WHAT IS HAPPENING TO CARS IN URBAN SPACES?

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INTRODUCTION

Until recently cars have been dominating many European cities, even while urban mobility in has been a multi-modal affair as well. Indeed, cars still dominate the modal split as a result of local policy makers' investment strategies and urban planner blueprints that started in the 1930s. The dominant discourse frames cars as a matter of principle as viable vehicles that should be able to enter the city and circulate uninterruptedly at considerable speed to reach its full potential as a vehicle of modernity. The vision has led to urban battles over how to create space for car traffic and land use dedicated to parking. At the same time while dominating in most cities, the car-oriented urban vision has been contested from the start.

The counter movement that first emerged as a pointed critique of the car-governed city among intellectuals during the late 1950s and early 1960s (Guy Debord, Lewis Mumford, Jane Jacobs) gained steam as a serious social and political movement during the 1970s. Organized citizen resistance to the car had been there from very beginning (1920s), but around 1970 a discourse emerged that offered alternative urban visions and planning solutions. In many cities in Northern and Western Europe, such alternative ideas linked future urban mobility to urban liveability and planning that first emerged among civil society organizations before finding their ways to professionals and public policy makers. The impact has been significant even though the success of well-referenced group of cities and neighbourhoods (like Freiburg-Vauban, Copenhagen, the Dutch *woonerf* (living yard/neighbourhoods) have been slowly adopted in policy practice in Western Europe or failed to get substantial attention in the Eastern and Southern cities of Europe. Nevertheless, over the last decade or so, the dominant position of cars in urban mobility seems to be changing in a more fundamental fashion.

In this paper, we present a number of developments that have gained momentum recently in seriously challenging the car-oriented city by putting them into a long-term perspective. We will offer a rough periodization in two distinct consecutive phases, which we label 'defensive' and 'offensive'. We describe several trends and zoom on two cities in particular: the car-oriented Swedish capital of Stockholm and Dutch city of Delft, home to the country's premier urban planning university. The Swedish capital, despite the development of an efficient public transport system, was one of the first cities of Europe to radically modernize towards a car-governed city in the immediate postwar period but also relative late in terms of transitioning away from the car after the 1970s. Delft represents a wide range of mid-sized Dutch cities with a historic city centre. As the site of the first Dutch technical university, it has been a site (in today's parlance a "Living Lab") for the development of urban planning as a discipline. In short,

we offer a long-term perspective to ponder the question whether the current debate over the car's urban position constitutes a paradigm shift.

CAR DOMINANCE IN URBAN MOBILITY

Looking at cities like Paris, London, Berlin, Amsterdam, and Copenhagen one could get the impression that in mobility in European cities public transport and non-motorized have a large share in the modal split. In reality, these cities are exceptional in a European urban landscape dominated by cars. And even in these five cities, cars dominate in their larger urban regions.

We have some European data to indicate the dominance of car use in urban mobility that include the suburbs. The EPOMM database contains 313 cities of over 100.000 inhabitants. This database, although rather weak, offers the only available overview of the modal split in such a wide set of European cities.[1]

Table 1. Modal split (trips) European cities, TEMS database, EPOMM, 2014

Number of inhabitants	Number of cities	Cars > 50 % of modal split	Number of cities where modal split for PT is higher than for cars
> 1.000.000	28	11 (40%)	7
500.000 – 1.000.000	41	14 (35%)	4
200.000 – 500.000	104	53 (51%)	6
100.000 – 200.000	140	88 (63%)	5
Total	313	166 (53%)	22

The database suggests that in 53 % of the European cities (ca. 70 % of cities with over 100.000 inhabitants are included) cars are responsible for more than 50 % of the trips. In only 7 %, public transit represents a higher percentage of trips than the car. Car dominance in the modal split increases as the number of a city's inhabitants decreases.

Looking at Europe regionally, we see that in Northern Europe (Scandinavia plus Scotland) most cities (65 %) have a car share under 50 %. In Western Europe, 40 % of the cities show a car share lower than 50 % (in particular German and Dutch cities, while most British and French cities in the North are above 55 % car share). Southern Europe is most car-oriented of all, with only 35 % of the cities with car shares below 50 %—most Italian and Portuguese cities score higher than Spanish and Southern French cities in terms of car share. With a tradition of strong investments in public transit in communist era, urban Eastern Europe is still less car-oriented, with 90 % of cities having car shares below 50 %. Public transit and (often connected to it) walking still dominates. The public transit domination in the former communist countries is

[1] Looking at the EPOMM statistics (http://www.epomm.eu/tems/result_cities.phtml, accessed 25.5.2015) many mistakes can be seen. For example, Brest in France is not a city with a population over a million, Frankfurt and Sevilla appear twice, and many cities are missing, as this database contains some 315 of the 430 cities mentioned in the title. However, this still is the overview on modal splits in European cities.

changing rapidly, however: ever since policy divestment of public transit systems after the fall of the Berlin Wall, Eastern European cities have been moving fast towards a greater car orientation.

How can we square the car's dominance in EPOMM's large data sets with the rich narrative accounts of cycling cities and pedestrian zones paired with calming traffic from Amsterdam through Munich to Strasbourg? First of all, the best-practice literature tends to present urban mobility solutions of cities where professionals and politicians fully cooperated with little attention to failures. The EPOMM database contains 19 cities that show the result of such a successful cooperation with a modest car share (less than 35 %) in the modal split (table 2).

Table 2. European cities (N, S, W) with car's modal share < 35 %

Inhabitants	Cities
> 1.000.000	Berlin, Madrid, Paris, Vienna, Barcelona
500.000 – 1.000.000	Frankfurt, Helsinki, Copenhagen
200.000 – 500.000	Zurich, Karlsruhe, Newcastle, Freiburg
100.000 – 200.000	Odense, San Sebastian, Burgos, Basel, Bern, Gottingen, Jena

A pattern can be seen: a focus on the greatest cities, a focus on university towns, and a focus on Germany and Switzerland (with a position of Spain that needs further elaboration). This focus on the largest cities and on university towns resonates in the literature, in which Berlin, Copenhagen, and Freiburg are celebrated as champions.[2]

More fundamentally perhaps, the two different accounts (aggregated data vs. narratives of case studies) point to the diverging stories between inner cities (reorienting towards pedestrianism, cycling, and public transit) on the one hand and city's suburbia combined with surrounding urban regions (with car-oriented commuting traffic) on the other hand. The cycling city of Amsterdam is a case in point. The latest 2008 modal split numbers show the growing difference between the inner and outer ring. While the average for the whole city shows a cycling modal share of 47% versus 31% for cars, for the inner ring the figures diverge much stronger: 62% vs. 13%.

EARLY DISCOURSES ON URBAN MOBILITY, 1960s–1995

In the late sixties and early seventies, urban citizens began to counter the car-oriented policy plans prompted by a critique of the car and by environmental concerns. Car-orientated plans were contested everywhere. For example in Freiburg, "public opinion shifted away from supporting automobile growth-due to various environmental and social problems caused by the car and the oil crisis of 1973."[3] Later, in the 1980s and 1990s activists and forward-looking

[2] For an overview on Freiburg, see Ralph Buehler and John Pucher, "Sustainable Transport in Freiburg: Lessons from Germany's Environmental Capital," *International Journal of Sustainable Transportation* 5, no. 1 (2011).
[3] Ibid., 53. See also Adri Albert de la Bruhèze and Frank Veraart, *Fietsverkeer in praktijk en beleid in de twintigste eeuw* (Eindhoven: Stichting Historie der Techniek, 1999); Martin Emanuel, *Trafikslag på undantag: Cykeltrafiken i Stockholm 1930–1980* (Stockholm: Stockholmia, 2012), 279–82.

policy makers also began to understand that through urban planning, non-motorist mobility measures could be key instruments in creating "social cohesion."[4]

Protesters came to articulate an appreciation for urban centres—often with historic districts—that was a break from the past, in which cities had gained a reputation as noisy, polluted, and low quality. To be sure, pedestrian organizations had been active in defense of non-motorized traffic since the 1930s.[5] It was in response to inner-city decline that planners designed the first pedestrian zones, retaking parts of the domain of the car.[6] German cities were rather early in designing pedestrian zones, following the example first set by Dutch city of Rotterdam through the shopping street of Lijnbaan in the mid–fifties. UK and France followed in the late seventies.[7]

Even Sweden with its early path towards car-oriented city planning, numbers of pedestrianisation suggest an exponential growth. Between 1959 and 1964, 25 pedestrian streets were implemented; another 91 were realized in the next five years—and numbers were growing. A prominent Swedish traffic planner later characterized the 1960s and 1970s as the "pedestrian street epoch". Already in the late 1950s, plans were drawn up to turn the city centre of the Swedish university town, Uppsala, into a pedestrian zone, inspired by German examples. In 1960, a Uppsala delegation went on a study tour to the Germany towns of Goslar, Kassel, Köln, Dortmund, Münster and Kiel. Initially, local businessmen were hesitant, even hostile, towards pedestrian streets, fearing they would lose what they considered their most important customer group: motorists. In drawing up redevelopment plans for central business centres, however—in Uppsala and also in Stockholm—around the city center pedestrian streets were paired with widened streets and car parking to secure short walking distances. Pedestrian streets were more than anything a way to carve out a space for pedestrians (presumably for shopping motorists) in city centres otherwise dominated by cars.[8]

Another discourse arose from the public's outrage over the skyrocketing traffic accidents in the early seventies. As automobility took off, death and injured people in traffic increased ever faster. The social protest against speeding, accidents, and cars existed ever since the 1920s. Yet it was the late 1960s counter movement, which articulated a more fundamental critique against the blueprints of the car-governed city with alternative traffic models like traffic calming. *Traffic calming* were material design like narrowed roads and speed bumps (aka "sleeping policemen") and policy measures to slow down or reduce motor-vehicle traffic and to improve safety for pedestrians and cyclists. During these decades, *pedestrianism* and

[4] Massimo Moraglio, "Big Struggle: Public Transport vs. Automobility," in *How Smart is Sustainable Mobility? How Sustainable is Smart Mobility?* (Eindhoven University of Technology2015).
[5] Barbara Schmucki, "Against 'the Eviction of the Pedestrian'. The Pedestrians' Association and Walking Practices in Urban Britain after World War II," *Radical History Review*, no. 114 (2012). Regarding pedestrians' resistance at the emergence of automobility in the U.S., see Peter D. Norton, *Fighting traffic: The dawn of the motor age in the American city* (Cambridge, Mass.: MIT Press, 2008).
[6] Carmen Hass-Klau, *The pedestrian and city traffic* (London: Belhaven, 1990).
[7] Cédric Feriel, "Pedestrians, cars and the city. From opposition to cohabitation," *Metropolitics* (2013).
[8] Per Lundin, "Mediators of modernity: Planning experts and the making of the 'car-friendly' city in Europe," in *Urban machinery: Inside modern European cities*, ed. Mikael Hård and Thomas J. Misa (Cambridge, Mass.: MIT Press, 2008); Christina Thunwall, *Genomfart och gågata: Om trafikmiljön i centrum av tre svenska städer efter 1945* (Gävle: Institutet för bostads- och urbanforskning, Uppsala Univ., 2002), 61–67.

cyclism emerged also as a movement that engaged with urban planning rather than through protest alone.

European traffic calming started as a grassroots movement in the late 1960s fuelled by community-based parent organizations (e.g. “Stop the Child Murder”) fighting for the safety of their children that had an early start in the Netherlands--and Delft in particular. Activists believed streets should be living streets (where children could play) rather than speed corridors for motorists. The traffic calming idea came to Delft by civil-society protest at first: residents turned some streets into an obstacle course for the motorized to curb motorization on their doorstep and provide safe spaces for their children to play. Then protest turned into a planning concept. In 1970, Delft engineer and activist Joost Váhl introduced the traffic bump (*verkeersdrempel*) as a speed-reduction method. Moreover, instead of the model of dividing traffic into “slow” and “fast” lanes, activists and selected planners introduced “traffic calming.”

The principles of the *woonerf* were embraced nationally in the mid-1970s and became the organizing principle for the neighbourhood of Tanthof-East, built in the 1970s. Its fine-grained networks of paths and footbridges were slightly disorienting, particularly for visitors, and gave occasion to feelings of disconnection both within the neighbourhood and with regard to the connection to the central parts of Delft. The adjacent neighbourhood of Tanthof-West, built slightly later, returned to straighter lines, while retaining the quality of its *woonerven*.[9] The expansion of the *woonerf* in Delft did not go uncontested. Their technical features, such as speed bumps, made them more expensive to build than a straightforward road, putting pressure on public finance. Moreover, they did not initially improve safety, for one because motorists disregarded the speed limits to which they were still unaccustomed.[10] A three-tier cycling network provided the connecting tissue for the city from the 1980s onwards.

The Dutch state responded to the social movement. In 1976, the Ministry of Transport and Public Works created a planning standard. All Dutch suburbs, would have a Traffic restraint precinct (*Woonerf*). And, cooperating with the Bicycle Union, the government developed design standards for bicycle infrastructures. Drachten and Delft became the international model cities for these new traffic models. Many countries and cities outside the Netherlands followed these best-practices and design standards.[11] The social slow-street movement (designed for 30 km/h or 20 m/h) found its way in policy circles during the 1980s through the application of traffic calming principles to intercity highways in small Danish and German towns and the redesign of urban arterials in area- wide schemes, principally in Germany and France. Traffic calming came to the U.K. also in the early eighties.

The Stockholm introduction and fate of the Environmental Traffic Management (ETM) schemes serves as a further example of the dynamics between grass-root activism, political leaders, and municipal planners. It also illustrates how the introduction of policy interventions

[9] Timothy Beatley, *Green urbanism: Learning from European cities* (Washington, DC: Island Press, 2000), 142–43.

[10] “Kinderen niet veilig in woonerf Delft”, *Het Vrije Volk*, 5 June 1976.

[11] Delft Architectural Studies on Housing, *The Woonerf Revisited* (Rotterdam: Nai Publishers, 2010); Peter Owen Engelke, “Green City Origins: Democratic Resistance to the Auto-Oriented City in West-Germany, 1960-1990" (Georgetown University, 2011).

only curbed urban automobility partially, but not fundamentally. In the late 1960s urban automobility supported by technocratic planning was being questioned on several grounds. Urban environmental groups took to Stockholm's streets and eventually managed to press local politicians to re-evaluate the rationalist redevelopment of the central business district and car-oriented infrastructures such as motor routes around and through the city center paired with large car parking facilities. In their place, so-called environmental traffic management (ETM, in Swedish "trafiksanering") schemes emerged as the main traffic policy instrument of the 1970s. Traffic problems should be solved without major interventions in the urban fabric, instead favouring measures that could be implemented in the short term and which limited and regulated car traffic and also accommodated other modes of transport. Residential areas would be divided into traffic zones with few opportunities for through car traffic, thus providing pedestrians and cyclists with calmer environments within the zones. Although there were obvious similarities to traffic calming, the ETM schemes in Stockholm and many other Swedish cities were rather inspired by the British Buchanan report *Traffic in Towns* in 1963, that aimed at traffic differentiation and the reduction of motorized through traffic rather than peaceful coexistence of different modes in the same urban space.[12]

The ETM programs, however, became a battle field from the start. Although there had been strong consensus regarding the principles of the programs in 1970, there were fierce debates when the same principles boiled down to specific proposals. Not least local businesses responded negatively, fearing these traffic schemes would prevent motorists from coming. In 1973–74, a large "traffic consultation" was held as part of the government's new participatory design process to carry out traffic planning. Initially, the alternative proposals, in particular for the city centre, were radical in terms of opposing urban automobility—for example by proposing closings of main streets—but they were progressively eroded as these participatory-based designs were recast by urban planners internally in official planning documents. Meanwhile, as the work with the schemes proceeded, interest from the political leadership vanished when a right-wing majority came into power in 1976 fuelled by direct hostility of a suburban electorate. The new Conservative Commissioner of Finance, sensitive to the heavier resistance and lobby efforts from motorists in the late 1970s, resisted restrictions on urban automobility. Many of the remedial measures were never realized, while many "hard" measures such as street closures were replaced by "softer" ones: bans on cars by means of signage, speed limits, and narrow streets sections. Here we also see the tensions between inner city urbanites and suburban oriented residents.

Parking was another big issue. The banning of cars from some streets to return them to residents in the seventies made it necessary to construct parking facilities to accommodate cars in the cities. Because the required public investments from the city had to be paid for without raising general taxes, car parking now came at a price for individual car owners. In this *first round of parking policy*, however, the focus was on providing space, on accommodating the cars, rather than on managing and guiding the flow of car traffic in cities. Separate

[12] This section and the next builds on Emanuel, *Trafikslag på undantag*, 311–16; Stig Holmstedt, *Ett halvsekel i Stockholmstrafiken: Politik, planing och utbyggnader* (Stockholm: Stockholmia, 2012), 155–203; Tom Miller and Ralf Österberg, *Medborgarinflytande i kommunal planering: Försök till utvärdering av trafiksamrådet i Stockholm 1973–1974* (Stockholm: Statens råd för byggnadsforskning, 1977). For more details in English and full references, see the forthcoming article Martin Emanuel, "A renaissance cut short: Cycling and the car-oriented regime in Stockholm, ca 1965–1985," (2015).

pedestrian zones, traffic calming, and car-parking creation shared one element; all were designed as separate infrastructures and spaces. Moreover, these separate infrastructures combined with traffic calming measures were meant to benefit the better circulation of cars. Even *Woonerven* (living yards) were ultimately designed to accommodate car use as they were separate zones away from the car-oriented thorough fares and the residents within them all were equipped with garages. [13][14]

The concept of the street as *Shared Space* changed this equation: the street is seen as a space for everyone. There is no street-space allocation for the exclusive use of one transport mode nor separate infrastructures. In this model, all modes should be able to use the street space; a shared use should take place.[15] This requires a behavioural change of all road users. To be sure, the shared space is still a contested concept.[16] The first outlines were conceived in the notion of urban liveability made famous by American journalist Jane Jacobs. In her book *The Life and Death of Great American cities* (1961) she argued cities should be built on a human scale, functioning as engines for social cohesion in society.[17] Liveability can be defined as the sum of the factors that add up to a community's quality of life—including the built and natural environments; economic prosperity; social stability and equity; educational opportunity; and cultural, entertainment and recreation possibilities. Liveability is a comprehensive, but in essence a political term. In relation to urban mobility liveability is about giving all households access to a transport system that is socially inclusive and sustainable. In this perspective, a policy focus is on investing in public transit and in designing shared urban spaces.

Inspired by the work of Jane Jacobs and others, many social movements discourses started in the Netherlands, in Germany, in Switzerland, Denmark or Sweden—often in university towns—started to interact with politicians and policy makers. These towns (like Karlsruhe and Freiburg, Basel and Zurich, Delft and Amsterdam, Copenhagen and Odense, and Gothenburg and Lund, to name a few) have been "incubation environments" for new concepts of urban mobility. The concepts have spread from these countries and towns towards the larger cities as well as to countries like France and the U.K. Southern Europe was slow to follow. Barcelona was the exception, with the early adoption of bicycle share plans funded by parking fees to curb automobility.

The concepts embracing the street as a vibrant living space emerged at a time when most European cities were losing (lower) middle-class residents who moved to the suburbs. Following blueprints from U.S. car-governed planning models (in the context of the Marshall Plan) the urban future was often defined in suburban, sprawl, and deconcentration terms. Prompted by urban social movements in collaboration with some progressive urban planners and local politicians, this trend was reversed. The car-dominated blueprints, and their related

[13] See also: Ruth Oldenziel, and Adri A. de la Bruhèze. "Contested Spaces: Bicycle Lanes in Urban Europe, 1900-1995." *Transfers* 1, no. 2 (2011): 31-49.
[14] Reid Ewing, *Traffic Calming: State of the Practice* (Washington, D.C.: Institute of Transportation Engineers, 1999).
[15] An overview on Shared Space is presented in Auttapone Karndacharuk, Douglas J. Wilson, and Roger Dunn, "A Review of the Evolution of Shared (Street) Space Concepts in Urban Environments," *Transport Reviews* 34, no. 2 (2014).
[16] Rob Methorst et al., "Shared Space: Safe or Dangerous? A contribution to objectification of a popular design philosophy," in *WALK21 conference* (Toronto2007).
[17] Jane Jacobs, *The death and life of great American cities* (New York: Vintage, 1961).

designs, could lead to investments for alternative planning models when the active citizens, transport professionals, and the leading politicians at three levels—city, region, and nation—converged and joined forces. At the same time, national investment in local governments decreased overall, leaving local politicians to fend for themselves. This also gave them more leverage to find local solutions.[18]

NEWER DISCOURSES ON URBAN MOBILITY, 1995–TODAY

What is the legacy of these earlier discourses since 1970s through the 1990s? During the 1960s and 1970s, civil society organizations dominated the alternative urban planning ideas. During the 1980s and early 1990s, public policy circles together with progressive politicians implemented local best practices. These were niche developments. Since the 1990s, we note two developments, however. The first is a transnational movement of urban planning and mobility concepts. There has been an explosion of national and international networks and platforms of transport professionals.[19] Around 2006, the EU has sponsored several European wide interurban programs from OBIS (Optimizing Bicycle Sharing European Cities) to NICHES (New and Innovative Concepts for Helping European Transport Sustainability) and CIVITAS (Cleaner and Better Transport in Cities), to name just a few. Secondly, we see a recent interest of national governments and corporations in the city for the first time. One example is the bicycle share program sponsored by outdoor advertising multinationals like the American Clear Channel (Bicing in Barcelona and dozens other world cities) or the French J.C. Décaux (Vélolib in Paris and many others) since 1996 and car manufacturer Daimler Benz shared-car program car2go since 2008 with 23 cities and over 1 million members worldwide.[20] Together it reinforces a growing feeling among broader audiences of stakeholders that the urban renewal discourse is important in the next phases in urban mobility.

The latest period also witnessed policy attempts to bring it all together. Between 1995 and 2010 three new developments can be discerned. Cities embraced a new and policy-based discourse called *mobility management*. Some cities tried to create *pricing policies for car use*, but rather often failed. Only London, Stockholm, Gothenburg, and Oslo, plus a few smaller cities, succeeded in creating pricing policies.

The case of Stockholm illustrates how implementations do not always align with the initial purpose of a policy intervention. Road tolls and congestion charging had been discussed in Stockholm with varying intensity since 1970, and also been part of several serious proposals. Following the 2002 election it resurfaced as a policy instrument for curbing urban automobility. The small Green Party used its unique pivotal position and brought the

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[18] Maxime Huré, "Les réseaux transnationaux du vélo; Gouverner les politiques du vélo en ville. De l'utopie associative à la gestion par des grandes firmes urbaines (1965-2010)" (Université Lyon 2 Lumière, 2013); Benjamin R. Barber, *If Mayors Ruled the World: Dysfunctional Nations, Rising Cities* (New Haven: Yale University Press, 2013).

[19] Like for example the Polis Network, created in 1989 by city governments throughout Europe with the aim to create networks for European cities and regions for innovative transport solutions, or the already mentioned EPOMM platform for mobility management.

[20] Huré, "Les réseaux transnationaux du vélo; Gouverner les politiques du vélo en ville. De l'utopie associative à la gestion par des grandes firmes urbaines (1965-2010)."; "Cars2Go", http://en.wikipedia.org/wiki/Car2Go (accessed 10 June 2015).

congestion charging into the negotiations with the Social Democrats locally in Stockholm and on the national level. In spite of immense opposition, political tensions, as well as complex juridical considerations, a full-scale congestion charge trial was carried out between January and July 2006 followed by a referendum in the fall of 2006 before being introduced in 2007.[21]

After the 2006 election, when a right-wing majority came into power both locally in Stockholm and nationally, things took an unexpected turn. Although the pilot had been a huge success in reducing car traffic levels (20–25 percent decrease passing the city centre border), traffic-related exhausts in the city centre, traffic jams and travel times in the road network, the new majority, while opting to make the scheme permanent, decided to allocae the revenues for road investiments rather than public transit improvements. [22] The resulting large traffic investment package for the Stockholm region included many road and rail projects that had been discarded in the past. In this sense, congestion charging, initially intended to curb urban automobility, had been skewed to make possible road projects which would otherwise not have been realized.[23]

Mobility management is defined by EPOMM (The European Organisation on Mobility Management, created in 1999) as 'a concept to promote sustainable transport and manage the demand for car use by changing travellers' attitudes and behaviour. At the core of Mobility Management are "soft" measures like information and communication, organising services and coordinating activities of different partners. "Soft" measures most often enhance the effectiveness of "hard" measures within urban transport (e.g., new tram lines, new roads and new bike lanes). Mobility Management measures (in comparison to "hard" measures) do not necessarily require large financial investments and may have a high benefit-cost ratio.' Mobility management is broader than urban mobility, also focussing on changing patterns in commuting, and in work related traffic.

In most cities, *cycling* was politically marginalised in the eighties, as cycling needed its own infrastructure. Thanks to local activists, local politicians, a health focus of urban residents, and Liveable City protagonists (like Jan Gehl, a Danish architect, the Dutch Provo's White Bike plan (1965) and urban planner Joost Váhl), cycling was reintroduced as a flexible form of urban transport.[24] While bicycle lanes originally had been introduced to make way for cars, bike-dedicated infrastructures became the focal point of globally inspired and locally based activists in alliance with green politicians after great political battles. From Amsterdam, Rennes to Barcelona and Budapest.

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[21] For details see Anders Gullberg and Karolina Isaksson, eds., *Congestion taxes in city traffic: Lessons learnt from the Stockholm trial* (Lund: Nordic Academic Press, 2009).

[22] Jonas Eliasson, "Lessons from the Stockholm congestion charging trial," *Transport Policy* 15, no. 6 (2008).

[23] Gullberg and Isaksson, *Congestion taxes in city traffic: Lessons learnt from the Stockholm trial*; Tim Richardson, Karolina Isaksson, and Anders Gullberg, "Changing Frames of Mobility through Radical Policy Interventions? The Stockholm Congestion Tax," *International Planning Studies* 15, no. 1 (2010).

[24] Jan Gehl, *Cities for people* (Washington: Island Press, 2010). Often mentioned in literature on liveable cities is the 10 Step Programme of Copenhagen: 1. Convert streets into pedestrian thoroughfares, 2. Reduce traffic and parking gradually, 3. Turn parking lots into public squares, 4. Keep scale dense and low, 5. Honour the human scale, 6. Populate the core, 7. Encourage student living, 8. Adapt the cityscape to changing seasons, 9. Promote cycling as a major mode of transportation, 10. Make bicycles available.

In Stockholm, strong support for cycling policy as instrumental in pursuing their urban environmental profile had come from smaller political parties. The momentum abated in the 1980s, yet cycling policy interest slowly increased again in the 1990s. Policy makers were now ahead of political parties. The local Stockholm Party found the bicycle plan developed over the decade unambitious and managed to use its bargaining position after the 1998 election to press the right-wing parties into a much more ambitious—and contentious—program for extending the bicycle network. Nevertheless, the party managed to push for a rapid implementation of the amended plan before it lost its seat in the Municipal Council in disastrous election. In the following term the right-wing majority in the City of Stockholm showed little interest in the issue, but in the 2010 local election campaign, cycling policy resurfaced as a key political issue. In response, the right-wing coalition has re-evaluated the bicycle—pushed by the oppositional parties, media and the general public—making it an essential part of a strategy to make the city "accessible" and stand out as an "attractive" one.[25]

Things are moving fast in Delft as well. In 2004, the central historic market square transformed from a parking lot to a pedestrian zone allowing bikes. The square symbolized municipality's broader demotorization (*autoluw*) policy since June 2000. Initially, the policy sought to improve the quality of the northern part of the historic city center for tourists to boost the economic climate. Interim research indicated that this goal was not achieved, yet by that time the demotorization policy had turned into an end in itself.[26] Over time, visitors and residents alike were satisfied with the greening of the public space. Political support was unusually broad. Even alderman Boelens from the local traditional pro-car party (liberal VVD) campaigned with the slogan "terraces without exhaustion fumes" ("Terrassen zonder uitlaatgassen").[27]

Demotorization subsequently spread to the university campus—the second most visible public space in town. The Delft University of Technology board then set a policy to transform the campus, (Mekelweg traffic thoroughfare), into park setting devoid of cars to encourage social interaction and facilitate a creative environment for students.[28] The mobility shift also represents a policy attention away from car-owning staff to cycling students and the university community at large.[29]

The car thus now plays second fiddle in these two iconic city parts, while non-car modes have become more important throughout the city. Furness rightly claims that cyclists have often been forced 'to literally and figuratively concede the right-of-way to the car,' but the reverse is currently happening in Delft--and many other Dutch cities.[30] In 2010, the Delflandplein, a major traffic light intersection and safety hazard in Delft's traffic system, was replaced with a

[25] Martin Emanuel, "Waves of Cycling Policy: Policies of Cycling, Mobility, and Urban Planning in Stockholm since 1970," (2015).
[26] Hans Stol, *A Framework for Evidence-Based Policy Making Using IT: A Systems Approach* (Delft: Eburon, 2009), 89–91.
[27] Municipal Council Delft, minutes meeting 25 November 2010, p.14. As a generally pro-car owner political party, the VVD had a lukewarm relationship with the *autoluw* policy overall.
[28] Delft University of Technology, "Update instellingsplan TU Delft 2007-2010: Prioriteiten 2009-2010" (Delft, July 2009), 30.
[29] The same shift is occurring at Eindhoven University of Technology.
[30] Zach Furness, *One Less Car: Bicycling and the Politics of Automobility* (Philadelphia, PA: Temple University Press, 2010), 49.

roundabout with a single car lane on which cyclists and pedestrians received right-of-way and car lanes were reduced to one in each direction. The change did not go uncontested; nevertheless, the gains have been impressive even for motorists. Traversing the Delflandplein by car has been reduced by 50%. At two main feeder roads of the roundabout, car lane reduction from 4 to 2 (at Papsouwselaan), traffic light removal (at Voorhofdreef) combined with right-of-way for bicycles and zebras for pedestrians, underline the fact that cars have become visitors to the urban fabric rather than its organizational principle.

This is also visible beyond the city center. To encourage bike rides for medium and long-range commutes, the municipality initiated a 16 km high-speed bike route (Zoefroute De Lier-Pijnacker-Delft), claiming the infrastructure offers cyclists faster transportation than either by public transport and by car during rush hour.[31] Inspired by Danish green wave models, cyclists meet few traffic lights, and they have been managed so as to primarily support the flow of bike traffic.[32]

The Stockholm and Delft cases are instructive. Behind the new practices, we see a new alliance emerging that no longer pits the inner city politically against suburbia. Both the new right coalition in Stockholm as the Delft liberal party seem to align with a new urban reality of shared space. Although the jury is still out whether or not this is a fundamental, even paradigmatic shift or a temporary alliance. On a more global level, we see other signs that the car-governed model may not disappearing but at least is being questioned as the undisputed model for the future.

The last years, from 2008 onwards, shows four new discourses, that all relate immediately to car use.

The first new discourse can be called *parking policy 2.0*. In this frame, parking policies are geared towards accommodating, but steering cars.[33] Rather influential on this issue was the report in 2011 from the Institute for Transportation and Development Policy, a New York based knowledge center.[34] Following the report, a number of European cities have reoriented their parking policy, often related to the policy demands to comply with air quality or greenhouse gas targets. By way of regulating parking space, car use can be regulated. Indeed, in the end the amount of parking spaces available in a city is a political issue. City governments often use the measure of diminishing parking space as a governing tool. This is rather new, and not without fight. Through parking policies urban spaces can be defined whether or not cars are allowed and for whom, for example for residents only. Parking policies have become the cornerstones in urban spatial planning.

The second discourse did arise from the fight against climate change, or broader, from a sustainability agenda. Cars producing more than average CO2 emission and posing policy

[31] http://www.zoefroute.nl/ (accessed June 7th, 2015). 'zoef' both being a slang term for quick movement and an acronym for 'carefree, unimpeded simple cycling' ("Zorgeloos Onbelemmerd Eenvoudigweg Fietsen")
[32] Mirjam Van Oers, 'Zoevend Op de Fiets Tussen Pijnacker, Delft En De Lier', 2009.
[33] The evolution of urban parking policy in Europe is described in three stages in Giuliano Mingardo, Bert van Wee, and Tom Rye, "Urban parking policy in Europe: A conceptualization of past and possible future trends," *Transportation Research Part A: Policy and Practice* 74 (2015).
[34] "Europe's Parking U–Turn: From Accommodation to Regulation," (New York: ITDP, 2011).

problems of reaching urban air quality standards, as defined by the E.U., are being banned from a number of cities. Instrumental here are the so called *Low Emission Zones*—areas in cities where cars should be banned.[35]

The last two discourses relate to the expansion of ICT in transport. Apps offer opportunities to bringing supply of mobility and demand for mobility closer together in real time, thus also reinforcing the sharing economy. Although car sharing antedates this development in the shape of shared ownership in the early days of the automobile, or for examples the 'white cars' in Amsterdam operating from the mid-1970s to the mid-1980s,[36] we now see that *car sharing* starts to boom.[37] Many urban residents no longer need their own car, but hire or rent cars when needed. Probably this new frame is related to the attitude of younger urban professionals, for whom cars are just useful for their lifestyles, needed in specific circumstances, but not a status symbol.

The last discourse goes one step further. The promise is that cars could, with the apps, also be used as a form of public transit. Most cars are underused with often two or three free seats and potentially available for people in need of car mobility. Through IT applications, demand and supply can easily be brought together more easily; *probably a range of supply- demand situations of car rides will arise*, from the expensive luxury taxis through less expensive cab services to drivers offering rides either at a small price or for free (with the old hitch hiking coming back). There are still a number of battles to be fought, but it looks like IT could disrupt car-based mobility, at least from the standpoint of taxi organisations, asking for proper regulation in this arising new market.

Part of these new markets will belong to the sharing economy, part will just be the introduction of new services. As Meelen and Frenken state, the sharing economy should be defined rather precisely.[38] In their view, in sharing economies, consumers accept other consumers to use their underused consumption goods. It is not about providing new services. For example Uber is only part of the sharing economy when the Uber-driver was already planning to make a trip for his or her own sake, and is only asking some money for people who would like to join the ride. In all other circumstances Uber should just be seen as delivering a service, and should accommodate to the rules for these services. The first case is more potentially disruptive than the second, for it may result in a drastic reduction of the number of cars. The municipality of Delft has embraced the development as being less environmentally damaging than its 'traditional' counterpart (as well as a way to save money for its residents).

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[35] On the impact of these emission zones, see Hanna Boogaard et al., "Impact of low emission zones and local traffic policies on ambient air pollution concentrations," *Science of The Total Environment* 435–436 (2012). Their conclusion is that local traffic policies are too modest to produce significant decreases in traffic related air pollution concentrations. However, Ellison, Greaves and Hensher found, evaluating London's low emission zone, a substantial effect on another target area: the composition of the vehicle fleet entering London. Richard B. Ellison, Stephen P. Greaves, and David A. Hensher, "Five years of London's low emission zone: Effects on vehicle fleet composition and air quality," *Transportation Research Part D: Transport and Environment* 23 (2013).

[36] The *witkarren* were an initiative of Luud Schimmelpennink, one of the driving forces behind the more famous white bicycle plan in Amsterdam as well. See Beatley, Green Urbanism, 151.

[37] On this issue in a worldwide perspective, see Susan Shaheen and Adam Cohen, "Growth in Worldwide Carsharing: An International Comparison," *Transportation Research Record* 1992 (2007).

[38] Toon Meelen and Koen Frenken, "UberPop is geen voorbeld van deeleconomie," *Het Parool*, 10 August 2014.

It notes that car sharers drive fewer kilometres than owners on average, and fewer vehicles are needed, easing the parking problem as well.[39]

Where will these new discourses, combined with the older ones, lead us? Will cars be banned from urban areas altogether? Probably not. In the words of Jan Gehl, "the goal is to ensure that cars can be "present, but not kings".[40] Urban space likely remain accessible for cars but further restricted; car parking areas will shrink, while individual vehicles will be used more efficiently through reduced car ownership and increased sharing and rental arrangements; cars will no longer be stand-alones but new elements in public transport. To state it dramatically, it is possible that the days of car owners, easily driving alone in their car to any point in urban areas, are over.

From this perspective two new frames can be introduced. We need a far smaller number of cars, which circulate most of the time instead of remain stationary occupying expensive urban spaces. The ITF (International Transport Forum) studied this situation. [41] And we could think of introducing mobility providers in European cities with a fleet of transit modes–from (e-)cars, (e-)bikes, (e) scooters that could also double as service public transport rides. Households subscribe with these providers and could easily pick up transport modes, and could leave them at their destination. Apps and GPS show users the exact locations of these vehicles in real time.

Two last elements need attention. Public transit providers also see the need to act. For example in Helsinki, the Regional Transport Authority is rolling out a new innovative minibus service called Kutsuplus, where riders can specify their own desired pick–up points and destinations via smartphones. Their requests are aggregated and the app calculates an optimal route that most closely satisfies all of them.[42]

And these developments will prompt less parking capacity in cities because cars are rented and thus driving around the greater part of the time. Diminishing parking capacity will lead to new and interesting possibilities for reclaiming urban spaces to the citizens.

CONTOURS OF A NEW URBAN MOBILITY PARADIGM: ELEMENTS OF AN EXPLANATION

We seem to enter a possible paradigm shift in urban mobility. European cities could abandon their dependency on cars for a future in which other transport modes become the norm and in where real equilibrium between space for roads and space for liveability is the standard. As

[39] Delft municipality, http://www.delft.nl/Inwoners/Bereikbaar_Delft/Autodelen (accessed 9 June 2015).
[40] Cited in Patricia Brown, "In a successful city, the car must no longer be king!," *The Guardian*, 9 July 2014.
[41] "Urban Mobility System Upgrade: How shared self–driving cars could change city traffic," (International Transport Forum Corporate Partnership Board, 2015). The report examines the changes that might result from the large- scale uptake of a shared and self-driving fleet of vehicles in a mid-sized European city. The system could, in combination with good public transport, remove 9 out of every 10 cars in a mid-sized city. 80 % of off-street parking space could be removed.
[42] Keith Barry, "New Helsinki Bus Line lets you choose your own route," *Wired*, 10 November 2013.

we have shown, long-term shifts are feeding this new paradigm. Perspectives on Shared Space, and design for liveable cities are reaching a critical momentum.[43]

In many cities cars will remain rather dominant, because standards, allocation models, urban planning and traffic circulation policies are still car-based. What is clear though is that car-based mobility in urban spaces is problematized by a larger political coalition than before. The late 1960s to early 1990s may be characterized as 'defensive' period in which an inner-city and suburban coalitions battled over urban space and mobility solutions between those that aimed to prevent the car of taking over the city (pressure groups like Stop the Child Murder envisioned cities based on walking and cycling) and those oppositional groups who defended their right of way with equal passion.

Around the turn of the millennium, we suggest this phase started to give way to more 'offensive' phase questioning whether we need cars in urban spaces at all. In this phase, the various discourses seem to culminate in a more fundamental assault on the car's position in cities. We predict this will not result in the disappearance of the car in the city. Nevertheless, it seems likely that its position will be a very different one than during its heyday in 'the century of the car'. As car-based mobility peaked in the late twentieth century, many actors were no longer willing to accept the system of automobility in all its force.[44]

The potential new urban mobility paradigm is further reinforced. First, public concerns about health, air quality, sustainability and CO2 levels in cities will remain high—not only in the west but also in rising economy of China. Second, the car has lost its symbolic value for younger generations, who display lower levels of car ownership, drive less, and learn to drive later or not than previous generations.[45] Third, urban densification continues, putting car-based mobility under strain as less appropriate than in a suburban model. Fourth, ICT possibilities may simultaneously disrupt car-based mobility from within (driverless cars as a means of public transport, car sharing, etc.) and provide means to give real-time information on supply and demand of mobility, to be met by different providers, drivers and renting companies regardless of transport mode.

PUBLIC POLICY AND URBAN MOBILITY

In general, with the exception of progressive parties on the left local political leadership seems to have been reactive rather than proactive in contributing to the early discourses on urban mobility or in pushing for the new paradigm possibilities. In a few cities with green-red

[43] An interesting overview by a journalist, with a quote from a politician from Lyon: "the car will become an accessory to the smartphone". Stephen Moss, "End of car age: How cities are outgrowing the automobile," *The Guardian*, 1 May 2015.

[44] John Urry, "The 'System' of Automobility," *Theory, Culture & Society* 21, no. 4–5 (2004).

[45] Glenn Lyons, founder of the Center for Transport and Society at the University of the West of England in Bristol, on this issue: 'Car license acquisition has been going down among younger age groups, and there are strong suspicions that the digital age is contributing to why people now have less reliance on physical mobility. We are in the midst of a fundamental regime transition in society. We are increasingly seeing the car as a functional technology to get from A to B, rather than the much more symbolic representation it had in defining society in previous generations. That is not to suggest the car is done and finished with, but I believe it will become a background technology.' Cited in Moss, "End of car age: How cities are outgrowing the automobile."

coalitions, politicians did take leading roles, joining forces with transport professionals and active citizen organisations. More often, urban politicians, sensitive to the power of suburbia faced an important reality: the perceived or real popularity of the car among a car-depended electorate in suburbia. Public policy was instrumental in creating (public) funds to implement various measures, but within a context of car dominance. Many politicians acted primarily as "gatekeepers" listening to their civil servant professionals, yet slowing down the diminishing of car dominance.

In understanding whether we are witnessing a paradigm shift, we should distinguish between urban, regional, national and European politicians. Urban politicians had to find this equilibrium between car-dependent suburban electorate and new discourses from new urban classes in the inner city. Most regional politicians were in favour of decentralisation and suburbanization, looking for investment equity in their regions. National politicians sometimes supported the new discourses, but were, certainly on the right-wing side of the political spectrum, keen on supporting car infrastructures. And finally, European politicians and funding schemes have giving support to cities and been instrumental in creating environmental regulations on air quality, climate change, and in funding research on multimodality in cities and city regions.

The somewhat contradictory policy support of both re-urbanization and deconcentration is evident in the Stockholm case. The 2010 comprehensive plan, entitled "Walking City", shares the ambition of its predecessor from 1999 to "build the city inwards" and promotes densification of the city centre and the suburbs just beyond, as well as in a couple of suburban "focal points". The compact city that is supposedly the result of this planning strategy is expected to bring about shorter (walkable, bicycle-able) distances and a better basis for public transport to compete with the car. In the word of Kristina Alvendal, Conservative Urban Planning Commissioner, it is intended to "heal the wounds" of modernist planning. The last decade has also seen the development of a broad arsenal of traffic policy documents in Stockholm. The 2012 Accessibility Strategy is the most prominent one, and is supposed to contribute in solving the capacity problems in the Stockholm traffic system that are expected to only grow as the given the rapid population growth. The strategy thus gives clear priority to walking, cycling, and public transport as energy-efficient modes which make effective use of existing space in front of car use.[46]

Re-urbanization and support of more sustainable modes in the city centre is, however, paralleled by continued dispersal, external locations of shopping centres and high-tech industry, and longer journeys, and more funding than ever is spent on infrastructure projects for automobility on the regional level. And even if the authors of the comprehensive plan acknowledges the need for the majority of the population to "abstain from choosing the car", it also takes the investments in the 2007 traffic infrastructure package for the Stockholm region (a result of "planning through negotiation"), including several motor bypasses in the outskirts of the city, as "given points of departure". While it calls for the compact city as one

[46] This section and the next is based on Emanuel, *Trafikslag på undantag*. For details in English and full references, see the forthcoming article "Waves of Cycling Policy: Policies of Cycling, Mobility, and Urban Planning in Stockholm since 1970," in *Invisible bicycle*, ed. Tiina Männisto-Funk and Timo Myllyntaus (Leiden: Brill, 2015).

which can bring "sustainable growth", it fails to recognize that the dense city is seriously undermined by these bypasses.

We may conclude then that in a global sense, the shift away from car-governance within inner cities is as real as it is paradigmatic even while the regional policy investments in car mobility remain. We believe that the mobility relationship between inner and outer city areas needs further exploration.

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