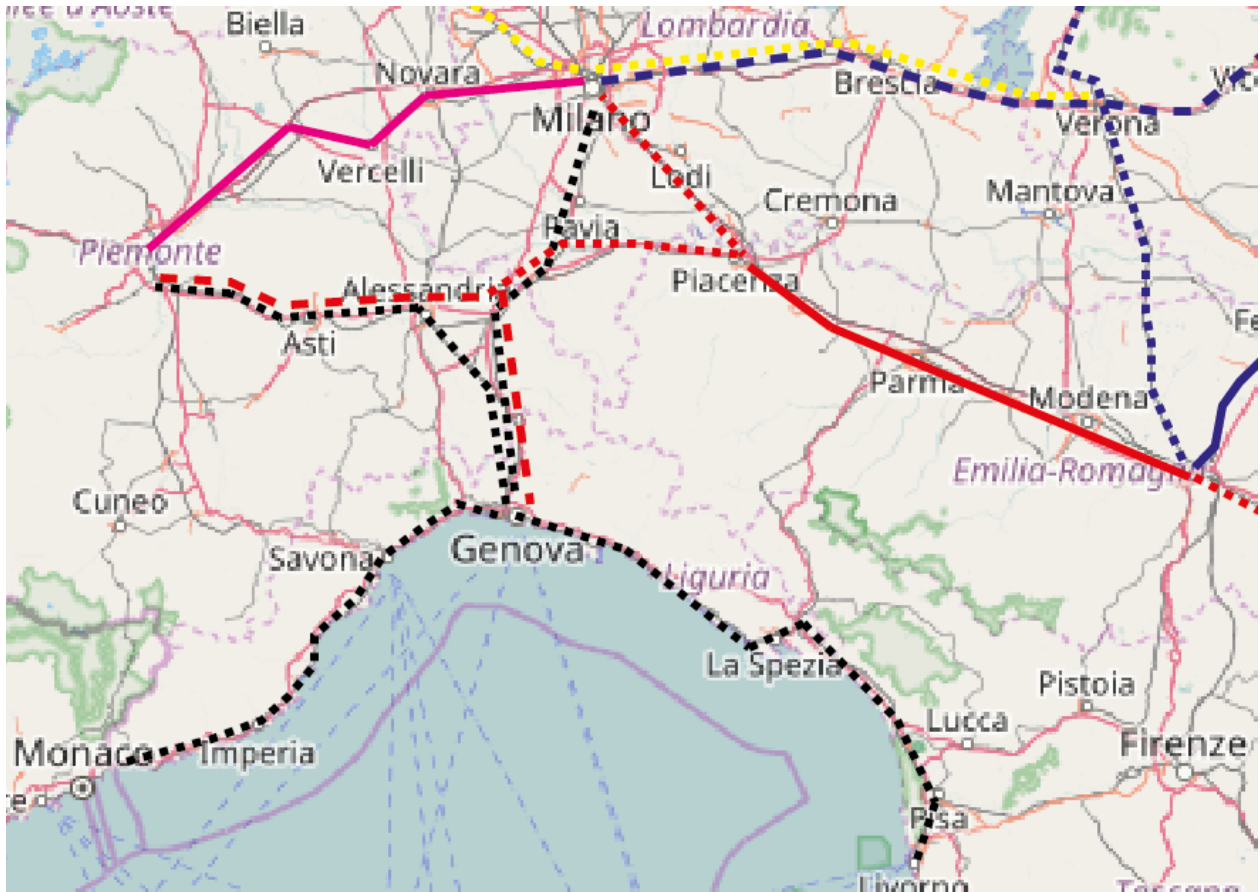
In 1997 an important reform of railways were carried out by the national governmental bodies in order to change the market form in which public transport were organised (Arrigo, 2007). It imposed the separation of the Ferrovie dello Stato in few different companies (implemented in 2000), mainly separating the governance of the infrastructural network from the train service but also, forecasting a close constitutional reform, the regionalisation of local services solving some incoherencies in regulation (Arrigo, 2007).

In 2000, according to this law, regional railway service were split in different blocks and assigned to the competences for planning, regulation and finance of regional governments. All regions signed the contract services with Trenitalia again.

The normative framework seems to be quite utopic for certain issues, while incomplete for others (Stagni, 2011). As a result only some regions have been able to set up a governance system to administrate and plan the development of the regional rail service, while the majority of them maintain the existing situation.

The national legal guidelines foresee also public tenders for the service commitment of regional services as to reform the market structure of public transport, but in 6 years only Lombardy started the procedures for a real public tender (for the suburban line S5).

In the division of train services are included also the so-called *Interregionali*. The repartition of IR trains happened through the concept of “local interest”, that means they have been assigned to the region along their way, with most relevant interest in controlling and running that service. Consequently each of these services with super regional nature (the name itself clearly explicit their role) passed under the control of one region only.



1: schematic map of IR services in 2005. (elaboration by G.Venditti on OpenStreetMap base) – continuous line: frequency 60’; spotted line: frequency 120’; fractured line: spot trains.

In the map it’s possible to see the IR services in the north of Italy as they were in summer 2005, connecting every 2 hours the main towns in this vast area, with some lines running every 60 minutes and others offering 3/4 couple of trains per day. The map does not include other fast services of the same level not classified as IR and running inside the regional border.

1	Milano – Ancona		Milano – Ventimiglia	
	Milano – Bologna	Bologna – Ancona	Milano – Genova	Genova-Ventimigl.
Travel time	2h30m	2h45m	1h48m	2h37m
frequency	120’		120’ (9 couples/d MI-GE)	
Capacity per train	800 seats		720 seats	
Pax on board IR part	Average 400 pax per train		Average 295 pax per train	

¹ Reconstruction from the official railway timetable 2005

	Torino – Livorno		Bologna – Torino/Genova	
	Torino – Genova	Genova – Livorno	Bologna – Tortona	Tortona – Ge*/ To§
Travel time	1h56m	3h16m	2h12m	1h * / 1h28 §
frequency	120'		120'	3 train/d . 4 train/d
Capacity per train	720 seats		700 seats	700 seats
Pax on board IR part	No data	No data	224 pax per train	

The situation of regionalised services remained more or less unaltered (except for some regions that started a real programming of service) with Regions sharing a national contribution of 1200 millions Euro (Stagni, 2011) till the timetable change of December 2005 when a drastic change to the structure of the whole system happened.

Change of strategy in 2005

The missed update of national resources for rail transport services and the uncertain future about the tenders for public service commitments worsen the already precarious economical situation of Ferrovie dello Stato.

In march 2005 a new organisation reform of Ferrovie dello Stato took place, precisely the 19th in 20 years. The two divisions *Passengers* (long haul) and *Regional* were re joint after 6 years of their existence. There is therefore a sort of return to the previous situation, somewhat solving some problems emerged during those years of separation, but partly posing new issues since the two divisions took different ways in regulation, planning procedures and institutional relationships that now appears challenging to integrate.

In fact between 2000 and 2005 the passengers division of Trenitalia were organised as follow:

- *Passeggeri* (long haul): railway company is responsible for planning and running the service. Economic autonomy: therefore the ticket sales must cover the costs. The state fixes some fare rules but the fare system is a pricing system managed with market rules.
- *Regionale* (regional): Service is planned in coordination with regional authorities and regulated by the contract service. Regions are the client of the railway company, contracting and “buying” the train service from the railways. Regional service is not economically autonomous. Fare system is also developed in accordance with public bodies and should cover at least 35% of costs. The rest of costs is covered with public subsidy.

During this period we assist to a consolidation of a sort of **double regime of railway services**: on one side the market trains with expensive fares but managed with pricing system to catch users who can chose, on the other the local trains subsidized. For these second ones the lack of planning and strategy by the regions and by the railway company itself, brought to a stagnant situation, with users reducing to commuters only and a progressive cut of the additional services (out of peak trains, non-working days, ecc). Therefore **some types of demand** like the touristic one, for leisure, casual, **do not find any solution** neither in the market trains, nor in the regional offer.

Additionally, from the planning point of view, the market trains escape from the control of regional planners since there is no official link between Regions and the *Passeggeri* division.

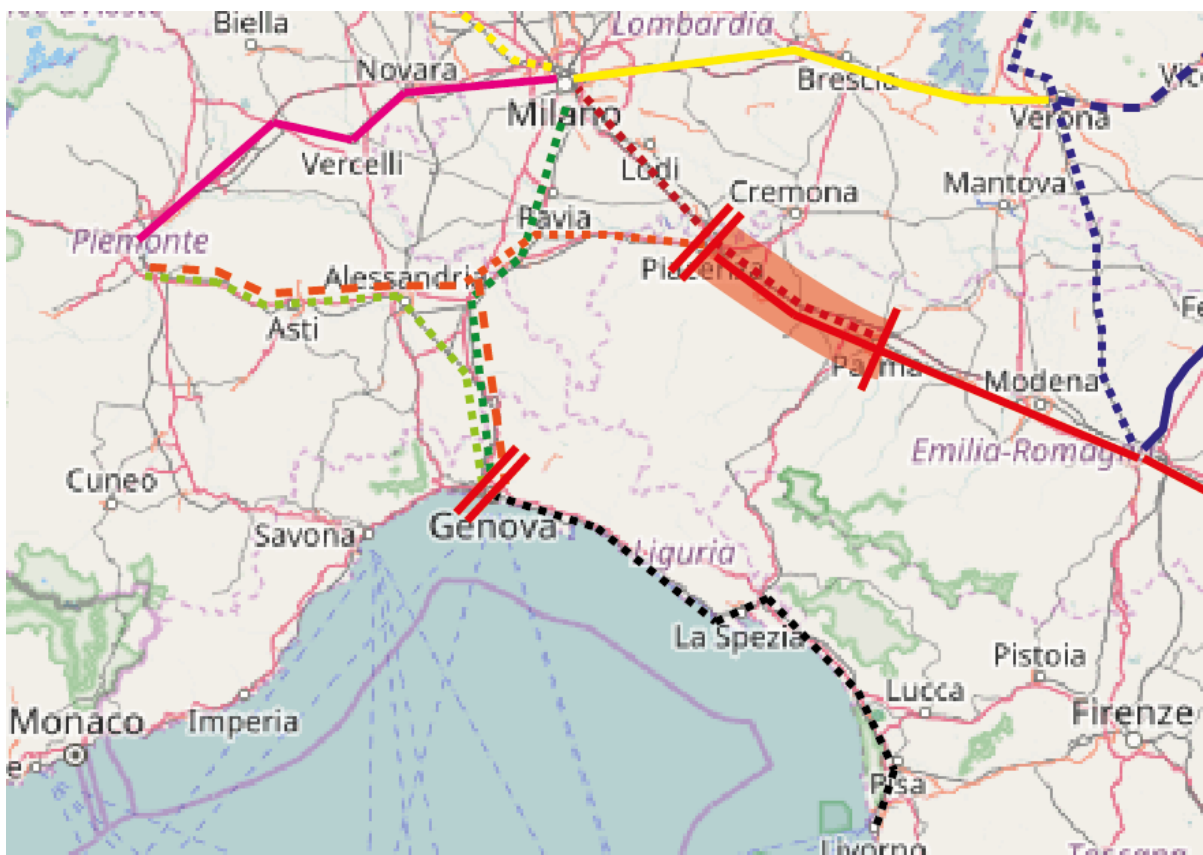
The coordination between the two divisions themselves seems lacking, but the good timetable planned in 1985 grants a minimum of structure till 2005 despite some Intercitys escaped from the regular clock system

and are declassified to a second level service. The concept of connection on the timetable nodes starts to disappear.

After few months from the unification of the two division in a unique one, we assist to an increase of attention towards the market service (Stagni, 2007) now promoted with aggressive fares and, in parallel, some clear choices for weakening the regional services.

The timetable reform of December 2005 signed an historical change in the strategy of Italian railways. A reorganisation of service levels occurred making explicit the double regime of train services.

The first level of service has been switched to the Eurostar, moving the Intercity to the second service level and reorganizing them on a structured timetable offering the same connections did before by the Inter-Regio, therefore stopping in the main localities. IR trains, remained inside the contract service with Regions, were subject to the weakening strategy of local services: they disappeared as they were before.



2: schematic map of IR services in 2006. (elaboration by G.Venditti on OpenStreetMap base) – continuous line: frequency 60'; spotted line: frequency 120'; fractured line: spot trains.

The main Inter-Regio services in the North of Italy were cut and limited to shorter journeys. IR Milano-Bologna-Ancona, Milano-Genova-Ventimiglia, Torino-Genova-Livorno, Bologna-Torino/Genoa **are cancelled**. They have been “substituted” by shorter train with the character of fast regional trains, getting more stops and planned with regional logic. Therefore their timetable has been redesign not simply cutting the existing trains, but reorganising the nodes with a regional view not considering medium distance travel solutions. Trans regional passengers therefore couldn't use anymore this category of train for their journeys but they are forced to the market trains (Intercity) now doing the job of IR before, but with not-integrated higher fares, same travel times (sometimes even higher!) and compulsory reservation of seat.

From the railway point of view the aim seems to move travellers from subsidized train to market services.

For travellers (but also for regional planners) this represents a clear reduction of competitiveness of railway transports due to higher fares and often higher travel times.

For the public bodies it's a lack of efficiency in the allocation of resources and an additional planning problem. In fact IR didn't disappear, they have simply been cut and re arranged. Therefore **the costs remained roughly unaltered** but, at the same time, the new "short" trains, deprived from their medium distance typical users, are now travelling more empty than before granting **less fares incomes**.

In the following years the economical crisis of FS group is still persisting and therefore it is adopted a new industrial plan in 2007 (Stagni, 2007). Around 2008 new contract services with Regions has been signed, in the middle of an uncertain political period about the financing of the public transport system, and some stratagems to help the national rail operator and consolidate its monopoly.

Following years are characterized by an important uncertainty about the economical resources for the public transport sector (Legambiente, 2016), with continuous changes in the financing system and constant delays (with respect to the planning system) in proving certain resources (Stagni, 2011). In the period 2009 – 2016 the total reduction of resources for local transport is around 19% (Legambiente, 2016). Consequently we assist to several cuts in the regional train service in these years. Lack of resources didn't push public administration to make more efficiency in this segment, but was materialized with a general cut of unprofitable rail service and an increase of costs of contract services asked by Trenitalia.

The situation became therefore strongly disordered with market/intercity trains escaping from public control. Only few regions have been reorganizing the service in the light of **good planning practice** allowing an **efficient use of resources** and the development of an **effective integrated transport system**.

2. Current inefficient situation

General situation

Different regional networks that are detached from the medium/long haul train service using the same infrastructure therefore characterize the current situation of Italian rail transport system. In the last years (from 2013) we assist to a progressive renewal of regional train service structure with the diffusion of the regular timetable also in the areas outside the best performing regions (Lombardia, Toscana, Trentino-Alto Adige). Contract services with Trenitalia are extended for other 6 years everywhere, but the public resources remain limited, constraining the implementation of a frequent and integrated transport system. Despite the regionalisation only few regions integrate with their own resources the ones transferred from the central government for the regional train service (only Lombardia, Toscana, Emilia, Trento and Bolzano provinces compensate the heavy cuts of 2012) (Legambiente, 2016). Unfortunately the dichotomy between regional service and long haul system remain strong and sometimes enhanced by the commercial choices of Trenitalia not controllable by public bodies. Regions go on in planning their system and implementing it according to the financial availabilities, with no regards towards the integration with adjoined regions and often deleting also good existing structures, while Trenitalia transfer trans regional trains to market trains that escape from public control.

Example cases

Lombardia – Veneto (Milan-Venice line)

Veneto region was running an Inter-Regio service Venice – Milan that, despite the low frequency, it had a great success in terms of users due to the significant higher costs and disorder of market services. For the reorganisation of regional rail network, Veneto implement an hourly fast service between Venezia and Verona but cuts the service at the border (Verona). Lombardy had to implemented a Regio-Express service on the same time table of the former IR, but the interchange between the two in Verona is missing. For travellers this represent a clear reduction of competitiveness, despite the increase of frequencies, due to the obligation to use market trains also for medium distance journeys. It's a perverse situation of competitiveness between market trains and subsidized service offering the same type of connections. Both the express regional services find also obstacles by the market service that impose them a reduction of commercial speed due to saturation of line. In December 2016, however, the interchange in Verona has been restored.

Piemonte – Liguria/Emilia Romagna

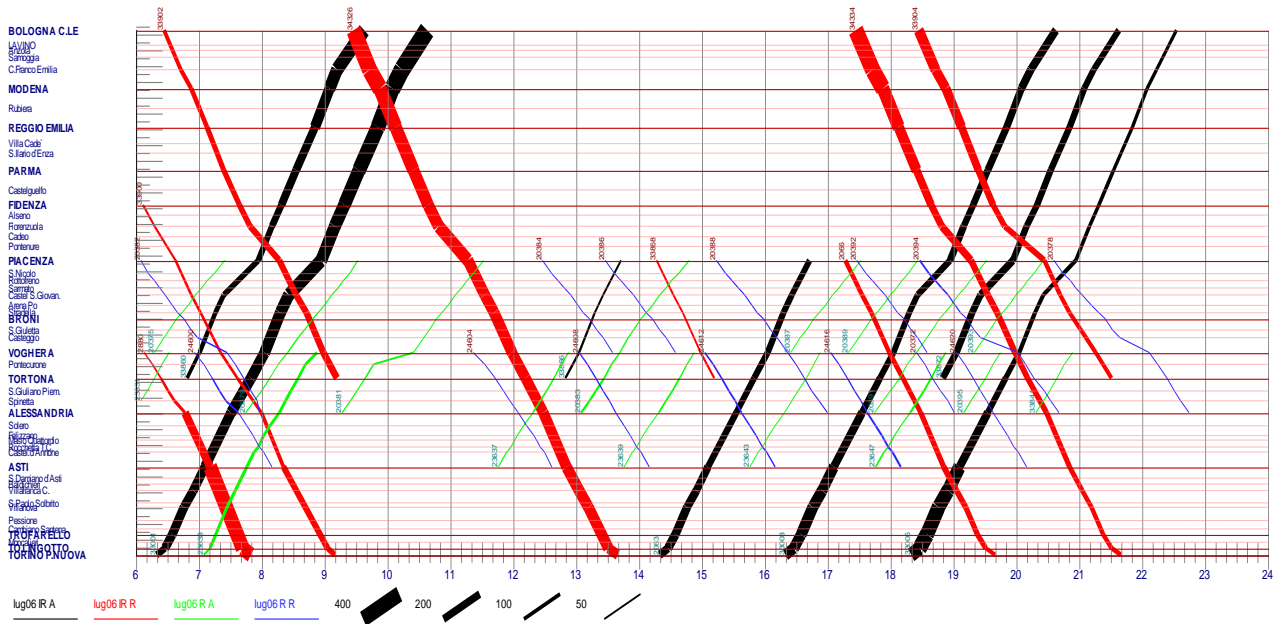
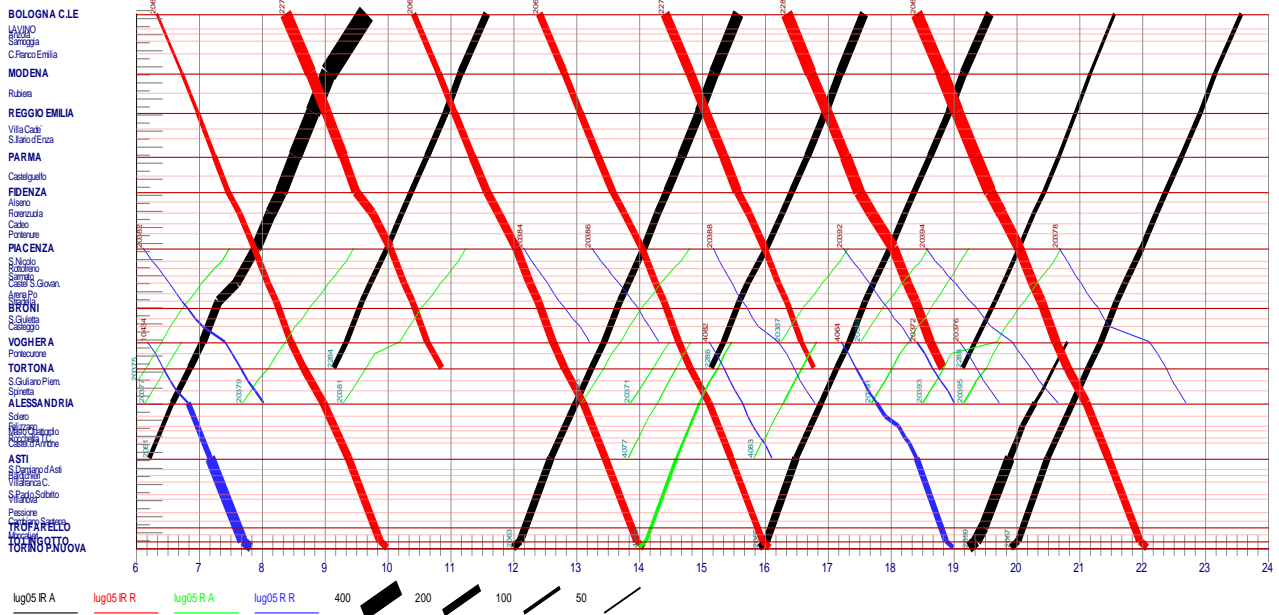
The reorganisation of regional service in region Piemonte allowed the implementation of a regular timetable on the regional network, largely composed by low traffic lines, giving them an opportunity to “survive” despite the low density areas they serve. In 2012 Piemonte already closed 12 secondary regional lines due to the reduction of national transfers from the government and lack of strategy for these small lines.

The new timetable foresee a train every hour on each line, but the small financial availabilities don't allow to have trains every hour for the whole day. The new regional timetable represent, anyway, an interesting attempt to bring efficiency and order in the system, using in a better way available resources.

The new structure of service didn't match with surrounding regions, impoverishing trans border trains seen as the far part of the network, instead that the connector to other systems. These trains are therefore impoverished and, after few changes, the IR Torino – Bologna disappeared, partially and then totally with no possibility today to move from South Piemonte towards Emilia region.

But looking at the data this service was not “poor” while running in a structured system, and repaid by good number of users.

All the travel solutions are now proposed via Milan or Turin with High Speed services therefore longer, more expensive, with more interchanges.



3: Timetable diagram showing the passengers on board of each IR train on the line Bologna-Torino/Genova in a working day of July 2005 and July 2006. - elaboration by G.Venditti on "Orario_Grafico"

Lombardia – Piemonte (IR Milan-Turin)

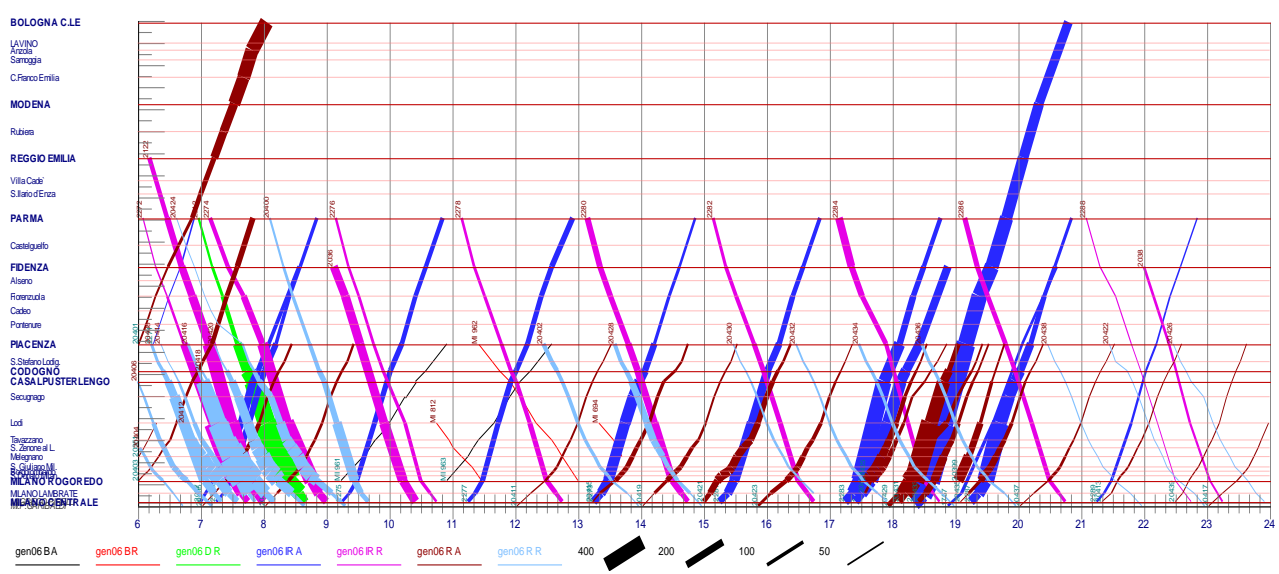
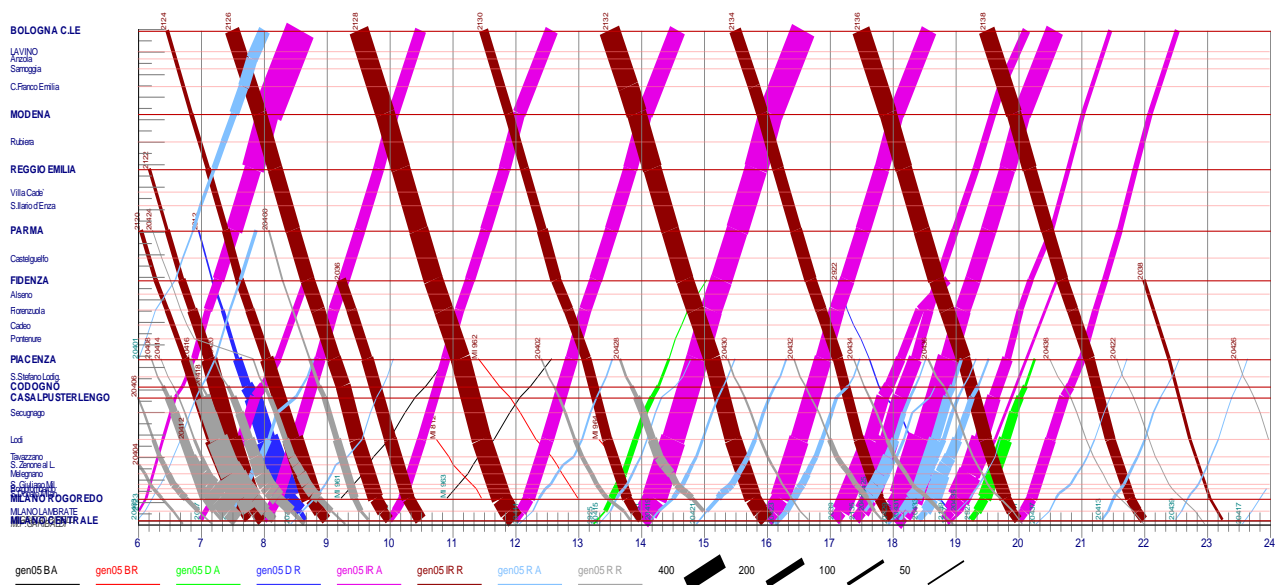
In Piemonte region we also have to highlight a positive example represented by the IR Milan – Turin. The service runs every 60' all day, it's well planned and it defines the railway nodes in the northern part of the region (as from good planning manuals). Despite the activation of the parallel high speed line this service has maintained high number of users and recently obtained also an increase of frequencies in rush hours. The service has been put on public tender in 2009 (then procedures not concluded) with a subsidy of 0,50€/train*km! (Stagni, 2010). This is a clear example of how a well planned service along an important axe can be sustainable by fare incomes even with "social" regional fares.

Lombardia – Emilia Romagna (IR Milan-Bologna-Ancona)

IR service was in place along one of the main railway axe in the North of Italy, connecting Milan with all the dynamic/industrial towns of Emilia region, Bologna and the Adriatic coast till Ancona. With the timetable change in 2005 they have been transformed in fast regional trains for the Emilia region and cut at the border with Lombardy. A careful look to the timetable shows that the service has been replaced by a new structure of Intercity.

The cost of the service for the region is increased since the two new fast service Milano – Parma and Piacenza – Ancona are overlapped for 50 km and, additionally, the shorter journeys and the missing interchange between them, deprive these trains from the medium/long distance (and well paying) travellers. Therefore: less travellers, less fare incomes, higher subsidies, higher consumption of capacity on the line.

The IR Milano – Parma have been extended to Bologna in December 2010, allowing again direct connections to Bologna and Milano from the main towns of Emilia regions. But the conception of the service is of regional train, therefore they have been assigned of more stops and slow down for the presence of intercity and market train running along the standard line.



4: Timetable diagram showing the passengers on board of each IR train on the line Milano-Bologna in a working day of January 2005 and January 2006. - elaboration by G.Venditti on "Orario_Grafico"

Lombardia – Liguria (IR Milan-Genoa-Ventimiglia)

IR service connecting Milan with Genoa and western Ligurian Riviera. The timetable changed in 2005 and service has been cut in Genoa with no connection with fast regional service towards Ventimiglia (French border). An Intercity service was running along the same line connecting Nice. As in the other cases the intercity service has increased frequencies (but limited to the French border), but the lack of coordination with regional system and higher rigid fares for the same service level, implied the necessity of subsidies also for the IC and the partial restore of IR generating a confused (and expensive!!) system.

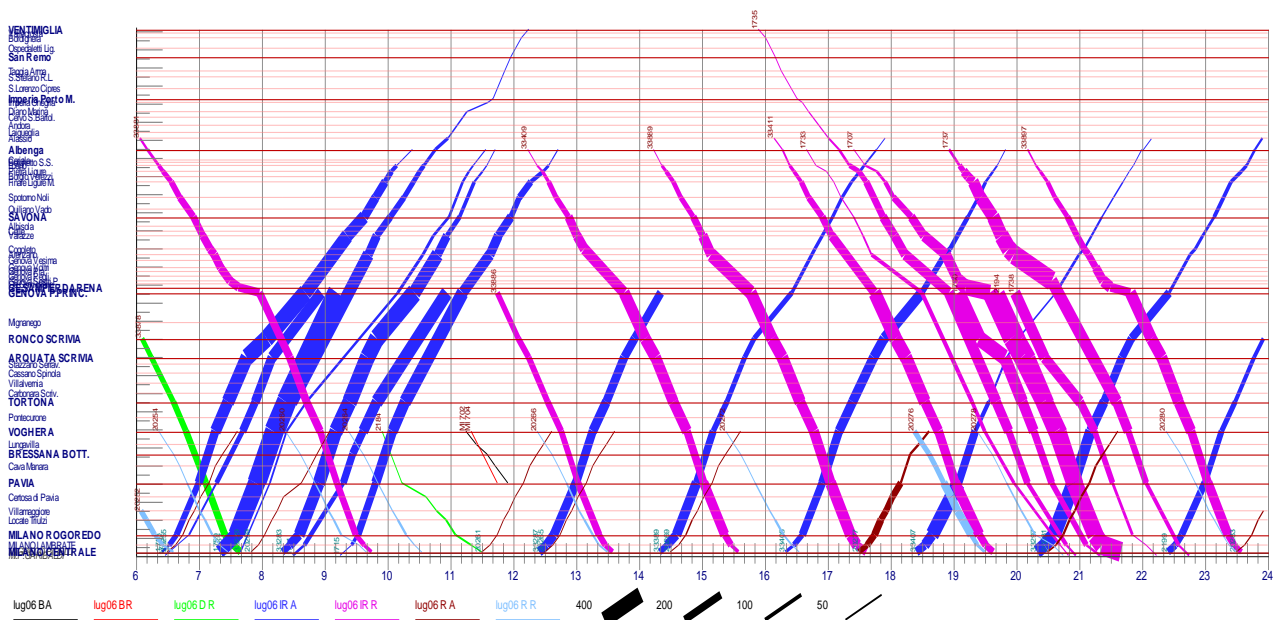
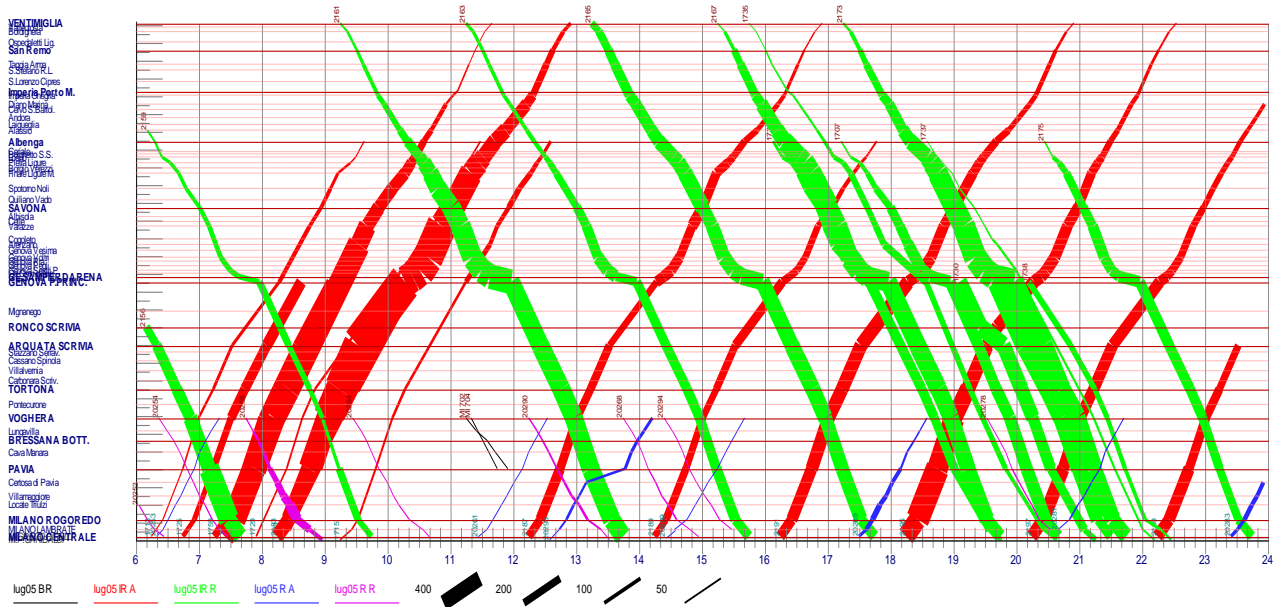


Figura 5: Timetable diagram showing the passengers on board of each IR train on the line Milano-Genova-Ventimiglia in Sunday July 2005 and July 2006. - elaboration by G.Venditti on "Orario_Grafico"

Key critical issues

In the light of good planning practice, it is questionable that the backbone services, that for sure are a specific target market but represent the basis structure for the whole service, is left to market rules and suffer of lack of coordination and control from the public authority.

If regions haven't been able to coordinate themselves and focused their attention to their political area, even the Ministry of Transport didn't activate controls on the contract services of regions (Legambiente, 2016) and verifications for the use of national resources (transferred to regions) for granting certain standards of transport services and the right accessibility of territories (Legambiente, 2016) (Stagni, 2008). In recent years the new Authority for Transport Regulation (ART) is defining new standards and guidelines for the contract services, nowadays highlighting many contrasts and inconsistencies with current procedures and existing tenders.

The ministry itself is title holder of the contract service with Trenitalia for the Intercity service. In 2007 the public contribution was 134 million € (Stagni, 2008) and related only to the night trains. In following years we assist to a continuous increase of resources for the medium/long distance trains including also the diurnal intercity service. The contract has been extended in spring 2017 without any public tender and foresee an increase of subsidy to 366 million € for a 7% increase of production (25 M train*km/year) (MIT, 2017) and the refurbishment of existing fleet (including already refurbished coaches of the '70s). In relation to the topic of the paper it's important to highlight additionally that there is no public guidance regarding where to allocate the production (train*km), confirming the separation of Intercity service from the rest of the network and lack of public governance.

The contribution is around 14,5 €/train*km for a service that should have been sustained only by fare incomes for the larger part. Therefore IC are not economically autonomous and even loose sustainability despite the cancellation of the competing subsidized IR trains. In conclusion **public administrations are today paying two different un-efficient and non-effective services** when before 2005 only the structured and well popular IR service was subsidized. The lack of structure and the forced transfer to market fares of medium distance journeys (not accompanied by a real new product to sell), pushed the whole trans regional train service to loose efficiency.

The situation become therefore more paradoxical with 3 different kind of trains in the trans regional transport level:

- Regionali Veloci (fast regional trains): former Inter Regio, now cut at the border, contract service with regions and accessible at regional blocked fare.
- Intercity: offer trans regional connections (did by the IR before), contract service with the Ministry of Transport, accessible at market fare but regulated and compensated by the contract
- Frecce: offer mainly of high speed trains but also of conventional trains along standard lines, not regulated by contracts, sustained only by fares incomes.

In the sight of a structured and planned rail system this represent a clear situation of confusion (no coordination with timetables, interferences, conflicting fare systems) with difficulties in developing a regional system supported by medium/long distance lines. It's a model of point-to-point with trains trying to go from everywhere to elsewhere without a clear transport strategy and overlapping a partial regional structured-network (based on integrated nodes and regular timetable), whose efficient implementation is impeded by the uncontrolled long distance trains. The stability and recognisability of public transport service is, instead, an important issue to reduce the costs of access to the system (Ramella & Crotti, 2008) allowing a higher frequentation of services.

The chart below summarize the average number of passengers on board of IR trains in the trans regional part of the journey so that to exclude regional traffic, before the cut of December 2005 and in recent years.

	Milano-Genoa-Ventimiglia ²			Milano-Bologna-Ancona ³			Bologna-Genova/Torino ⁴		
	2005	2006	2015	2005	2006	2014	2005	2006	2014
pax on board ⁵	296	164	250	400	136	273	225	116	83
Variation ⁶		-44%	-15%		-66%	-31%		-48%	-62%

It appears clear the loss of effectiveness of the new services and the relevant diminishing number of passengers along the main national railway axes. After 2006 many timetable changes tried to patch the situation and therefore we assist anyway to little increases. The Bologna-Torino service today doesn't exist anymore and the calculation of passengers is done on the short trains remained between Piacenza and Voghera which is also the cross border part. These data highlight that these important trains, deprived from their long distance passengers, are travelling considerably emptier than before implicating a loss of efficiency of the railway service (that means higher public subsidies).

The creation of the network is the only way to make the system efficient, optimizing the use of resources (financial and material, rolling stock, personnel, ecc) and giving a sense to each part of the network, even to the small and *"far from regional centre"* lines. In a planned system the revenues of main lines can sustain the service on smaller lines that, additionally, have systematic interchange with other services in the nodes of the network. In fact, higher number of passengers and higher fare incomes has rewarded all planned systems (see for example the regional network of Lombardia and IR Milano – Torino).

In a scenario of lack of public funding, a network strategy for transport should be today brought ahead as a national planning policy, starting from a reorganisation of trans regional train services in order to create the basic structure of the system.

We can summarize that the Inter-Regio rail services are opposed by:

- The market services that need to catch the higher number possible of user to be profitable and a subsidized competitive service would afflict them
- Regional governments with lack of vision and strategy for transport services with the consequent missing coordination
- The monopoly of Trenitalia, only actor with a complete view of the system and pushing towards its own business.

To redevelop this level of transport service it will be necessary to tackle these points in order to re organize the environment in which to plan a structured and unique transport system.

² Pax on board calculated between Tortona and Arquata Scrivia

³ Pax on board calculated between Fiorenzuola and Fidenza

⁴ Pax on board calculated between Castel S.Giovanni and Stradella

⁵ Average number of passengers on board calculated on the base of available data. It's the mathematic average of the passengers of board of the different trains in a working day.

⁶ Variation of passenger is always calculated with respect to year 2005.

3. Proposal of new governance

General concepts

In the light of what written before, we try to bring ahead some hypothesis of how to reorganize the trans regional rail service in order to bring efficiency and optimize the use of public resources and, at the same time, to develop an effective transport service that could be competitive with other modes and better granting the right to mobility.

It should be clear at this point that a system planned in a unitary and shared way is the answer we try to give in accordance with the good planning practices. The idea is to develop a structured network of medium distance trains along the main axes defining the regular timetable and the nodes from where to develop the regional service. One category of train is enough for this level of service (could be IR or IC in coherence with European classification and RegioExpress for the same service level but inside regional border), simplifying the planning procedures and improving the communication and identification of service for users. The cancellation of the overlapping services will release capacity on lines that could be use for other future services, and will allow a more efficient use of human and physical resources since there will be regular frequencies of trains simplifying the programming of service. A planned reorganisation of services is therefore able to bring scale economies in this segment allowing a reduction of costs and subsidies. (Antitrust, 2016). In this way each train, from the intercity to the short local train, is part of the system and compose an effective public transport network. The return under the public control of the main train network, would also allow the implementation of an equilibrated system, where the revenues of “rich” medium distance trains sustain the local services allowing the reduction or a more efficient use of public subsidy.

To achieve this goal is fundamental to review the rules for the regulation of market trains and for the public commitment of service, in order to have the basis for a good planning and a public control on the service using the market forces to reach efficiency in running the service of public utility. A limitation of on-market service is proposed in order to limit the cannibalization of planned service, while a market competition is used during public tenders to get efficiency, higher quality and limit the dominant position of the national rail operator. At the same time a new structure for planning with an over regional view is needed to overcome the regional scale of planning service.

Integrated fare system

As seen before the public rail transport is a market failure due to the physical limitation of the offer that strongly limits the possibility of choice for the users. If the resource is scarce and the costs are sustain by the citizenry, it is not equal that the enterprises sell it to the best offer. Therefore, public authorities should do the choice of the repartition of the resources substituting a not working market. From a planning point of view this means the development of a transport system.

In this scenario medium distance trains gives the planning bases for the development of the integrated timetable (**transport system**): an environment where all the trains run with regular schedule and frequencies and each train is a tile of a wider complete structure. In this context it is reasonable the adoption of an **unique fare system**, independent from the typology of train (Bin, 2008), faster trains don't have to costs more than slower ones. This is because intercity trains are a part of a network, not simply a link between A

and B, but connecting the main nodes from where comfortable connection with local trains (and busses) connect the less urbanised areas with the main line. It's the **speed of the system** that matters, not the speed of the single trains.

In the light of this it is possible to re organize the whole structure of trans regional train service, defining a unique category of train, clearly identifiable and avoiding the interferences, waste of resources, capacity of lines and "fake" competition between trains.

The large number of fully paying travellers (no wonder they switched to market services) together with the network effect of the new planning, gives a better economical sustainability of these trains allowing interesting opportunities to optimize the public subsidies balancing them on the network as a whole. Today the separation of market trains from regional service doesn't allow a redistribution of subsidies and incomes (and a sustainability of costs on small lines) on the system.

The current fare system on Italian railways reflects the organisation of service split in different categories of trains. Therefore each region has its fixed fare system and certain areas are moving towards integrated fares with other means of transport. For inter regional journeys a trans regional fare is applied which is the sum of two (or more) tariffs according to the kilometres covered in the different regional fares (with a small correction). This method de facto is a tariff system that is suitable for a system oriented transport network: the same fare for whole regional system (despite the operator and the mode of transport) and the sum of the two system to cross the border. The trans regional fare, anyway, sums the kilometres travelled on rail and do not allow integration with other regional transports since the integrations is left to single regional systems. The fares are delineated in accordance with different regions in parallel with compensations between them in order to pay the trains running in foreign territories. Outside this segment there is the Intercity fare system that is composed by blocked fares (according to the contract with the ministry) and partly by a market oriented pricing system. Additionally there are some fully market trains (Frecce) that propose different tariffs again. On the Intercity and Frecce the reservation of seats is compulsory, imposing rigidity in the travel solutions also for short journeys. Certain regions with a relevant presence of this kind of services, signed agreement (and paid) for allowing commuter monthly passes on these trains, but it's clear that this is a patch and not the solution to the conflicts of train services.

The proposal of this paper is to maintain the regional structure for the fare system, leaving to the **regions** the competences to develop the **integrate tariff structure** according to their political choices. The **trans regional fare could be maintained** and it is a tariff for railway only due to the complexity (and the uncertain utility) of integrating different local system in a national network.

Inside the regional border **all trains should be accessible with the regional fares** in the conception of a transport system and not of single trains/journeys. On certain trains with high long distance demand, a seat reservation could be organised with a supplement, but the access to the trains should be grant to everyone with a valid ticket.

Market rules

In a planning environment like the one proposed, where all the system is planned and should be "tidy" without interfering trains, and in a context historically characterized by high levels of inefficiencies (Arrigo, 2007) (Antitrust, 2016), a key role is played by the rules for the assignment of public commitments for service and for the regulation of market trains.

It's clear that the public control of the railway service as a whole is fundamental to redevelop and effective, but also efficient service while, on the other hand, the European policies for liberalisation of rail services has been recognized in Italy and some private operators exists and run their services along the network.

It is therefore necessary to maintain a certain level of *competition in the market* but regulated in a way that does not interfere with planned medium distance service, reducing the risk of re proposing the disordered and un-efficient situation worryingly created from 2005.

The competition in market can bring real benefits to users if there is a real possibility of choice and if the demand is elastic (Papal, Richard, & Norman, 2009). In the public transport system these conditions could meet in case of long distance journeys and along axes with high demand and possibility of coexistence of two rail operators on the same line (need capacity). Recalling this, the proposal is to allow market train service to run along the network but with a minimum distance of stops around 150km. This length covers approximately the distance of the main network nodes and regional capital towns in Italy. A good calibration of this length (with some specific exceptions) allows competition in the situations where the demand is suitable for that and can be well benefited from fares defined by market pricing systems (long distance journeys, occasional demand, high grades of flexibility). Meanwhile it could not damage current private rail operators and grants the existence of competition in the market along the main axes. In the other circumstances we fall in cases of market failure, where therefore market competition is not real and *"healthy"* for consumers. In these situations the public intervention is needed (Ramella & Crotti, 2008) and the authorities for regulation and planning of rail system have to substitute the market and have to contract with rail operators to obtain good quality standards at the lower price possible.

It's a situation of *competition for the market* where it is possible to match the advantages of planning with the ones coming from the competitive environment of service providing (Ramella & Crotti, 2008). The tools of public bodies to operate in this environment are the competitive dialogue and the public tender. Public bodies should make the plan of services defining the offer in its quantitative and qualitative aspects. Rail companies are then expected to make offers for the product requested by the public (that represent the client) that will have to chose between multiple proposals.

The authority of transport is pushing towards this direction after years of uncertainties and in-house assignment of public commitments (Antitrust, 2016). But if for the case of bus service the environment is quite mature for competitions, for railway service there are only few experiences in Italy and lots of obstacle to be solved among which the property of rolling stock and the competences of public bodies to manage the process. Regarding this, only few regions have invested additional resources in this direction, while the majority of them limit the activities to mere administrative aspects of contract services. The switch towards this system therefore can not be immediate but should be organized per progressive phases, accompanying it with a new redistribution of resources. It is so possible to put regions in the conditions to have competences and economic resources to manage a higher quality service and to start the tenders for small lots.

Coordination

This point is very challenging and is the key point for a successful planning. As seen before the problems of coordination between different entities have brought to the impoverishment of trans regional services. The national rail operator has been the only one with a national view operating a certain internal coordination but, of course, played its own game according to its strategic planning (Antitrust, 2016), acting in a fragmented and uncertain context of lack of public coordinated strategy.

The main railway service network should be the base on which to plan local systems, therefore from a theoretical point of view it should be planned before the development of regional service. Today we are moving in context where regional systems have been (fortunately) largely planned, consequently the new structure of trans regional service must be developed in accordance with regions and it can't be imposed from above otherwise it will replicate the current confused situation.

In the following chapter we will propose two ways in which to reorganise the governance structure of inter region service: the first is the transfer of these competences to the ministry that will organise the service structure with a constant interface with regions. The second solution sees the ministry to force the coordination between regions to implement trans regional trains after the cancellation of the current intercity service.

In the first case we imagine the **ministry of transport as title holder of contract services for the inter-Region service**. From its position it is facilitated to see the trans regional transport demand and able to set an adequate transport offer, planned and implemented with the modern best practices. The existence of this service by a contract service permit a strong public control. In this way it will be possible to draw the timetable structure for the main national axes, connecting the main metropolitan areas and defining the other nodes along the network from where to develop the local transport system (competence of regions). These new national trains will substitute the current fast regional trains and intercity, deleting the interferences between the two and defining a clear intermediate (between high speed and regional) service level. This way of planning allows a certain flexibility with the possibility, depending on the contexts, to provide fast regional relations while connecting more regions and maintain long distance trains along certain routes not covered by the high speed. This possibility represents a clear optimisation of resources with trains carrying more travellers with a mix of local and long distance passengers, offering a better sustainability of the service and saving resources from the overlap. Anyway a special care to the stability of the timetable must be posed for longer trains.

The problems of this solution are mainly posed by the cooperation between the ministry and the regions. In fact, a redistribution of resources for financing the service could be quite challenging to develop and should be negotiated with the different regional governments. The presence of some fast services inside the contract service of regions, in fact, gives economical sustainability to the regional service since, as seen before, they are generally the trains yielding the highest revenues. If regions lose these incomes (because rich trains are moved to the ministry's contract service) the whole regional transport system will necessitate an economical review and an increase of subsidies. But we are at the same time proposing an optimisation of medium distance trains (that would even guide the optimisation of local trains) and a different system of allocating resources pushing towards efficiency. It will be possible, therefore, to transfer to regions additional resources, if needed, saved from the reorganisation of trans-regional services.

The access to trains will be granted at regional fare, with a compensation system between regions and the ministry like the one today in practice between the regions themselves.

Other planning problems could emerge in the phase of design of timetable, because it could be difficult to integrate the new service in different local systems. The new trains can use the slots of current intercity, but losing interchange with regional trains, or running on fast regional slots integrated in the local transport structure, but not matching with fast regional of adjacent regional systems. The solution must be evaluated case by case and it's a very technical choice in charge of timetable offices. We also remind that in a system-planned service is the speed of system that matters and not the one of single trains. Some slowing down of certain trains, to permit a good integration with regional systems, could therefore happen and shouldn't be seen in a negative way.

Another possible new structure of governance could be the "contrary" of what exposed before. The national contract service could be limited only to night trains or some other specific cases, **leaving the inter-region**

service uncovered and **in the heads of regions**. The resources saved from the subsidy of Intercity can be transferred to region for their rail contract services.

We can roughly imagine a situation along an axe where the IC service disappear, therefore regions will have to grant the trans-border trains. In this situation regional governments has to find solutions together and organize new services to compensate the lack of offer left from IC and allow inter regional journeys.

In such a situation the ministry, of course, can not simply give up from running this service but need to define the new governance environment specifying the repartition of competences, the financing system, goals, minimum services and monitoring.

It will be also necessary to organize the coordination between regions, to provide regional government of the resources needed to implement services in the new governance structure and to facilitate the coordination between them.

The structure service resulting from this organisation will probably be simpler than the one planned with a national view, since regions would organize the services between their main urban poles and railway nodes. In fact the coordination of timetables between different regional networks will be difficult already, adding obstacles in the development of a network crossing more than two regions.

This solution has the advantage of retracing the current organisation of inter region service as services part of the regional service structure. Therefore the organisation activities are already running and largely tested.

It will also help to integrate the medium distance services inside the regional network, creating that integrated system that today is largely missing, where main rail service are the base on which to plan a regional network in coherence with a structured integrated view of transport service.

But, at the same time, it's important to develop this reform together with regions, in order not to have conflicts in the following planning and operative phases. The ministry needs also to assist the regional governments during the planning procedures (also in the light of the new guidelines for assigning public commitments and monitoring service) and force a certain cooperation. Some goal oriented mechanisms to give incentives and provide the right resources (economical and knowledge) need to be organised.

Starting from this last scenario we also want to highlight that a certain collaboration between different governments could be possible even today if some of them, clearly the ones with a better strategic view of transport policies, is able to propose some renowned ideas and projects. This means timetable solutions, fares and financing agreements that develop a unique and structured rail system without damaging (see: mainly without adding extra costs) any of the government bodies involved and sharing some benefits of the better performing network.

4. Conclusions

The Inter-Regio train service that should define the network's base of the train service, has been impoverished following railway company's internal industrial plans, with no public body able to take again the control of situation and bring back the attention to this level of service.

The switch of inter-regio service to market trains with the aim of rising efficiency on this segment of service, produced, after a decade, rather the opposite results.

In fact in a context suffering of a general lack of vision for transport policies (during those years mainly focused on the high speed), together with problems of coordination, crisis of public finance and mismatching of transport planning goals, induced a loss of efficiency in the rail transports.

Inter-Regio trains has been cut at the border between regions and, deprived from their long distance passenger, are travelling with less customers than before. Since the costs of the service are covered by the fares incomes and by the public subsidy, the diminishing passengers means even higher public expenditure. If we consider that long distance passengers are generally occasional demand and therefore paying the full fare, it appears clear that the reduction of fare incomes is consistent.

In addition, the growth of intercity market trains, that escape from public control, on standard lines, increase the disorder and complicate the planning of a transport network with modern conception, while the fare system and access rules to this service represent an important loss of attractiveness and competitiveness of the train. This segment of service has lost anyway efficiency till the current situation where also these trains are heavily subsidized by the ministry of transport.

A relevant transport demand for this segment clearly exists, and it represent an important opportunity to redevelop the transport system in an efficient way, in the light of the best planning practises. The new governance structure proposed should be implemented with the idea to bring back efficiency in the rail transport sector managing it with a network view. In fact a service network planned with modern concepts (regular timetable, nodes, fare integration) will allow a more efficient use of public resources and the implementation of a more competitive public transport system. In such a contests, where the revenues of "rich" lines contribute to sustain costs of the whole system, it is possible to redistribute resources, allowing a more efficient use of funds for lower demand areas, integrating them in the transport system and allowing investments on them.

It is therefore necessary to switch from a single-line view of public transport, to a transport system approach where trains are not in competition between them (with perverse effects of increasing demand of subsidy), but part of a system that is competitive with respect with other means of transports. This means a grant of real right to mobility, and a better use of existing infrastructures and resources related to public transports and relevant changes in the quality of life and local environment.

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