Railway stations and a geography of networks

Wouter-Jan Oosten

Paper presented at the 6th Annual Congress of the Netherlands Research School for Transport, Infrastructure and Logistics. The Congress took place at The Hague, December 12th 2000. This paper was published in the TRAIL Proceedings series (Delft: TRAIL Research School, October 30th 2000).

Contents

Abstract

Starting from their observation that in our society matters of spatial planning and of traffic and transport have become intertwined, and from their assessment that improvements can be made in the management of processes aimed at spatial investments, TRAIL and TNO Inro have formulated the Ph.D.-project *Strategy and project in the organization of planning and decision-making*. From the analysis of both strategic and operational spatial investment projects, conclusions are to be drawn which lead to a model for the smooth interaction of actors involved in spatial planning processes.

Within the broader context of the above mentioned Ph.D.-project the Dutch situation presents the introduction of the high-speed train, and the government program of 'Nieuwe Sleutelprojecten'. Here questions accumulate concerning the vitality of the urban fabric, rail transport innovation, and real estate development. The required process management tackling these spatial investments is in need of a framework from which its governance instruments can be implemented.

The paper will focus on the redevelopment of railway station areas from the perspective of a geography of networks. Three questions structure this exploit.
1. What concepts are useful for the study of both space and human interaction?
2. How do actors therein involved construct a strategy concerning the redevelopment of a railway station area?
3. How may management meet the diverging stakeholder demands concerning spatial investments?

1. Introduction

Within the TRAIL research and development program Transport Policy Analysis research has been laid out to analyse policy processes regarding spatial planning and traffic and transport, with the intention to formulate guidelines for the complex planning practice in situations of intertwinement. In this paper some theoretical concepts are tried which promise to be useful to this end.

1.1. Understanding railway station area redevelopment

The San Francisco Bay Area Rapid Transport (BART) in the United States, and the double railway station and real estate development of Euralille in France, are probably the best known examples where urban fabric, rail transport innovation, and development feature on the scene. The introduction of the high-speed train (HST) in the Netherlands, as with Lille, gives cause to redevelop several railway station areas. This paper will concentrate on those redevelopments, that at Rotterdam in particular.

Following research on investments in infrastructure and regional development, Robert Guild (2000, 282) merely concludes that an investment should correspond to the existing situation. 'Three lessons can therefore be drawn for the planning process. First, before infrastructure can have a positive impact on output, there needs to be a sufficient level of productive activity to take advantage of the complementary relationship. Second, no amount of investment in core infrastructure is capable of overcoming disadvantaged locations. Third, because the relationship between investment and growth is interdependent, development pressure (such as congestion) may be efficient investment triggers.' David Banister and Nathaniel Lichfield (1995, 15), having studied the matter from several sides, state that: 'The precise relationships between transport investment and urban development are not well known, even theoretically. There seems to be no single methodology available to test the relationships, the counterfactual situation is difficult to determine and the question of causality not addressed. Decisions have been based more on faith than understanding.' Kenneth Button (1995, 241) specifies: 'Our general understanding of the exact link between transport and economic development is far from complete and is even less precise when it comes to considering the roles of specific pieces of infrastructure such as major terminals or interchanges.' To this Peter Hall (1995, 81, 85) adds: 'The new high-speed rail systems present an additional complication here, since they are relatively new in Europe and their impacts are by no means yet clear. […] Since future developments around high-speed stations involve both a new technology and public-private partnership, any forecasting exercise is likely to approach the limits of the possible.' So it seems that approaches centering on economy and transport lack instruments to measure, calculate and predict development. If there even exists a rationality to be taken by such instruments (Edwards 1995). An approach centering on exactly the decisions mentioned, those taken on basis of faith or understanding, requires a different kind of methodology. From a study on planning and decision-making processes of human interaction, and the discourses therein, concepts may rise that not only describe acts and dress them with meaning, but also points from

which more traditional science can unfold its methodology. The developed concepts can then be put to empirical use.

1.2. Research questions

This paper will focus on the redevelopment of railway station areas from the perspective of a geography of networks. Three questions structure this exploit.
1. What concepts are useful for the study of both space and human interaction?
2. How do actors therein involved construct a strategy concerning the redevelopment of a railway station area?
3. How may management meet the diverging stakeholder demands concerning spatial investments?

The actors mentioned are railway companies and other transport providers, tiers of government, real estate owners and developers, and pressure groups such as consumers' organizations, neighbourhood committees, and environmental groups. In the processes set up by these actors individual citizens may get involved. All these actors are stakeholders in a redevelopment project, whoever initializes an investment. Those actors who take up and finance a project are its shareholders. The process of railway station area redevelopment is managed by its shareholders, or at least they will try to control the project.

In the second paragraph concepts will be presented for the description and understanding of railway station area redevelopment. In conclusion spatial and transport networks are taken into the framework that is to be used. The third paragraph follows the development of government towards governance as network steering. Governance networks are then also taken into the framework.

The construction of a strategy for the redevelopment of a railway station area, or perhaps diverging strategies, is described in the case study of Rotterdam Centraal in the fourth paragraph.

2. Spatial and transport networks

Processes of human interaction with regard to space are increasingly difficult to characterize within a framework of understanding which predates late modernity. Railway infrastructure investments touch upon a nineteenth century transport mode within twentyfirst century society. The professional fields of architecture, urban planning, and landscape not only concentrate on an increasing geographical scale, these disciplines aim at an increasing time-scale as well. Therefor concepts are sought which are useful for the understanding of both space and human interaction: 'In plaats van zich te baseren op traditioneler definities van ruimte zouden architecten en projectontwikkelaars zich in de toekomst dan ook kunnen richten op de locatie van knooppunten in het web van de nieuwe transport- en communicatiesystemen.' (Jodidio 1997, 59).

The notion of networks in any framework of understanding recognizes that with the huge increase in use of appliances, starting in the United States early in the twentieth century, society has become dependent on electricity, water, and gas networks. Surpassing even these physical networks our internet society will probably think and act within networks. In their comparative study of redevelopment of railway station areas, Luca Bertolini and Tejo Spit (1998, 10-13) focus on the concepts of node and place. There are two connotations to nodes, and, with that, networks. They consider the railway station as a node of transportation networks, the first connotation. Whether the second connotation, the railway station as a node of socio-economic networks, holds true, is hypothetical according to the authors. They warn that with a transport node the socio-economic potential is not necessarily realized. Bertolini and Spit (1998, 13) come to define a place as 'all the built and open spaces, together with the activities they host, contained within the perimeter designed by a "walkable radius" centred on the railway station building, as amended to take account of case-specific phsysical-psychological, functional-historical and development features.' These authors indicate that several attempts have been made to construct an integrated typology of railway station areas. 'However, a central problem is that approaches tend to be based on either a node or a place perspective, and rarely account for process and institutional variables. […] an integrated framework of analysis would have to comprise both node and place variables, but also process and context factors. In order to complete such a framework, the latter two factors must be understood.' (Bertolini and Spit 1998, 46, 48). An alternative or addition to node and place would be the use of a framework featuring accessibility and service. Anja Zweedijk and Zerline Serlie (1998) have indeed constructed a node-place model for railway station areas. They compare one railway station to another, as a result of which their railway stations remain phenomenon isolated from their actual environment. Zweedijk and Serlie operationalize the concept of a node with accessibility; this accessibility is no more than the local experience of the transport network. Concluding, their node-place model can be best used to describe the position of railway station areas within the hierarchy of the spatial and transport networks.

Node and place or accessibility and service, process, context, and institutions are concepts mentioned here. Three sets of variables, that is context variables like societal changes and institutional arrangements, process variables like organizations or actors and their aims and actions, and object variables like the node and place dimensions, are spread throughout spatial, transport, and governance networks. Spatial networks consist of the earth itself, of man-made landscape, the urban fabric, in all: the laid-down pattern of human activity within the universe. Transport networks consist of the flashes and streams of the pattern of human activity, the movement of people, goods, and information. Transport networks feed the places within spatial networks, or they withhold nourishment. The stocking and rerouting within networks show hierarchies. Along the lines of networks processes of reorientation, shifts and relocations might be more prominent within he overall dynamics than actually generating new activities. Disagreement between the French railway company SNCF, and the cities and regions in France, about the stops of the TGV, may illustrate that the notion of hierarchy is crucial within the concept of networks.

3. Governance networks

In our complex society there exist interdependencies of government layers, business and other societal actors. The almost permanent need for another actor's resources, such as money, knowledge, and political support, forces all public and private actors to adjust, cooperate, and to allow some coordination. Decentralization and the subsidiarity principle with the government tiers, and ever new public-private partnerships can be seen as the almost tactyle fabric of governance networks.

The 1996 European Union Directorate General XI report *European Sustainable Cities* formulates a holistic view of urban problems and an integrated approach to their solution. It mentions five ecosystems management tools: collaboration and partnership, policy integration, market mechanisms, information management, and measuring and monitoring. The report insists on community consultation and participation in a network approach, on a discursive and consensual approach from at the local level. The OECD seminar proceedings *Integrating Transport in the City* (2000, 79) formulates an approach much like it, and even states 'The only acceptable policy in the future will be a consensual policy, accepted by all.' This way transport, environmental policy, urban renewal, and spatial planning are drawn into a public administration of governance and network steering, which seeks to involve all relevant public and private actors in policy processes from an early stage. This public administration hopes to transcend a symbolic call on society which takes place once policy makers have already formulated their plans. Governance has to be brought into practice, though (Kearns and Paddison 2000).

The notion of network steering has within the broader European context not been brought into practice with regard to railway station area redevelopment. At an aggregated level of scale the cooperation related to these spatial investments is limited, certainly when compared to the situation regarding (air)ports. The research on high-speed technology, and location development are matters in which the railway companies might meet oneanother as European organizations. At the international level of scale the European Union transport policy aims at the recognition and further development of a European transport network. Out of fourteen Trans-European Networks (TEN's), there are nine rail links. No HST will be succesful unless it is well connected with a regional network of feeding and follow-up transport. The French TGV, however, originally passed by the region as if it were an airplane (Bertolini and Spit 1998, 34). Stops in the region, realized with the later growth of the TGV network, also eased its implementation since this answered local executives' wishes. For these reasons, main railway stations located in the urban periphery or rural surroundings are not to be preferred. Centrality matters: 'The position of a station location within the emerging urban networks is, as the case studies will show, a crucial ingredient of its property development potential.' (Bertolini and Spit 1998, 39). The Euralille complex, developed in Lille right between London, Brussels and Paris, illustrates this.

However succesful governance as network steering might be, planning processes always include the unexpected, these processes being interaction of human beings who judge and act as individuals within everchanging group constellations. For instance, in the course of the redevelopment process of King's Cross in London, the organized inhabitants of the

railway station area bypassed local government in their approach towards the owner and developers (Newman and Thornley 1996, 140-141). Bertolini and Spit (1998, 84) sum up some efforts to realize internal and external quality in the planning process regarding Euralille: 'To guarantee this cohesion as well as support and acceptance by outside interests, innovative negotiation and communication tools were conceived and applied. These innovations include Japanese-style quality circles, opinion polls among the local population, discussion forums, and public conferences with experts.' Social acceptability of spatial investments (see for instance OECD 2000), or legitimacy rather, is indeed an issue. Some of the tools which can be used to gain understanding, acceptance, and perhaps support, are group-decision-support information systems for meetings of shareholder representatives, and for the further stakeholders public information meetings with participation of the experts commissioned by the investors. By these means governance as network steering can be brought into practice with a specific spatial investment.

4. Redevelopment of railway station areas

The railway station area needs to be demarcated (see for instance Bertolini and Spit 1998, 12-13). The area at which the formal development plan aims can be allowed to guide the study, if the researcher is prepared to supersede this demarcation when there is reason to suspect that the initial approach is too narrow.

4.1. Railway station area redevelopment in general

The interdependent growth of population, wealth, and mobility results in having to increase the capacity of all kinds of infrastructures. More specific forces can be mentioned with regard to railway stations. Bertolini and Spit, in their *Cities on Rails* (1998, 5-7), identify five driving forces behind railway station area redevelopment:
two distinct types of public policy, namely promoting environmentally sustainable transportation and land-use patterns on the one hand, and regenerating local economies by restructuring the urban fabric on the other hand,
positive and negative technological change, or development of the modalities in use such as HST systems and regional networks,
institutional change, or privitization and commercialization,
the property cycle, or development of the real estate market,
internationalization and metropolitanization, in which respect station areas are related to Manuel Castells' space of flows.
The development of railway station areas not only meets requirements or wishes with regard to the transport network and the urban situation. The exploitation of railway infrastructure almost demands additional commercial development, it seems. 'Rail networks are geographically dispersed making it extremely difficult precisely to define and limit the concession area, an ideal prerequisite of concessionaires, which thus know the full extent of their commitment; lenders, too, for rather different reasons prefer the concession to be fully carved out. The most successful rail network developments, accordingly, involve a dedicated end-user, while the most successful rail privitizations, like the most profitable port developments, involve transfer of the associated

infrastructure, rights of way, tracks and stations at below fair market values. In addition, developers will often seek to obtain the right to develop adjacent properties, either in support of the concession or as an independent source of project income.' (Pollio 1999, 205; see also OECD 2000, 52-53). The decline of freight rail transport at some railway station areas turns warehouses redundant. A recent example in the Low Countries is a number of buildings being demolished at Gent Dampoort. This way space is made available for the growth of passenger transport, and new real estate development.

What, then, comes of these railway station (area) redevelopments? The railway infrastructure investments from the introduction of the French TGV onward, went with a new self-esteem and pride. The railway companies had in this regard been injured by the growth of air traffic. The self-awareness is expressed in railway station architecture, where the highlights seemed to belong to an already distant past (Jodidio 1997, 56-61). It may not surprise that the new main railway stations often resemble airports. The present-day main railway stations are true transport hubs, facilitating more transport modalities and a more passengers. The concept of a single terminal answers the integrated perception of the user in stead of the compartmentalized perspective of the transport operators. This railway station is to be the transport optimum for interchange of several (public) transport modalities, merely concentrating on the intercity rail links does not suffice (Overvest 2000). The necessity of nodes within the transport network to realize efficient and effective mobility, must be balanced with the nature of the spatial network when additional development is considered. Not all transport nodes can become bee-hives of activity with shops, offices, and bars. Competition forces to respect specialization and hierarchy within networks. Railway station area redevelopment projects should therefore include market studies which give attention to competing locations.

4.2. Rotterdam Centraal

The Rotterdam main railway station, which dates from the rebuilding after World War II, is too small. In particular the single passage underneath the tracks is too narrow. The square in front of the station positions the streetcar stops in such manner that the streetcars cannot pass very efficiently. And now Randstadrail, which is a new rail link stretching from The Hague southward through the Randstad metropolitan fabric, and not to forget the high-speed train from Amsterdam to Paris are to be added to the Rotterdam hub. Any redesign of course has to take buses, taxis, and parked bicycles into consideration as well. Within the context of the city centre, the railway station is now an isolated island: it divides the Noord neighbourhood from the main city, and anyone new to Rotterdam stepping out of the station will not know where to go from there: there is no explicit link to the streets where shopping and entertainment take place.

The municipality and the railway company Nederlandse Spoorwegen (NS) started the redevelopment process. The NS is therein represented by the real estate division, NS Vastgoed. The thought of redeveloping the area attracted the bank and insurance company Internationale Nederlanden Groep (ING), and the real estate company Amvest. The municipality valued the financial know-how of ING. Important is that ING and

Amvest, in addition to NS and the municipality, own real estate in the area. Rodamco Continental Europe, which was active in Rotterdam already, took over Amvest during the summer of 2000. Because the long term interests are to dominate, the municipality prefers to deal with the existing large real estate owners in the first phases of the process, and not yet with developers. Within national spatial policy the program of the 'Nieuwe Sleutelprojecten' promises financial support for the planning studies regarding the high-speed railway stations and the revitalization of their urban surroundings, and perhaps the hope for full financial state participation. For a project to be adopted by the Nieuwe Sleutelprojecten program, it has to be a public-private partnership. The project of Rotterdam Centraal with the NS, the city of Rotterdam, ING, and Amvest as its partners, was granted the status of Nieuw Sleutelproject by national government.

With the Rotterdam Centraal project the attention will of course be drawn to financing the entire operation. National government refused to become a full partner in the redevelopment alliance, and so the amount of money made available within the Nieuwe Sleutelprojecten program is limited. However, the Ministry of Transport and Public Works formulated a policy program to diminish Randstad congestion. This program, Bereikbaarheidsoffensief Randstad (BOR), was presented duing the summer of 2000. A tunnel in the centre of Rotterdam for the new Randstadrail receives additional financing from this BOR program.

The traffic effects of the redevelopment present another challenge. The attention is drawn to a proposed large number of new parking lots within the railway station area, three or even five thousand, and a fly-in for car traffic from outside the city centre. It is understandable that the success of the high-speed train largely depends on the accessibility of the railway station. Whether private cars are to be facilitated, or local light rail links stimulated, is fiercely debated.

The functions that are to be introduced to or strengthened in the railway station area are mainly offices and 'urban entertainment'. Some housing, including apartments for non-permanent habitation, will also be developed. With the office space it is important to maintain balance within the market. The development of Kop van Zuid elsewhere in Rotterdam has to be closely followed. The redevelopment of the railway station areas of Amsterdam, Leiden, The Hague, and Rijswijk are to be taken into consideration as well. International business cannot be expected to be in need of large amounts of office space in all these cities; the relevance of hierarchy within a network will show itself here. The urban entertainment is best not to become a threat to bars, cafes, restaurants, cinemas, and dancings in the remainder of the city centre. And with regard to the introduction of the urban entertainment function, the residents within the area are most watchful. With the realization of an earlier railway tunnel a local framework of citizen participation was built up. The residents can be expected to defend their interests. It is to be noted, though, that relatively few people live in the Rotterdam centre. The week link between the railway station and the attractive parts of the centre results from a monofunctional barrier of offices along Weena. The addition of functions to the railway station area is therefore not being rejected. In a study commissioned by the public sector organizations Stuurgroep Experimenten Volkshuisvesting and Rijksplanologische Dienst, both MONO

LAB architects and the designers of Max. 1 en Crimson showed the possibility of intensification within the city of Rotterdam (Fokkema and De Visser 1999, 36-39, 42-43).

Projectbureau Rotterdam Centraal, the project organization set up by the four-partners alliance, and the bureau Alsop & Störmer, the design bureau chosen for its international experience and for its affinity with communication and participation, have invited inhabitants, railway passengers, and others to participate in a first phase of planning. These participants, and the Projectbureau Rotterdam Centraal and Alsop & Störmer, together write a masterplan for the redevelopment during the period of spring to fall 2000. This document will contain an urban vision, not yet a detailed building program. The four partners are then to agree on this masterplan.

Conclusions

The high-speed rail link from Amsterdam to Paris, the existing national and local rail links, and new ones like Randstadrail, together with all other transport modalities, present us with a transport network. The initialized redevelopment of railway station areas, the nodes in the transport network, more closely connect this network to the spatial network. That network consists of the spatial planning with its considerations of zoning, and of the urban fabric in particular.

With Rotterdam Centraal the public-private partnership of the four-partners alliance plus the citizen participation add up to governance as network steering. The development of office buildings and housing, and the realization of Randstadrail connecting The Hague and Rotterdam in particular, requires adaptation and cooperation amongst the several municipalities in the South Randstad ('Zuidvleugel'). This does take place. On a somewhat larger scale adaptation and cooperation take place in the form of the activities of Deltametropool, a private association of municipalities, water boards, and business representatives initialized by the four largest Randstad cities Amsterdam, Rotterdam, The Hague, and Utrecht. Deltametropool studies economic and spatial processes, and promotes the Randstad interests with national government. And also, on a smaller scale, adaptation and cooperation take place in the form of the nowadays not too bad cooperation within Stadsregio Rotterdam, a regional public body of Rotterdam and surrounding municipalities. Stadsregio Rotterdam has some tasks in for instance the fields of spatial planning, and youth care. It can be concluded then, that a governance network is functioning.

This paper formulates a geography of networks, both in theory and in practice, which is a framework that can be used for a further empirical study of railway station area redevelopment. Taking the characteristics of the spatial and transport networks into consideration, shareholders of redevelopment projects can within the governance network address other stakeholders using network steering. Citizens have a true chance of presenting their views on a redevelopment scheme with this governance as network steering.

In conclusion, the three networks offer useful concepts for the study of both space and human interaction, and these three constitute a full geography. In a case like the Rotterdam Centraal redevelopment process, the transport, spatial and governance networks are linked up. The use of concepts and practices from governance as network steering helps the actors involved to meet the diverging stakeholder demands concerning spatial investments.

References

Adviescommissie Sociaal-Economische Vernieuwing Rotterdam, *Nieuw Rotterdam, Een opdracht voor alle Rotterdammers*, Rotterdam: gemeente Rotterdam, November 1987

Andersson, P.C., B. Egeter, A.M. van den Broeke, J.M. Schrijver, *Effecten van een goede autobereikbaarheid van HST-stationslocaties*, Delft: TNO Inro, September 1999

Andersson, P.C., B. Egeter, A.M. van den Broeke, J.M. Schrijver, *Effecten van een goede autobereikbaarheid van HST-stationslocaties - Achtergrondrapportage*, Delft: TNO Inro, September 1999

Banister, D., N. Lichfield, 'The Key Issues in Transport and Urban Development', in: D. Banister (ed.), *Transport and Urban Development*, London: E & FN Spon, 1995, pages 1-16

Bertolini, L, T. Spit, *Cities on Rails, The redevelopment of railway station areas*, London/New York: E & FN Spon, 1998

Boschken, H.L., 'Behaviour of Urban Public Authorities Operating in Competitive Markets, Policy Outcomes in Mass Transit', in: *Administration & Society*, volume 31, number 6, January 2000, pages 726-758

Button, K., 'Transport Terminals, Interchanges and Economic Development', in: D. Banister (ed.), *Transport and Urban Development*, London: E & FN Spon, 1995, pages 241-247

College van Burgemeester en Wethouders, *Vernieuwing van Rotterdam*, Rotterdam: gemeente Rotterdam, October 1987

Edwards, M., 'Critical Issues in Regional Rail Investment', in: D. Banister (ed.), *Transport and Urban Development*, London: E & FN Spon, 1995, pages 123-127

Expert Group on the Urban Environment, *European Sustainable Cities, Report*, Brussels: European Commission, Directorate General XI Environment, Nuclear Safety and Civil Protection, March 1996

Financieele Dagblad, Het, vastgoedbijlage April 16th 1999

Fokkema, J., W. de Visser, *VerVerst!, Een ontwerponderzoek naar vernieuwende verstedelijkingsvormen*, Rotterdam: Stuurgroep Experimenten Volkshuisvesting/Den Haag: Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, December 1999

Guild, R.L., 'Infrastructure, Investment and Interregional Development, Theory, Evidence, and Implications for Planning', in: *Public Works Management & Policy, Research and Practice in Infrastructure and the Environment*, volume 4, number 4, April 2000, pages 274-285

Hall, P., 'A European Perspective on the Spatial Links between Land Use, Development and Transport', in: D. Banister (ed.), *Transport and Urban Development*, London: E & FN Spon, 1995, pages 65-88

Hall, P., C. Hass-Klau, *Can Rail Save the City?, The Impacts of Rail Rapid Transit and Pedestrianisation on Brittish and German Cities*, Aldershot: Gower, 1985

Het Metropolitane Debat, Bussum: Uitgeverij Thoth, 1998

Jodidio, P., *Nieuwe vormen in de architectuur, De jaren '90*, Köln: Taschen, 1997

Kearns, A., R. Paddison, 'New Challenges for Urban Governance', in: *Urban Studies, An International Journal for Research in Urban and Regional Studies*, volume 37, number 5/6, May 2000, pages 845-850

Krings, U., *Deutsche Großstadt-Bahnhöfe des Historismus, Band 1 (Text)*, Keulen: U. Krings, 1981

Krings, U., *Deutsche Großstadt-Bahnhöfe des Historismus, Band 2 (Nachweise und Abbildungen)*, Keulen: U. Krings, 1981

Meer, J. van der, *Wat beweegt de stad?, Studie naar de stedelijke dynamiek in de Rotterdamse agglomeratie*, Rotterdam: J. van der Meer, 1989

Newman, P., A. Thornley, *Urban Planning In Europe, International competition, national systems and planning projects*, London/New York: Routledge, 1996

Oosten, W., 'Manke mieren om infrastructuur aan te leggen', in: *Agora*, volume 15, number 5, December 1999, pages 24-25

Organisation for Economic Co-Operation and Development, *Integrating Transport in the City, Reconciling the Economic, Social and Environmental Dimensions*, Paris: OECD, 2000

Overvest, J., 'Spilfunctie stations zorgt voor beheersbare mobiliteit, Behoefte aan nieuwe gebruiksvriendelijke vervoerssystemen', in: *ROM Magazine*, volume 18, number 4, April 2000, pages 22-24

Planteam Programma Rotterdam CS, *Rotterdam CS, Verkenning van het programma*, Rotterdam: OntwikkelingsBedrijf Rotterdam, June 1998

Projectbureau Noordrand Rotterdam, *IPNR*, Rotterdam: gemeente Rotterdam, November 1992

Pollio, G., *International Project Analysis and Financing*, Houndmills: MacMillan Press, 1999

Priemus, H., *Stadsvernieuwwing: problemen en perspectieven, Analyse van de Rotterdamse aanpak*, Alphen aan den Rijn: Samsom Uitgeverij, 1978

'Randstadrail komt er nu echt', in: *Algemeen Dagblad*, July 13th 2000, page 5

Richards, J., J.M. MacKenzie, *The Railway Station, A Social History*, Oxford: Oxford University Press, 1988

Rotterdamse Duurzaamheidsclub, *Mobiliteit als uitdaging*, Rotterdam: Erasmus Universiteit Rotterdam Capaciteitsgroep Milieukunde, 1999

Rotterdam terminal, Stedenbouwkundige visie Rotterdam-CS, Deelonderzoek, Rotterdam: DS+V / RO+VV, November 1998

Ruimtelijk Plan Rotterdam 2010, Meer stad meer toekomst, Voorontwerp structuurplan, Rotterdam: dienst Stedebouw en Volkshuisvesting, afdeling RO Stad & Regio, September 1999

Ruimtelijk Plan Rotterdam 2010, Meer stad, meer toekomst, Rotterdam: Dienst Stedebouw en Volkshuisvesting, September 1998

Uum, E.C., 'Stedelijkheid in de netwerkstad, Over stedelijke transformaties via infrastructuur', in: *Stedebouw & Ruimtelijke Ordening*, volume 81, number 2, 2000, pages 15-20

Vilsteren, W. van, H. Eversdijk, '"Duurzaamheidspiramide", Instrument voor samenhang milieu en stedenbouw, Stationslocaties Den Haag, Rotterdam en Utrecht', in: *ROM Magazine*, volume 18, number 5, May 2000, pages 10-11

Visser, J.G.S.N., T.G.M. Bentvelsen, *De hoge-snelheidslijn in de Randstad, Beleid en besluitvorming omtrent een grootschalig infrastructuurproject*, Delft: Delftse Universitaire Pers, 1991

Zweedijk, A., Z. Serlie, 'Een "knoop-plaats"-model voor stationslocaties', in: *Geografie*, volume 7, number 5, October 1998, pages 35-37