Metropolitan railway systems and Transit oriented development in Italian provincial coordination territorial plans

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Keywords: Metropolitan railway systems, polycentrism, transport-land use coordination, Provincial coordination territorial plans.

Abstract

In the last twenty years, Transit oriented development (TOD) has received increasing attention all over the world. It is recognized as a planning approach that allows to pursue, on the one hand, more sustainable mobility patterns that are less dependent on car and more based on rail usage; on the other hand, it is in line with strategies that promote polycentric development in contrast to urban sprawl. In this sense, it seems quite suitable to be applied to Italian metropolitan areas, where recently many suburban railways have been reorganized as integrated Metropolitan railway systems (MRSs), and polycentric development is often set as a strategic issue in regional planning. The paper examines the provincial coordination territorial plans (PTCPs) of nine Italian Provinces in order to verify if and how they adopt a TOD approach to support their MRSs. The selected PTCPs are analyzed in terms of promoted settlement model, role assigned to the MRS, rules and recommendations concerning new residential developments and the localization of manufacturing activities and metropolitan tertiary functions. The results show that in most PTCPs TOD approach is referred in generic terms, and is not systematically applied or operationally defined; furthermore, in locating metropolitan tertiary functions, PTCPs often prefer accessibility by road rather than by rail. The only – but relevant – exception is represented by the PTCP of Bologna, where a TOD approach has been adopted to mutually support the sustainability of mobility patterns and a polycentric densification, with positive effects on both rail ridership and containment of urban sprawl.

1. Metropolitan railway systems in Italian cities

In the last fifteen years, several big Italian cities have launched plans and projects to rationalise and enhance their suburban railway lines; they often took advantage of new infrastructures promoted by Rete Ferroviaria Italiana, like tunnels doubling from two to four the rail lines crossing urban core areas, or new high-speed rail lines and stations that offered the opportunity to devote current rail tracks to metropolitan and regional trains (De Luca & Pagliara, 2007). In most cases, this rationalisation process was no longer based on the traditional "line by line" planning approach; on the contrary, it was aimed at creating integrated and coordinated metropolitan railway "systems" (MRSs), like the long-established S-Bahn systems of German cities and the Parisian regional express network RER. The essential feature of these systems is the regular-interval (or clock-face) timetable, which has two main characteristics (Johnson, Shiresa, Nasha & Tyler, 2006):

- continuous, regular and periodic repetition during the whole service period. Trains always leave a certain station at the same minutes past every hour, preferably throughout a long operating day, every day (for example at minute xx.10 if frequency is hourly, at minutes xx.10 and xx.40 if services run half-hourly);
- symmetry. The service in one direction is the mirror-image of that in the reverse direction, generally around a symmetry point at minute xx.00, so arrivals and departures are symmetrical around the hour (for example trains leaving at minute xx.20 from station A arrive to station A at minute xx.40).

The regular-interval timetable has many advantages both for rail users and companies. The repeating pattern of departures across the day allows timetable to be more easily memorised, reducing the costs of acquiring information on train departure times; an impression is given of an orderly, well planned and reliable system; a fair level of service is guaranteed along the whole day and for every origin-destination pair (Wardman, Shires, Lythgo & Tyler, 2004). The symmetry allows to optimize the overall connectivity and to minimize interchange times: the structure of services can be organized so that crossing symmetric points correspond – at least approximately – to key interchange stations, where also street-based public transport can converge. For rail companies, the regular pattern across the day simplifies planning and management processes (Johnson et al., 2006), allows a fuller utilisation of the railway infrastructures (Malavasi & Ricci, 2001), increases punctuality and reliability (Avelino, Brömmelstroet & Hulster, 2006), maximizes the amount of captured transport demand (Cordone & Redaelli, 2011).

In 1938 the Dutch national Railways were the first to introduce a regular-interval timetable; now it has been adopted – at national or metropolitan level – in countries like Swiss, Germany, Denmark, Finland (Avelino et al., 2006). As it was said in advance, this kind of timetable has been – or is being – adopted also in the re-organization of most suburban

rail services of Italian metropolitan cities, even if, at least currently, at different levels of integration and overall coherence. The regular and repeating pattern of departures every hour is generally introduced in every line (with frequency of 15, 30 or 60 minutes); the integration and coordination of this pattern on the whole system (i.e. between the lines) is respected particularly where a number of lines overlap in the tunnel crossing the main city, so to create a regular high-frequency (5 to 10 minutes) intra-urban rail service (like in Turin and Milan, and the same will happen in Bologna when present infrastructural works will be completed).

In some cases (like Turin, Milan, Bologna, Rome and partially Naples), these MRSs have already been presented to the public as real "systems" (figures 1, 2, 3 and 4): they have a unique logo for the whole network (lines and stations), lines are progressively numbered, rail services are integrated not only with each other but also with other local transports (like street buses and metros) in terms of ticketing and connectivity. In Venice and Florence this model has been planned but is quite far to be completed. In Genoa its systemic coherence is quite low.

Most Italian MRSs have a radial structure: they are made up of lines converging from the suburbs on the main central city. Only in Naples and Rome a ring line is foreseen: it should connect the other radial lines and serve the (increasing) mobility demand between municipalities of the first and second suburban rings.

Figure 1 – The map of the MRS in Turin.

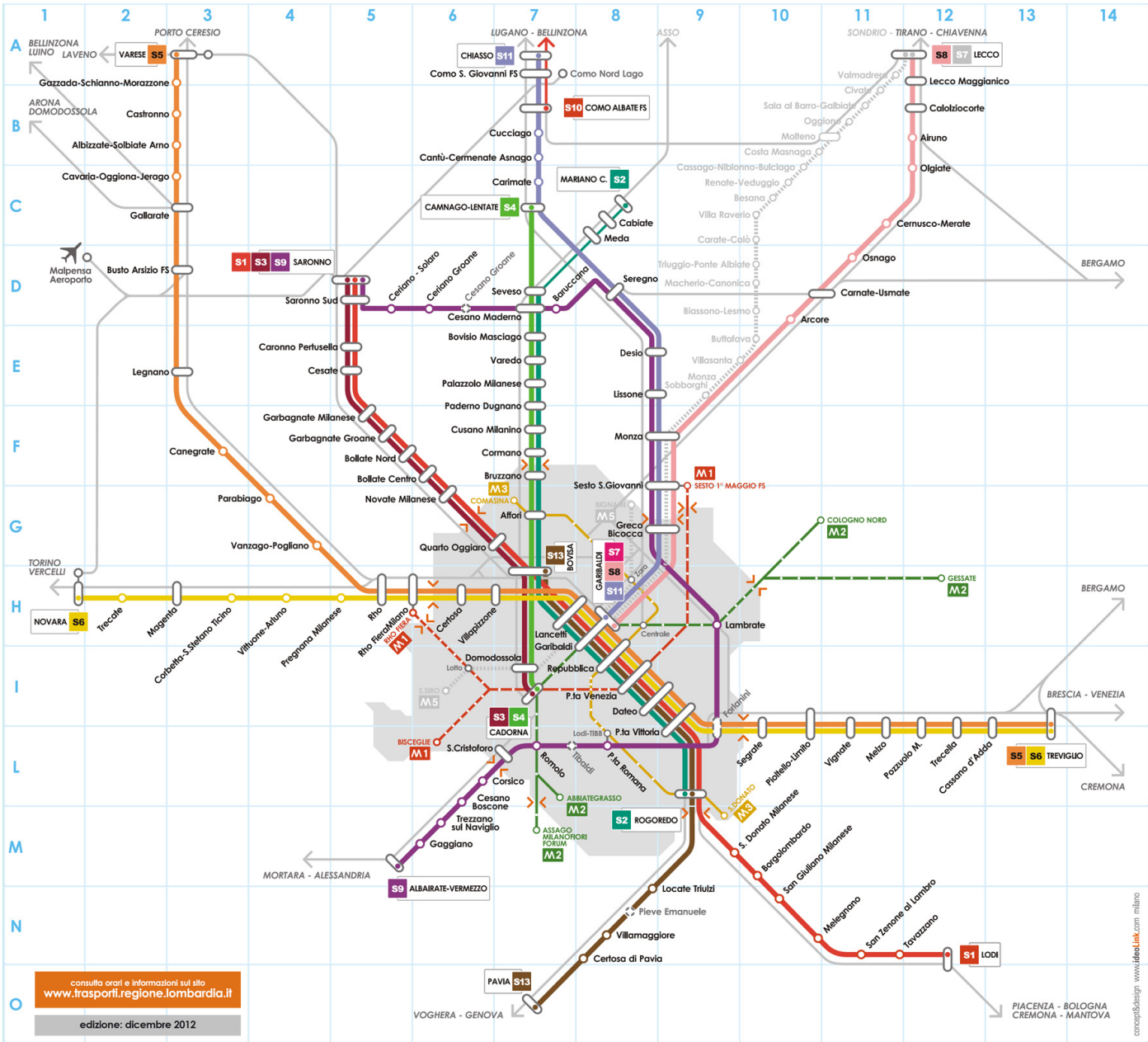

Figure 2 – The map of the MRS in Milan.

2. The Transit oriented development approach

As it is demonstrated by some European experiences in the 20th century – see, in particular, Copenhagen (Knowles, 2012) and Stockholm (Cervero, 1995) – and, more recently, by the approach of Transit oriented development (TOD) in North America, Asia and Australia, MRSs work at their best when they are not only well organized in terms of timetable, connectivity, frequency etc., but also – if not mainly – when they are supported by a consistent urban and regional planning, both at micro and macro level.

The TOD approach suggests to promote, in the areas surrounding rail stations within a radius of 500-750 meters (corresponding to a 8-10 minutes walking journey), an urban development characterized by the so-called 3D (Cervero & Kockelman, 1997):

- a medium-high (residential and/or employment) *density*, so to guarantee a substantial number of potential passengers that can reach the station without using a car;
- an appropriate *diversity* of the land uses. This would allow train passengers to perform a range of activities (not only living and working, but also shopping, entertainment, social relations and so on) near the arrival and/or departure station; at the same time, neighbourhoods around these stations would be "lived" along the whole day, and their safety improved. According to the TOD approach, the areas

Figure 3 – The map of the MRS in Bologna.

surrounding train stations should accommodate the main trip generators and attractors; in particular in the case of MRSs having a radial structure, metropolitan tertiary activities (like large scale shopping centres, conference centres, entertainment facilities, hospitals, universities etc.) should be located also near some minor stations in the municipalities around the main central city, so to attract trips from it and produce directional-flow balances in commuting period[1] (Chorus, 2012);

- a *design* of the built environment that encourages walking and cycling to the station, thanks to a grid pattern of the street network, attractive streetscape, extensive bike lanes, the presence of retail stores etc.

If local city planning should articulate the detailed plan and the precise contents of land use types, densities and facilities in the areas surrounding the stations, planning at the regional scale is supposed to set the spatial structure of TODs, in terms of hierarchical distribution of transport nodes, links, and activities. In other words, regional planning should assess how local choices can support objectives at a higher scale, and consequently steer decision making at the local level (Kamruzzaman, Baker, Washington, & Turrell, 2014). The role of regional planning is particular important for stimulating TOD around smaller suburban rail stations: their adjacent areas usually attract less interest than central stations in big

1. For example, in Stockholm during peak hours 55% of commuters travel in one direction on trains and 45% in the other direction (Cervero, 2015).

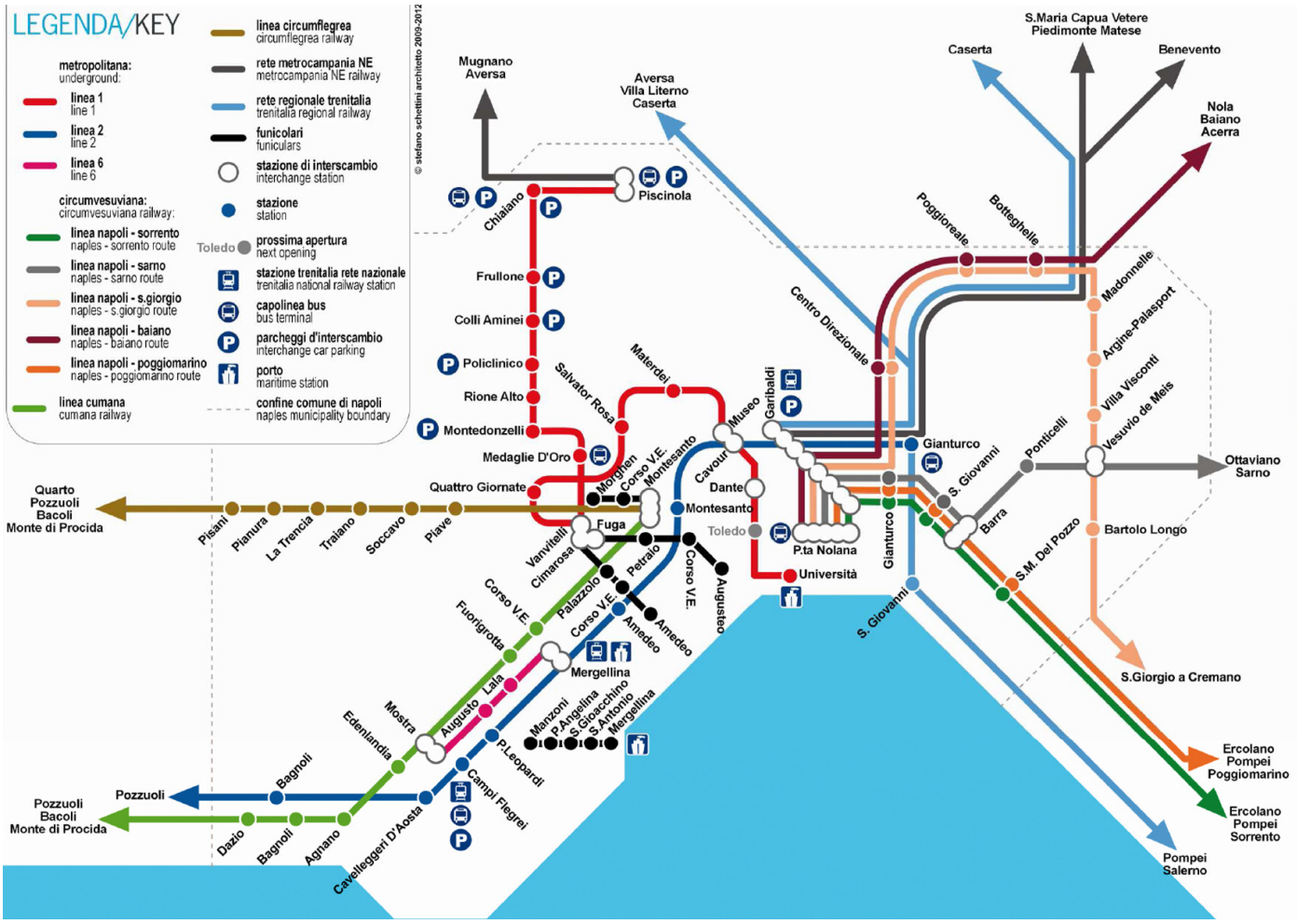

Figure 4 – The map of the MRS in Naples.

cities, and have characteristics that make it more difficult to integrate transport and planning land use (low-density, high levels of car use, distance from town centre, barrier effect of rail infrastructures, uneven availability of land, unfavourable market conditions, resistance of inhabitants and local authorities to higher density etc.) (Desjardins, Maulat, & Sykes, 2014). Conversely, TOD can support through a "decentralized concentration" a polycentric development, which is often set as a strategic objective in regional planning in contrast to urban sprawl (Jenks & Dempsey, 2005).

Till now, most attention – both in scientific literature and in practices – was focused on promoting TOD at the local level, less on the role of regional planning. Two significant exceptions are represented by the Stedenbaan project and the French "contrats d'axe".

Stedenbaan (City Line) is a project developed in Zuidvleugel, literally South Wing, a part of the Randstad in the Dutch province of South Holland. It aims not to implement new rail connections, but to improve service on the already existing rail lines between Schiphol, Dordrecht, The Hague, Gouda and Rotterdam, increasing frequency from 4 to 6 trains per hour. The cost of this improvement should be covered by a growth in rail ridership – and consequently in train ticket revenues –, due in part to the same frequency increase, in part to an intensification of land uses around the stations of the rail network. Stedenbaan adopts a dual strategy, resting on the assumption that transport and spatial development can stimulate each other (Balz & Schrijnen, 2009). Stedenbaan is promoted by the South Wing Administrative Platform (a coalition of political representatives of the five involved city regions, the province of South Holland and the cities of Rotterdam and The Hague), which in 2005 requested a spatial survey of the catchment areas (defined by a radius of cycling accessibility of 1,200 m) of 47 existing and potential rail stations. The areas were analyzed in terms of feasible developments, degree of access by public transport and by car, mix of uses and local density of inhabitants and jobs (figure 5); on the basis of these characteristics, they were matched to one – or more – of nine "Stedenbaan typologies", representing potential developments around the station (figure 6). Finally, three (densification, network, sustainability) scenarios (figure 7) were used to assess how the potentialities of the local areas could be exploited to achieve the goals set at the South Wing level (Atelier Zuidvleugel, 2007).

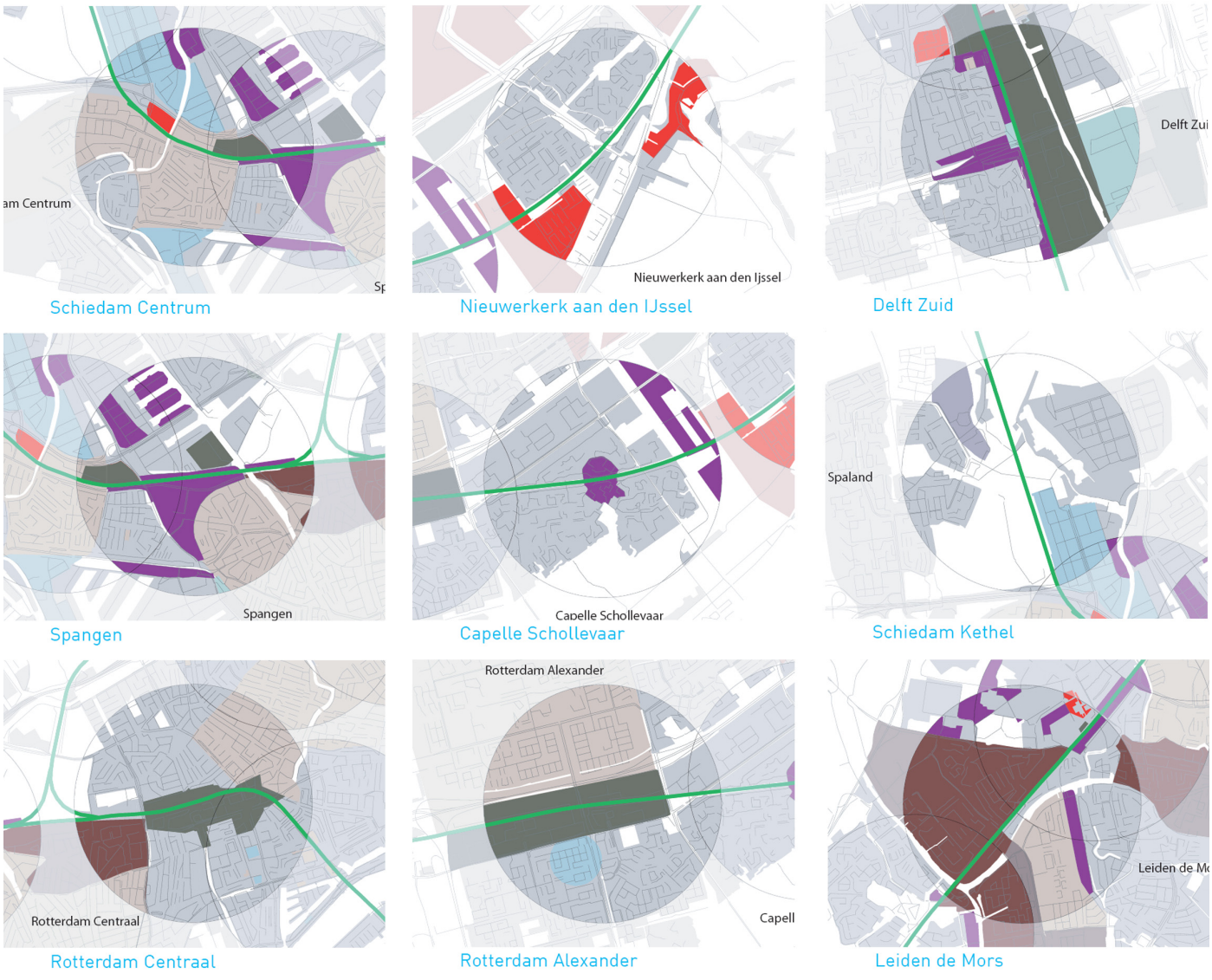

Figure 5 – The catchment areas of a few Stedenbaan stations.

The results of this survey, published in 2006, demonstrated the benefits of the regional coordination of local developments, and allowed a number of agreements to be signed to make the Stedenbaan project operational. A declaration of the intention to realize up to 40,000 new dwellings (corresponding to 40% of the newly added dwellings foreseen for the period 2010-2020 in the South Wing) and 1,000,000 square metres of office space was adopted by the city regions; another declaration of intent to increase frequency of service on the rail network was signed by the national rail company NS. Moreover, a negotiation was launched between the local municipalities to assign (quantitative and qualitative) development profiles to the local station areas – to be translated into the formal spatial land use plans of the cities –, according not only to local market demand but also and above all to the regional strategy. In the period 2006-2010, 45% of the new dwellings in the South Wing was actually built near Stedenbaan stations. In 2011 the project has been expanded to StedenbaanPlus, having a new ambitious urban development goal: 60 to 80% of all newly added dwellings in the period 2010-2020 are to be built within the catchment area of the rail stations (Geurs, Maat, Rietveld & De Visser, 2012).

A similar mechanism has recently been proposed by some French local authorities: the so-called contrat d'axe ("corridor contract") (Cabiron, 2013). The transport authorities of the metropolitan areas of Toulouse and Grenoble were the first to define the concept of contrat d'axe in 2007: they planned to develop new high capacity transport lines for suburban areas, and introduced the contrat d'axe to guarantee the socio-economic pertinence of their public investment by making public transport development conditional on increased urban density in the areas of future provision. The mechanism comprises a period of consultation and studies on infrastructure design, transport services and urban strategies near the line (500 m), a period of scenario development and selection, and finally the signature of a joint agreement between

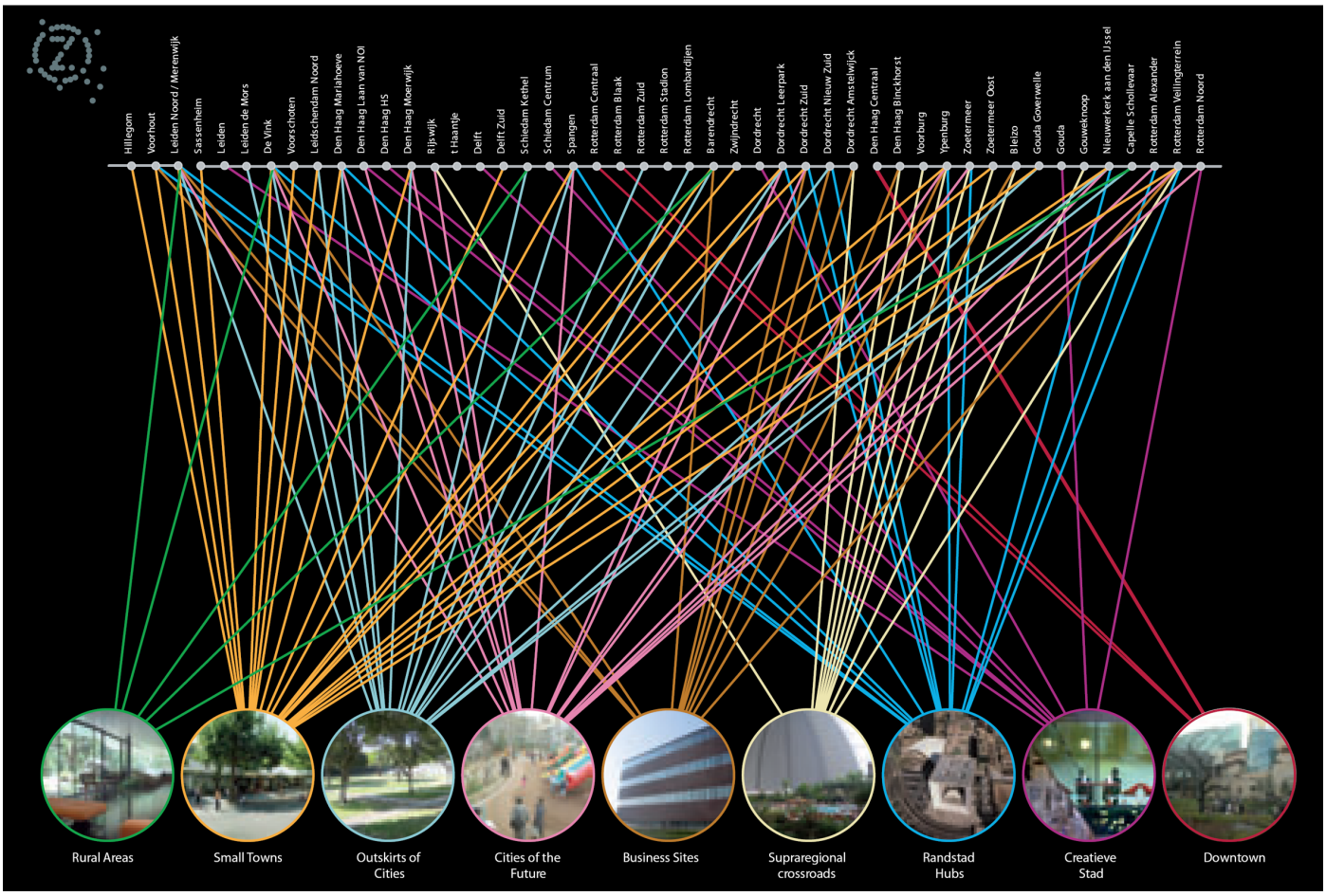

Figure 6 – The nine Stedenbaan typologies of stations.

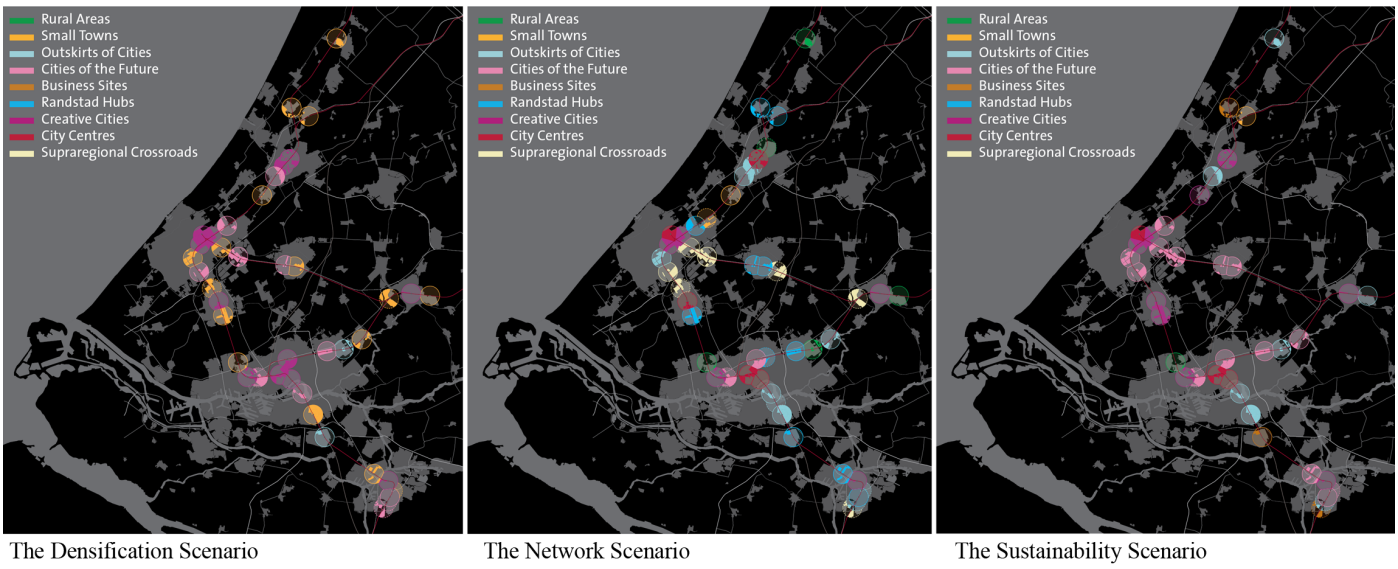

Figure 7 – The three assessment scenarios used in the Stedenbaan project.

the transport authority – undertaking to improve transport service – and local planning authorities (municipalities and inter-municipal bodies) – undertaking to promote urban density around stations. Contrats d'axe were then developed for regional rail transport in the French regions of Aquitaine, Languedoc and Provence-Alpes-Côte d'Azur (Maulat & Krauss, 2014).

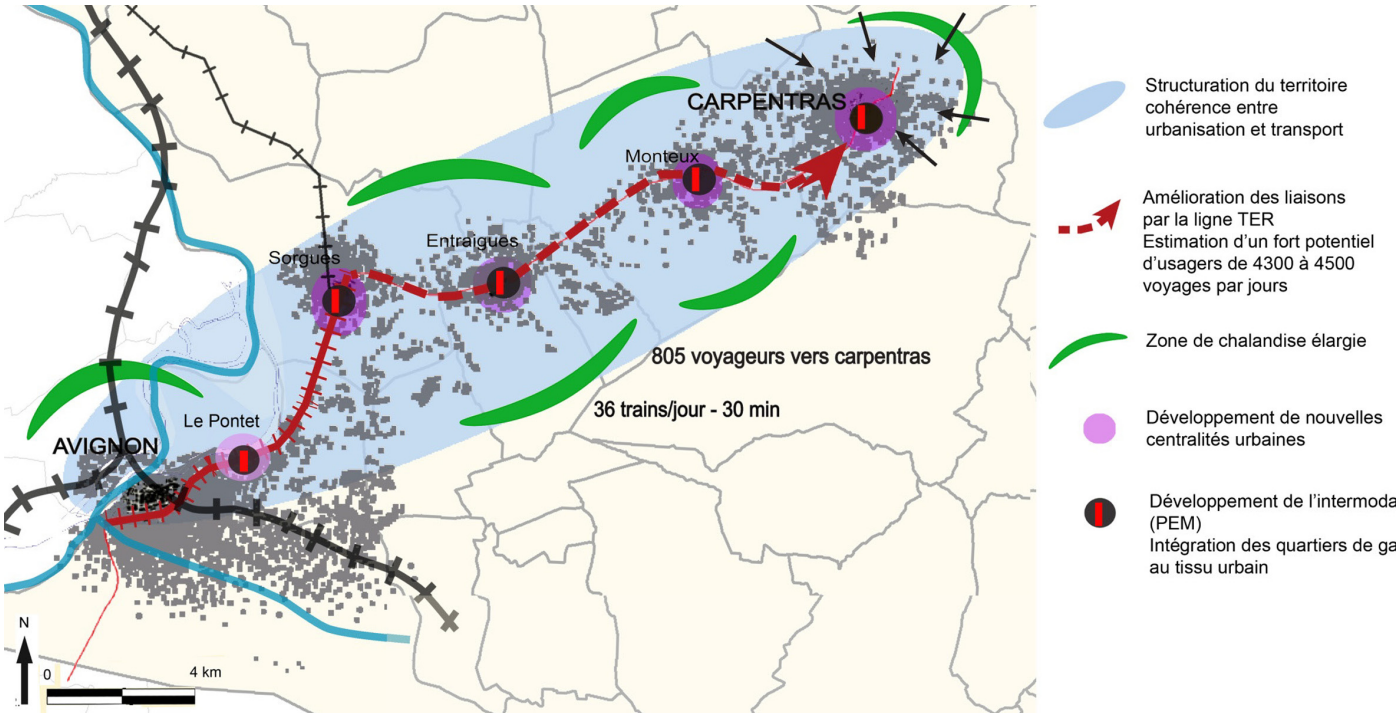

Figure 8 – The contrat d'axe Vauclusien between Avignone and Carpentras

3. Promoting TOD in Italian PTCPs

TOD approach is recently becoming subject of increasing interest not only in European Northern countries (where there is a strong tradition of integration and coordination between land use and transport planning), but also in Mediterranean countries like France (as the example of contrats d'axe shows), Spain (Zonneveld & Ortuño Padilla, 2012), Greece (Milakis & Vafeiadis, 2014). What about Italy? Were the above mentioned MRS rationalization processes in Italian cities supported by a coherent TOD-like planning approach?

As we said, TOD needs to be promoted at two administrative and institutional levels. In Italy, the local level can be identified in the municipalities, which can influence density, diversity and design in the areas through their PRG ("piano regolatore generale", physical development plan). The regional level can instead be identified in the NUTS 3 level, because MRSs generally operate at this scale; in Italy, this level corresponds to Provinces, which have the task of elaborating the PTCP ("piano territoriale di coordinamento provinciale", provincial coordination territorial plan). Through this plan, the Province can establish parameters and standards that municipalities have to respect in their PRG (for example, in terms of maximum new residential volumes that PRGs can permit) and define the localization of functions and activities which have a metropolitan or provincial scale.

In the next sections, the PTCPs of nine Italian Provinces (table 1) will be analyzed, in order to examine if and how they promote a settlement model that can support the MRSs which are present in their territory[2]. The selected PTCPs will be examined in terms of:

- settlement model that is promoted;
- role that is assigned to the MRS;
- rules and recommendations concerning new residential developments;
- rules and recommendations concerning the localization of manufacturing activities and metropolitan tertiary functions.

Table 1 – The nine selected PTCPs

Province	*Date of adoption or approval*
Turin	Approved in July 2011
Milan	Approved in December 2013
Genoa	Approved in January 2002
Venice	Approved in December 2010
Bologna	Approved in March 2004
Florence	Approved in January 2013
Rome	Approved in January 2010
Naples	Approved in October 2008
Bari	Provisional draft adopted in May 2007

2. The nine Provinces that have been selected are the Provinces that, since January 1st 2015, have been replaced by the so-called "Metropolitan Cities", according to the national Law 56/2014. They are the Provinces where the presence of a metropolitan area has been recognized by the State. The tenth Metropolitan City, Reggio Calabria, has not been selected because it has neither a MRS nor a PTCP. There are five other Provinces where the presence of a metropolitan area has been recognized by the Regions, but four of them (Cagliari, Catania, Messina, Trieste) do not have a MRS; Palermo has a 3-lines MRS, but it does not have an approved PTCP (if not for a provisional draft, that anyway does not assign any relevant role to the MRS).

3.1. The proposed settlement model

All the examined PTCPs explicitly assume that urban sprawl cannot be further promoted, for its environmental impacts (mainly soil consumption) and its consequences on car-depending mobility patterns. Nevertheless, what differs is the emphasis that plans place on the alternative settlement models to promote.

In the cases of Turin, Genoa and Venice, attention is mainly focused on containing soil consumption; this aim is supposed to be pursued restraining urban expansion and fragmentation, and prioritizing infill of empty or abandoned lots in consolidated urban areas. However, polycentrism is not postulated as an explicit objective (the hierarchic role of the centres is not defined, the interactions between the centres are not analyzed, etc.).

Bari's PTCP includes the containment of soil consumption and the enhancement of the provincial urban polycentrism as two of its six strategic lines.

In the other examined plans, polycentrism is directly identified as the settlement model to be pursued, even if in relation to slightly different reasons and objectives. In Milan, Florence and Rome a polycentric structure is recognized as already permeating the provincial territory (although in attenuation because of urban sprawl processes) and representing a strong local identity factor: the key purpose is to maintain and strengthen this structure and the specific characteristics of its centres. In these plans, the containment of soil consumption is declared as a secondary objective, just because it helps to support polycentrism.

The PTCP of Naples promotes polycentrism to balance the excessive concentration and polarization on the central city. The plan proposes a redistribution of activities and services on a limited number of suburban emerging or consolidated centres, according to their main specialization. Fulfilling this system of centres should also represent an attempt to control and influence the mobility demand generation.

Lastly, in the case of Bologna polycentrism is seen as the reference model mainly for its consequences on the mobility patterns: it is considered as the settlement structure that is more suitable to foster the use of public transport rather than private motorized transport means. Also the containment of soil consumption is put as an objective to support a more sustainable mobility demand.

3.2. The role assigned to the MRSs

The role that PTCPs assign to MRSs varies from plan to plan in terms of emphasis and importance, but it seems possible to recognise a fundamental difference which depends on the assumed settlement model. In those plans where attention is addressed mainly on containing soil consumption, the role of MRSs is associated above all to the densification processes that should be promoted by local municipal plans around stations. If a polycentric model is explicitly proposed instead, the focus on the MRS is not limited to its nodes but also and especially to its structure, which should take a network – rather than a radiocentric – shape in order to support a balanced development of all its centres.

Modest attention to the prospective role of MRSs is given in the three PTCPs of Florence, Genoa (except for the reuse of abandoned rail areas near the stations) and Bari.

The PTCPs of Turin and Venice, which have the containment of soil consumption as the fist objective, identify the stations of the MRS as barycentres of areas where processes of residential (in the case of Turin) or tertiary (in Venice) densification should be launched in opposition to sprawl.

In the PTCPs of Milan, Rome and Naples, which on the contrary emphasize more the polycentric model, the focus is mainly on the MRS structure. They fear the risk that a radiocentric railway structure could increase exaggeratedly the accessibility of the central city to the detriment of the balance of the overall polycentric system; on the other hand, this kind of structure could turn out to be inadequate to serve the tangential trips between municipalities of the first and second suburban rings. For this reason, these PTCPs give significant attention to ring and tangential connections, both through rail (in Naples and Rome) or street buses (in Milan).

Bologna's PTCP tries to combine the two above-mentioned approaches, in order to promote through polycentrism a more sustainable mobility. On the one hand, it is the only plan that systematically examines the areas around the MRS stations (within a radius of 600 m) to verify what development they could accommodate and what is their waking and cycling accessibility; on the basis of the results of this analysis, the plan assigns to local municipal plans the objective of densifying these areas for increasing the potential ridership of the MRS. On the other hand, the PTCP assumes the MRS as the key element to reorganize the suburban public transport lines on road, with the aim to effectively serve not only the trips toward the central city, but also the tangential ones.

3.3. Rules and recommendations for new residential developments

All the examined PTCP pursue their objectives of soil consumption containment and/or polycentric development through a strategy of urban infill and densification. Their strategic recommendations and their technical implementation rules often ask municipalities to demarcate through a line the urban areas from the rural contexts, and to concentrate new residential developments in empty or abandoned lots that are enclosed or contiguous to these urban areas. However, only few plans assume proximity and accessibility to MRS stations as conditions that restrict, more or less

strictly, the possibility and quantity of new residential developments.

Turin's PTCP determines that municipalities which are on hills or near the mountains and have "a significant accessibility to the MRS" can increase of 2.5% the maximum new residential volumes that their physical development plans can propose (and these volumes can be built only within or in continuity to consolidated urban areas). But this generic "significant accessibility" is operationally defined as a distance from the station that should not exceed 10 kilometres: therefore this approach is quite different from the usual TOD strategy, and its positive impact on the ridership of MRS can be questioned.

In Naples, new residential volumes should be built within or in contiguity to consolidated urban areas, "preferably" near existing or planned public transport stations; this nearness is not operationally defined by the PTCP. Rome's PTCP proposes generic incentives to new residential developments in urban centres that are served by MRS.

Only in the case of Bologna the implementation rules of the PTCP are operationally specified in a way that is in line with a TOD approach. These rules require municipal physical development plans to commensurate the permitted new residential volumes to two parameters: the presence of a MRS station in the municipality, and the range of local services (nursery and primary schools, food stores, banks, health and welfare facilities etc.). Only those municipalities that have a station and a complete range of these services do not have to define a maximum limit to the permitted new residential volumes. In the municipalities that lack a station or a certain number of services, these volumes cannot exceed 70% of the volumes built in the previous ten years. This threshold is reduced to 50% for those municipalities that lack both a station and a complete range of services. In any case, the PTCP determinates that the new residential volumes must be built "only within walking accessibility to the station", if there are void or abandoned lots; if the area around the station is saturated, or if the municipality lacks a station, the volumes must anyway be realized on brownfield sites, and not on greenfield ones, as a matter of priority.

3.4. Rules and recommendations for the localization of manufacturing and tertiary activities

As regards the localization of new manufacturing activities, the examined PTCPs generally prioritize brownfield rather than greenfield sites. The accessibility of these sites is defined in the PTCPs as a key factor that municipal plans must consider in choosing this localization, but accessibility is mainly declined in relation to road transport (e.g. proximity to a motorway junction), as this mode is dominant for goods in Italy. Rail accessibility (for example in terms of proximity – or connection through shuttle vehicles, as hypothesized in Naples – to an intermodal freight terminal) is defined as a "further" – but not essential – positive factor. Only in Milan's PTCP the technical implementation rules require that new manufacturing activities must benefit of adequate accessibility conditions with particular reference to rail infrastructures.

With respect to metropolitan tertiary activities (hospitals, universities, multiplexes, convention halls, exhibition centres, sport facilities, business districts and so on), most PTCPs adopt a decentralization strategy. This strategy aims not only to relieve the pressure on the central city, where historically most of these services tended to concentrate, but also to give real substance to polycentrism and bring some tertiary functions closer to the inhabitants of the so-called sprawled city. Some PTCPs simply provide strategic recommendations and guidelines for the localization of these activities, but let the municipalities (possibly in coordination with the Province) to identify the precise sites for them; in other cases it is the same PTCP that chooses the localization of metropolitan and provincial tertiary functions.

In this decentralization strategy, accessibility is assumed by PTCPs as a decisive factor to be considered in locating tertiary activities; but this is true for accessibility in general, only rarely rail accessibility (in terms of proximity to a MRS station) is defined as crucial.

Three approaches to the localization of metropolitan tertiary activities can be synthetically identified in the examined PTCPs:

- the plan does not provide any standards or parameters in term of accessibility. It is the case of Genoa's PTCP;
- the plan requires good levels of accessibility. For example, it is the case of the PTCP of Turin, even if it does not operationally define these "good levels" and does not specify if this accessibility concerns private or public transport; the plan envisions transport interchange hubs as "inter-municipality service centres" so to make them more attractive, but it does not bind the localization of metropolitan tertiary activities to the proximity to these hubs. Milan's PTCP articulates the levels of accessibility by rail for different kinds of tertiary functions: regional functions should be located within walking accessibility from a regional rail station, metropolitan functions within walking distance from a MRS station. In Rome, the plan identifies 20 metropolitan centres where services of excellence should be concentrated: almost all of them are near a motorway junction, some of them are "also" near a rail station;
- the plan explicitly requires good levels of accessibility by public transport. In the case of Venice, new metropolitan tertiary activities should not be distant more than 500 m from metropolitan rail stations or 250 m from other public transport stops in urban areas, while in suburban and rural

areas proximity is required to motorway junction. The PTCP of Florence defines accessibility by public transport as a key localization factor for tertiary activities, but it does not define this accessibility operationally. According to the rules of the PTCPs of Bologna, new clusters of tertiary functions should be located near the junctions of the national or regional motorway network, but a connection to a rail station is judged as necessary.

Among tertiary functions, retail activities deserve a separate analysis, in particular with reference to big shopping centres. Most PTCPs do not consider accessibility by rail as a factor to be taken into account for their localization (Milan's PTCP defines this accessibility as "not significant"). The PTCP of Rome advises against locating these centres near motorway junctions. The PTCP of Naples requires giving priority to localizations near existing or planned rail stations. In Bologna, the PTCP locates retail/entertainment integrated parks in sites near motorway junctions, selecting those offering also the "possibility" of a connection by shuttle to a rail station; medium and large-sized shopping centres should be preferably localized within walking accessibility to a MRS station. Moreover, the plan identifies 10 rail stations which are labelled as "strategic for retail activities", and proposes to insert small and medium retail stores in these stations, in order to make them more attractive.

4. Discussion

Despite integration and coordination between land use planning and transport planning is a recurrent feature in urban planning discourse, the gap between this discourse and reality remains substantial (Marshall & Banister, 2007, Desjardins, Maulat & Sykes, 2014). This is true also for TOD: notwithstanding many success cases all over the world, both formal and informal context-specific barriers impede a simple 'copy and paste' transferral of lessons learnt elsewhere (Tan, Bertolini & Janssen-Jansen, 2014).

The analysis in this paper shows that most Italian "metropolitan" PTCPs set objectives concerning more sustainable mobility patterns, polycentric development, containment of soil consumption etc. in their discourses, but they do not have exploited the rationalization and enhancement of MRSs as an opportunity to structure territorial policies consistent with these objectives. TOD approach is sometimes referred in these plans in general terms, but it is not systematically applied; accessibility to MRS stations is often identified as a relevant localization factor, but it is almost never operationally defined (and when it is, the maximum acceptable distances from the stations are set so high to make the impact on modal share quite questionable). Furthermore, in locating metropolitan tertiary functions, PTCPs often prefer accessibility by road rather than by rail.

It could be supposed that institutional, cultural or regulatory barriers prevent an effective transferral of TOD approaches to the Italian context, at least for the metropolitan level. Is the Province, which – by the way – has no responsibilities in the rail sector, the appropriate institution to coordinate TOD policy for MRSs[3]? Is perhaps the PTCP a too formalized and rigid planning tool for TOD, and negotiated and contractual procedures (like the ones adopted in the Stedenbaan project and in the French contrats d'axe) are more effective in overcoming the separation of power between planning and rail transport authorities, and between vertical scales of governance?

The case of Bologna's PTCP demonstrates that the answers to these two questions are negative. In contrast with the other eight examined PTCPs, this plan adopts a TOD approach systematically: it spatially analyzes the areas around all the MRS stations, provides municipalities with inputs to increase the 3D in these areas, and structures the metropolitan polycentric settlement on the MRS stations. The outcomes of this policy are relevant: between 2004 (when the MRS was launched and the PTCP approved) and 2010, ridership on the metropolitan trains increased by 48%; 63% of the MRS passengers live within 10 minutes from a station; most new residential volumes have been built in municipalities having a MRS station and in lots that are near this station (Nigro & Donato, 2013). The main feature that differentiates Bologna's PTCP from the other examined plans is the general strategic aim: sustainability of mobility patterns and polycentric development are assumed as two objectives that are not "parallel", but strictly integrated and mutually supporting, and TOD is identified as the approach that allows to put this integration into effect.

According to the Italian Law 56/2015, the new "Metropolitan City" institutions, that have substituted the examined Provinces since January 1st 2015, have the task to elaborate the Metropolitan General Territorial Plan. This plan should cover the same features that PTCPs already deal with, but also further issues, like the "metropolitan mobility" (and not only the private and public road transports at the provincial level, that were assigned to PTCPs). As a consequence, new opportunities for the integration and coordination of rail transport and land use planning emerge: the experiences of the Stedenbaan project, the French contrats d'axe and above all Bologna's PTCP can offer significant inputs to these new plans to promote MRS ridership and polycentric development through a TOD approach.

3. For example, in the case of Naples (where the railway system has a regional – more than a metropolitan – dimension), it was the Region to launch a programme for improving the design of stations and redeveloping the surrounding areas (Cascetta & Pagliara, 2009), even if the adopted approach was less comprehensive than TOD.

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