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Developing transit-oriented corridors: Insights from Tokyo

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ABSTRACT

Various studies have pointed out that a successful integration of public transport and land use requires plans covering the entire metropolitan region that are consistent over a long period of time. The proposition that is explored in this article is that railway corridors can offer an effective spatial and institutional focus for this. For this purpose, a real-world case in Tokyo, where a corridor-based approach is central to the coordination of public transport and land-use developments, was examined. The analysis combines and links spatial and institutional dimensions. Three criteria are employed in the spatial analysis: corridor transport characteristics, land-use densities, and land-use mix. On the institutional side, the role the local government and the private railway sector play in developing railway corridors in Tokyo is discussed. The exploration seems to support the proposition that the railway corridor can be a convenient spatial and institutional unit in which to integrate transport and land-use developments. However, translation to other metropolitan areas of elements of the Tokyo approach would have to adequately acknowledge contextual differences.

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In many countries around the world, cities are looking for ways to promote the integration of public transport and urban development or “transit-oriented development” (TOD) (Cervero 1998; Curtis, Renne, & Bertolini, 2009; Dittmar & Ohland, 2004; Dunphy et al., 2005). Often, however, these integration attempts are limited to a particular station site, instead of being based on a comprehensive strategy encompassing the whole urban region and public transportation network. Various studies (e.g., Bertolini, 2007; Cervero, 1998; Curtis, Renne, & Bertolini, 2009; Dittmar & Ohland, 2004; Filion & McSpurren, 2007) have pointed out that a successful integration of public transport and land use requires plans covering the entire metropolitan region that are consistent over a long period of time.

The proposition that will be explored in this article is that railway corridors can offer an effective focus for this. We define a railway corridor as a railway line operating on an urban regional level and including the land surrounding the stations along it. There are various reasons why railway corridors can be an effective focus for the integration of public transport and land-use developments (Bertolini & Rietveld, 2008). First, within a railway corridor, origin locations (i.e., residential areas) and destination locations (i.e., working, retail, and leisure areas) can be developed in a coherent way. This enables the design of spatial strategies addressing the whole set of activity and mobility patterns of specific target groups. Second, a focus on railway corridors allows for a coordination of plans between different station areas. In this way destructive competition between station areas can be avoided and instead synergies between them can be promoted. Third, a focus on railway

corridors makes it possible to utilize public transport in a more efficient way most notably by helping identify developments that can generate off-peak travel or bidirectional traffic flows. Finally and importantly, railway corridors seem to offer a workable compromise between the need to address the whole spectrum of transport land-use interactions sketched above and the need to harmonize the actions of a heterogeneous array of stakeholders. This is a key governance dilemma recognized by both metropolitan planning literature in general (Healey, 2007; Neuman, 2007; Salet & Thornley, 2007) and TOD literature in particular (Curtis, Renne, & Bertolini, 2009; Filion & McSpurren, 2007). An alternative focus on individual station areas would—as already mentioned—not do justice to the need for transport land-use integration, but a focus on the whole network and region would arguably make it disproportionately difficult to cope with the need for actor coordination.

The exploration will be guided by four questions:

1. How can a focus on railway corridors allow for station areas to be planned and developed in a coherent way?
2. How can a focus on railway corridors help seek synergies between station areas, or in other words, how can it be useful for preventing competition between station areas?
3. How can a focus on railway corridors help find ways to generate off-peak travel and bidirectional traffic flows?
4. Finally, through which governance mechanisms can a corridor strategy emerge?

We do not aim to find final answers to these questions. Rather, we will use them to structure the exploration of a

real-world case where a corridor-based approach is central to the coordination of public transport and land-use developments at the urban regional level. The aim of this exploration is to start understanding how this can happen in practice.

With the above questions in mind, a railway corridor in Tokyo has been analyzed. Tokyo has been chosen because it is one of the most transit-oriented metropolitan areas in the world. Of course Tokyo is not unique; there are other cities in the world that use railways to guide their urban development (see, e.g., Bertolini & Spit, 1998; Cervero, 1998; Curtis, Renne, & Bertolini, 2009). However, the difference is that in Tokyo this approach has been consistently applied for a long time—since the late 1920s. Therefore, the development stage that Tokyo is currently in is much further than other cities in the world in this respect. In Tokyo, development strategies focused on railway corridors provide the foundations of the integration of land use and transport (Chorus, 2012). We thus expect that the analysis will deliver a useful benchmark for other urban regions aiming to attain a comparable degree of transit-oriented development but as yet much further away from achieving it.

1. Analyzing railway corridors

In this article the transport and land-use development dynamics within a railway corridor are analyzed. A strong relationship between transport and land use is acknowledged in a wide body of literature (see, among others, Meyer & Miller, 2001; Muller, 2004; Wegener & Fürst, 1999). By affecting the accessibility of locations, transport may shape favorable conditions for new land uses, while at the same time land uses will co-determine travel behavior and thus demand for transport services. In particular, the underlying relationships between transport and land use are further explored with a focus on station areas. The node-place model of Bertolini (1999) has served as a starting point for this. According to this model, each station area consists of a node and a place value. The node value represents the transport services available in a certain location, while the place value represents the intensity and diversity of activities in a certain location. It is assumed that there is a balance between the node and place functions, and where this is not the case, the stations will show a strong tendency to move toward a more balanced state. With the help of the node-place model, the position of a station in the urban and regional railway network can be identified as well as its development potential. In Tokyo, the node-place model has been used to explore the development dynamics of individual station areas (Chorus & Bertolini, 2011). Accordingly, these dynamics are further explored here within a railway corridor.

Three criteria are employed in this corridor analysis: transport characteristics, densities, and land-use mix. Transport characteristics address the impacts transportation can have on land use, while density and land-use mix address the impacts land use can have on transportation. Transport characteristics are operationalized by looking at travel time and distance to the nearest subcenter, passenger numbers, and the number and type of services offered at a station. These transport factors are generally considered important for positively influencing property values (Debrezion, Pels, & Rietveld, 2011; Pagliara & Papa,

2011; Pan, 2013; Yan, Delmelle, & Duncan, 2012). Land-use factors such as density and land use mix, on the other hand, are generally considered to have a positive effect on public transport usage (Cervero, 1996; Cervero & Kockelman, 1997; Gutiérrez, Cardozo, & Garcia-Palomares, 2011; Kitamura, Mokhtarian, & Laidet, 1997; Loo, Chen, & Chan, 2010; Sohn & Shim, 2010; Sung & Oh, 2011).

Transport characteristics were analyzed by using a Japanese train route finder website (travel time and distance), the Annual Urban Railway Statistics (passenger numbers), and the websites of the private railway companies (number and type of services offered at a station). Densities were derived from land-use zoning maps available on the websites of the local governments. The density levels assigned to the areas directly bordering a station were used, as these areas are considered to receive the highest impact on property values. Land-use mix was analyzed by looking at the distribution of workers over four economic clusters: (1) services and administration; (2) retail, hotel, and catering; (3) industry and distribution; and (4) education, health, and culture. In addition, the number of residents is included in this analysis. In both cases the number of workers and population is determined within a walkable radius of 700 m around the station, following similar approaches in the literature (Bertolini, 1999; Reusser et al., 2008).

Before discussing the results of the corridor analysis, some background is presented about the role the local government and the private railway operator play in developing railway corridors in Japan. This provides essential material for the exploration of our fourth question (the governance mechanisms). It also provides a rationale for more precisely and concretely defining what terms such as *coherent planning* (as mentioned in the first question), or *synergies between station areas* (as in the second question) mean. Finally, it is crucial information when assessing the relevance of the insights for other cities and regions.

2. Key actors involved in the development of railway corridors in Tokyo

Typically, two actors are involved in the development of railway corridors in Tokyo. They are the local governments and the private railway operators. Local governments in Japan are two-tiered, consisting of prefectures serving wider areas and municipalities serving local areas. In particular, the prefecture—in Tokyo called the Tokyo Metropolitan Government (TMG)—plays an important role in the development of railway corridors. The role of the TMG mainly concerns conditioning and facilitating land-use developments. It has several instruments at its disposal to do this (Chorus, 2012). Basically these instruments can be divided into two categories: planning instruments and financial instruments. Both instruments are used in conjunction with each other. Relevant planning instruments are the building volume controls, in particular the Floor Area Ratio (FAR). In general, station areas in Tokyo are given higher FAR-values than their urban surroundings (see Figure 1). By deliberately targeting higher-density development at station areas, the TMG seeks to encourage private sector development there. In addition, several provisions exist that allow for a relaxation of the existing FAR-values. Furthermore, the TMG seeks

Figure 1. Floor area ratio map of central Tokyo. Source: A copy of this map was personally received from the Tokyo Metropolitan Government.

to encourage the development of different functional programs around stations by using tax breaks such as a temporary exemption of the real estate tax to attract specific companies to a station area. In this way it hopes to contribute to the development of subcenters and regional centers that complement rather than compete with each other. Thus, besides deliberately targeting higher-density development, functional differentiation is also consciously promoted by the TMG.

In general, the planning of railway corridors is not done by local governments, but by each private railway company individually or in cooperation with other private developers. Local governments do not draft urban plans, but rather confine themselves to providing the conditions to which a development should comply. Instead, such plans are made by the private railway actors themselves. In other words, private railway operators enjoy a rather prominent position in planning. Railway services in railway corridors in Tokyo are usually the monopolistic domain of a private railway operator. Furthermore, they usually also control feeder bus services to stations in the corridor, and can thus provide integrated, door-to-door transport services in their catchment areas. Private railway operators usually also own considerable amounts of land along their railway tracks. They can utilize this land for constructing houses, universities, offices, shops, theme parks, and so on. The locations

of these functions are consciously planned. For example, theme parks are usually planned at the end of a railway line because this not only generates more fare revenues (ticket prices are based on the distance traveled), but also off-peak and bidirectional traffic flows (i.e., people traveling after rush-hour and away from the city center). Another example is universities. Private railway operators are keen on having universities along their railway lines because it stimulates off-peak travel. Usually, universities are planned away from city centers to also generate bidirectional traffic flows. Some railway operators go very far in attracting universities by sometimes giving the land away for free (Cervero, 1998).

Private railway actors are the most important and most characteristic actors in developing railway services and station areas in Tokyo. As such, an understanding of their operations is essential to understand the context of transport land-use integration in Tokyo. Their activities are, on the one hand, geographically confined to one or few railway corridors, and on the other hand, highly diversified, stretching both the transport and the land-use domain. They have greatly diversified their businesses during the last decades. Besides being active in the transportation segment, such as the operation of trains, buses, taxis, and in some cases cargo, private railway companies have become increasingly engaged in nontransportation activities,

such as retail, real estate, leisure (e.g., cinemas, resorts, and golf courses), hotels, and other services (e.g., car rental, cable television, travel agencies, and Internet). There are basically three reasons for private railway operators to engage in nontransportation businesses. The first and foremost reason is that such activities generate stable ridership (Shoji, 2001). For example, Tokyu Corporation has generated passengers by building offices, department stores, and residences along its railway lines. Such activities have generated both commuter traffic (offices and residences) and noncommuter traffic (amenities and residences). At present, 60% of the daily number of passengers carried consist of commuters and 40% of noncommuters (Tokyu Corporation, 2013). Generating a stable ridership became especially important after 1906 when the Railway Nationalization Act went into effect. Under this law, private railway operators were no longer allowed to use or build new lines that could interfere with government-operated lines in the urban center. As a result, private railway operators were compelled to serve sparsely populated areas. The limited customer base, together with national government policies requiring private railway operators to be self-supportive, basically forced companies to generate a steady ridership through business diversification. A second reason for private railway companies to engage in side businesses was to pursue additional revenue sources for expanding their profit margins (Mizutani, 1994). Although the regulated fare system provided railway companies with minimum profits, it offered limited room for business growth. As such, business diversification could be seen as a rational and understandable corporate choice. A third and final reason for engaging in nontransportation businesses is the fact that railway companies were granted indefinite concessions by the ministry, which enabled them to develop long-term integral development strategies for their railway territories.

The three core business areas of the major private railway companies are transportation (railway, bus, and taxi operations), retail (department and chain store operations, CATV) and real estate (management, sale, and lease of real estate, including residences, offices, and other). Although accounting regulations prescribe that cross-subsidization between these activities is not allowed, there are strong interdependencies. Private railway operators have managed to achieve viable business growth through successfully exploiting these interdependencies. An important reason for this success is that private railway operators have been developing their transport, retail, and real estate activities in such a way that they have reinforced each other's profitability. In other words, they have generated synergy. How this synergy is achieved is illustrated in Figure 2 and discussed below.

Basically, three mutual relationships exist through which synergy can be created (see, e.g., East Japan Railway Company, 2008; Tokyu Corporation, 2008). First, a mutual relationship between transportation and real estate can be identified. Improvements to the transportation network (e.g., building connecting lines, introducing rapid-train services, or increasing train frequencies) can make certain areas more attractive for development, which is reflected by higher property prices and rents. Property developments around station areas increase the number of residents and people working in these areas, and thus the number of passengers using the stations/railway

Figure 2. Synergy as growth strategy. Source: Adapted from Tokyu Corporation (2005).

network. Second, a mutual relationship between transportation and retail exists. Improvements to a railway network may encourage more people to use the train for shopping, leading to a higher number of potential customers and revenues. The development of retail facilities may also generate off-peak travel, thereby making railway operations more efficient. The third and final relationship concerns the one between real estate and retail. The development of retail facilities can contribute to making a station area more attractive, which is reflected by higher property prices and rents. Property development, on the other hand, can contribute to increasing the potential customer base for the shops and can lead to more revenues. These three ways of achieving synergy are the pillars of the integrated approach to railway corridor development of private railway companies, as articulated, for instance, in the “Area Strategy” of Tokyu Corporation (2005, 2008). Figure 3 documents how this strategy translates into operating profits in the different segments of activity of Tokyu, while Figure 4 zooms in on recent examples of property developments and railway improvements in the corridors controlled by Tokyu, and their impacts on passenger numbers.

3. Transport and land-use characteristics of the Toyoko line corridor

In this section, the analysis of the transport and land-use characteristics of the Toyoko line corridor will be presented. The Toyoko line has been chosen as representative of the development of railway corridors in Tokyo. Other corridors document similar patterns (Chorus, 2012). The Toyoko line is owned and operated by Tokyu Corporation, one of the major private railway companies operating in the Tokyo metropolitan area. In Tokyo, this company owns and operates seven railway lines with a total length of 99.5 km in the area to the southwest of the subcenter of Shibuya (see Figure 5). The Toyoko line is 24 km long, has 21 stations, and carries in roughly 29 minutes 1.36 million passengers on an average workday between the subcenters of Shibuya and Yokohama. Most of its stations fulfill a local role in the railway network, which is reflected by their fairly small passenger numbers and relatively low intensity and diversity of activities found in the surrounding areas. In this article, the stations that fulfill a regional role in the railway

Figure 3. Operating profit per segment in fiscal year 2009 (million Euros). Source: Tokyu Corporation (2010).

Figure 4. Effects of property developments and railway improvements to passenger numbers. Source: Tokyu Corporation (2012).

Figure 5. The Toyoko line.

network are analyzed. This regional role is defined as having at least one transfer option to another railway or subway line. For the Toyoko line, this is the case for eight stations (see Figure 5).

3.1 Transport characteristics

As was mentioned earlier, the transport characteristics are analyzed by distance and travel time of stations to the nearest subcenter, their passenger numbers, and the number and type of train services offered at each station (see Figure 6). In addition, Figure 7 shows the passenger flows during the morning rush hour. Determining the distance and travel time to the nearest subcenter is more complicated for the Toyoko line because this line actually has two subcenters, Shibuya and Yokohama. Shibuya station has been chosen as a point of reference, because the largest daily passenger flows go in this direction.

3.2 Assigned densities

With the help of the local government websites of Yokohama City, Kawasaki City, and the Tokyo Metropolitan Government, the designated FAR-values for the areas directly bordering the stations were found. In Figure 8, these values are related to the position each station has in the railway corridor. Important to note is that the designated FAR-values in most cases closely match the actual pattern of densities in Japan, as can be seen by a comparison between Figure 8 and Figure 9.

As the figure clearly shows, density levels differ considerably within a railway corridor. The highest densities are assigned to the subcenters, which in the case of the Toyoko line are Shibuya and Yokohama station. The intermediate stations show a relatively low and similar density level. However, interestingly, there are also some in-between stations that clearly stand out in comparison to their neighboring stations, such as Jiyugaoka

	Shibuya	Naka Meguro	Jiyugaoka	Den en Chofu	Tamagawa	Musashi Kosugi	Kikuna	Yokohama
D	0.0km	2.2 km	7.0 km	8.2 km	9.0 km	10.8 km	18.8 km	24.2 km
T	(0 min.)	(4 min.)	(9 min.)	(11 min.)	(13 min.)	(15 min.)	(23 min.)	(29 min.)
P	286	51	82	24	10	57	104	136
NS	8	2	2	2	2	3	2	9
TS	R	R	R	L	L	R	R	R

Figure 6. Transport characteristics. D = distance, T = travel time, P = passenger numbers $\times$ 1000 (people getting on and off the train), NS = number of train service, and TS = type of train service (R = rapid express, L = local express).

Figure 7. Passenger flows on the Toyoko line during rush hour (7:50 a.m.–8:50 a.m.). The data were calculated on 26 July 2010. *Source:* The data were personally retrieved from Tokyu Corporation in 2010.

and Musashi Kosugi station. These stations are considered important subregional centers for decentralizing businesses and commercial facilities outside the CBD of Tokyo (Jiyugaoka), and outside the center of Kawasaki (Musashi Kosugi) (Tokyo Metropolitan Government, 2002). In addition to their subcenter status, the FAR of Jiyugaoka and Musashi-Kosugi can also be seen as a means to increase reverse transportation flows (i.e., away from Shibuya and Yokohama station) and consequently achieve a more efficient train operation.

3.3 Land-use mix

Based on a GIS (Geographical Information Systems) computation, the numbers of employees and residents within a walkable radius of 700 m of the selected stations have been calculated (see Figure 9).

Figure 9 shows that within a railway corridor, different functional profiles can be distinguished. The urban subcenters situated at the beginning and/or end of the line (Shibuya and Yokohama) are dominated by offices and retail. In between these subcenters a variety of functional profiles can be found. Interestingly, the most multifunctional stations tend to be located somewhere in the middle of the line, such as Jiyugaoka and Musashi Kosugi on the Toyoko line. First and foremost this is caused by the business strategy pursued by Tokyu Corporation (Tokyu Corporation, 2008). The core of its growth strategy focuses on creating synergies between its transport, real estate, and retail departments, as discussed in the previous section. By placing activities (e.g., shopping malls, universities, hospitals, and offices) somewhere in between the line, bidirectional and off-peak travel can be promoted (see Figure 4 and Figure 7). Consequently, a more efficient railway operation can

be realized. In addition, such activities can lead to more customers and consequently increased sales. And last but not least, the development of attractive facilities will have a positive influence on the surroundings of a station, illustrated by the increased land and rent prices. Furthermore, the government can also help in attracting certain functions to a station area or in stimulating the development of certain stations by, for example, offering tax incentives to companies or using planning incentives. The latter was the case in the Musashi Kosugi station, where private developers were offered considerable bonuses for investing in public facilities, and thus increased its attractiveness as an alternative center to congested Kawasaki.

3.4 Patterns of relationships

A number of distinct station area types can be identified based on the relationships between the transport and land-use characteristics described above. At the two ends of the line are the station areas with the highest level of service, passenger numbers, and densities, and with a land-use mix overwhelmingly focusing on office and retail. These are quintessential trip destinations. In between are station areas with lower levels of service, passenger numbers, and densities, and with a land-use mix much more oriented toward residential uses. Having trip destinations at both ends of the line contributes to the bidirectional flows documented in Figure 7. In addition, the significant presence of retail in the two subcenters helps generate off-peak travel. Stations in between have a more trip-origin function (and even more markedly so for the local stations not analyzed here). However, some of them—Jiyugaoka and Musashi Kosugi—are also being deliberately developed as subcenters, as discussed earlier and documented in Figure 9. In this way, private railway companies seek to achieve more balance in passenger flows, and local governments to provide alternatives for congested centers.

4. Discussion

In this section, as a way of wrapping up the argument, the four questions pinpointed in the introduction will be used to structure a discussion of the corridor governance and land-use analysis.

4.1 How can a focus on railway corridors allow for station areas to be planned and developed in a coherent way?

Major private railway companies in Tokyo make an area strategy for their railway lines, similarly to that of the Tokyu Corporation for the Tokyu line analyzed in the previous pages. This

Figure 8. Assigned densities and their position in the railway corridor (%). Displayed in the above figure is the Floor Area Ratio (FAR) which stands for the ratio between the gross floor area and the area of the plot of land.

Figure 9. Distribution of employees and residents per station.

strategy has enabled a hierarchical development pattern to occur along railway corridors, with the highest peaks (i.e., highest assigned densities) to be found at the beginning and end of a line and some additional high peaks (relatively high peaks) to be found at selected locations in between a line. In addition, this has also contributed to a diversified functional pattern to be found along a railway line, with relatively monofunctional stations found at the beginning and end of a line, and stations with more diversified functions found in the middle of a line. Local governments exert some further influence on the development patterns of a railway corridor because they have the authority to assign the density levels and have the means (e.g., tax incentives) to attract certain functions to stations. Consequently, it seems fair to conclude that (sub)regional planning strategies such as the area strategies have, at least to some extent, allowed for a corridor to be planned in a coherent way.

4.2 How can a focus on a railway corridor help seek synergies between station areas, or in other words, how can it be useful for preventing competition between them?

Generating synergy between transport, real estate, and retail stands at the core of the business strategies pursued by major private railway companies in Tokyo (see Figures 2, 3, and 4, and the underlying discussion). In line with the area strategy, the location and type of new businesses and services is carefully planned along a railway line. This is done to attract more passengers during off-peak hours, to generate bidirectional traffic flows, to increase the number of customers, and consequently to increase the number of sales. Eventually, these new businesses and services are expected to make stations areas more attractive, resulting in an increase in land and rent prices. The development patterns analyzed within the Toyoko line have

illustrated that there are several types of centers to be found along a railway line, ranging from metropolitan to regional subcenters. These do not have the same functional patterns. Within the station areas of metropolitan subcenters such as Shibuya and Yokohama, office and retail functions tend to dominate, while in the regional subcenters, other functions such as residences are represented. Although there are multiple regional subcenters found along a railway line, differentiation and individualization between them is encouraged. This is a strategy found in other railway corridors as well. For example, Tokyu Corporation has made a Retail Refinement Plan, in which stations in all its corridors are categorized into five retail types serving a particular market and focusing on specific facilities. Consequently, it seems fair to conclude that stations along railway corridors are planned to complement one another and competition is prevented by means of the diversity in functional profiles and catchment areas.

4.3 How can a focus on railway corridors help find ways of generating off-peak travel and bidirectional traffic flows?

The case documents two ways of generating off-peak travel and bidirectional traffic flows. First are the locations of destinations at both ends of the line. In the case of the Toyoko line, these are the metropolitan subcenters of Shibuya and Yokohama. The concentration of retail ensures that there is also off-peak travel. Not all railway corridors in Tokyo connect two subcenters, as in the case of the Toyoko line. However, also in these cases, destinations are created at the end of the line, for instance by means of the location of leisure functions (e.g., golf course, theme park), to achieve the same objective. Besides practical reasons (there is hardly space to develop leisure functions within the built-up urban area), such functions are able to

generate considerable off-peak travel and bidirectional (i.e., away from the urban subcenter) traffic flows. A second way to generate off-peak travel and bidirectional traffic flows is to develop regional subcenters in between the line. For example, Tokyu Corporation has been very successful in drawing universities to its station areas. Universities are usually not located at a subcenter, but instead somewhere in between the line to generate bidirectional traffic flows. In addition, a function such as a university is able to stimulate off-peak travel. The passenger numbers documented in Figures 4 and 6 and the passenger flows documented in Figure 7 seem to indicate that, besides the subcenters at the beginning and end of a line, there are also centers somewhere in the middle of a line that are able to attract considerable numbers of passengers. Consequently, it seems fair to conclude that by carefully planning functions along a railway line, transport operations can be made more efficient.

4.4 Through which governance mechanisms can a corridor strategy emerge?

In the case of Toyoko line, as in most railway corridors in Tokyo, the private railway company is the main force in shaping the integration of transport and land-use developments. Private railway companies have a rather prominent role in the planning of station areas. They draw up urban plans by themselves or in conjunction with other private actors and are also actively involved in initiating real estate and retail activities in or near their station premises. The local government has a facilitating and conditioning role in the planning and development of station areas, by setting maximum development densities, coupling additional development rights to the contribution of public amenities, giving tax breaks to attract specific companies to a station area, etc. An essential feature in this governance configuration is that it builds in powerful incentives for acknowledging interdependencies and achieving synergy (in the sense represented in Figure 2) between the development of different locations and transport services. In the end, it is not the viability of each component but that of the whole that counts for the actors involved.

5. Conclusion

The analysis of the governance mechanisms and transport and land-use characteristics of the Toyoko line and reference to similar patterns in other railway corridors in Tokyo seem to support the proposition that the railway corridor can be a convenient spatial unit in which to integrate public transport and land-use development that goes beyond what can be achieved by focusing on a single location. The case shows that a focus on railway corridors can allow for station areas to be planned and developed in a coherent way, can help seek synergies and prevent competition between station areas, and can help find ways of generating off-peak travel and bidirectional traffic flows. Admittedly, our findings cannot be seen as hard proof of these achievements. However, the fact that a viable business model has been developed along these lines is a concrete indication that in economic terms, synergy between transportation, real estate, and retail can be achieved within the geographical scope of a railway corridor. In addition, passenger

flows (see Figure 7) and resident and worker concentrations (see Figure 9) document how a focus on railway corridor has helped local governments achieve some of their decentralization objectives. Future research should make these findings more substantial.

A different issue is that of the generalizability of the findings to other contexts. Tokyo is characterized by a rather unique governance context as is illustrated by the dominant position of the private railway sector in developing station areas, the indefinite railway concessions, the full integration between infrastructure management and transport services, an extensive railway network, and high overall land-use densities. In addition, in Tokyo, the railways are the dominant transportation mode. The car is expensive because of high parking fees, a toll that needs to be paid on expressways, and the relatively low commuting allowances in comparison to public transport. Besides, travel speeds during rush hour are only 14 km/hour. The train, on the other hand, is punctual, frequent (every 2–3 minutes during rush hour and every 5 minutes during off-peak hours) and the travel costs are, in many cases, fully covered by the company. This makes it difficult, if not impossible, to directly apply the insights to other contexts. Despite these contextual differences, we think that something can be learned from Tokyo. In particular, for metropolitan areas that have the ambition to develop in a more transit-oriented way, the Tokyo case can serve as a benchmark. It can help to stimulate and structure the debate around the ways in which this can be achieved. For instance, in the Netherlands, insights into the achievements and workings of the Tokyo model have been used as a way to trigger and structure a discussion about integrated transport and land-use strategies in the Randstad, the highly urbanized west of the country. This was done in two steps. Step one concerned a series of focus groups and focus-group interviews in which the approach for developing station areas in Tokyo was used as a benchmark against which to assess ambitions and strategies in a number of Dutch case studies. Step two concerned a series of individual interviews with actors involved in the development of station areas in the Randstad in which the findings generated from the focus groups and focus-group interviews were further explored on their applicability in light of the differences in contexts. This gave insight into the elements of the Tokyo approach that could be considered for application to station area developments in the Randstad. These elements included the coordination of functional programs between station areas as a means to prevent competition between them, regulation of land-use densities as a way to focus developments on station areas, incentives for triggering private-sector investments, more focused land-use regulations, and the prominent role of regional governments in coordinating functional programs at the subregional level (Chorus, 2012).

For the actual implementation of these lessons, it is important that the organizations involved obtain a deeper understanding of their potential. Also, within the organizations these lessons should trickle down the hierarchy in order to receive wider support. That this could lead to concrete results is illustrated by the Dutch railway sector, which after twenty years of exchange with its Japanese counterpart is now increasingly

implementing measures inspired by these exchanges (see van de Velde, 2011).

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