

Promoting TOD through regional planning. A comparative analysis of two European approaches

*Original*

Promoting TOD through regional planning. A comparative analysis of two European approaches / Staricco, Luca; Vitale Brovarone, Elisabetta. - In: JOURNAL OF TRANSPORT GEOGRAPHY. - ISSN 0966-6923. - STAMPA. - 66:(2018), pp. 45-52. [10.1016/j.jtrangeo.2017.11.011]

*Availability:*

This version is available at: 11583/2697261 since: 2020-05-07T15:40:15Z

*Publisher:*

Elsevier Ltd

*Published*

DOI:10.1016/j.jtrangeo.2017.11.011

*Terms of use:*

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

*Publisher copyright*

(Article begins on next page)

## **Promoting TOD through regional planning. A comparative analysis of two European approaches**

### **Abstract**

Transit-oriented development (TOD), first coined and mainly applied in the US, has received increasing interest in Europe over the past two decades as a sort of reinterpretation of typical intrinsic European planning principles and values. In the Old continent, it especially focuses on transport and land use integration, extending the approach from the local to the regional framework. This regional shift implies an intergovernmental cooperative approach with vertical and horizontal institutional coordination that constitutes both a strategic value and one of the main barriers to the implementation of TOD. This paper focuses on the role of regional planning for TOD by analysing its benefits, tools and barriers, both theoretically and through two European case studies. The latter, which were conducted in the Netherlands and in Italy, were selected as they belong to two different “planning families”, in order to underscore how and to what extent they apply this multi-level governance approach and overcome institutional barriers to the implementation of TOD. The analysis reveals that, albeit the two planning styles lead to different results, the main issue remains the deep coordination of land use and transport, which is hard to achieve despite dedicated efforts.

**Keywords:** transit-oriented development, regional planning, land use and transport integration, spatial planning styles

### **1. Introduction**

Transit-oriented development (TOD) is generally defined as a mixed-use, relatively high density, pedestrian-oriented development around rail or bus stations. Its aim is to encourage transit use by promoting, in areas surrounding these stations within a radius of 500-750 metres (corresponding to an 8-10 minute walk), an urban environment characterised by the so-called 3Ds (Cervero & Kockelman, 1997), precisely medium-high (residential and/or employment) *density*, appropriate *diversity* of land uses and built environment *design* that encourages walking and cycling to the station.

The term TOD was first coined by Peter Calthorpe in his book *The Next American Metropolis: Ecology, Community, and the American Dream* (1993). Since then, the TOD concept has been widely accepted mainly in the US and in Canada as consistent with the “smart growth” movement, but also in Asia, Australia and South America. More recently, in the last two decades, the TOD approach has aroused increasing interest also in Europe (Bertolini, Curtis, & Renne, 2012), not only in Northern

countries (which feature a strong tradition of integration and coordination between land use and transport planning), but also in Mediterranean countries, such as France (Maulat & Krauss, 2014), Spain (Zonneveld & Ortuño Padilla, 2012), Greece (Milakis & Vafeiadis, 2014), and Italy (Pagliara & Papa, 2011; Staricco, 2015). This might sound quite paradoxical, since the origins of TOD can be traced to Europe as an intrinsic planning principle in many European countries (Pojani & Stead, 2016). Satellite villages developed around a rail station, as proposed by Calthorpe, mimic the Garden Cities promoted in England by Ebenezer Howard in the late 1800s, and the New Towns built in Europe in the mid-20<sup>th</sup> century (Renne, 2009). According to Cervero (2009), the best developed cases of TOD on the global scene were achieved precisely in Europe, particularly in Scandinavia, through the celebrated “finger Plan” of Copenhagen, Denmark (Knowles, 2012), and the “Planetary Cluster Plan” of Stockholm (Cervero, 1995), Sweden. Rail corridors were built in these metropolitan areas, often in advance of demand, to channel overspill growth from the urban centres.

Hence, Renne and Wells (2004) describe TOD as an “emerging European-style planning in the USA”. They consider it as European not only in terms of product, as the 3Ds of TOD are “European-like” urban characteristics, but also of practice because the land use-transport planning integration required by TOD implies vertical cooperation between state, regional and local government. According to them, this intergovernmental cooperative style of planning is not typical of America and represents a “European-like” transition in planning.

At the same time, it is important to note that the difficulties in vertical and horizontal institutional coordination are generally outlined in literature as one of the main barriers to the land use-transport planning integration required by TOD (Hull, 2009; Leite et al., 2008; Tremblay Racicot & Mercier, 2014). Despite the importance and problematic nature of this multi-level governance approach in promoting TOD, to date scientific literature has predominantly focused on the local implementation of TOD planning, i.e., on how municipalities and urban actors can guarantee density, diversity and walking-oriented design around stations. Conversely, TOD planning at a regional level, and its interactions with the local level, have been explored to a lesser degree. This paper specifically discusses the strategic role and importance of regional planning for TOD. The aim is to analyse which policy tools allow regional TOD planning, their theoretical benefits and the barriers to their implementation (section 2). Sections 3 and 4 analyse two European case studies to verify how and to what extent these tools were applied, the benefits achieved and barriers that were overcome with two different planning styles.

## **2. Planning TOD at a regional level: benefits, tools and barriers**

Local city planning is supposed to define a detailed plan with precise contents of land use types, densities and facilities in areas surrounding stations, while regional planning should, instead, establish the overall spatial structure of TOD in terms of hierarchical distribution of transport nodes, links and activities. This coordinated perspective based on regional planning is supposed to have several potential benefits, which might be lost, if left only to local initiatives.

Firstly, TOD needs the T, and high quality rail transit services connecting municipalities can be planned, managed and financed only at a metropolitan or regional level.

Secondly, station areas along a transit line can have different present (and potential) levels both regarding the 3Ds and the node/place balance (according to the model introduced by Bertolini, 1999). Hence, regional planning can assess which role each station should play as a component of a wider territorial system, and consequently steer local decision making to support objectives at a higher scale (Kamruzzaman, Baker, Washington, & Turrell, 2014). This regional planning role is particularly important in the case of smaller suburban rail stations, whose adjacent areas usually attract less interest than central stations in big cities. Moreover, they present characteristics (such as low-density, high levels of car use, uneven availability of land, unfavourable market conditions, resistance of inhabitants and local authorities to higher densities) that make it difficult to integrate transport and land use planning; hence the need for the input and incentives associated with regional planning (Brès, 2014; Desjardins, Maulat & Sykes, 2014; Hickman & Hall, 2008).

An additional underappreciated benefit of a regional approach to TOD is the possibility of intermixing land uses along linear rail corridors to produce bidirectional flow balance during the commuting period (Cervero, 2009). This is particularly important in cases, such as metropolitan areas, where the rail network has a radial structure. A “decentralized concentration” of metropolitan tertiary activities (such as large scale shopping centres, conference centres, entertainment facilities, hospitals, universities, etc.) from the main central city to stations in the surrounding municipalities can reduce the risk of poor train patronage in a centrifugal direction during morning peak hours and in the opposite direction in evening peak hours (Jenks & Dempsey, 2005).

Last but not least, regional planning is generally based on a strategic approach that allows a flexible response to different possible future scenarios (Albrechts, Healey & Kunzmann, 2013). Such an approach is useful to face the uncertainties that might arise in the implementation of TOD at a metropolitan or regional scale (Lin & Li, 2008); for example, changes in real estate market demand, in actors involved in the implementation process, in available financial resources, in the strategies adopted by various institutional levels, etc.

In order to achieve these benefits, Newman (2009) identifies a set of four policy tools, which he considers necessary for TOD implementation, and which can generally be ensured not locally but only through regional planning:

- a strategic policy framework that links centres with a rapid transit base, almost invariably electric rail;
- a strategic policy framework that establishes where centres need to be created and with what kind of density and mix;
- a statutory planning base that requires development to be implemented with the necessary density and design in each centre;

- a public-private funding mechanism to enable both transit and TOD to be either built or refurbished by linking transit and the centres it will serve<sup>1</sup>.

Despite its potential benefits, regional planning should be considered a necessary but not sufficient condition for the development and success of TOD projects (Leite, et al., 2008). Indeed, regional planning is not easily implemented in the context of land use-transport integration, since it has to face some relevant barriers that are typical of this sector.

Several authors have pointed out that, though the importance of TOD is widely acknowledged, barriers to its implementation appeared in each development stage of TOD projects, from early strategic planning to realisation and management. Barriers can be political, legal, financial, technical, organisational or cultural (Hull, 2009), formal and informal (Tan, Bertolini, & Janssen-Jansen, 2014), institutional and substantive (te Brommelstroet & Bertolini, 2010). According to Rietveld and Stough (2005), institutional barriers are a major impediment to land use-transport integration. In the case of TOD, they can be identified in:

- *multiplicity and lack of clarity of the roles of stakeholders*; in several cases, TOD projects involve a large number of public and private actors; regional coordination is, therefore, essential but it is often challenged by this multiplicity of actors and roles that burden the process (Tan & Bertolini, 2010; Pojani & Stead, 2014); the absence of a widely acknowledged leader for the governance process can be a barrier as well;
- *vertical, horizontal, spatial and financial segmentation* involving different sectors and levels; TOD projects have to deal with the multiple segmentation of governance layers (local, metropolitan, provincial, regional, national), planning sectors (land use, transport, economy), administrative boundaries between municipalities involved, and financial resources and budgets (Hull, 2009; Leite et al., 2008; te Brommelstroet, 2010; Tremblay Racicot & Mercier, 2014);
- *failed governance arrangements*; despite the general interest in TOD and support provided, consensus building among different actors is a hard and time-consuming process that has not always led to the desired governance arrangements; this is due to several factors, including competition among municipalities, lack of involvement of crucial actors (real estate agents, private developers, railway service managers), resistance to change and lack of commitment of stakeholders (Legacy, Curtis, & Sturup, 2012; Pojani & Stead, 2014; Tan & Bertolini, 2010).

Figure 1 outlines relations between benefits, tools and barriers in planning TOD at a regional level. The figure illustrates which benefits each policy tool is supposed to generate, and how barriers can interfere with these tools. It is evident that all barriers can either prevent or hamper the operationalisation of each of the four policy tools.

---

<sup>1</sup> According to Newman (2009), public-private funding arrangements for rail are more effective in creating TODs than state funding alone. Indeed, if the private sector were to build rail in partnership with the government through land development financing, rail would be more integrated with land use, which would be the major source of funds to pay for it.

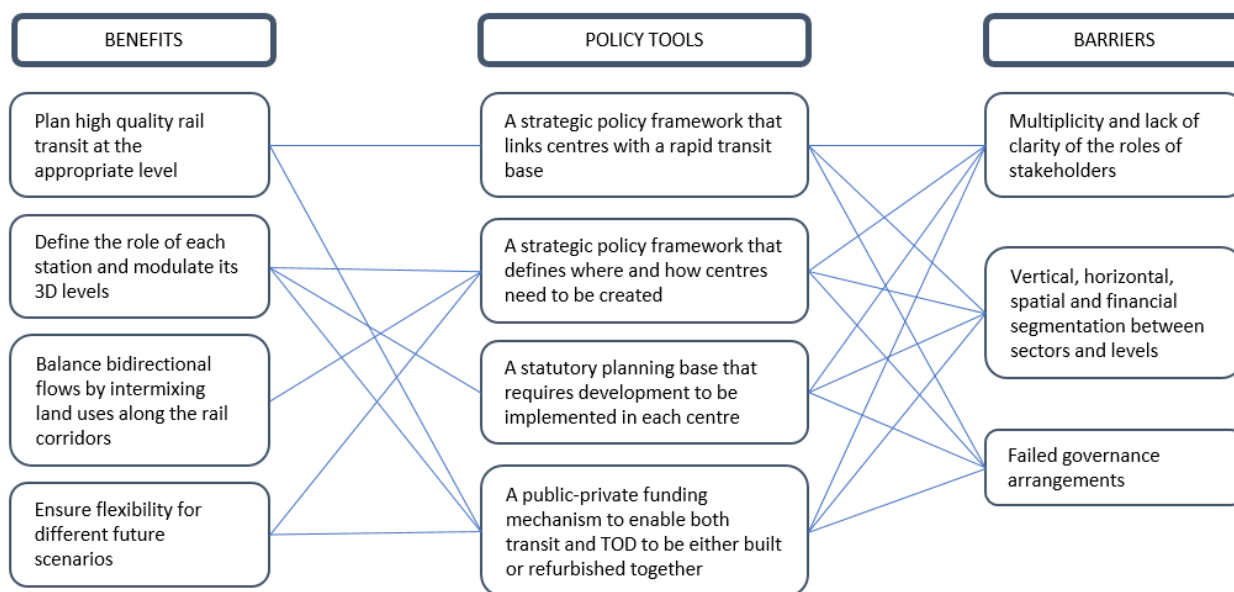


Figure 1 – Relationships between benefits, tools and barriers in planning TOD at a regional level

### 3. European case studies

#### 3.1. Case selection

In order to study the contribution of regional planning to TOD, despite the outlined barriers, this section and the next will provide a comparative analysis of two case studies, precisely the Stedenbaan project in the Netherlands and the territorial provincial plan for Bologna in Italy. Both cases are European, since most of the above strategic elements advocated by Newman (2009) are applied in Europe (Bertolini, Curtis & Renne, 2009). However, European States do not present a homogeneous picture in terms of institutional organisation and spatial planning systems. The Netherlands and Italy were chosen because they belong to two different “planning families” out of the four European families identified by the EU Compendium of Spatial Planning Systems and Policies (EC, 1997, Nadin & Stead, 2008) on the basis of spatial planning styles.

The Netherlands (together with, for example, Denmark, Germany and Sweden) belongs to the “comprehensive integrated approach” family (or German model). This group features a mature style of spatial planning based on a very systematic and formal hierarchy of plans ranging from national to local, and which coordinates public activity across different sectors and spatial levels. In this family, the Netherlands can be recognised as a country that presents strong horizontal and vertical coordination.

Conversely, Italy belongs to the “traditional urbanism” family (or Mediterranean model), whose rather immature style of planning is based on rigid zoning, codes and building regulations at the local level, with a strong architectural flavour. Horizontal and vertical cooperation is generally weaker in this model.

The general difference between the two spatial planning styles can also be noticed at a regional level, since regional spatial plans are more “strategic” in the Netherlands, where they explore

possible and desired developments, and more “regulative” in Italy, where they define provisions and indications, which local authorities must conform to (EC, 1997).

A key trait that is common to both the Netherlands and Italy is that the regional government is committed to plan rail networks and services but municipalities possess the power to legally bind land uses. Hence the need for a multi-level governance approach to TOD<sup>2</sup>. But again, the two countries have different modes of assignment for spatial development rights that especially affect the statutory planning mechanism, which requires density and mix in TOD centres. Italy adopts a “conformative” model (typical of southern Europe) centred on “preventive” binding zoning of a comprehensive urban area. A public spatial strategy is laid out in a plan, which assigns rights for both land use and spatial development. However, a new plan (or a substantive variation in the existing one) is required, if certain projects that do not conform to the plan are considered, for any reason whatsoever, preferable to the existing allocation of rights. Instead, in the Netherlands, a “neo-performative” model (typical of north-western Europe) that is still based on binding zoning, neutralizes the preventive legal effectiveness of the plan. New spatial development rights are only approved once projects have been negotiated, and thus checked by the public authority before the plan acquires the force of law. (Janin Rivolin, 2017).

Considering TOD examples in the Netherlands and in Italy, Stedenbaan and Bologna have been selected as specific cases because they combine some relevant affinities, especially in terms of cross-territorial involvement of actors, 3D approach and scale of areas targeted for urban development around stations. Some particular differences will be discussed below to underpin a critical comparison. Several TOD attempts have been developed in the Netherlands, e.g., in the Arnhem-Nijmegen and Amsterdam-Utrecht city regions (Thomas & Bertolini, 2017), but the Stedenbaan project is undoubtedly acknowledged as the most representative case (probably in the whole of Europe<sup>3</sup>) for regional planning. Only two TOD examples planned at the regional level can be identified in Italy, precisely Naples and Bologna (Staricco, 2015). The most renowned is undoubtedly the Regional Metro System of Naples and Campania (Pagliara & Papa, 2011). But despite some affinities with the Stedenbaan project (e.g., in terms of territorial scale, regional approach, etc.), in Naples the focus for urban development seems to be limited to precise and significant interventions on the design of stations, giving less importance to the density and the diversity of larger urban areas around them. Instead, in the case of Bologna that, to date, has not been extensively analysed by the scientific debate, the approach is more focused on all the 3Ds on a wider scale, consistently with the definition of TOD; moreover, multi-level governance between regional and local TOD planning is more evident in Bologna than in Naples.

---

<sup>2</sup> Western Australia provides a non-European example of regional planning for TOD (Curtis, 2009) but, in this case, the State can influence both transport and land uses through a statutory mechanism that zones land for development; hence, multi-level governance is not strictly necessary.

<sup>3</sup> Besides the Dutch and Italian cases, other regional TOD attempts can be identified in Europe, such as Copenhagen in Denmark (Thomas & Bertolini, 2017) and the so called “contrats d’axe” (“corridor contracts”) recently developed by some local authorities in France (Maulat & Krauss, 2014).

### 3.2. Methodology of case analysis

Case description and comparison were carried out by combining various sources of information, such as scientific literature, official documents (plans, regulations, contracts, etc.), reports and discussions with the local administration and project coordinators.

The starting point was a systematic literature review. Both peer reviewed studies published in scientific journals and grey literature, such as proceedings and reports, were considered. The latter were very useful for the case study, since they provided detailed and neutral information about the context. Conversely, journal papers often focus on specific aims (e.g., testing a model, measuring accessibility, etc.) with shorter case descriptions, also due to word limits.

As regards Bologna, this case study is new to the debate and, therefore, scientific literature on the subject is scarce. Hence, most of the information was collected from official administrative documents, reports and direct contacts with officials involved in the TOD planning process.

In both cases, the systematic review of scientific literature and grey documents was conducted with the specific goal of analysing the following points:

- if and how the Stedenbaan and Bologna projects were successful in applying the four policy tools of regional planning for TOD and in overcoming the main institutional barriers to the implementation of TOD mentioned in section 2;
- if the expected benefits of this planning approach were achieved;
- how different spatial planning style influenced the implementation of tools and their benefits.

### 3.3. The Stedenbaan project

The Zuidvleugel, literally “South Wing” of the Randstad<sup>4</sup>, stretches over a surface area of about 3,400 km<sup>2</sup>, and with 3.5 million inhabitants and 1.5 million jobs, it is one of the densest regions in Europe (Balz & Zonneveld, 2015; Switzer, Janssen-Jansen, & Bertolini, 2013). The settlement structure is polycentric with roughly 65 minor municipalities spread out over the area and two major cities, namely Rotterdam and The Hague.

The TOD strategy developed in the Zuidvleugel, called *Stedenbaan* (Cities Line), was launched in the early 2000s and was meant for the 34 stations of the three oldest rail lines in South Holland (Balz & Schrijnen, 2009) (Figure 2). From the onset it focused on two major issues (*Dubbele Benuttingsstrategie* – Dual Utilisation Strategy), precisely:

- densification of urban development around rail network stations through a regionally coordinated urban development programme;
- increase in local train frequency from 4 to 6 trains per hour.

---

<sup>4</sup> The Zuidvleugel is not bound to a geographical area. It is an administrative coalition born as an attempt to bridge the gap between local and national governments in order to make the Randstad more manageable.





and two thirds of the total urbanisation target, within the catchment area<sup>5</sup> of railway stations. NS would increase train frequency from 15' to 10' (van Lierop et al., 2017). In 2011, the Stedenbaan agreement was revised and extended to 47 cities. This new agreement, called StedenbaanPlus, set the ambitious goal of building 80% of newly added dwellings around all railway stations and key transit nodes of the South Wing, with a distinction between different types of stations, which correspond to different TOD solutions (Geurs, Maat, Rietveld, & de Visser, 2012; Spaans & Stead, 2013).

### 3.4. The PTCP of Bologna

The city of Bologna is Italy's main railway hub. It is located at the intersection between the main lines that cross Italy in a North-South and East-West direction. The city and its metropolitan area have long been unable to benefit by these rail infrastructures for local mobility (Santacroce, 2008), but in 1994 a project for a new high speed rail line from Milan to Florence crossing Bologna (and a new underground central station in the city) offered the opportunity to allocate current rail tracks to metropolitan and regional trains. Therefore, in 1997 an agreement was signed between the national Transport Ministry, regional and provincial administrations, the Municipality of Bologna and the national rail operator FS to rationalise and enhance the existing suburban railway lines gravitating to Bologna, and to create an integrated and coordinated metropolitan railway system (MRS). The schedule would envisage regular intervals, like the long established S-Bahn systems of German cities and the Parisian regional express network RER.

In 2004, the Bologna Provincial Administration approved its new PTCP<sup>6</sup>, whose priorities were to stop the sprawling that had prevailed around the main city during the previous twenty years, and to ensure a balanced modal split by reducing car dependency and promoting public transport use at a metropolitan level. In order to achieve these objectives, the plan was designed to mutually enhance the polycentric structure of the metropolitan settlement and the MRS through "decentralized concentration" of new urban developments around MRS stations.

A preliminary spatial survey revealed that the catchment areas of these stations (within a radius of 600 m; Figure 3) could accommodate nearly 25,000 dwellings (6,000 more than the 18,500 already foreseen by municipal development plans). Therefore, the plan set the objective of concentrating in these areas 70% of the dwellings to be built in the province after 2002 by defining limits to the new residential volumes each municipality could promote:

---

<sup>5</sup> The catchment area has a cycling accessibility radius of 1,200 m<sup>2</sup>.

<sup>6</sup> The PTCP ("piano territoriale di coordinamento provinciale", provincial coordination territorial plan) is the plan through which Italian Provincial Administrations can establish mandatory parameters and standards municipalities are required to comply with in their PRG ("piano regolatore generale", physical development plan), e.g., in terms of maximum new residential volumes, PRGs can allow and define the localisation of metropolitan or provincial functions and activities.

- if a municipality does not host an MRS station, the maximum residential volume that can be built in the subsequent 10 years cannot exceed 50% of the volume produced during the previous ten years;
- if a municipality hosts an MRS station but is not provided with a complete range of local services (primary and secondary schools, medical and welfare services, bank, general stores, etc.), this percentage rises to 70%;
- if a municipality is provided with both an MRS station and a complete range of local services, no limit is set to new residential volumes, as long as they are accommodated within the catchment area of the station.

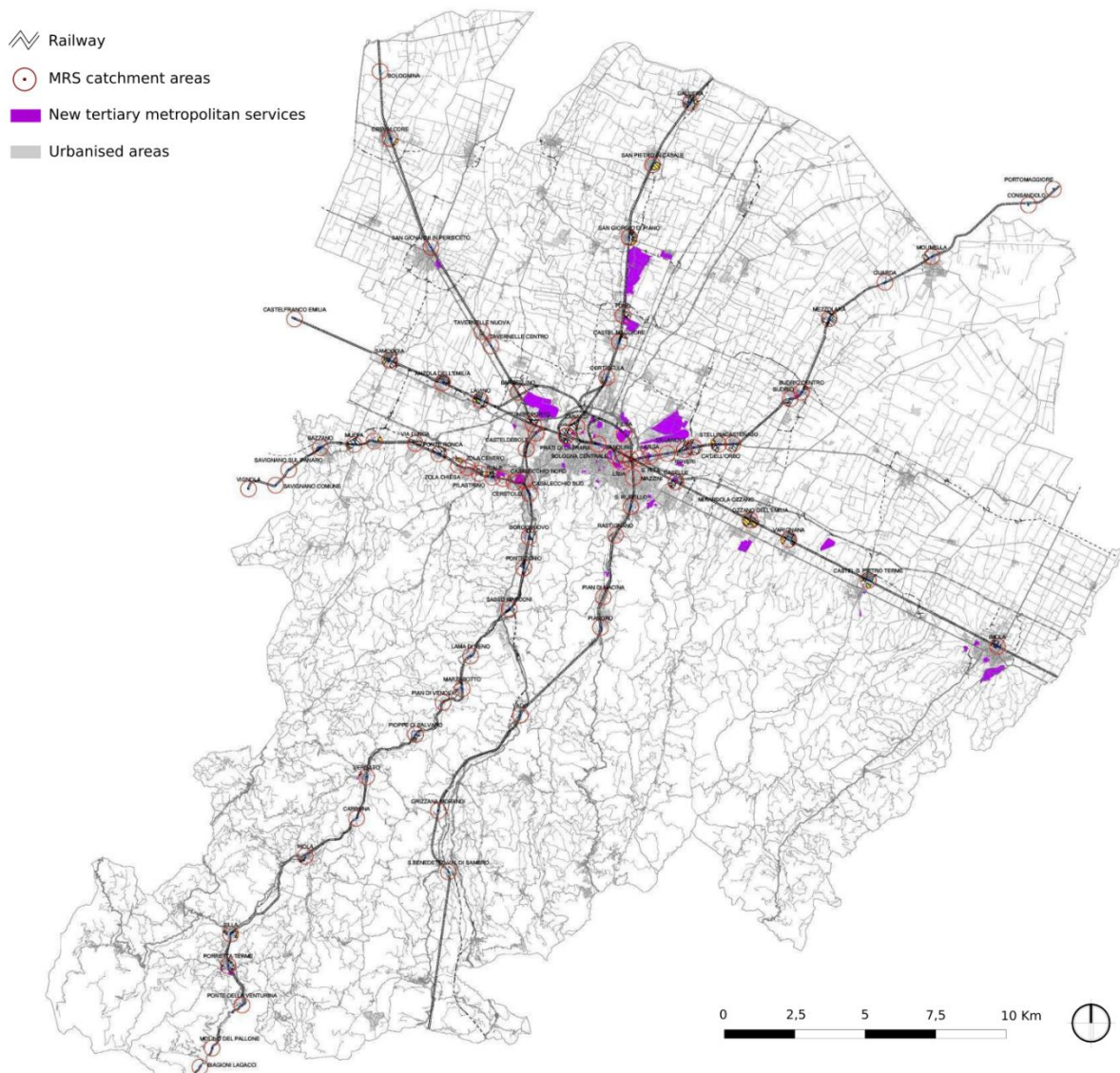


Figure 3 – The station of Bologna’s MRS and related catchment areas

As regards new tertiary metropolitan services (i.e., hospitals, logistic hubs, university campuses, etc.), their locations were determined by the PTCP through “territorial agreements” between

provincial administrations and municipalities. Sites situated next to MRS stations outside Bologna were preferred.

Finally, among the 190 industrial areas in the province, 14 were selected by the PTCP as important in the metropolitan framework. They were the only ones that could be further developed. Most of them were located near major roads but the plan required an appropriate public transport link to an MRS station to be guaranteed for each of them.

#### **4. Comparative analysis**

This section will analyse the two case studies with reference to the four policy tools of regional planning for TOD. As already stated, the aim is to examine if and how they were applied in Stedenbaan and Bologna, how the different spatial planning style influenced their implementation and their benefits, if and how the main institutional barriers were overcome.

##### *4.1. A strategic policy framework that links centres with a rapid transit base*

In both cases, the development of a rapid transit base was more the end than a means. The TOD approach was explicitly promoted at a regional level to increase potential rail patronage and to subsequently support projects that enhanced local rail services. However, institutional barriers hindered the process.

As regards Stedenbaan, the pursued increase in train frequency required railway tracks between Rijswijk and Rotterdam to be doubled from two to four. However, the institution responsible for providing this infrastructure was the national government, which was not included in the Stedenbaan contract promoted by the Provincial Administration (Switzer et al., 2013). This has slowed down project implementation, and railway track capacity will be doubled only in 2023.

In Bologna, the PTCP was promoted by the Provincial Administration but the Regional Administration, which is in charge of planning rail infrastructures and train services, was scarcely involved in the TOD planning process. Hence, its commitment to upgrade local rail services to a genuine metropolitan railway system was rather weak, and the final implementation of the service, which was originally envisaged for 2009, has as yet to be achieved.

A weak vertical (between different government levels) and horizontal (between different institutional sectors) coordination surfaces in the overall picture. TOD projects were promoted by institutions in charge of spatial planning that, especially to keep the process under their control, refrained from extensively involving higher level transportation institutions. Hence the lack of an actual strategic policy framework to develop the rapid transit base, with a subsequent delay in the delivery of increased train services, which is an essential prerequisite for the success of TOD.

##### *4.2. A strategic policy framework that establishes where centres need to be created, and with what kind of density and mix.*

Both in Stedenbaan and Bologna, the definition of a regional TOD strategy was based on three phases, namely a spatial survey of catchment areas around existing and potential rail stations, a

scenario analysis to assess how the potential of these areas could be exploited to achieve regional goals, and a strategy designed to customise 3D levels to suit each station.

In Stedenbaan, this process was implemented on a participatory platform involving a wide range of stakeholders, with Municipalities among them. Conversely, in Bologna it was carried out independently by the Provincial Administration through a top-down approach, and the final strategy was directly incorporated into the PTCP, whose indications Municipalities can neither reject nor modify. The former approach presented a few advantages. The participatory process in Stedenbaan helped build inter-actor trust, which plays a crucial role by ensuring that parties make agreements with each other and abide by them. Since dense urban development cannot be guaranteed in advance, parties must rely on the other to deliver (Switzer et al., 2013). Moreover, the collaborative platform made it easier to share detailed information both about the prospective impact of the project and about actual local needs and requirements. This helped to convince minor municipalities, which were generally reluctant to favour station-based development rather than suburban sprawling, to implement the strategy.

Considering the 3Ds, density was predominant in Stedenbaan's strategy, together with design. The latter appeared only in the second phase, after 2011, when focus on the overall picture, and not only on the rail-transit node, enhanced interest in intermodality). Diversity was promoted to a lesser degree, in the first place most probably due to the adherence of Dutch planning doctrine to traditional types of urbanisation (residential or working; low or high density, etc.) (Casabella & Frenay 2009); and secondly due to the fact that the shape of the rail network itself, which is polycentric rather than radial as in Bologna, guarantees more bidirectional flow balance in the commuting period. Diversity thus loses importance. As underscored by Spaans and Stead (2013), each local authority was inclined to focus on similar types of development. In some cases, the Province had to take the lead to define which kind of urban development was to be promoted in the locations.

In Bologna, all the three Ds were developed, with special focus on diversity in the localisation of metropolitan services. To avoid competition among municipalities to accommodate these facilities, a "territorial agreement" was stipulated for each of these services in order to redistribute taxes and income generated by their localisation from the hosting municipality to the surrounding ones.

#### *4.3. A statutory planning base that requires development to be implemented with the necessary density and design in each centre*

As described above, in Italy and in the Netherlands regional recommendations about density can become effective only if and when they are incorporated into municipal zoning plans, the only planning tools that can legally bind land use.

In this sense, in Stedenbaan, consistently with the neo-performative planning model, residential density targets near rail stations were pursued through "case-by-case" agreements with municipalities. Densification targets are being achieved in Stedenbaan. In the 2012-2014 phase, over three quarters of the new dwellings were built near a high quality public transport stop. The

negotiation approach allowed to adapt the strategy in time; despite the crisis, in 2011 the target of concentrating new dwellings around stations even accounted for 60% to 80% of the overall residential increase.

Instead, the Bologna Provincial Administration attempted to densify areas around rail stations by modulating upper limits to the number of new dwellings that could be built in each municipality, based on the presence or not of a rail station and on a range of crucial local services. Hence, it attempted to channel residential increase from municipalities without a station to municipalities hosting a station. But, according to the Italian conformational planning model, these limits are not immediately prescriptive. They become effective only when a municipality decides to review its land use plan. Moreover, neither deadlines nor incentives were defined for this revision. This approach turned out to be partly successful. Six years after PTCP approval, nearly 60% of rail-served municipalities had identified new greenfield residential zones around their stations but, during the same period, the greatest increase in residential buildings was observed in Granarolo. This municipality near Bologna had no rail station because it did not revise its plan and was, therefore, not forced to comply with an upper limit to residential development. Densification was achieved because most of the residential increase occurred during the years preceding 2008, when all municipalities around Bologna recorded a residential boom. If the process had commenced after the global crisis when the real estate market collapsed, the residential channelling mechanism based on these differentiated limits would probably have failed.

#### *4.4. A public-private funding mechanism to enable both transit and TOD to be built or refurbished by linking the transit and the centres it will serve*

Newman (2009) advocates a genuine public-private funding mechanism for TOD in terms of transit-joint development and value capture, where the capital cost of the transport investment is partially recovered by capturing some or all of the increments in land value resultant from the increase in accessibility. Instead, a more traditional division of financing mechanisms was implemented both in Stedenbaan and in Bologna, with the government financing infrastructural development and the private sector financing property development. As Bertolini et al. (2009) say, this division is recurring in European and American examples of TOD, while diverse sets of mechanisms can be recognised in Asian and Australian cases. In this sense, this fourth policy tool seems less important for TOD than the previous three. At the same time, one could question if the difficulties in developing the regional rail service due to delays in national financing in both case studies (see section 4.1) could have been reduced just by a value capture mechanism.

## **5. Concluding remarks**

According to Bertolini et al. (2012), the universal models on which some TOD literature tends to focus should not be accepted uncritically. This paper has discussed the underlying complexity of the notion of TOD as an “emerging European-style planning in the USA”, implying vertical cooperation between state, regional and local government. If it is generally true that, in Europe, TOD projects

are less focused on single station precincts and more on developing a polycentric network of station areas presenting different sizes and functions, at the same time more than one planning style can be identified in Europe. Two case studies were then analysed to underscore how differences in these styles can influence vertical cooperation between local and regional levels, and the benefits of a regional approach to TOD.

Overall, the two cases provide evidence that a regional approach constitutes an important strategic framework to control the overall spatial structure of TOD, particularly in modulating the 3Ds for the station.

The case of Stedenbaan, based on a comprehensive integrated, neo-performative style of planning, confirms the importance of cooperative regional planning as an approach to integrate transport and land use (Pettersson & Frisk, 2016). The dialogue-based process seems to be particularly adequate to both define the overall regional structure of TOD and implement it in detail at the local framework, provided that it constantly focuses on reconfirming the support of stakeholders and the feasibility of activities (Geurs et al., 2012).

As regards the Italian “traditional urbanism” and conformative planning style, the case of Bologna shows that the top-down, hierarchical approach, mainly based on prescriptive recommendations, can be effective in a phase of strong urban growth, when regional planning is mainly supposed to steer new developments. In a downturn phase, this approach can be hampered by institutional barriers, as municipalities are inclined to shirk the responsibility of implementing these recommendations. In this case, the adoption of formal and informal institutional incentives (e.g., financial compensation) can prove useful to lift these barriers (Tan, Janssen-Jansen, & Bertolini, 2014).

Despite the underlying differences in planning styles, both cases indicate that the hardest element in the regional planning process of TOD projects seems to be the enhancement of a timely train service. In Bologna and Stedenbaan this enhancement followed 3D improvements only with significant delay as a consequence of the TOD project’s sponsor failure to involve the institution in charge of train service management (and/or development).

Both within a conformative and a neo-performative style of planning, the main obstacle is again the integration of land use and transport due to institutional barriers that are still deeply rooted in planning processes. From this standpoint, a regional approach to TOD cannot be considered as a sufficient condition for effective land use and transport coordination, especially if all the key actors are not involved in the planning process.

## References

- Albrechts, L., Healey, P., & Kunzmann, K. R. (2003). Strategic spatial planning and regional governance in Europe. *Journal of the American Planning Association*, 69(2), 113-129. <http://doi.org/10.1080/01944360308976301>
- Atelier Zuidvleugel. (2007). Space and line. A spatial survey for Stedenbaan 2010-2020, The South Wing of the Randstad. *Nova*, 11-16.

- Balz, V. E., & Schrijnen, J. (2009). From concept to projects: Stedenbaan, The Netherlands. In C. Curtis, J. L. Renne, & L. Bertolini, *Transit Oriented Development: Making It Happen* (pp. 75-90). Ashgate.
- Balz, V. E., & Zonneveld, W. A. (2015). Regional design in the context of fragmented territorial governance: South Wing Studio. *European Planning Studies*, 23(5), 871-891. <http://dx.doi.org/10.1080/09654313.2014.889662>
- Bertolini, L. (1999). Spatial development patterns and public transport: the application of an analytical model. *The Netherlands. Planning Practice and Research*, 14 (2), 199–210. <http://dx.doi.org/10.1080/02697459915724>
- Bertolini, L., Curtis, C., & Renne, J.L. (2009). TODs for a sustainable future: key principles to “Make TOD happen”. In C. Curtis, J.L. Renne & L. Bertolini (Eds.), *Transit Oriented Development: Making It Happen* (pp. 257-267). Farnham: Ashgate.
- Bertolini, L., Curtis, C., & Renne, J.L. (2012). Station Area projects in Europe and Beyond: Towards Transit Oriented Development? *Built Environment*, 38(1), 31–50. <https://doi.org/10.2148/benv.38.1.31>
- Brès, A. (2014). Train stations in areas of low density and scattered urbanisation: towards a specific form of rail oriented development. *Town Planning Review*, 85(2), 261–272. <https://doi.org/10.3828/tpr.2014.16>
- Calthorpe, P. (1993). *The next American metropolis: Ecology, community, and the American dream*. New York: Princeton architectural press.
- Casabella, N., & Frenay, P. (2009). Regional Planning Choices: Comparing the RER in Brussels (BE) and the Stedenbaan in South-Holland (NL). *The 4th International Conference of the International Forum on Urbanism*, (pp. 973-984).
- Cervero, R. (1995). Satellite New Towns: Stockholm’s rail-served satellites. *Cities*, 12(1), 41–51. [https://doi.org/10.1016/0264-2751\(95\)91864-C](https://doi.org/10.1016/0264-2751(95)91864-C)
- Cervero, R. (2009). Public transport and sustainable urbanism: global lessons. In C. Curtis, J.L. Renne & L. Bertolini (Eds.), *Transit Oriented Development: Making It Happen* (pp. 23-35). Farnham: Ashgate.
- Cervero, R., & Kockelman, K., (1997). Travel demand and the 3ds: Density, Diversity, and Design. *Transportation Research Part D*, 2(3), 199-219. [https://doi.org/10.1016/S1361-9209\(97\)00009-6](https://doi.org/10.1016/S1361-9209(97)00009-6)
- Curtis, C. (2009). Implementing Transit oriented development through regional plans: a case study of Western Australia. In C. Curtis, J.L. Renne & L. Bertolini (Eds.), *Transit Oriented Development: Making It Happen* (pp. 39-47). Farnham: Ashgate.
- Desjardins, X., Maulat, J., & Sykes, O. (2014). Linking rail and urban development: reflections on French and British experience. *Town Planning Review*, 85(2), 143-154. <https://doi.org/10.3828/tpr.2014.9>
- European Commission (1997). The EU compendium of spatial planning systems and policies. Retrieved from: [http://commin.org/upload/Glossaries/European\\_Glossary/EU\\_compendium\\_No\\_28\\_of\\_1997.pdf](http://commin.org/upload/Glossaries/European_Glossary/EU_compendium_No_28_of_1997.pdf)
- Geurs, K., Maat, K., Rietveld, P., & de Visser, G. (2012). Transit Oriented Development in the Randstad South Wing: goals, issues and research. *BUFTOD conference “Building the Urban Future and Transit Oriented Development”*, Paris, April 16-17.
- Hickman, R., & Hall, P. (2008). Moving the city east: explorations into contextual public transport-orientated development. *Planning, Practice & Research*, 23(3), 323-339. <http://dx.doi.org/10.1080/02697450802423583>



- Hull, A. (2009). Implementing Innovative Transport Measures: What Local Authorities in the UK Say About Their Problems and Requirements. *European Journal of Transport and Infrastructure Research*, 9, 202-218.
- Janin Rivolin, U. (2017). Global crisis and the systems of spatial governance and planning: a European comparison. *European Planning Studies*, 25(6), 994-1012. <http://doi.org/10.1080/09654313.2017.1296110>
- Jenks, M., & Dempsey, N. (Eds.). (2005). *Future forms and design for sustainable cities*. Amsterdam: Elsevier.
- Kamruzzaman, M., Baker, D., Washington, S., & Turrell, G. (2014). Advance transit oriented development typology: case study in Brisbane, Australia. *Journal of Transport Geography*, 34, 54–70. <https://doi.org/10.1016/j.jtrangeo.2013.11.002>
- Knowles, R. D. (2012). Transit Oriented Development in Copenhagen, Denmark: from the Finger Plan to Ørestad. *Journal of Transport Geography*, 22, 251–261. <https://doi.org/10.1016/j.jtrangeo.2012.01.009>
- Legacy, C., Curtis, C., & Sturup, S. (2012). Is there a good governance model for the delivery of contemporary transport policy and practice? An examination of Melbourne and Perth. *Transport Policy*, 19, 8-16. <https://doi.org/10.1016/j.tranpol.2011.07.004>
- Leite, T., Leiren, M., Zibell, B., Fürst, D., Löb, S., & Henning, L. (2008). *Integrating Land Use and Transport Planning: Does Regional Governance Matter?* Oslo: The Institute of Transport Economics.
- Lin, J.-J., & Li, C.N. (2008). A grey programming model for regional transit-oriented development planning. *Papers in Regional Science*, 87(1), 119-138. <https://doi.org/10.1111/j.1435-5957.2007.00146.x>
- Maulat, J., & Krauss, A. (2014). Using contrats d'axe to coordinate regional rail transport, stations and urban development: from concept to practice. *Town Planning Review*, 85(2), 287–311. <https://doi.org/10.3828/tpr.2014.18>
- Milakis, D., & Vafeiadis, E. (2014). Adapting the Transit-Oriented Development Model in the Greek Urban and Transport Contexts. *Planning Practice & Research*, 29(5), 471–491. <https://doi.org/10.1080/02697459.2014.893952>
- Nadin, V., & Stead, D. (2008). European spatial planning systems, social models and learning. *disP-The Planning Review*, 44(172), 35-47. <http://dx.doi.org/10.1080/02513625.2008.10557001>
- Newman, P. (2009). Planning for Transit oriented development: strategic principles. In C. Curtis, J.L. Renne & L. Bertolini (Eds.), *Transit Oriented Development: Making It Happen* (pp. 13-22). Farnham: Ashgate.
- Pagliara, F., & Papa, E. (2011). Urban rail systems investments: an analysis of the impacts on property values and residents' location. *Journal of Transport Geography*, 19(2), 200-211. <https://doi.org/10.1016/j.jtrangeo.2010.02.006>
- Pettersson, F., & Frisk, H. (2016). Soft space regional planning as an approach for integrated transport and land use planning in Sweden – challenges and ways forward. *Urban, Planning and Transport Research*, 4(1), 64–82. <https://doi.org/10.1080/21650020.2016.1156020>
- Pojani, D., & Stead, D. (2014). Ideas, interests, and institutions: explaining Dutch transit-oriented development challenges. *Environment and Planning A*, 46, 2401-2418. <https://doi.org/10.1068/a130169p>
- Pojani, D., & Stead, D. (2016). A Critical Deconstruction of the Concept of Transit Oriented Development (TOD). *REAL CORP 2016 Proceedings/Tagungsband*, (pp. 1-5).

- Renne, J.L. (2009). Measuring the success of transit oriented development. In C. Curtis, J.L. Renne & L. Bertolini (Eds.), *Transit Oriented Development: Making It Happen* (pp. 241-255). Farnham: Ashgate.
- Renne, J.L., & Wells, J.S. (2004). Emerging European-style planning in the USA: Transit-oriented development. *World Transport Policy & Practice*, 10(2), 12-24.
- Rietveld, P. & Stough, R. (eds.) (2005). *Barriers to Sustainable Transport: Institutions, Regulations and Sustainability*. London: Spon Press.
- Santacroce, C. (2008). Rigenerazione urbana e sviluppo del sistema delle infrastrutture di secondo livello: la stazione come porta della "Città della Ferrovia". *Relazione presentata al forum Constructa 2008*, Venezia, 6-8 novembre.
- Spaans, M., & Stead, D. (2013). *ESPON TANGO: Territorial Approaches for new governance: Annex 3 – Case study: Integration between public transport and urban development in the metropolitan region of Rotterdam-The Hague*. Retrieved from [http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/TANGO/Case\\_Study\\_3\\_Southern\\_Randstad.pdf](http://www.espon.eu/export/sites/default/Documents/Projects/AppliedResearch/TANGO/Case_Study_3_Southern_Randstad.pdf)
- Staricco, L. (2015). Metropolitan railway systems and Transit oriented development in Italian provincial coordination territorial plans. *CSE-City Safety Energy*, (2), 33-45.
- Switzer, A., Janssen-Jansen, L., & Bertolini, L. (2013). Inter-actor trust in the planning process: The case of transit-oriented development. *European Planning Studies*, 21(8), 1153-1175. <http://dx.doi.org/10.1080/09654313.2012.722940>
- Tan, W., & Bertolini, L. (2010). Barriers to Transit Oriented Developments in the Netherlands: A luxury problem? *24th AESOP Annual Conference, Space is Luxury*, (pp. 1-28). Helsinki.
- Tan, W., Bertolini, L., & Janssen-Jansen, L. (2014). Identifying and conceptualising context-specific barriers to transit-oriented development strategies: the case of the Netherlands. *Town Planning Review*, 85(5), 639–663. <https://doi.org/10.3828/tpr.2014.38>
- Tan, W., Janssen-Jansen, L. B., & Bertolini, L. (2014). The Role of Incentives in Implementing Successful Transit-Oriented Development Strategies. *Urban Policy and Research*, 32(1), 33–51. <https://doi.org/10.1080/08111146.2013.832668>
- te Brommelstroet, M. (2010). Equip the warrior instead of manning the equipment: land use and transport planning support in the Netherlands. *Journal of transport and land use*, 3(1), 25-41. <https://doi.org/10.5198/jtlu.v3i1.99>
- te Brommelstroet, M., & Bertolini, L. (2010). Integrating land use and transport knowledge in strategy-making. *Transportation*, 37, 85-104. <https://doi.org/10.3828/tpr.2015.32>
- Thomas, R., & Bertolini, L. (2014). Beyond the case study dilemma in urban planning: using a meta-matrix to distil critical success factors in transit-oriented development. *Urban Policy and Research*, 32(2), 219-237. <http://dx.doi.org/10.1080/08111146.2014.882256>
- Thomas, R., & Bertolini, L. (2017). Defining critical success factors in TOD implementation using rough set analysis.. *Journal of transport and land use*, 10(1), 139-154. <http://dx.doi.org/10.5198/jtlu.2015.513>

- Tremblay Racicot, F., & Mercier, J. (2014). Integrating transportation and land use planning at the metropolitan level in North America: multilevel governance in Toronto and Chicago. *Urbe. Revista Brasileira de Gestão Urbana*, 6(2), 184-200. <http://dx.doi.org/10.7213/urbe.06.002.SE04>
- van Lierop, D., Maat, K., & El-Geneidy, A. (2017). Talking TOD: Learning about Transit-Oriented Development in the United States, Canada, and the Netherlands. *Journal of Urbanism*, 10(1), 49-62. <http://dx.doi.org/10.1080/17549175.2016.1192558>
- Zonneveld, W., & Ortuño Padilla, A. (2012). TOD implementation possibilities in Alicante province and Murcia Region (Spain) according to Stedenbaan experience (The Netherlands). Paper presented at the Conference Building the urban future and Transit Oriented Development 2012 (BUFTOD), Paris.