

TeMA

Journal of
Land Use, Mobility and Environment

This special issue collects a selection of peer-review papers presented at the 8th International Conference INPUT 2014 titled "Smart City: planning for energy, transportation and sustainability of urban systems", held on 4-6 June in Naples, Italy. The issue includes recent developments on the theme of relationship between innovation and city management and planning.

Tema is the Journal of Land use, Mobility and Environment and offers papers with a unified approach to planning and mobility. TeMA Journal has also received the Sparc Europe Seal of Open Access Journals released by Scholarly Publishing and Academic Resources Coalition (SPARC Europe) and the Directory of Open Access Journals (DOAJ).

INPUT 2014

papers selected

Smart City

planning for energy, transportation
and sustainability of the urban system

SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

Special Issue, June 2014

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This special issue of TeMA collects the papers presented at the 8th International Conference INPUT 2014 which will take place in Naples from 4th to 6th June. The Conference focuses on one of the central topics within the urban studies debate and combines, in a new perspective, researches concerning the relationship between innovation and management of city changing.



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EIGHTH INTERNATIONAL CONFERENCE INPUT 2014

SMART CITY. PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

This special issue of TeMA collects the papers presented at the Eighth International Conference INPUT, 2014, titled "Smart City. Planning for energy, transportation and sustainability of the urban system" that takes place in Naples from 4 to 6 of June 2014.

INPUT (Innovation in Urban Planning and Territorial) consists of an informal group/network of academic researchers Italians and foreigners working in several areas related to urban and territorial planning. Starting from the first conference, held in Venice in 1999, INPUT has represented an opportunity to reflect on the use of Information and Communication Technologies (ICTs) as key planning support tools. The theme of the eighth conference focuses on one of the most topical debate of urban studies that combines , in a new perspective, researches concerning the relationship between innovation (technological, methodological, of process etc..) and the management of the changes of the city. The Smart City is also currently the most investigated subject by TeMA that with this number is intended to provide a broad overview of the research activities currently in place in Italy and a number of European countries. Naples, with its tradition of studies in this particular research field, represents the best place to review progress on what is being done and try to identify some structural elements of a planning approach.

Furthermore the conference has represented the ideal space of mind comparison and ideas exchanging about a number of topics like: planning support systems, models to geo-design, qualitative cognitive models and formal ontologies, smart mobility and urban transport, Visualization and spatial perception in urban planning innovative processes for urban regeneration, smart city and smart citizen, the Smart Energy Master project, urban entropy and evaluation in urban planning, etc..

The conference INPUT Naples 2014 were sent 84 papers, through a computerized procedure using the website www.input2014.it . The papers were subjected to a series of monitoring and control operations. The first fundamental phase saw the submission of the papers to reviewers. To enable a blind procedure the papers have been checked in advance, in order to eliminate any reference to the authors. The review was carried out on a form set up by the local scientific committee. The review forms received were sent to the authors who have adapted the papers, in a more or less extensive way, on the base of the received comments. At this point (third stage), the new version of the paper was subjected to control for to standardize the content to the layout required for the publication within TeMA. In parallel, the Local Scientific Committee, along with the Editorial Board of the magazine, has provided to the technical operation on the site TeMA (insertion of data for the indexing and insertion of pdf version of the papers). In the light of the time's shortness and of the high number of contributions the Local Scientific Committee decided to publish the papers by applying some simplifies compared with the normal procedures used by TeMA. Specifically:

- Each paper was equipped with cover, TeMA Editorial Advisory Board, INPUT Scientific Committee, introductory page of INPUT 2014 and summary;
- Summary and sorting of the papers are in alphabetical order, based on the surname of the first author;
- Each paper is indexed with own DOI codex which can be found in the electronic version on TeMA website (www.tema.unina.it). The codex is not present on the pdf version of the papers.

SMART CITY

PLANNING FOR ENERGY, TRANSPORTATION AND SUSTAINABILITY OF THE URBAN SYSTEM

Special Issue, June 2014

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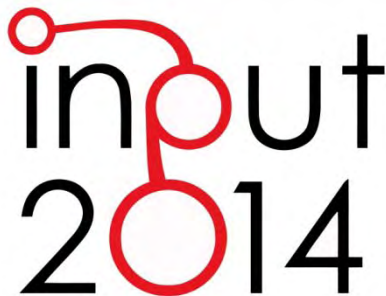
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SPECIAL ISSUE

Eighth International Conference INPUT
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Naples, 4-6 June 2014

The logo for the INPUT 2014 conference. It features the word "input" in a lowercase, sans-serif font, with the "i" and "n" connected by a red line that forms a stylized shape. Below "input" is the year "2014" in a larger, bold, sans-serif font. The "0" in "2014" is also connected to the red line above it.

ACHIEVING PEOPLE FRIENDLY ACCESSIBILITY

KEY CONCEPTS AND A CASE STUDY OVERVIEW

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ABSTRACT

The present paper stems from the evidence that one of the reasons of the “crisis” of today’s cities probably depend on mobility issues.

But what should be done to confront all the negative impacts of passenger transportation, without curbing mobility? Can Urban Engineering be applied to promote a friendlier mobility, that should be not only environment and climate friendly, but user friendly as well? And how?

A “people friendly” accessibility approach is presented and conceived as a solution to better integrate land uses with the transport system, satisfying people’s expectations (especially those of vulnerable users) to easily reach the opportunities they wish to engage with.

The case study of Amsterdam, as walkable and cycle friendly city, is briefly presented and reveal good practices in the field of urban and mobility planning.

Finally, an isochronal accessibility analysis of Amsterdam is applied: it represent catchment areas of railways stations and of supermarkets, and it highlights how much the structure of the city supports bicycle use.

KEYWORDS

Urban planning; Friendly mobility, Accessibility, Amsterdam

1 INTRODUCTION

In the recent years, some Italian authors started to express the idea of a “crisis” of the City and of the Urban Planning discipline in Italy. A new approach to mobility issues in urban planning – that may for example take into account accessibility issues as discussed further in this paper – is often seen as a possible solution to overcome the crisis of today’s cities (see, i.a., Campos Venuti 1999; Salzano 2003; Campos Venuti 2010; Benevolo 2012).

Campos Venuti (1999; 2010) argues that mobility planning represents a crucial factor to solve the problems of the contemporary city, and he suggests a “rail therapy” (what he calls “*cura del ferro*”) to make the major Italian cities grow (Campos Venuti 1999). For Salzano, the “traffic paradox” is among the aspects that most contributed to the crisis of cities (Salzano 2003, 4): “moving about” has nowadays become a torment and a waste of time, a dissipation of public and private resources, a misuse of space and energy, and a worrisome source of pollution. Historically, the city has been the place of the relationships among people, but it is now degenerating. In the years of the “civilization of the car”, the city has become a place of segregation, isolation, and difficulties for communication. Therefore, Salzano argues that mobility issues rank among the most urgent challenges for today’s urban and territorial planning practice. A new organisation of the transport system, that allows a consistent modal share shift from on road individual transport to collective and rail transportation means is required. And in the meantime, a new organisation of the city, playing with the location of the urban functions and the management of times, can reduce the demand for mobility (Salzano, 2003).

The crisis of mobility is therefore seen as the most emblematic factor of the crisis of the city: passenger mobility is nowadays a very critical issue. Mobility is vital for the quality of life of citizens as they enjoy their freedom to travel (European Commission 2011), and plays an essential role in economic and social development in every society. But, in the meantime, it entails several negative consequences, both on the environment and on the liveability of our cities.

Current passengers’ modal split is highly overbalanced towards road transport and private cars. In 2010, total passenger transport activities in the European Union (EU-27) by any motorised means of transport were estimated to have amounted to 6,424 billion passenger kilometres, and passenger cars accounted for 73.7% of this total (European Commission 2012). On the contrary, non-motorised means of transport, such as cycling and walking, account only for a very marginal share of road transport: the average person in the European Union cycles about 0.5 km, walks about 1.0 km, and travels 28 km by car per day (WHO Europe, 2004). In 2010, the European Union had 477 passenger cars per 1,000 inhabitants (European Commission, 2012). And Italy is among the EU countries that have the highest motorization rate¹, with 606 passenger cars per 1,000 inhabitants (Eurostat 2013).

What should be done to confront all the negative impacts of passenger transportation, without curbing mobility, or hindering in the meantime, the right to move freely? Can Urban Engineering be applied to promote a friendlier mobility, that should be not only environment and climate friendly, but user friendly as well? And how?

¹ According to Eurostat data, only Luxembourg shows a motorisation rate higher than Italy, with 672 passenger cars per 1000 inhabitants (Eurostat 2013) (Eurostat motorisation data are based on 2009 values).

2 TOWARDS A FRIENDLIER ACCESSIBILITY

Cities depend on mobility: contemporary society is a mobile society, where lifestyles and business practices are inextricably linked to mobility (see, i.a., Bertolini 2012). Therefore, mobility should become a central issue in planning, and there is a need to find a balance in response to what Bertolini (2012) defines the “core dilemma” of mobility planning: dependency vs. lack of sustainability.

The literature on these topics is extremely wide, and assumes that there are tight and complex relationships between urban planning and mobility. Within this framework, many authors agree that a shift from mobility-oriented to accessibility-based transport planning is nowadays the key towards a sustainable transport planning (see, i.a., Banister 2008; Handy 2002; Marshall 2001). And the World Business Council for Sustainable Development (WBCSD 2001) states that «for mobility to be sustainable, it must improve accessibility while avoiding disruptions in societal, environmental, and economic well-being that more than offset the benefits of the accessibility improvements».

Accessibility expresses the interactions between the activities located in a region and the transport system serving it. It is an essential feature of a well-functioning city or region, and represent a fundamental principle, because it provides a framework for understanding the reciprocal relationships between land use and mobility (Hull, Silva and Bertolini 2012).

Furthermore, accessibility focuses transport planning on the connection of people and activities instead of on the transport system: it represents a shift of focus from the means (e.g. infrastructures and their performances) to the ends: the fulfillment of people’s expectations. Accessibility involves a person-centered planning view: thinking in terms of accessibility represents a way of thinking in terms of people and individuals rather than on traffic.

For all these reasons, accessibility is a key issue within the People Friendly City vision, a concept developed since the beginning of the '90s in the researches coordinated by Prof. Roberto Busi in Brescia (see, i.a., Busi 2011; Busi 2012). The final goal of this vision is to greatly influence the quality of life in urban areas, starting from a focus on vulnerable road users.

With reference to accessibility, Busi (2013) argues that researchers and urban planners should have in mind that the final aim of mobility is reaching the final destination, possibly in an easy and pleasant way. People’s daily lives are made up of a growing diversity of activities and locations, and mobility holds all of this together (Bertolini 2012). But, as reminded by Busi, the city is too often designed in such a way as to prevent it being used easily and calmly by the most vulnerable citizens. The city is therefore seen by them as inaccessible or even hostile (see, i.a., Busi 2009, Tiboni and Rossetti 2012). Tira (1999) remarks that land uses, public spaces, facilities and residential areas should be planned and designed considering the possibility to be reached, and considering the different modes of transport.

Finally, Busi (2013) shows a bit of skepticism regarding the use of accessibility evaluation models, due to the fact that accessibility has too many implications, that go further ahead the proposal of uncritical mathematical solutions like models. He proposes instead the creation of cultures and the development of techniques geared towards accessibility. According to this idea, case studies are probably one of the most useful approaches: the following section presents the case study of the city of Amsterdam.

3 AMSTERDAM CASE STUDY OVERVIEW

In the '90s, a Dutch National Report on transportation concluded that car based mobility growth should be reduced to a given target: mobility growth was restricted to 30%, while forecasts were predicting increases

of 60% and more (Dutch Ministry of Transport and Public Works 1990). And the city of Amsterdam applied some policies to reduce car use.

Today, the city of Amsterdam counts approximately 800,000 inhabitants and covers an area of 219,33 km². But, how is mobility in Amsterdam structured? Which are the main mobility patterns? And how do these affect the urban accessibility?

Amsterdam is, arguably, a walkable and cycle friendly city. In the city of Amsterdam, 32% of daily movements are made by bicycle, 27% on foot, 22% by car and 16% by public transport (source: DIIV, 2013 based on 2011 data). Bicycle use is encouraged by a wide and well-connected network of cycle paths (figure 2).

DISTRICT	CAR	PUBLIC TRANSPORT	BICYCLES	MOPEDS & MOTORCYCLES	WALKING	OTHERS
Centrum	14%	10%	48%	3%	25%	1%
West	16%	21%	34%	2%	26%	1%
Nieuw-West	33%	14%	25%	2%	20%	6%
Zuid	17%	15%	36%	0%	31%	1%
Oost	19%	10%	41%	2%	27%	1%
Noord	39%	17%	16%	0%	27%	1%
Zuidoost	27%	31%	13%	1%	26%	2%
Amsterdam	22%	16%	32%	1%	27%	2%

Tab.1 Modal Split in Amsterdam. Data source: DIIV, 2013

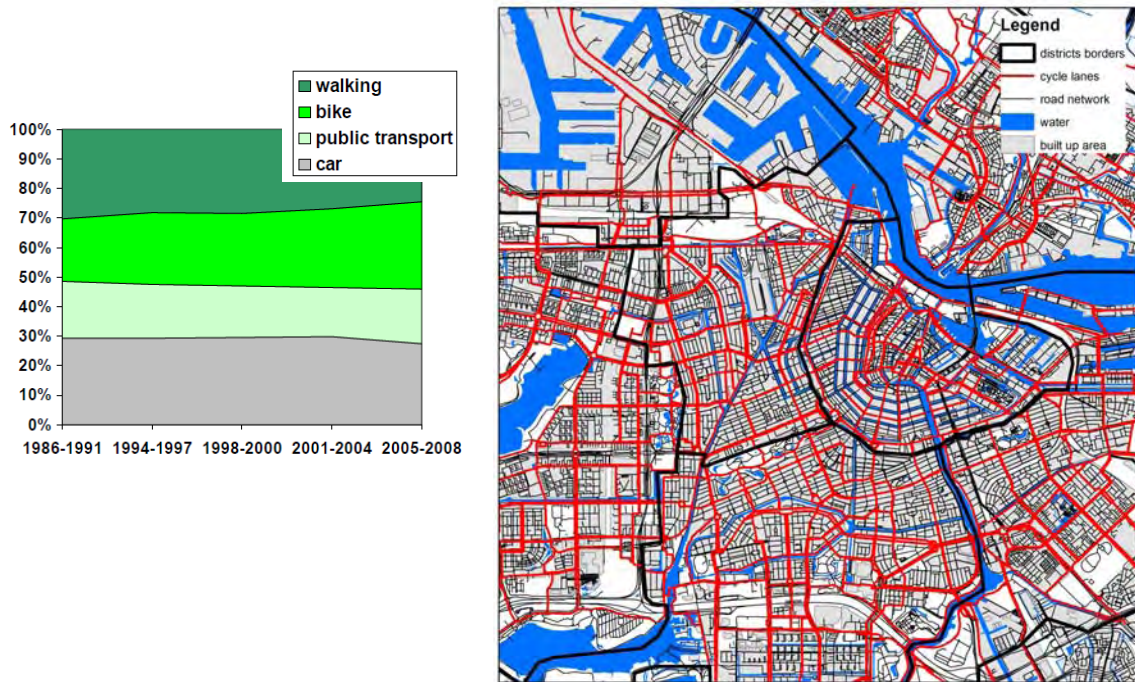


Fig. 1 and 2 Modal Split in the city of Amsterdam (1986-2008) (left). The cycle lanes network in the city of Amsterdam (right)

In addition, the public transport network in Amsterdam is widespread (fig. 3). There are a dense rail metro system (4 lines), a tramway network (16 lines), and a bus network.

The different public transport modes have completely integrated fares (not only in Amsterdam, but in the whole Netherlands), thanks to the OV-chipkaart, a smart card that can be used to pay buses, trams, metro and trains.

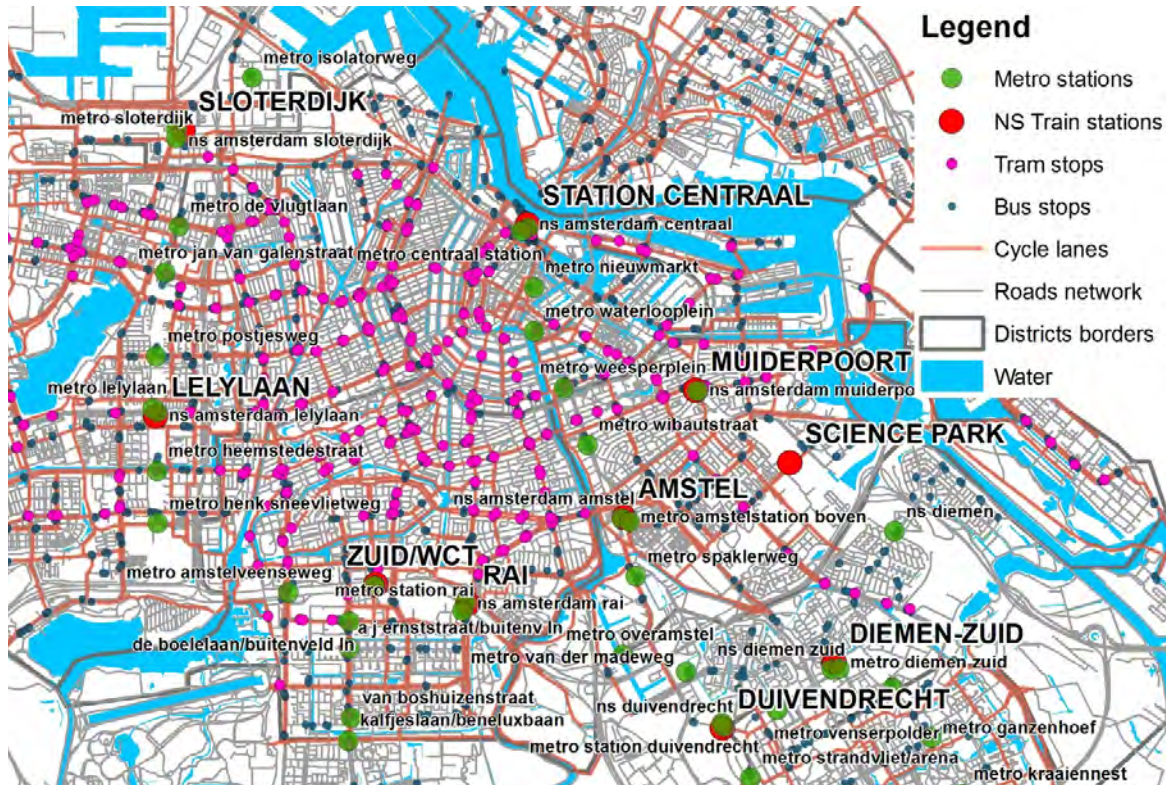


Fig. 3 The public transport system in the city of Amsterdam.

In Amsterdam there are examples of train stations area redevelopment, partially in accordance to Transit Oriented Development (TOD) principles: the ZUID station area is an emerging business centre while BIJMER ARENA is an emerging leisure centre. Both the stations are characterised by a mix of moderate to high density land uses that highly support public transport use (fig. 4).

Furthermore, one of the most important factors in lowering individual motorised vehicle use lies in the multimodality: the integration between bicycle and train is therefore highly encouraged (see section 2.2).



Fig. 4 The Bijmer Arena railway station in Amsterdam

But, which are the main land use and mobility policies implemented in Amsterdam in the last decades?

In 1990, a Dutch National report on transportation concluded that the growth of mobility by car should be reduced to a given target. Three main land use and transport policies have been implemented in Amsterdam (Le Clercq & Bertolini, 2003): a compact city policy, which aimed at concentrating activities and reducing trip

lengths and is part of wider efforts that involved the whole Randstad Holland area; a policy to expand the public transport system, particularly to new city extensions; and the ABC location policy.

The ABC location policy was designed by the National Government to help curbing the growth of car use and in reinforcing urban vitality. The policy aims to match the mobility needs of businesses and amenities with the accessibility of different locations according to the motto “the right business at the right place” (Martens and van Griethuysen 1999). The Dutch authorities rated business locations according to their accessibility profiles: “A” locations were well-connected by public transport, “B” locations were fairly accessible by both public and private transport and “C” locations were poorly connected by public transport, but had good road access (Martens and van Griethuysen 1999; Le Clercq and Bertolini 2003; Santos *et al.* 2010).

Among the best practices on sustainability and integration between urban and transport planning, Amsterdam has also developed a car-free neighborhood: GWL Terrein (see, i.a., Scheurer 2001; Foletta and Field 2011). GWL Terrein was built between 1996 and 1998 on the former site of the municipal water utility (Gemeente Water Leidingen). GWL Terrein is a compact neighbourhood consisting of high-density housing: it is composed by 625 residential units and covers an area of 6 hectares of land. It is located 2.5 km far from Amsterdam central station, and it is well connected by the public transport system: the tram line n. 10 links GWL Terrein with the city centre. Furthermore, it is served by car-sharing facilities.

GWL Terrein provides a compact mix of both social and market-rate housing, and addresses environmental concerns. Among the peculiarities of GWL Terrein there is a lack of parking spaces for the inhabitants to encourage a car-free environment: the average parking supply is 0.2 per unit.



Fig. 5 Pictures from the car-free neighborhood of GWL Terrein

2.2 MAPPING ACCESSIBILITY IN AMSTERDAM

To show some of the results of the policies implemented in Amsterdam, some GIS-based accessibility analysis in the city of Amsterdam were performed².

The first analysis aimed at assessing the integration between bicycle and train for commuters, while the second one assessed the accessibility to supermarkets by bicycle.

Amsterdam is served by ten railway stations of the Dutch Railways. Five of them are major stations served by intercity trains (Sloterdijk, Zuid, Amstel, Bijlmer Arena and Amsterdam Centraal), while others are served only by regional trains (Leylaan, RAI, Holendrecht, Muiderpoort and Science Park). To display the

² The analysis was conducted by Silvia Rossetti during a visiting research period at the University of Amsterdam hosted by Prof. Luca Bertolini.

accessibility to these stations, the GIS environment was used and isochrones were built, incorporating the catchment areas of the train stations by bicycle (fig. 8) and on foot (fig. 7). From the maps, it emerges clearly that the whole municipal territory is easily accessible by bicycle from the train stations: most of the territory can be reached in 5-10 minutes cycling. Bicycle is seen in Amsterdam as a complementary mode to trains, because it makes possible the combination between the speed of the train for the long distances and the flexibility of the bicycle to reach the final destination of the journey. The integration between railway/public transport and bicycle to reach the final destination is encouraged also by good bicycle parking facilities at the train stations (fig. 6).



Fig. 6 Underground bike storage at the ZUID (left) and at the AMSTEL (right) railway stations.

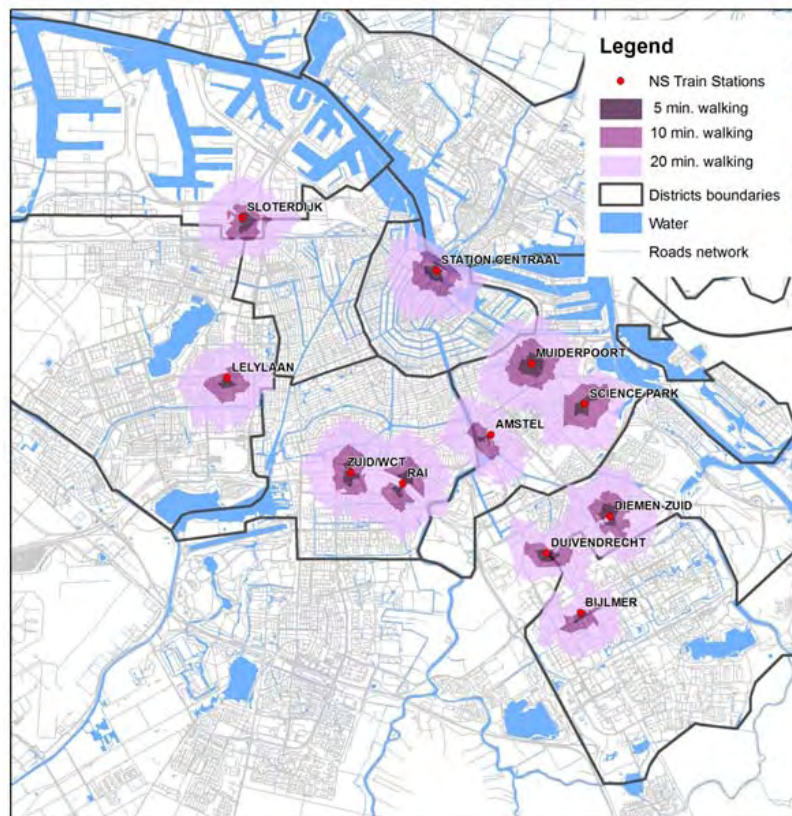


Fig. 7 Catchment areas of train stations by walking

Fig. 7 and 8 show the global accessibility level to the city and the catchment areas covered by the transport network (railways and bicycle paths). A subsequent step of the analysis is the assessment of the activities, opportunities and attraction points (services and facilities, jobs, ...) located on the territory. In this paper, this kind of analysis is provided with reference to retail services: supermarkets and grocery shops.

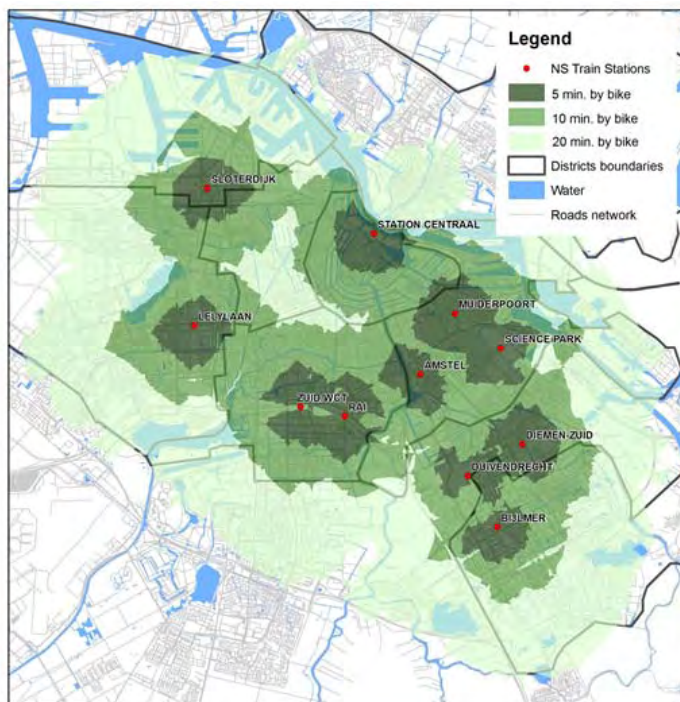


Fig. 8 Catchment areas of train stations by bicycle

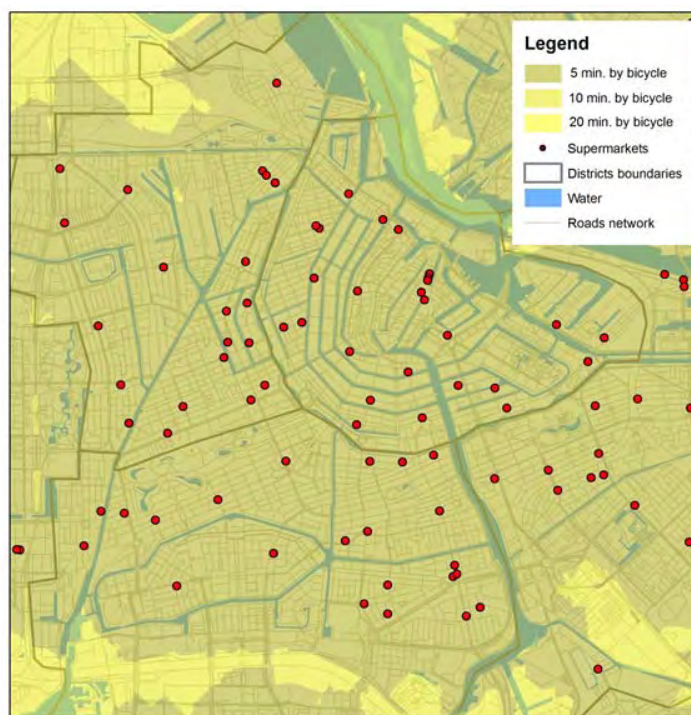


Fig. 9 Accessibility to supermarkets by bicycle in the City of Amsterdam

This services are often (at least in Italian cities) reached by car. Does it happens also in Amsterdam? Or not? To answer this question, a second analysis focused on supermarkets was performed. It aimed at highlighting that the above mentioned urban mobility structure in Amsterdam has major implications on the retail structure as well: instead of few big hypermarkets, to be reached almost exclusively by car, Amsterdam has a range of medium scale supermarkets, easily accessible by bicycle for a daily-based grocery shopping. Therefore, isochrones by bicycle were built from each supermarket in the area. Figure 9 shows that the whole city is dotted with supermarkets within 5 minutes by bicycle.

4 FINAL REMARKS

A people friendly approach may be seen as complementary, or even opposed, to the “smart city” concept. While the primary objective of a smart city is to optimise energy resources and transport management to make urban areas maximally efficient, a people friendly city approach re-centers the attention on people and individuals, favoring cities with enjoyable spaces and accessible to all (Tiboni and Rossetti 2012).

As a matter of fact, the quality of life is not only a land use issue, but also a mobility issue. A “people friendly” accessibility approach can therefore be conceived as a solution to better integrate land uses with the transport system. The final goal of this approach is an increase in the quality of life through the satisfaction of people's expectations (especially those of vulnerable users) to easily reach the opportunities they wish to engage with.

The case study of Amsterdam, as walkable and cycle friendly city, is noteworthy, because it incorporates different sets of policies and good practices that together lead to the creation of people friendly environments. It shows that to achieve a “people friendly” accessibility, infrastructural improvements to provide the city with more sustainable travel choices are not enough. Infrastructures and transport strategies must be fully integrated with urban planning policies and practices geared towards life styles less dependent on cars. To show an example (that also relates with the accessibility to supermarkets analysis provided for the City of Amsterdam), a strong policy focused on retail facilities was implemented in the city of Freiburg (see, i.a., Tiboni and Rossetti 2011), where suburban retail structures are only allowed to sell bulky goods (like furniture) in order to ensure access to basic shops within walking distances from dwellings and residential areas.

Furthermore, also road safety plans and policies plays a crucial role: it has been proofed that accessibility as strong interrelations with Road safety. According to a report by WHO Europe (2004), real and perceived safety concerns are an important barrier preventing many people from choosing walking and cycling as means of transport. Therefore, accessibility without safety is useless: a destination can be optimally accessible both from a transportation and an urban planning point of view, but if it is not safely accessible by the users (e.g. pedestrians have to cross a road with a lack of pedestrian protection facilities), it will be not perceived so accessible.

Finally, all policies and strategies should be accompanied also by a cultural and behavioural shift in the citizens, to be reached through educational and public awareness enhancing activities.

REFERENCES

- Banister, D. (2008), “The sustainable mobility paradigm”, *Transport Policy*, Elsevier, 15: 73-80.
- Benevolo, L. (2012), *Il tracollo dell'urbanistica italiana*, Editori Laterza, Roma-Bari.
- Bertolini, L. (2012), “Integrating Mobility and Urban Development Agendas: a Manifesto”, *The Planning Review*, Routledge, 48(1): 16-26.

- Busi, R. (2013), "L'accessibilità come valore etico e sociale", in Pezzagno M. (ed.), *Living and Walking in Cities. Cultures and Techniques for Accessibility*, Egaf, Forlì.
- Busi, R. (2010), "For a Safer City. A Friendlier City. And a More Beautiful City", *TeMA*, 3(SP): 39-46.
- Busi, R. (2011), "Methods, Techniques and Policies for Mobility in the Friendly City", *TeMA*, 4(2):7-18.
- Busi, R. (2012), "Multiplicity and complexity in interpreting the meaning of 'friendly city'", in Pezzagno M., Docchio S. (eds.), *Living and walking in cities. Sustainable mobility and road safety*, XVIII International Conference, Egaf, Forlì.
- Campos Venuti, G. (1999), "Il trasporto su ferro per trasformare le città: Roma a confronto con le metropoli europee", *Urbanistica*, 112: 37-46.
- Campos Venuti G. (2010), *Città senza cultura. Intervista sull'Urbanistica*, Editori Laterza, Bari.
- Dutch Ministry of Transport and Public Works (1990), *Second Transport Structure Plan*, Ministry of Transport and Public Works, The Hague.
- European Commission (2011), *White Paper. Roadmap to a Single European transport Area. Towards a competitive and resource efficient transport system*, EU Publications office, Brussels.
- European Commission (2012), *EU transport in Figures. Statistical pocketbook 2012*, Publication office of the European Union, Luxembourg.
- Foletta, N., Field, S. (2011), *Europe's Vibrant New Low Car(bon) Communities*, ITDP, New York.
- Handy, S. (2002), *Accessibility vs Mobility. Enhancing Strategies for Addressing Automobile Dependence in the U.S.*, Institute for Transportation Studies, UC Davies.
- Hull, A., Silva, C., Bertolini, L. (2012), *Accessibility Instruments for Planning Practice in Europe*, Clássica Artes Gráficas SA, Portugal.
- Le Clerq, F., Bertolini, L. (2003), Achieving Sustainable Accessibility: an Evaluation of Policy Measures in the Amsterdam Area, *Built Environment*, 29(1): 36-47.
- Marshall, S. (2001), "The challenge of sustainable transport", in Layard A., Davoudi S., Batty S. (eds.), *Planning for a sustainable future*, Spon, London, 131-147.
- Martens, M.J., Van Griethuysen, S. (1999), *The ABC Location Policy in The Netherlands. The Right Business at the Right Place*, TNO-INRO, Delft.
- Salzano, E. (2003), *Fondamenti di urbanistica. La storia e la norma*, Editori Laterza, Roma-Bari.
- Santos, G., Behrendt, H., Teytelboym, A. (2010), "Part I: Policy Instruments for Sustainable Road Transport", *Research in Transportation Economics*, 28(1): 46-91.
- Scheurer, J. (2001), *Urban Ecology. Innovations in housing policy and the future of cities. Towards sustainability in neighbourhood communities*, Murdoch University, Perth.
- Tiboni, M., Rossetti, S. (2012), "L'utente debole quale misura dell'attrattività urbana", *TeMA*, 5(3): 91-102.
- Tiboni, M., Rossetti, S. (2011), "The Role of Urban Planning into a long-term Climate Friendly Transport Vision", in Radmilović Z., Čišić D. (eds.), *Shaping Climate Friendly Transport in Europe: Key Findings & Future Directions*, University of Belgrade Faculty of Transport and Traffic Engineering, Belgrade.
- Tira, M. (1999), "Comfort, sicurezza e accessibilità", *Paesaggio Urbano*, mag-giu, 58-63.
- World Business Council for Sustainable Development (2001), *Mobility 2001. World mobility at the end of the twentieth century and its sustainability*, Atar Roto Presse, Geneva.
- World Health Organization Regional office for Europe (WHO Europe) (2004), Racioppi F., Eriksson L., Tingvall C., Villaveces A. (edited by), *Preventing Road traffic Injury: a Public Health Perspective for Europe*, WHO, Copenhagen.

IMAGES SOURCES

Fig. 1: O+S Amsterdam (Bureau Onderzoek en Statistiek). Figg. 2, 3: Elaborations edited by Silvia Rossetti based on data provided by the City of Amsterdam (2013). Figg. 4, 5, 6, 7, 8, 9: Pictures and elaborations edited by Silvia Rossetti (2013).

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