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A REVIEW OF AN OPTIMAL PUBLIC TRANSPORT SERVICE NETWORK IN THE RANDSTAD AREA: IS THE RANDSTAD AREA IN CONTROL?

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ABSTRACT

The general belief in the Netherlands is that the public transport in the western urbanized part of the Netherlands (the Randstad area) with the main cities of Amsterdam, Rotterdam, The Hague and Utrecht can perform (much) better. The central research question of the article is: How does the optimal public transport service network in the Randstad area look like and how can actors use their responsibilities to contribute? The answer to the first part of the research question is 'we don not know yet'. There is no clear picture of current infrastructure networks in the Randstad area and of the desired or actual quality levels of public transport in the area. The most important issues that are under control of the respective actors and can be improved in the short term are: coherence in spatial planning and investments in public transport infrastructure, public transport service coherence in the Randstad area, the quality of public transport services, and concessions. The most important issues that are not under control of the respective actors are: reliable relationships with private businesses in combined developments of public transport infrastructure and offices, and the national public rail transport services. The involved actors might focus on the respective issues they are able to (partly) control and see what their contribution could be for a PTSN for the Randstad area. For the longer term, an integrated picture of the current and 2050 public transport infrastructure network for the Randstad area, an integrated picture of the current and 2050 public transport services for the Randstad area and clarity about the degree of control of the different involved public actors and the role of the public transport authorities is needed. Overall, change the focus from problems to control issues and then start working on solutions for the short and longer term.

1. INTRODUCTION

The Dutch government wants to improve the competitive position of the Randstad area (the central economic region in the Netherlands with the main cities Amsterdam, Rotterdam, The Hague and Utrecht) as compared to other European economic regions. The Randstad area is under increasing pressure of environmental regulations, accessibility problems, and competition from other European regions. In order to cope with these challenges, several Dutch ministries have together developed the Randstad Urgent program (Ministerie van Verkeer en Waterstaat, 2007b). In this program, 50 projects have been selected to improve the accessibility, environment, and competitive position, leading to a more sustainable and competitive Randstad area. For sustainability, several projects have been selected to reduce CO₂ emissions and fine dust exhaust. In several other projects, policy is tested to realise a modal shift to public transport combined with reduced car usage. The public transport in the Randstad area can perform (much) better, but public transport is not able to offer sufficient quality and extra capacity. This is often claimed to have led to a worse performance on accessibility of the Randstad area as compared to other economic regions in Europe. On the other hand, the other European regions do experience comparable problems in their accessibility. Back in 1990, it was already concluded that there was not much cooperation between the different main cities in the Randstad area. Current cooperation between the involved actors does not lead to the desired quality improvement in public transport. There is a need for more coherence between the different passenger public transport modes (rail, bus, tram, metro, and light rail). The cities and provinces that form the Randstad area have concluded that the problems that exist in public transport must be solved in a coordinated way in order to deliver the best product to the customer for the lowest possible price. Given these backgrounds, the central research question is: *How does the optimal public transport service network in the Randstad area look like and how can actors use their responsibilities to contribute?* Section two will describe the Randstad area in more detail, the public transport infrastructure, and the public transport services. Section three deals with infrastructure and public transport theory and derives the model that is used to analyse the public transport infrastructure and services of the Randstad area. Section four contains the analysis of the different infrastructure and service models for the Randstad area. Section five ends with conclusions.

2 Public transport in the Randstad area: network infrastructure and services

The Randstad area encompasses the economic most important regions of the Netherlands. Included are the city regions of Amsterdam, Den Haag, Rotterdam, and Utrecht. Furthermore, the provinces of North- and South Holland, Utrecht, and Flevoland are included. For the public transport service network (PTSN), the focus is on national and regional rail, bus, tram, light rail and metro transport. International rail connections, airports, and taxis are excluded.

2.1 Public transport infrastructure

Public *Rail transport infrastructure* is owned by the Dutch state and maintained by the Dutch infrastructure provider ProRail. The majority of rail services in the Randstad area is provided by the former Dutch national railway company NS. The rail infrastructure connects the main cities of the Randstad area (see Figure 1). In the figure, ‘international’ stations (red) and ‘national’ stations (green) are depicted.

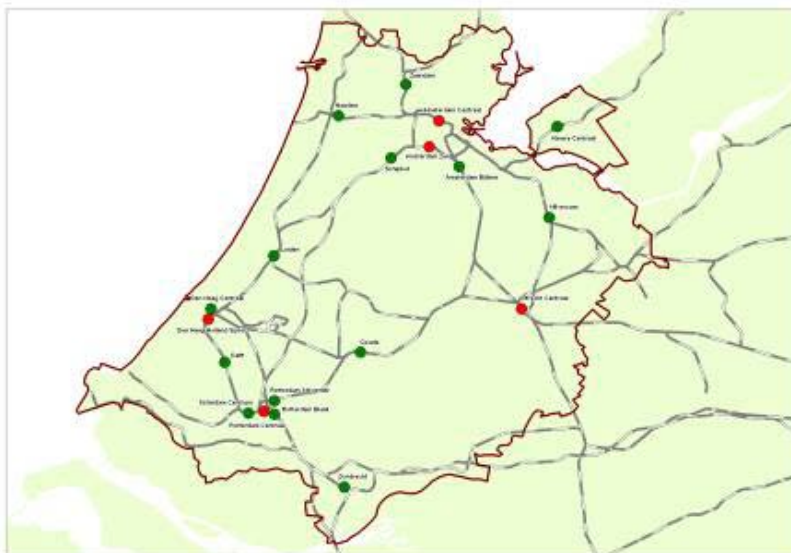


Figure 1. Rail infrastructure in the Randstad area

Source: Rob Koning, Stadsregio Amsterdam, 2008.

Public *bus transport infrastructure* is in principle no ‘separate’ infrastructure category. Most buses use public highways and provincial and municipal roads in order to provide the bus services. It can be observed at several places (e.g. Zuidtangent) that separate

dedicated bus infrastructure is developed. Also on motorways buses are allowed to use the hard shoulder when congestion arises in order to stimulate the reliability of bus transport. Public *Metro/tram infrastructure* is located in the largest cities of the Randstad area. Current networks are maintained and small extensions are introduced now and then. A major ongoing project is the Noord-Zuid lijn in Amsterdam in order to improve the metro infrastructure. When ready, this new metro infrastructure will result in changes in tram services. Investments in network extensions (new connections and extra capacity) are needed in order to increase the capacity and also quality of public transport in the Randstad area. In general, financial means for investments in public rail infrastructure are limited in the Netherlands. Especially ‘cross-border’ connections (between different public transport authorities) could be improved both in terms of infrastructure and services. Part of the solutions has been expected from the combination of investments in infrastructure with investments in stations and offices close to stations. So far, these expected effects have not materialised as expected. The public transport infrastructure maps in the Randstad area show that each public transport authority (rail, bus, tram, metro) has its own picture of its own public transport infrastructure.

2.2 Public transport services in the Randstad area

The characteristics of public transport services possess many elements. There exist differences per mode, per city in the Randstad area, and per actor involved. In the end, many characteristics can be traced back to quality aspects of public transport services. An important quality aspect in public transport services in the Randstad area has been accessibility (see Table 1):

Table 1. Accessibility differences in the Randstad area

The Southern part of the Randstad area	
Area	door-to-door or average speeds
Centre The Hague and Rotterdam	Travel time twice as much as maximum speed allowed for public transport. Important locations outside the Southern part of the Randstad: 45 minutes by public transport
Knowledge centres	1 city centre accessible within 30 minutes. 2 nd city centre within 45 minutes and Schiphol within 60 minutes
Work- and living locations	From work locations minimum 2/3 of large living locations accessible in 45 minutes by public transport. From work locations all large living locations accessible in 60 minutes

The Northern part of the Randstad area		
Distance	Type of travel	Maximum acceptable travel time
5-10 km	City	20-25 minutes public transport
10-30 km	City/regional	45 minutes public transport
30-50 km	Regional	60 minutes public transport
> 50 km	Above regional	60 km/h public transport
The Eastern part of the Randstad area (Utrecht)		
Authority	Indicator	Norm
BRU	Frequency and speed	None
Utrecht Province	Frequency (Route) speed	1-15/hour 25-40 km/h
Utrecht municipality	(route) speed Travel time O-D	18-23 km/h (peak) 20-25 (off-peak hours) 15-45 minutes
Amersfoort municipality	(Route) speed Travel time	Bus rapid transit >24 km/h 6-8 minutes (selected routes)
Nota Mobiliteit	Punctuality	89-91%

* Accessibility characteristics refer to peak-hour situations

Source: adapted from Berenschot, 2006

In the Randstad area, the interregional public transport mainly takes place through train. The bus is taken for local and regional trips. A major part of the public transport services takes place within 40 kilometres. This suggests that a major part of public transport is within the city regions and not on Randstad area level.

2.3 Finance and control of public transport in the Randstad area

The finance and control of public transport in the Randstad area is not organised through one public transport authority, but takes place on different levels (see Table 2). In the area, nine PTAs and eight public transport companies operate.

Table 2. Finance and control of public transport in the Randstad area

Transport mode	Infrastructure investment	Public transport purchase	Public transport quality
Rail	Dutch state invests in rail	Dutch state buys / in some cases PTA*/Province	Contract with NS / Connexion/Veolia/Arriva
Bus	Dutch state invests in roads	Public transport authority buys	Contract with concession holder
Metro	City plus Dutch state	PTA region buys	Contract with GVB, RET, GVU, HTM
Tram	City plus Dutch state	PTA region buys	Contract with GVB, RET, GVU, HTM
Light rail	City/Province plus Dutch state	Public transport authority buys	Contract with concession holder

* PTA = Public Transport Authority

Sources: Ministerie van Verkeer en Waterstaat, 2004; Ministerie van Verkeer en Waterstaat, 2007a; Ministerie van Verkeer en Waterstaat, 2007b.

For *public transport rail services* the current situation in the Randstad area is clear. The Dutch national government is the concession holder and the NS (Dutch Railways) delivers the public rail transport services. Regional public transport authorities do not have any jurisdictions for public rail transport in the Randstad area. The connection between public rail transport and regional and city public transport is safeguarded through regular meetings requested by law. For *bus, tram, and metro* transport services, the current eight public transport authorities do possess the concessions for public transport in their respective areas. In the four cities of the Randstad area, public transport provision is done by the respective city transport company (GVB, RET, HTM, GVU). The concession is handed over to them under strict conditions. Other concessions for public transport are competed for in ‘open’ competitions. The main source of income for the regional transport authorities is the BDU (See Table 3).

Table 3. Overview of financial flows BDU 2008 (million Euros)

	Total BDU	Exploitation public transport	Infrastructure	Other BDU budget
National	1.832	-	-	-
Province Noord- Holland	67	50	15	2
Province Zuid-Holland	91,5	86,6	3,3	1,6
Province Utrecht	38,3	24,8	14,2	0,9
Province Flevoland	32,9	30,8	1,5	0,6
City region Amsterdam	410,0	320,6	74,4	8,6
City region Rotterdam	291,3	283,8	2,5	5,0
Region Haaglanden	218,4	212,5	2,1	3,8
Region Utrecht	86	66,8	8,3	10,1

About 90% of the BDU funds are used to pay for concessions for public transport.

Source: Ministry of Transport, 2008.

In the Randstad area, the exploitation of public transport services (in monetary terms) consists of mainly two modes: rail and bus. Also metro and tram form part of public rail transport, but their financial importance is limited to the largest cities in the Randstad area. *Rail*: The ministry of Transport, Public Works and Water Management is the holder of the concession for public rail passenger transport in the Netherlands. Certain regional connections do not form part of the Dutch national concession (e.g. Friesland and Groningen with Noordned and Overijssel with Syntus), but most of these concessions are outside the Randstad area. *Bus*: The Randstad area consists of approximately 25 concessions for public bus transport (see Figure 2). The Dutch law BDU (Wet Brede Doeluitkering verkeer en vervoer) aims for an integration of national (mainly rail) and regional (mainly bus) public transport.



Figure 2. Public bus transport concessions in the Randstad area

Source: drawn by Rob Koning, Stadsregio Amsterdam, 2008.

Annually, approximately 1.5 billion euro is available for provinces and city regions. Provinces and city regions are free to spend the budget on car or public transport projects (except Dutch national railway related). The budget is divided among the participants based on inhabitants, inhabitants/square meter, total area and growth numbers (Ministerie van Verkeer en Waterstaat, 2004). The majority of the (limited) financial means are used by the PTA to buy public transport services from the public transport companies.

3 Public transport service network: in control?

For the PTSN in the Randstad area, it is about interaction between infrastructure, services, and the degree of control over these issues.

3.1 Public transport infrastructure

Investments in infrastructure have a number of specific, economic characteristics (ECMT, 1990, Wiegmans, et al., 2002): the expected economic life span is very long, from 20 years up to more than a century. For this reason, also the pay-back time is long (15 up to 30 years); the construction period can be characterised by high investment

amounts which causes directly high interest expenditure and write-offs; the variable costs tend to be low in comparison with the fixed costs. In such cases, pricing strategies according to the marginal costing principle (which is economically optimal) will not produce sufficient output on the invested money. In general, this means that investments in infrastructure are unattractive to private parties; the construction period lasts long (2-7 years depending on the scale of the project); there are many procedures before the real construction starts; the investment is irreversible the moment the project has started (halting the project would lead to high costs and alternative application is frequently not possible); and each investment in infrastructure is unique. In general, private parties will not invest in public transport (infrastructure) without relevant guarantees from the governmental organisation involved, that would entitle them to certain regular financial income resulting from the investment concerned. Public organisations do hesitate because they will be committed to a private party and will lose their independent position. So far, the public private cooperation has not been very successful in public transport. The investments in public transport infrastructure are the responsibility of the Ministry of Transport, Public Works and Water Management (See Table 4 for an overview of projects).

Table 4. Rijksniveau: MIRT: Randstad area related infrastructure investment projects

Project name	Budget (millions)	Period
Planned projects:		
High frequent rail transport	3.089	2013-pm
Amsterdam Zuidas: station	93	2010-pm
Amsterdam Zuidas WTC/4-sporig + keerspooren	321	2010-pm
OV Schiphol-Amsterdam-Almere-Lelystad	1.350	2009-pm
Executed projects:		
BB21	158	Different
Problem solving Baarn and Hilversum	64	Different
HSA Claim	38	Pm
Extension Amsterdam-Utrecht	985	2006/07
Small stations	77	Different
Amsterdam - Utrecht - Maastricht/Heerlen	1.040	2005 e.v.
Amsterdam CS	77	2004/07/13
Den Haag Centraal	105	2008/11
Den Haag emplacement	10	2006
Den Haag CS: terugbouwen sporen	23	2012
Fietsenstalling Amsterdam CS	33	2008/12
Rotterdam Centraal	251	2011/12
OV-terminal stationsgebied Utrecht	321	2009/13
Regionet (inclusief verkeersmaatregelen Schiphol)	179	Different
Rijswijk - Schiedam incl. spoorcorridor Delft	392	2013
Extra perroncapaciteit Amsterdam Zuid (2e	33	2006

Source: based on <http://www.mirtprojectenboek.nl/mirt/2008/documenten/tabellen.pdf>

3.2 Public transport services

Most urban regions in Australia and the United States must cope with an inherent dependence on cars, and a reluctance of individuals to switch to public transport (Murray, 2001). Also the Randstad area is dependent on cars, although to a relatively lesser extent than the US and Australia, also most individuals are reluctant to switch to public transport. Probably it is not only reluctance of individuals, but also the insufficient public transport service quality offered by public transport. Barriers to public transport growth are capacity, network transfers, perceptions, and investment/subsidy needs. For public transport to become more competitive with road transport, a wider choice of modes, and also comfortable, convenient, reliable, flexible, and attractive travel is needed. Research by (Murray, 2001) proved that improvements in public transport would require: 1) more effective price structures. On average, the estimated effects of integrated tariff systems on patronage are 2 percent in the short-run and 12 percent in the long-run (Abrate et al., 2009); 2) enhanced travel comfort; 3) suitability and convenience of service quality; 4) reductions in travel time efficiency; and, 5) increased service access. These might be among the issues for the Randstad area to concentrate on in order to improve the public transport.

In the Netherlands, three quality levels are distinguished for the future *rail transport services* in the Randstad area (Ministerie van Verkeer en Waterstaat, 2007a): 1) BASIC (4 inter city trains and 4 sprinter trains/hour on the 2012 infrastructure); 2) BETTER (4 inter city trains and 4 sprinter trains/hour including extra infrastructure to enable a 15 minute interval train schedule); and, 3) MORE (6 inter city trains and 6 sprinter trains/hour including extra infrastructure to enable a 10 minute interval train schedule). The most important *bus services* quality attributes are fares, frequencies, and in-vehicle time (Currie and Wallis 2008). A more extensive research by (Eboli and Mazzulla, 2008) revealed that in addition to these three 'core' attributes also: walking distance to the bus stop, reliability, bus stop facilities, bus crowding, cleanliness, information, and transit personnel attitude are important bus service quality attributes. The largest bus service usage growth levels follow from increases in service levels, and from bus rapid transit and bus priority systems targeting improved reliability. In general, for public transport to be competitive with car transport, the travel time must be competitive. This

always links to the number of stops, the more stops, the better the accessibility but the lower the speed and thus the longer the travel time.

3.3 Finance and control of public transport in the Randstad area

For public transport in the Netherlands, the central government (and sometimes provinces) aims to be the owner of infrastructure, but the supply of the public transport services is contracted to market parties. In general, the governments do not aspire to be supplier of public transport services. In the public transport contracts, governments aim to regulate service standards for public transport services. Policymakers can define public transport policy goals, the policy goals can be met (e.g. accessibility) but still public transport usage can be low. This makes the organisation of public transport in the Randstad area a complex phenomenon. Many actors are involved, responsibilities are often shared and/or unclear. This is further complicated through the issue that policy not only covers improvements of the public modes, but also enhancement of all intermediate and end-point facilities, such as linkways, customer service, and service information (Ibrahim, 2003). Many discussions focus on the organisation of public transport, while the most important challenges in public transport in the Randstad area are to define a sufficient Randstad area network, determine the financial needs, define the desired quality level for public transport in the Randstad area, and its organisation. Therefore, the challenge is to focus on the basics of the organisation and exploitation of public transport in the Randstad area. The basics deal with control issues (political, financial, and organisational) in public transport infrastructure and service. In the end, efficient cooperation of these 'control issues' must lead to the desired goal of growth of public transport usage in the Randstad area. Factors that influence the growth of public transport can be separated into directly under the influence of those involved in providing public transport services, and those which are not (Currie and Rose, 2008). This provides a nice distinction in the differences that exist in the organisation and exploitation of public transport in the Randstad area and forms important input for the framework. The resulting framework has been build around the three core themes: 1) infrastructure; 2) public transport services ; and, 3) control in public transport. The distinction between 'under control' and 'not under control' nicely separates between aspects under control of actors involved in providing public transport infrastructure

and/or services and aspects not under control of those involved actors. For a complete overview of the resulting model see Table 5.

Table 5. Public transport control over infrastructure and services

	Infrastructure	Service quality
Under control		
- National government		
- Province		
- City region		
- Transport company		
Not under control		
- National government		
- Province		
- City region		
- Transport company		

Source: drawn by the author and based on Currie and Rose (2008).

4 Analysis of control of public transport infrastructure and services

4.1 Public transport infrastructure (not) under control

Many reports, papers and articles have been written about the problems with public transport in the Randstad area (Berenschot, 2008; Raad voor Verkeer en Waterstaat, 2007; Ruimtelijk Planbureau, 2008; Stichting vrienden van de Deltametropool, 2005). In this paper, the focus is on responsibilities on involved actors and what they could do in order to contribute to an optimal PTSN in the Randstad area. The study of Berenschot (2008) is taken as the input for the analysis of problem areas. The problem areas are grouped together in ‘control issues’ and ‘improvements’ for a better PTSN are suggested. Factors that influence the growth of public transport in the Randstad area can be separated into directly under the influence of those involved in providing public transport services, and those which are not (Currie and Rose, 2008). In table 6, the control of the different actors over public transport infrastructure is depicted.

Table 6. Control over public transport infrastructure

	Infrastructure
Under control	
- National government	1 coherence between spatial planning and public transport (content and process) 1 integrated planning when developing public transport terminals 1 connection between spatial planning and public transport 2 infrastructure connections between different regions 2 connection between national and regional rail transport 2 investments in public rail/metro transport infrastructure 3 number of public rail/metro transport terminals 4 planning procedures
- Province	1 integrated planning when developing public transport terminals 1 spatial potential of public transport terminals 1 connection between spatial planning and public transport 2 connection between national and regional rail transport 5 number of public bus transport terminals
- Stadsregio	1 integrated planning when developing public transport terminals 1 spatial potential of public transport terminals 1 connection between spatial planning and public transport 2 connection between national and regional rail transport 5 number of public bus/tram/metro transport terminals
- Transport company	6 purchase of transport means
Not under control	
- National government	1 operations of developing- and building companies 1 participation of private businesses in public-private partnerships 1 synergy between public transport investments and office developments
- Province	1 operations of developing- and building companies 1 synergy between public transport investments and office developments 2 impact on national public rail transport infrastructure
- City region	1 operations of developing- and building companies 1 synergy between public transport investments and office developments 2 impact on national public rail transport infrastructure
- Transport company	-

Source: adapted from Berenschot, 2008.

Different issues in public transport infrastructure are under (shared) control of the different actors: 1) link between spatial planning and public transport; 2) infrastructure links between different levels and regions; 3) public rail/metro transport terminals; 4) infrastructure planning procedures; 5) number of public bus/tram/metro transport terminals; and, 6) purchase of transport means.

The link between spatial planning and public transport is under the (shared) control of the national government, province and/or city region. This first control issue consists of the spatial potential those public transport terminals possess, the synergy between investments in public transport and office buildings, and the coherence between spatial planning and public transport (content and process). A more coherent development of transport links, terminals, and offices (both in content and process) will contribute to the optimal PTSN in the Randstad area. The infrastructure links between different levels and regions is under the (shared) control of the national government, province and/or city region. The national government is responsible for the national rail transport, the provinces and city regions are responsible for the regional bus/tram/metro transport. This second control issue consists of infrastructure links between regions, services

between different concession areas, and the link between national and regional transport. Better timed investments in inter-regional links, more and better inter-regional public transport services and rail transport with a 'Randstad' focus will contribute to the optimal PTSN in the Randstad area. A good balance between available financial means and ambitions for public transport in the Randstad area will contribute to this goal. The number of rail/metro terminals is mainly under the control of the national government because the government provides the finance for investments in large infrastructural projects of national importance. This third control issue consists of the number of terminals. The number of terminals is too limited and leads to low quality change-over and long pre- and post trip travel times. Within the financial limits, this could be improved by adding extra 'simple' public transport terminals (e.g. Amsterdam-Oost, Almere-strand). The infrastructure planning procedures are mainly under the control of the national government. But also provinces and city regions are able to control part of the planning process. This fourth control issue consists of length of the planning process and the national mobility policy. The planning procedures could be improved by shortening the process without harming the quality of it. Furthermore, a balanced and stable national policy contributes to the optimal PTSN in the Randstad area. The number of public bus/tram/metro transport terminals is under the control of provinces and city regions. This fifth control issue solely consists of the number of terminals. The number is regarded by the different actors as insufficient. The number could be improved by either increase the financial means or by reducing the costs of public transport terminals. This contributes to the optimal PTSN in the Randstad area. The purchase of transport means is in principle under the control of the transport operator but also provinces and city regions can influence it through the concession requirements. This sixth control issue solely consists of the material costs of relatively low purchase quantities of transport means. This could be improved by implementing one concession area for the Randstad area. This contributes to the optimal PTSN in the Randstad area.

Different issues in public transport infrastructure are not under (shared) control of the different actors: 1) operations of developing- and building companies; and, 2) impact on national public rail transport infrastructure. The operations of developing- and building companies is not under the control of one of the public actors. This first control issue consists of the operations of the private developing and building companies, synergy

between public transport investments and office developments, and public private partnerships. The public actors will not be able to bring this issue under control, what they are able to do is to act as reliable partners for the private businesses. A task that is already very challenging to them and if successful might contribute to the optimal PTSN in the Randstad area. The national public rail transport infrastructure is not under the control of province and/or city region. This second control issue deals with the desire of the provinces and city regions to be able to influence regional rail transport infrastructure investments more directly. Rail transport investments with a Randstad area focus will contribute to the optimal PTSN in the Randstad area.

4.2 Public transport service quality (not) under control

In table 7, the control of the different actors over public transport services is depicted.

Table 7. Control over public transport services

	Service quality
Under control	
- National government	1 connection between national public rail transport and regional public transport 1 the public transport coherence in the Randstad area 2 service connections between different regions 3 quality of public transport 3 development of new concepts and connections 3 chain mobility 3 travel information 3 marketing of public transport 3 one public transport system (entrance regimes, discounts, seamless service) 4 concession holder of NS 4 concession competition for public transport in Randstad cities 4 number of concession holders 5 decentralisation of public transport responsibilities
- Province	1 connection between national public rail transport and regional public transport 1 the public transport coherence in the Randstad area 2 service connections between different regions 3 quality of public transport 3 development of new concepts and connections 3 chain mobility 3 marketing of public transport 4 concession holder of provincial bus transport
- City region	1 connection between national rail transport and regional public transport 1 the public transport coherence in the Randstad area 2 service connections between different regions 3 quality of public transport 3 development of new concepts and connections 3 chain mobility 3 marketing of public transport 4 concession holder of city bus/tram/metro transport
- Transport company	3 quality of public transport 3 development of new concepts and connections 3 chain mobility 3 travel information 3 marketing of public transport
Not under control	
- National government	-
- Province	1 national public rail transport services
- Stadsregio	1 national public rail transport services
- Transport company	2 concession competition in Randstad cities

Source: adapted from Berenschot, 2008.

Different issues in public transport service are under (shared) control of the different actors: 1) public transport service coherence in the Randstad area; 2) public transport service connections between different regions; 3) the quality of public transport services; 4) concessions in the Randstad area; and, 5) decentralisation of public transport responsibilities. The public transport service coherence in the Randstad area is under the (shared) control of the national government, province and/or city region. This first control issue consists of the connection between the national rail transport and regional public transport, and the public transport coherence in the Randstad area. Connections between national rail services and regional public transport services could be improved and also a vision for public transport in the Randstad area could help to contribute to the optimal PTSN in the Randstad area. The public transport service connections between different regions (concession areas) is under the (shared) control of the national government, province and/or city region. The national government is responsible for the decentralisation that has taken place in public transport. Provinces and city regions are responsible for their respective concession areas for regional bus/tram/metro transport. Coherent concession holder ship will contribute to the optimal PTSN in the Randstad area. The quality of public transport is jointly under control of the national government, provinces, city regions, and the transport companies. This third control issue consists of development of new concepts and connections, chain mobility, travel information, marketing of public transport, one public transport system (entrance regimes, discounts, seamless service), and travel information. Better quality of public transport on the majority of these items contributes to the optimal PTSN in the Randstad area. The concessions in the Randstad area are under the control of the national government, provinces and city regions. This fourth control issue consists of concession holder of NS, concession competition for public transport in Randstad cities, number of concession holders, concession holder of provincial bus transport, concession holder of city bus/tram/metro transport. More coherence in the concession requirements in terms of quality, better connection of the national rail concession within the regional public transport concessions, and competition for the concessions in the large Randstad cities will contribute to the optimal PTSN in the Randstad area. The decentralisation of public transport responsibilities is under the control of the national government. In an optimal PTSN, the responsibilities are decentralised to the Randstad area in order to contribute to good quality infrastructure network and services on the right level.

Different issues in public transport services are not under (shared) control of the different actors: 1) national public rail transport services; and, 2) concession competition in Randstad cities. The national public rail transport services are not under the control of the provinces and city regions. This first control issue consists of the wish of these public authorities to influence the national rail transport services and enable a better connection with regional public transport. It could also be the other way around, the provinces and city regions are able to influence concessions in their respective areas in order to better connect with national rail transport. More coherent services in the Randstad area will contribute to the optimal PTSN in the Randstad area. The concession competition in Randstad cities is not under the control of the transport companies. Their influence on the process is limited, but so far, the largest cities in the Randstad have 'given' the concession to the local transport company. Introducing competition for concessions in the main cities of the Randstad area might contribute to the optimal PTSN in the Randstad area.

4.3 Conclusions on public transport issues (not) under control

Different issues in public transport infrastructure are under (shared) control of the different actors: 1) link between spatial planning and public transport; 2) infrastructure links between different levels and regions; 3) public rail/metro transport terminals; 4) infrastructure planning procedures; 5) number of public bus/tram/metro transport terminals; and, 6) purchase of transport means. Within the degree of control of the different actors, they should aim for improving coherence in spatial planning and investments in public transport infrastructure. By shortening the process without reducing the quality of the process it might bring the goal of an optimal PTSN faster within reach. Missing inter-regional infrastructure connections and public transport terminals must be identified. An integrated vision and corresponding financial means must be attributed to the Randstad area in order to realise the vision. In the end, it is important that public transport infrastructure ambitions are in line with the available financial means. Different issues in public transport infrastructure are not under (shared) control of the different actors: 1) operations of developing- and building companies; and, 2) impact on national public rail transport services. Especially, reliable relationships with private businesses in combined developments of public transport infrastructure and offices are very important. If public entities are able to increase their

reliability towards private businesses this will contribute to more successful public transport projects and thus to an optimal PTSN in the Randstad area.

Different issues in public transport service are under (shared) control of the different actors: 1) public transport service coherence in the Randstad area; 2) public transport service connections between different regions; 3) the quality of public transport services; 4) concessions in the Randstad area; and, 5) decentralisation of public transport responsibilities. Improved coherence in concession tendering, execution, and holder ship will contribute to the optimal PTSN in the Randstad area. Another subject of main importance that needs improvement is the quality of public transport in the Randstad area. First, current quality levels in the area as a whole must be measured. Next, quality aspects for improvements can be identified and implemented. Different issues in public transport services are not under (shared) control of the different actors: 1) national public rail transport services; and, 2) concession competition in Randstad cities. One single public transport authority for the Randstad area as a whole will safeguard the interests of the Randstad area and enable good quality public transport services contributing to the optimal PTSN for the Randstad area. In Table 8, the main control issues are depicted.

Table 8. Public transport control over infrastructure and services

	Infrastructure	Service quality
Under control		
- National government	1 link between spatial planning and public transport 2 infrastructure links between different levels and regions 3 public rail/metro transport terminals 4 infrastructure planning procedures	1 public transport service coherence in the Randstad area 2 public transport service connections between different regions 3 the quality of public transport services* 4 concessions in the Randstad area 5 decentralisation of public transport responsibilities; and
- Province	1,2, 5 number of public bus/tram/metro transport terminals	1-4
- City region	1,2 5 number of public bus/tram/metro transport terminals	1-4
- Transport company	6 purchase of transport means	3
Not under control		
- National government	1 operations of developing- and building companies	
- Province	1, 2 impact on national public rail transport infrastructure	1 national public rail transport services
- City region	1, 2 impact on national public rail transport infrastructure	1 national public rail transport services
- Transport company		2 concession competition in Randstad cities

Sources: Berenschot, 2008;

* Public transport service quality includes: service access, customer service, information, comfort, convenience, reliability, flexibility, attractiveness, perceptions, walking distance to the station/bus stop, frequency, railway station/bus stop facilities, train/bus crowding (capacity), cleanliness, safety, transit personnel attitude, route structure and scheduling, feeder services, fare integration, well-timed transfers, unitickets, terminal parking facilities, and in-vehicle time.

* The framework can be further specified for rail, bus, tram, metro, and/or light-rail.

5. Conclusions

In this article, public transport infrastructure and services in the Randstad area and their respective 'control' have been analysed. The central research question was: 'How does the optimal PTSN in the Randstad area look like and how can actors use their responsibilities to contribute?' The answer to the first part of the research question is 'we don't know yet'. There is no clear picture of current infrastructure networks in the Randstad area and of the desired or actual quality levels of public transport in the area. The most important issues that are under control of the respective actors and can be improved in the short term are: coherence in spatial planning and investments in public transport infrastructure, public transport service coherence in the Randstad area, the quality of public transport services, and concessions. The most important issues that are not under control of the respective actors are: reliable relationships with private businesses in combined developments of public transport infrastructure and offices, and the national public rail transport services. The involved actors might focus on the respective issues they are able to (partly) control and see what their contribution could be for a PTSN for the Randstad area.

For the longer term, an integrated picture of the current and 2050 public transport infrastructure network for the Randstad area, an integrated picture of the current and 2050 public transport services for the Randstad area and clarity about the degree of control of the different involved public actors and the role of the public transport authorities is needed. In terms of infrastructure networks, missing infrastructure links and public transport terminals must be identified for all public transport modes in the Randstad area. Gaps in infrastructure networks should be identified on Randstad, city, and regional levels. An integrated vision and corresponding financial means must be identified. Investments should be made by the Dutch state in order to improve the capacity of the public transport infrastructure networks, if needed and consistent with the developed long term vision for public transport in the Randstad area. In the end, it is important that public transport infrastructure ambitions are in line with the available financial means. In terms of public transport services in the Randstad area, coherence, quality, and concessions should be key drivers when preparing the integrated picture of the current and 2050 public transport services for the Randstad area. Current and desired levels of quality must be researched on Randstad level in order to determine

what changes might be needed. One single public transport authority for the Randstad area as a whole might safeguard the interests of the Randstad area and enable good quality public transport services contributing to the optimal PTSN for the Randstad area. Overall, change the focus from problems to control issues and then start working on solutions for the short and longer term. In the short term, we can improve the identified infrastructure and service issues, but in the long term we need visions and financial means for additional infrastructure and services in the Randstad area.

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