

Accessibility: an interesting concept to address  
strategic planning issues in the Amsterdam region?

**Thomas Straatemeier**

Universiteit van Amsterdam  
Amsterdam Institute for Metropolitan and International Development Studies  
E-mail: [t.straatemeier@uva.nl](mailto:t.straatemeier@uva.nl)

Bijdrage aan het Colloquium Vervoersplanologisch Speurwerk 2005,  
24 en 25 november 2004, Antwerpen

**Table of content**

Summary	3
1. Introduction	4
2. Accessibility an interesting framework?	5
3. Layered accessibility	7
4. Mobility environments and spatial development potential	10
5. Accessibility a new way of looking at strategic planning issues?	13
6. Conclusion	15
References	16
Maps	19

## Samenvatting

*Bereikbaarheid: een interessant vervoersplanologisch concept om strategische planningsvraagstukken in de regio Amsterdam te benaderen? – Thomas Straatemeier*

“To be accessible or not to be accessible”, lijkt de cruciale vraag voor veel economische activiteiten tegenwoordig. Adequate toegang tot, bijvoorbeeld consumenten, arbeidskrachten, leveranciers zijn cruciale condities voor het functioneren van bedrijven. Voor deze bedrijven is niet het verkeer- en vervoersysteem an sich van belang, maar het feit dat ze via dit systeem in staat zijn allerlei voor hun relevante activiteiten binnen een bepaalde tijd te bereiken. Planning dient daarom zowel de kenmerken van het verkeer- en vervoersysteem als het verstedelijkingspatroon in ogenschouw te nemen. Het concept van potentiële bereikbaarheid, wat aangeeft welke activiteiten binnen bereik liggen van een bepaalde plek en hoe deze te bereiken zijn, voldoet aan deze behoefte. Het verkeer en vervoersysteem speelt een cruciale rol in het beiden van (potentiële) bereikbaarheid aan bedrijven. Toch wordt deze rol door planologen nog vaak genegeerd en lijkt de nadruk in verkeer- en vervoerbeleid vooral te liggen op de efficiëntie van het verkeer- en vervoersysteem. Dit artikel onderzoekt in hoeverre het begrip potentiële bereikbaarheid leidt tot een verfrissende kijk op vraagstukken op het raakvlak van ruimtelijk beleid en verkeer- en vervoerbeleid. Voor de regio Amsterdam wordt de diversiteit van bereikbaarheidskwaliteiten in kaart gebracht en bekeken wat dit betekent voor de ontwikkelingspotentie van plekken in de regio. Het paper sluit af met de vraag in hoeverre dit leidt tot een andere aanpak van strategische vraagstukken, die spelen in het gebied.

## Summary

*Accessibility: an interesting concept to address strategic planning issues in the Amsterdam region? – Thomas Straatemeier*

To be accessible or not to be accessible seems to be the question for economic activities these days. Adequate access to, for example, consumers, labor, suppliers, are vital conditions for the functioning of firms. For economic activities it is not the transport system itself that is important, but the fact that the transport systems provides them with access to spatially and temporally dispersed resources. Planning therefore needs take both the qualities of the transport system and the land-use system in to account. The concept of potential accessibility – or what and how can be reached from a given point in space – can provide a useful conceptual framework to address this need. Infrastructure networks play a crucial role in determining accessibility. Yet, traditional urban transportation planning often neglects this important role infrastructure networks play and limits its focus to the efficiency of the transport system itself. This study explores the use of accessibility as a framework planners can use to approach land use and transportation issues in a different way. The paper maps the quality of the accessibility in the Amsterdam region on different scales and investigates which qualities are more favorable to certain activities than others. Creating these favorable accessibility conditions is what planners of the land-use and transport system should aim for. The paper concludes with reviewing different regional planning policies to determine if this is indeed in the mind of planners.

## 1. Introduction

To be accessible or not to be accessible seems to be the question these days. In a highly dynamic globalized economy adequate access to spatially and temporally dispersed resources, for example, knowledge, consumers, labor and suppliers, are vital conditions for firms in order to thrive or even just to survive (Van der Knaap, 2002; Bertolini, 2004). Infrastructure networks play a crucial role in providing economic activities with sufficient access to these different resources. Yet, traditional urban transportation planning often neglects this important role infrastructure networks play and limits its focus on the efficiency of the transport system itself.

As a consequence, in recent years it has been argued that the time is right for a shift in paradigm towards a new approach in urban transportation planning (Dimitriou, 1992; Banister, 2002; Gifford, 2003). The traditional view of transportation planning as an essential technical ability based on a simple demand led assumption (sometimes called predict and provide) no longer fits modern society for different reasons (Banister 2002). First, the systems view to transport which tries to achieve equilibrium of supply and demand has been overtaken by reality (Groenendijk et al., 2003). Since the capacity of the network will never increase at a level to match the increase in demand, congestion is here to stay (Downs, 2004). Even if it was possible to invest in expanding infrastructure, for financial and environmental reasons this is not seen as desirable (Banister 2002, Bertolini 2004). Second, due to its inward-looking nature traditional urban transportation planning is not able to address broader economic, social and spatial goals, which can be served or hampered by transportation developments. With the supply of infrastructure structurally falling short of demand there is no “rational” equilibrium in reach within the transport system. Instead the desired or acceptable equilibrium should be the outcome of a decision making process in which these higher economic, social and environmental goals can be weighed with respect to each other. Through such an approach planners could better acknowledge that the range of actors who want to be involved in the planning process has grown considerably. Finally, increasing complexity of mobility patterns of persons and goods, and uncertainty about future location behavior of households and firms makes predictive modeling of future mobility patterns more and more problematic (Banister, 2002; Gifford, 2003; Bertolini, 2005). Let alone the fact that these models are often

too complicated for decision makers not trained in the theory of these models (Gifford 2003). These different concerns are not typical for urban transportation planning, but derive from a much broader debate about the role of planning in a more and more complex spatial context and market-oriented society.

With recognition to the shortcomings of the conventional approach different ingredients for a new form of transportation planning can be distinguished. In the first place as was posited by Banister (2002, p. 158), “planning should move away from trend-based extrapolation to richer social analysis based on linking transport to what people do and how firms operate”. The desired connectivity of places instead of predicting future congestion levels should be the focus of planning. Furthermore, planning should be able to articulate and incorporate different goals stakeholders of the land-use and transport system may have. To address these different planning goals there is need for a planning framework, which provides a normative base and is able to generate different alternatives (Groenendijk et. al. 2003). There is also a need to address the shortage of tools to generate policy alternatives and support the design of policies, as opposed to the relative abundance of tools for analyzing the problems at hand and evaluating alternative solutions (Bertolini et. al., 2004). Finally, as Meyer and Miller (2001, p. ix) stress, “the institutional framework for decision making is one of the key characteristics influencing the effectiveness of planning”. For planners this means they have to present information to decision makers in an understandable and useful form and help decision makers to select interventions, establish priorities and develop planning strategies (Meyer and Miller, 2001; Ben-Akiva et.al., 2004). As is shown above in several studies researchers (Dimitriou, 1992, Banister 2002, Gifford, 2003) have stressed the need for a new approach to urban transportation planning and the aspects this new approach should take into account. However, these studies still lack the actual tools planners need to put such an approach into practice. The aim of the research presented in this paper is to contribute to fill this gap, using the concept of accessibility as a planning framework.

## **2. Accessibility an interesting framework for urban transportation planning?**

Within urban transportation planning many notions exist about the meaning of accessibility. Some politicians seem to relate accessibility directly to the issue of congestion, while many transportation planners view accessibility as a way to describe the performance of the

transport system. In this research accessibility is defined as the accessibility at zone  $x$  to opportunities in all other zones within a certain travel time and cost. To put it simply this means that accessibility indicates the potential space of action firms and households located in certain place have to engage in spatially and temporally dispersed activities. Potential accessibility is the expression used by researchers (Handy & Niemeier, 1997; Geurs & Ritsema van Eck, 2001) to describe this definition of accessibility.

Potential accessibility can be used as a planning framework that can tackle some of the problems of conventional urban transportation planning discussed in the previous section. First, this approach to defining accessibility relates to the actual behavior of households and firms. For them it is not the transport system itself that is important, but the fact that the transport system provides them with access to spatially and temporally dispersed opportunities. Furthermore, using this definition accessibility cannot only be directly related to the qualities of the transport system (e.g. travel speed or costs), but also to the qualities of the land-use system (e.g. functional densities and mixes) (Bertolini et.al., 2004). Thus providing planners with the possibility to understand interdependences between transport and land-use development, and giving them the opportunity to seek the so-wanted integration of transport and land-use planning strategies and assess the effects changes in land use and transport system have on the development potential of locations. Defined in this way accessibility can also be related to broader economic, social and environmental goals that are at the heart of present-day urban politics (Bertolini et.al., 2004). The need to provide people access to jobs, or firms with access to skilled workers are just some examples of these issues. In addition accessibility can be used as a design tool to generate alternative solutions (Groenendijk et. al 2003), which is crucial in a planning process with multiple actors involved and uncertainty about future conditions. By way of illustration, one could design a planning strategy that maximizes consumer accessibility for the main retail locations or one could work the other way around and find out which locations have the best access to the consumer market and would be suitable for retail development. Finally, accessibility describes the quality of accessibility of places or locations, which makes it possible to benchmark the accessibility conditions of places in the urban network. These differences could be the subject of a planning debate and planning strategies could be developed to increase or lessen variety in accessibility conditions within the region depending on the goals policymakers want to

achieve. These various aspects lead us to the conclusion that accessibility as defined above can address some of the flaws of the traditional approach to urban transportation planning. This signifies, in the words of Bertolini et. al. (2003), “a shift in urban transportation planning from catering for mobility to catering for accessibility”.

How could such a planning approach aimed at shaping accessibility conditions work out? Aim of this study is to develop tools to design planning strategies aimed at improving accessibility conditions, and thus help planners to cater for accessibility. This is done in three steps. First step is to identify the variety in accessibility conditions within the Amsterdam region using the transportation model of the municipality of Amsterdam. The second step is to give insight in the place development opportunities and threats following changes in accessibility conditions. This is done through the comparison of the spatial pattern of distinctive economic activities with the accessibility conditions identified in step one of the research. The information collected in the first two steps of the study is put into practice in the third step of the research by reviewing two planning strategies. The paper concludes with some recommendations about the implications for planning and the need for further research.

### **3. Layered accessibility**

Mobility patterns of economic activities show an increasing variety. Depending on the scope and functional relationships they have, economic activities want access to different spatially dispersed resources at different geographical scales. To be able to catch diversity in accessibility requirements it is thus important to measure accessibility at different scales. To select the appropriate scales for measuring accessibility, a connection is made with different types of agglomeration economies. The latest insights point at a variety of agglomeration economies (Parr 2002, Phelps and Ozawa 2003). The emerging picture is one where some economic activities still require physical proximity. Scott (1998) states that, “firms whose transactions are small in scale, irregular and unpredictable, and dependent on intensive face-to-face contact will probably find it to their advantage to be located in some sort of mutual proximity”. More traditional reasons for similar firms to locate in close proximity derive from localisation economies, for example a specialized pool of labor (Parr 2002, Atzema et.al. 2002). A second group of economic activities appears to be dependent on functional linkages at the scale of the urban region. The quality of access to, for example, labor and consumer

markets, specialized services and knowledge institutes, are important location conditions for economic activities to consider at the regional level. A third group of economic activities operates within a fully relational and accessibility based ‘network’ space, which increasingly surpasses national borders (Bertolini, 2003) and is depended on global connectivity. Obviously, there are many spatial activities that favor a combination of these different agglomeration economies, because they have functional linkages at different scales. Places in the urban network that provide economic activities with a combination of accessibilities have proven to be hotspots for spatial development (Van der Knaap, 2002).

The analysis of accessibility of places in the Amsterdam region takes these different agglomeration economies as a starting point. The aim of the analysis is not to compare the accessibility of different regions, but to compare places within the region to asses differences in development potential of locations, which could be related to regional economic planning goals. Accessibility was measured with the use of a potential accessibility measure. This kind of measure indicates the number of opportunities reachable within a given time. The use of this measure has several advantages. With a relative small amount of data it is possible to calculate accessibility conditions for a wide range of locations. In contrast to more complicated accessibility measures a potential accessibility measure is comparatively easy for planners to understand, which makes it possible to use the out come of analysis in a policy environment. Table 1 presents the accessibility conditions that were measured at different geographical scales.

**Table 1. Different layers of accessibility**

Geographical Scale	Access to:	Travel Time	Transport Mode
Global	- International Airport	- 30 min.	- Car
Regional	- Inhabitants	- 30 min. - 45 min.	- Car - Public Transport
Local	- Jobs	- 15 min.	- Car - Bicycle

Research in the Netherlands (Goudappel Coffeng & VHP 1999) show that on average people do not want to travel more than 30 minutes to there destination after they made an international trip. As a corollary globally accessible places in the Amsterdam region are simply defined as those places who are within 30 minutes travel time by car of Schiphol



Airport. Regional accessibility is measured by calculating the total number of inhabitants you have access to from a certain location within (in the Netherlands) commonly accepted travel times of 30 minutes by car and 45 minutes by public transport (O&S, 2000). Household research in the Amsterdam region (O&S 2000) shows that people using public transport on average spent more time traveling to work. The number of inhabitants can serve as a proxy for the quality of access to the labor and consumer market. To measure local accessibility, jobs instead of inhabitants were chosen, since the number of jobs you have access to tells you something about the potential the location offers to firms to engage in face-to-face contacts with other economic activities. The threshold of 15 minutes was chosen simply because it is the shortest travel time the model could calculate potential accessibility for. This is still a rather rough-hewn attempt to measure accessibility at these different levels, but it already provides more differentiation in accessibility requirements than most other studies, which only seem to focus on measuring accessibility at one geographical scale (Prud'homme & Lee, 1999; Geurs & Ritsema van Eck, 2001; Halden 2002).

With the use of the GENMOD transportation model<sup>1</sup> of the municipality of Amsterdam (dIVV 2000) the global, regional and local accessibility conditions of each place in the Amsterdam region could be calculated. Afterwards the accessibility conditions at different scales were combined in one map (see Map 1) to assess the combination of accessibility qualities each place in the urban network has to offer.

**Table 2. Different combinations of accessibility**

Location type	International	Regional		Local
		Car	Public Transport	
Network	+	+	+	+
Multimodal	+	+	+	0
Historic Centre	0	-	+	+
Urban	0	0	0	+
Edge City	+	+	0	0
Airport Region	+	+	-	-
Suburban	-	0	0	0
Peripheral	-	-	-	-

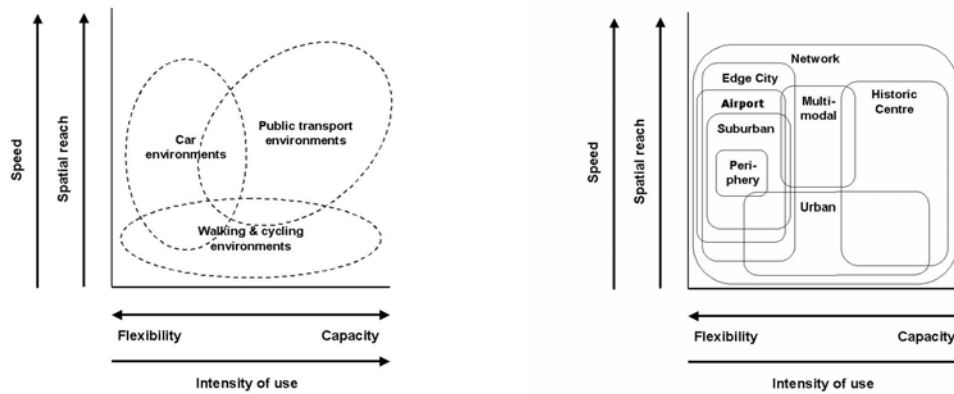
<sup>1</sup> GENMOD is a static multimodal transportation model used by the municipality of Amsterdam, to model future mobility demand in the region, and assess the implications of a combination of different land-use and transport policy measures on this demand. Data derive from household research and mobility counts.

Table 2 shows the different combinations of accessibility conditions for each location. For each geographical layer the potential accessibility was calculated with the use of the GENMOD model and subsequently the locations were divided in three logical defined classes (high, medium and low accessibility). A 'network' location has optimal accessibility at every level, whereas a peripheral location is least accessible on all scales. The other location types are some where in between and specialize in certain accessibility conditions. The 'network' locations are situated around the western and southern part of Amsterdam's circular beltway and radial motorways, adjoined by regional public transportation lines. This strategic position does not only provides these locations with an excellent multimodal regional accessibility, but also with a comparatively good local accessibility since the dense and mixed urban core of the city of Amsterdam is still within a grasp. The historic centre of Amsterdam combines an excellent accessibility by public transportation, due to the presence of the Central Station, with a very good local accessibility, as a consequence of a great amount and variety of activities within short reach. Accessibility by car of the historic centre is however problematic. Between the 'network' locations and the historic centre is what can be called the urban environment. This is an area, which is not well connected on higher geographical scales, but has excellent local accessibility, due to high densities and a finely woven urban infrastructure. Multimodal places have excellent regional accessibility by car and public transport, but lack good local accessibility. Edge Cities are suburban areas and parts of the urban periphery that are positioned between the centre of Amsterdam and Schiphol Airport. They can be characterized by excellent international accessibility and regional accessibility by car and offer reasonable local accessibility and accessibility by public transport. The airport region consists of good accessible suburban areas within 30 minutes travel time of the airport. Suburban and peripheral locations are scattered in the northern and eastern part of the region. The total number of inhabitants within reach by car in 30 minutes from these areas can be less than 25% of the total number you can reach from the best accessible location. The presented map is no static picture. Changes in the land use and transport system could result in changes in accessibility conditions. Map 2a&b illustrate the shift in accessibility conditions in the centre of Amsterdam due to the completion of a new north-south metro-line. Result is a drastic switch in typology of parts of the inner-city urban locations to a network location well connected on a regional level.

#### 4. Mobility environments and spatial development potential

To determine the development potential of places with these different combinations of accessibility the concept of mobility environments introduced by Bertolini and Dijst (2000) is used for analysis. They define different mobility environments using two important spatial features of economic activities: “*the spatial reach* of an activity or function (or its spatial market or ‘catchment’ area, e.g. expressed in kilometers) and its *intensity of use* (e.g. expressed in workers and/or visitors per unit of space and/or time). Given these two dimensions the features of the available transport modes (e.g. speed, flexibility, capacity) determine the preferred location of an activity, or the most logical coupling between land-use and transport features”.

Figure 2a&b. Mobility environments (Bertolini & le Clercq 2003)



This is illustrated in figure 2a. Activities with a high intensity of use and a wide spatial reach should ideally be located in close proximity of public transportation nodes. Activities with a low intensity of use and a wide spatial reach would favor locations who are easily accessible by car, whereas locations with a low intensity of use with a limited spatial reach probably do well in walking and cycling environments. These archetype environments probably do not exist in real life. Figure 2b shows how the different accessibility combinations that were found in the Amsterdam region fit into this scheme. In theory the historic centre would favor high densities and a mixture of regional and local oriented economic activities. The areas characterized as urban provide the ideal environment for economic activities depending on physical proximity to other economic activities. Due to its variety in accessibility conditions a network location could appeal to almost any economic activity in theory. Economic activities

that prefer good regional access to workers and consumers with different transportation modes, but do not need optimal physical proximity to other economic activities should choose to locate themselves at a multimodal node. Edge Cities, Airport Region, Suburban areas, and Peripheral locations should be preferred by car dependent economic activities.

To judge if these different combinations of accessibility are an adequate unit of analysis to capture the increasing spatial differentiation in the Amsterdam region, they have been compared to the spatial pattern of 30 different economic activities using data from the ARRA (Spatial Activities Record Amsterdam 2000). These patterns were compared in a qualitative way with the combinations of accessibility conditions defined in Section 3. Table 3 summarize the results. Additional statistical analysis is still in progress. Table 3 demonstrates that the best accessible (local and regional) locations portray highest employment densities, suggesting a positive correlation between potential accessibility and economic vitality.

**Table 3. Accessibility conditions and spatial differentiation**

Location type	Employment Density	Firm size		Firm orientation	Firm linkages
		Large firms > 50 empl.	Small firms < 50 empl.	High share of commuters > 40%	High share of firms dependent on face-to-face contact
Network	++	+	0	+	0
Multimodal	+	+	-	+	0
Historic Centre	++	+	+	0	+
Urban	+	-	+	-	+
Edge City	0	0	-	0	-
Airport Region	0	-	-	0	-
Suburban	-	-	-	0	-
Peripheral	-	-	-	0	-

If you compare table 3 with figure 2b the historic centre and urban locations seem to live up to the theoretical expectations. The historic centre shows a mixture of small and large firms, some with a regional orientation while other choose the centre, because of its superb local accessibility. The urban locations are characterized by a concentration of small firms, with a low share of commuters. This includes an important share of home-based start-ups. Especially industries associated with high dependency on face-to-face contact, such as, for example, cultural industries, media industries and small size ICT-firms (Florida 2002), appear to prefer the urban environment (see Map 3). Given the diversity in accessibility conditions a network location has to offer one would expect a mixture of functions at these locations. Apparently this is not the case. The excellent combination of accessibility conditions mainly attracts large regional oriented firms (see Map 4), especially financial and business services. Competition

between firms for these best accessible locations could result in only the stronger and larger firms being able to locate themselves in these places. The spatial pattern seems to confirm this assumption. However, it could also be argued that the way local accessibility is defined in this research is not able to catch the differences in development potential between the network locations and the urban locations in an adequate way. Large firms, with a high share of commuters, also dominate the multimodal locations. The edge city locations appear to attract more car dependent activities such as transport and distribution services and manufacturing activities. The international accessibility appears to be an important asset of the Amsterdam region with 75% of all jobs within 30 minutes travel by car from the airport. Particularly transport and distribution service, and business services are pulled towards the airport.

The overall picture suggest a distinction in different potential accessibility combinations a location has to offer is an interesting way to assess the nature of the development potential of different locations. Of course, due to different reasons all kinds of inconsistencies exist between what spatial activities you would expect and the observed spatial pattern. Planners could, for example, block or stimulate development at certain location. In the Amsterdam region some of the best accessible location by car do not appear to have many economic activity, due to planning regulations preventing economic development. The second aspect, causing dissimilarities in accessibility conditions and spatial patterns, deals with path-dependency and slow response of spatial patterns to changes in accessibility conditions. The orbital motorway in Amsterdam was completed in 1992, but the spatial transformations influenced by this event are still going on today. Spatial activities do not relocate every day. Final aspect causing dissimilarities in accessibility conditions and spatial patterns, deals with the research itself. This study is a rather crude approach to identify important accessibility conditions. More research is needed to identify which accessibility conditions are crucial to different types of economic activities. The emerging picture, however, seems to indicate that accessibility is a promising entry point to address the development potential of locations in the urban network.

## **5. Accessibility a new way of looking at strategic planning issues?**

To gear transport and land-use policies is an important goal planners in the Amsterdam region have. Two strategies described in the new structure plan of are Amsterdam (Municipality of

Amsterdam 2003) are discussed to get a better understanding of the practical use of potential accessibility as a planning tool to achieve integration of transport and land use policies.

*Strategy 1: Separate through- and destination traffic within the regional road system*

To limit the disruption of interregional traffic by regional congestion, planners in the Amsterdam region proposed to make a distinction in the regional motorway system in roads designed for through traffic (e.g. high speed, limited no. of turn offs) and roads designed for intraregional traffic (e.g. high capacity, moderate speed and many turn offs). The orbital motorway around the city centre would fall into the latter category, while the emerging second tangential motorway connection on the south side of the region falls into the first category. What would the implications of such a strategy be for the potential accessibility of locations in the Amsterdam region. Special attention should be paid to the development potential of the emerging urban centers alongside the orbital motorway, whose development with activities with an (inter)national scope is strongly supported in the new structure plan (Municipality of Amsterdam 2003)? Reducing rush-hour congestion may have a positive affect on the accessibility of these locations at that particular time of the day, but apart from rush hour, the reduction of travel speed will have a negative impact on the spatial reach of these locations. Compared with a location that is situated at one of the scarce turn offs of the new interregional expressway system, the locations alongside the orbital motorway come off even worse. In the end this could result in the re-location of spatial activities alongside the beltway to locations at turn-offs of the new interregional expressway system. Thus, a strategy to relieve congestion problems, may have unwanted impacts on spatial conditions.

*Strategy 2: Increasing spatial and economic development potential of new town Almere*

Almere is a big new town (170.000 inhabitants) within 30 kilometers of Amsterdam. Planning schemes, aimed at increasing total population of Almere to 300.000 inhabitants or more, are developed by the National Government in cooperation with regional planning actors. The current growth of jobs in Almere, however, lags behind the growth in population, resulting in vast flows of commuters to working areas in and around Amsterdam causing severe congestion. To address this problem an increase in the number of jobs in Almere is one of the important secondary goals of the planning scheme. To increase capacity of existing road and rail connections between Amsterdam and Almere, should be one of the ways to make the new

town more attractive for economic activities. Following the hypothesis that an increase in potential accessibility would favor new economic development one could wonder if expansion of road and rail capacity, between Almere en Amsterdam is the best solution. Notwithstanding the positive effects of cutting down congestion levels expanding existing infrastructure will not help much to increase potential accessibility of Almere. Investing in new infrastructure connecting Almere to other neighboring regions to which it is not well connected, could have a much greater effect on total number of opportunities you can reach. Furthermore, it is important to understand accessibility works both ways. Not only Almere benefits from the improvement in accessibility, but also Amsterdam. This could result in existing differences in accessibility remaining more or less the same.

## **6. Conclusion**

This paper tries to reveal some interesting points of departure for the use of accessibility as a conceptual framework for regional strategic planning. Introducing accessibility as a concept to introduce a form of transportation planning which recognizes the spatial implications interventions in the transport system may have. From the empirical study described in Section 4, there appear indeed some interesting correlations between the spatial pattern of different economic activities and the quality of the potential accessibility in a certain area. However, in agreement with other studies (Wegener & Fürst, 1999; Cervero, 2001; Meurs et al., 2002), it remains difficult to prove a strong statistical relationship between transport and land use development. In spite of this, this study suggests that the inclusion of access to other spatial activities and potential users in the definition of accessibility could lead to a better understanding of the development potential of different areas.

What significance does this insight have for planning? First, the model presented gives planners an opportunity to map the spatial conditions created by the transport and land-use system and use these maps in an interactive way to address different planning issues. Second, the model shows how different planning interventions change future conditions. Thus, giving planners the possibility to as it were 'read the tea leaves', to see which consequences their actions may have. Finally, the concept of potential accessibility addresses the need for tools to relate planning interventions in the land-use and transport system not only to transport goals but also to broader social, spatial and economic objectives (Banister, 2002). The review

of current planning strategies in the Amsterdam region in Section 5 shows that the use of potential accessibility as a framework for planning may lead to interesting alternative planning strategies. Further work and discussion is needed on both the research level and the planning level to have a good understanding of the use of accessibility as a planning tool. I start with two comments stressing the need for further research and conclude with one remark about the implications for planning. First, the accessibility measure used in the present study does not take competition and distance decay into account. The use of more theoretically sound activity-based measures may solve this problem, but at the same time it will make the model more complex. Second, a refinement of the model is needed to include a greater range of spatial conditions (e.g. labor market, consumers) which economic activities want access to see if this leads to a better selection of crucial accessibility conditions.

For planners this study emphasizes the need for discussion about what land use and transport policies should aim for. Should transport planning aim at creating development potential for places in the urban network (as history shows) or only at the improvement of the transport system as such (le Clercq & Bertolini, 2005)? And if the first part of the question is answered in a positive way other questions arise. Is it for example better to aim for a homogeneous quality of accessibility for each place or is a variety of qualities needed? It seems obvious from this study that some kind of differentiation in accessibility conditions is needed. The question should be; ‘How far should this differentiation go and is it possible to design integrated land use and transport strategies to accomplish this differentiation in accessibility conditions?’

## Referenties

Amsterdams Bureau voor Onderzoek & Statistiek (2000) *Amsterdam in cijfers 1999*.

Gemeente Amsterdam: Amsterdam.

Atzema, O, J. Lambooy, T. van Rietbergen & E. Wever (2002) *Ruimtelijke economische dynamiek kijk op bedrijfslocatie en regionale ontwikkeling*. Bussum: Coutinho.

Banister D. (2002) *Transport planning*. London: Spon.

Ben Akiva, M. & P. Bonsall (2004) Increasing the relevance and utility to practice of transportation research. In *Transport policy*, No.11, pp. 101-4.



- Ben Akiva, M. & S.R. Lerman (1985) *Discrete choice analysis: theory and application to travel demand*. Cambridge, MA: MIT Press.
- Bertolini, L. (2005) *Planing transport in cities: an evolutionary approach*. Utrecht: Paper presented at EMAEE 2005
- Bertolini, L. (2004) *Fostering urbanity in a mobile society: an exploration of issues and concepts*. Grenoble: Paper presented at AESOP 2004
- Bertolini, L., F. le Clercq & L. Kapoen (2003) *Sustainable accessibility: a conceptual framework to integrate transport and land use plan-making. Two test applications in the Netherlands and reflection on the way forward*. Amsterdam: AMIDSt.
- Bertolini, L. & F. le Clercq (2003) Urban development without more mobility by car? Lessons from Amsterdam, a multimodal urban region. In *Environment and planning A*, Vol.34, 4, pp.575-590.
- Bertolini, L. & M.J. Dijst (2000) Mobiliteitsmilieus, Ankers voor het vluchtende stedelijke leven. In L. Boelens (red.), *Nederland Netwerkenland*. Rotterdam: Nai publishers
- Bhat, C., S. Handy, K. Kockelman, H. Mahmassani, Q. Chen & L. Weston (2000) *Development of an Urban Accessibility Index: Literature Review*. Center for Transportation Research, The University of Texas, Austin
- Cervero, R. (2001) Efficient Urbanisation: Economic Performance and the Shape of the Metropolis. In *Urban Studies*, Vol.38, No.10, pp 1651-1671
- Cheng, J., L. Bertolini, F. le Clercq & L. Kapoen (2005) *Understanding accessibility: a new strategy for its modelling*. Amsterdam: AMIDSt.
- Clercq, F. le & L. Bertolini (2005) *Optimizing accessibility in the Randstad Holland*. Amsterdam: Presentation for the COST-conference 2005
- Dienst Ruimtelijke Ordening (2003) *Structuurplan Amsterdam; Kiezen voor stedelijkheid*. Amsterdam: Physical Planning Department
- Dimitriou, H.T. (1992) *Urban transport planning a developmental approach*. London: Routledge.
- Downs, A. (2004) Why Traffic Congestion Is Here to Stay...and Will Get Worse. In *Access*, No. 25, pp. 19-25.
- Florida, R. (2002) *The rise of the creative class: and how it's transforming, work, leisure, community and every day life*. new York: Basic Books.

- Geurs, K.T. & J.R. Ritsema van Eck (2001) *Accessibility measures: review and application*.  
RIVM, Utrecht
- Gifford, J.L. (2003) *Flexible urban transportation*. Oxford: Elsevier Science
- Groenendijk, J.M., F. le Cercq & L. Bertolini (2003) *Bereikbaarheid als planningskader voor interventies in verkeer en vervoer*. Amersfoort/Amsterdam.
- Halden, D. (2002) Using accessibility measures to integrate land use and transport policy in Edinburgh and the Lothians. In *Transport policy*, No. 9, pp. 313-324.
- Handy, S. & D.A. Niemeier (1997) *Measuring accessibility: an exploration of issues and alternatives*. In *Environment and planning A*, Vol. 29, pp. 1175-1194.
- Janelle, D. (1969) Spatial reorganization: a model and concept. In *Annals of the association of American Geographers*, Vol.59, pp. 348-368
- Knaap, G.A. van der (2002) *Stedelijke bewegingsruimte, e over veranderingen in stad en land*.  
Den Haag: Sdu Uitgevers.
- Meurs, H. (red.) (2002) *Land use and mobility*. Utrecht: NOVEM
- Meyer, M.D. & E.J. Miller EJ. (2001) *Urban transportation planning a decision-oriented approach*. Boston: McGraw-Hill.
- Parr, J.B. (2002) Agglomeration economies: Ambiguities and confusions. In *Environment and planning A*, Vol. 34, pp. 717-731
- Phelps, N.A., T. Ozawa (2003) Contrasts in agglomeration: proto-industrial, industrial and post-industrial forms compared. In *Progress in Human Geography*, 27, 5, pp. 583-604.
- Prud'homme, R. & C. Lee (1999) Size, sprawl and the efficiency of cities. In *Urban Studies*, 36,11, pp.1849-1858.
- Scott, A.J. (1998) *Regions and the world economy, the coming shape of global production, competition, and political order*. Oxford: Oxford University Press.
- VHP & Goudappel Coffeng (1999) *Onderzoek naar de typering van knopen*. Den Haag:  
Ministerie van VROM
- Wegener, M. & F. Fürst (1999) *Land-Use Transport Interaction: State of the Art. Rep. 46*.  
Institut für Raumplanung, Dortmund

