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Post-Car World.

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Where do we stand with cars ?

When the PostCarWorld programme team presented its initial set of questions, we clearly excluded the hypothesis of an evolution driven or imposed by outer, constraining factors. Typically, we discarded a framework in which an overwhelming climatic constraint and its ensuing legal enforcements would have forced car-users to give up their vehicle and to accept and undesired change. Our plan was, conversely, to approach the car/no-car not as a constraint but as a freedom. It is an open issue that has to be addressed by societies and its inhabitants-citizens. As a result, the context in which this question is posed is crucial since it determines the difference between the current situation and that which would correspond to people’s wishes, expectations, or assent. Where are we with the car today ?

A Turning Point ?

The situation is beyond any doubt full of contradictions. The private car markets reveal two

opposite trends. On the one hand, we can observe a dramatic catch-up process in areas, such as Asia – spectacularly in China – or Africa, where ownership rates were still very low a few decades ago. On the other hand, after the 2008 crisis, the market seems to have more or less got closer to pre-crisis numbers in North America, but in Western Europe, the 2004-2007 maximum levels were not reached again, although growth has returned in all other consumption sectors.

Another indicator of the gentle slope down experienced by the car situation is its market share in comparison with other mobility modes. Recently, in 2017, a foresight team that had been commissioned by the Société du Grand Paris, a public corporation of Paris metropolitan area (Île-de-France, 12.2 million inhabitants), to forecast future transportation demands admitted that they had seriously underestimated the changes in favour of public transport that have occurred since 2000. They had not anticipated a dual curve inflection : growth of public modes instead of an expected stability, stagnation of private use of car where growth was forecast. In the updated predictions at the metropolitan area scale, an equal public-private share in the number of trips is highly probable by 2030, even if there are no further tipping points in the curves, while the 2000 situation was roughly 1/3 public – 2/3 private.

Finally, what is changing and probably more rapidly than the other aspects, is the status of the car in society. Ecological awareness obviously plays its role, along with ideas about a desirable city. In the last period, after the large climatic consensus of the December 2015 United Nations Paris conference (COP 21), we can observe an emerging powerful advocacy movement that focuses less on natural environments than on human bodies and the casualties caused by car-produced air pollution, especially particulates generated by Diesel-engine vehicles. In many cities, legal traffic restrictions in case of dangerous pollution episodes seem to become more legitimate than smoother, more transactional road-pricing mechanisms (like in Singapore, London, Stockholm, or Milan). Beyond, explicit statements and political movements, this cultural change might be above all about information, description and organisation of data. Some decades ago, walking was not even mentioned as a way to move and the number of passengers-kilometres was the dominant, almost consensual, measurement unit. When Paris municipality (the central zone of the urban area) informed the public that 52% of the trips performed in its territory were assured by pedestrians on 13% of the municipal territory only, the surprise was not coming from the fact itself, but from the new way of approaching mobility. Simultaneously, the ‘unhipisation’ of car culture we had identified four years ago, before starting this programme has been confirmed. The original amazing fact was the decline of driver’s license ownership among young people not only in Japan and Europe (see the Swiss data in the graph below), but in the *par excellence* car-nation, the USA.

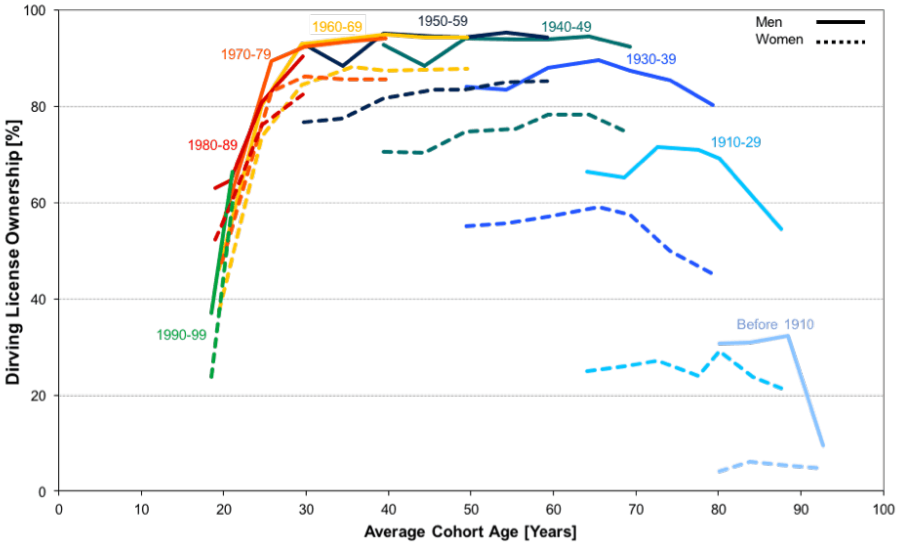

Figure 1 : Driving Licenses and Age Groups in Switzerland. Source : Swiss Micro-Census, 2015. Courtesy : Kay Axhausen, 2017.

This information could then still be interpreted as a delay in lifecycles due to the continuation of ‘pre-adult’ ways of life in connection with longer education times. However, the even more astonishing data came from recent academic research that showed that this decline now impacts potential drivers of all ages. Significant reductions can be observed up to 50-year people. In this all-drivable country in which public mobility can often, and with good reasons, be seen as an ordeal, we can be surprised by this emerging change not only in dreams, but in practices, too.

How far is a beyond-car society emerging worldwide ?

These contextual snapshots show we are in a general situation which is more open to public debate than it used to be in the last decades of the 20th century. This does not mean that there is an emerging consensus, even a majority standing against the present-day role of cars. It solely means that, from now on, few people would be outraged, or shocked, or even surprised if we addressed with them car issues. This is exactly what we have noticed in the different surveys we have carried out for the PostCarWorld programme : citizens-inhabitants are open to debate but do not agree with each other, sometimes with themselves ; the society is divided but open to change.

A clear bifurcation can be observed in big cities’ centres. In developed countries, in over-1 million-people urban areas, individual car use is decreasing. In big metropolises’ city centres, car have now a very limited modal share and it is still going down. Some clues show a diffusion process in progress into smaller cities.

What is sometimes called ‘soft’ mobility (non-motorised trips) meets a political consensus in large urban areas and, as a result, clearer public policies appear, spending (and especially investing) money in public transport, and providing riders with a better supply. Are there city-scale thresholds beyond which strong public-mobility policies cannot be implemented ? Probably, but not the same in different societies. In Western Europe, Germanic countries have a lower threshold of policy change than Latin countries. It is therefore difficult to identify a quantitative demographic border between ‘big’ and ‘small’ cities.

Does ecological awareness trigger a significant move through *cleantech* mobility ? With which consequences ? Do electric vehicles or other zero-GHG-emission vehicles offer a solution and, as a result, are they discarding the ecology/mobility coupling ? It is too early to be final in this matter : electric cars (like – see below – autonomous vehicles) might generate both a decline or a surge in the role of car.

In the next sections, the outcomes produced by the different teams and subprojects of PostCarWorld SNF-Sinergia programme are detailed. They bring a significant contribution to this debate.

What the car-society is : an object-driven configuration

The first significant outcome of the programme has been a redefinition of the current situation. We have started with a neutral 'car world' and we adopted the more precise term of *car-society*. As André Ourednik showed in his 2014 contribution, a car-society is a multidimensional system whereby car endorses various rationales which more or less encompass every single aspect of social life.

One major, outstanding characteristic is the focus on a particular thing : the car. The vehicle-object is central and generates massive constraints (car-industry rationales, fuel, traffic, parking lots…), it partially or totally embodies different social features that had existed before its birth : a passenger-transportation automotive, a personal or collective cockpit, something like a house, or even an intuitive extension of the driver's body. It therefore implies many economic, psycho-sociological and geographic logics.

Two particular aspects can be emphasised :

1. *A tool-for-freedom creed.* Rational or mythical, this powerful belief which allows for the acceptance by the users of car-object's requirements and constraints. This faith has been and remains largely present in a predominant part of the public but also, as Farzaneh Bahrami showed (subproject C), among urban planners and others designers of transportation systems. A car-society is a society in which the use of a car provides a level of individual autonomy apparently superior to what an ordinary individual could obtain in the rest of his/her life at the same moment. Hence the heavy discontent that can be easily observed when a pedestrian, another car, a police officer, a traffic rule, or a traffic jam impose a disruption in the supposedly normal, *libertarian* automobile performance. *Unilateralism* (in the meaning philosopher Peter Sloterdijk gives to this word) can then be seen as the quintessence of car-society.
2. *An ownership-driven object.* Car is an expensive material good. Given the trends in purchasing power, its relative price has beyond any doubt dramatically decreased since its beginning, in the early 20th century. However, private mobility budgets remain significant for low or middle-class households in developed countries and, as an isolatable object, a car is still the second more expensive purchase after housing. Contemporary societies are experiencing a general challenge to ownership of 'things', the alternative being an access to uses or services. How far a car-society relies on this both personal and material property or could continue as such without this feature and become a using-car society ? This is clearly not a trivial question.

As a whole, car societies have also generated three major indirect realities :

1. A huge set of peculiar practices (drive/being driven relationships, gendered activities, smoking, petting, sex, violence against people, objects or environments…), which are either totally specific to car or unquestionably different from what they would have been without car.
2. A major contribution to greenhouse-gas emissions : 33% for transport in Switzerland, on which approximately 30% are due to road transport and 19,5% to individual cars[1].
3. Last but not least, a critical part of residential spaces, and beyond, of the overall inhabiting system including urban sprawl, individual housing, and the little room left for public space. This is probably here that the notion of car-society is the most evidently justified. As a matter of fact, it is extremely difficult to isolate car as a cause (sprawl being a consequence of individual car's transportation logics : speeds allowed to car, the surfaces devoted to roads and parking lots) or a consequence (car being a relevant mobility tool for low density, low diversity areas). In between, car appears as the mobile component of a way of life defined by the desire to avoid the public spaces that characterise the high-urbanity areas. Conversely, public mobility provides a continuity with streets and squares and maintain a comparable exposure to otherness in stay and in motion. As a result, car-society is not a mere way of moving life, but rather a way of inhabiting life.

The concept of car-society could also be named car-culture or car-civilisation. We know there has been something before. Can we consider something after ? And if yes, what ? Figure 2 suggests a framework to answer these questions.

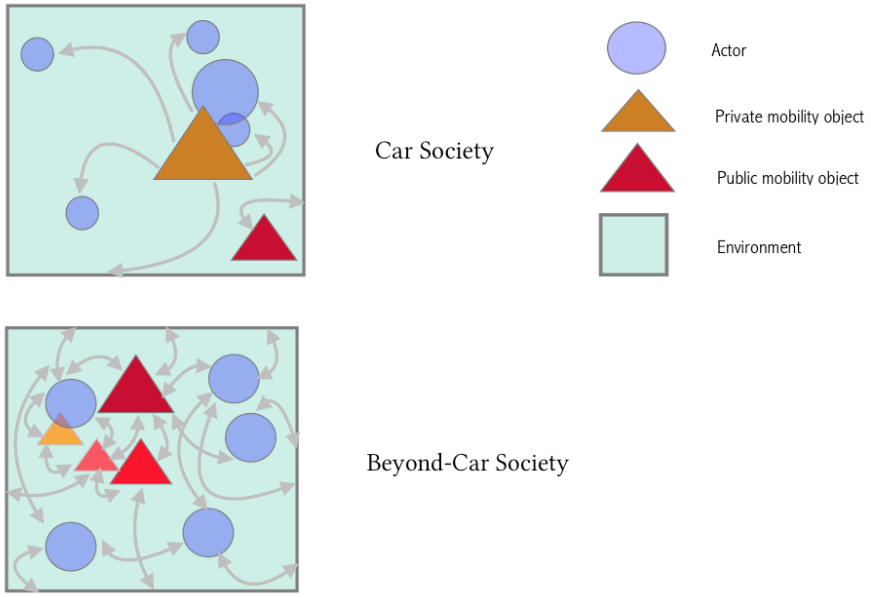

Figure 2 : Car and Beyond-Car Societies.

What a beyond-car society could be : an actor/environment-balance rationale.

Field studies carried out by PostCarWorld research groups propose a more in-depth exploration of a general picture that finally appear complex and contradictory. We have used different methodologies and quantitative or qualitative survey approaches. It is all the more notable that outcomes coming from the different subprojects clearly converge.

A profound hesitation.

Thus, the subproject A1, directed by Rico Maggi, with Antonio Borriello), shows that two layers of attitudes – a negative assessment of car mainly because of natural environment issues and a positive assessment of due to the pleasure of driving do coexist in spite of their clear logical contradiction in individuals' minds. We see the same kind of discrepancy within the A2-3 sub-projects (directed by Vincent Kaufmann, Jacques Lévy, Jérôme Chenal, and Monique Ruzicka Rossier) in Alexandre Rigal's and Jade Rudler's works about personal attitudes toward mobilities. Here we can observe a strong divergence between two trends : firstly, an interest for change both for societal goals (a concern about urbanity and natural environments) and for personal lifestyle reasons (a sometimes clearly asserted desire to downgrade the role of car in their mobility practices) ; secondly, the consideration of a heavy inertia due to the current place of the car in spatial configurations and in spatial agency. Pulling the car out of one's life means a systemic cascade of transformations that many inhabitants acknowledge they are not prepared for due to the resulting daily-life revolution which would combine in an intricate way looked-forward and worrying aspects.

The *Rescheduling* simulation (sub-project B1, directed by Kay Axhausen, with Basil Schmid and Milos Balac) shows different levels of reluctance to change mobility practices. Among the most radical car-adepts, a moderate increase of a car-use costs demonstrates a low elasticity of practices : they accept to devote a larger part of their income to conserve their mobility routines. In case of a more dramatic increase of these costs, a (private) vehicle to (public) vehicle substitution can be accepted by because of its benign impact on their overall lifestyle. More fundamental changes suppose a long-run reorientation of daily life and a general rescheduling of activities and not only of mobility.

What our different qualitative and quantitative surveys shows the gap between legitimacy and majority. There is a consistent minority group which has made up its mind in positively choosing a no-car way of life. This 'pre-post-car-world' is animated by a significant group of anticipators that often inhabit city centres or transportation nodes which provide a satisfactory supply for public mobility. A smaller subgroup is constituted by environmental activists who value low density habitats and compensate this inconvenient of a low accessibility to public transport system by an affirmative attitude whereby they accept to disconnect their mobility model from a time-saving quest.

However, in all these surveys, opinions appear divided not only between individuals or social groups but inside each person. The A1 sub-project poll shows that there is a positive correlation between availability of a car and a sceptical attitude towards a car-dominated mobility. This is a good indicator of the fact that the moment of societal hesitation about mobility we are currently experiencing worldwide is crossing and sometimes tearing all the social body, and challenging coherences of each individual. This kind of hesitation is not brand new : for a long period, most actors of city-planning have endorsed at best some fuzzy statements, at worst contradictory stances regarding the car. It is true that this is less evident today because of a stronger centrality of mobility issues in urban and regional debates. We can imagine that, following the experts, ordinary citizens will take on these issues in an increasingly explicit and consistent way.

The graph below sums up the situation, which shows three different attitude groups and their possible combination.

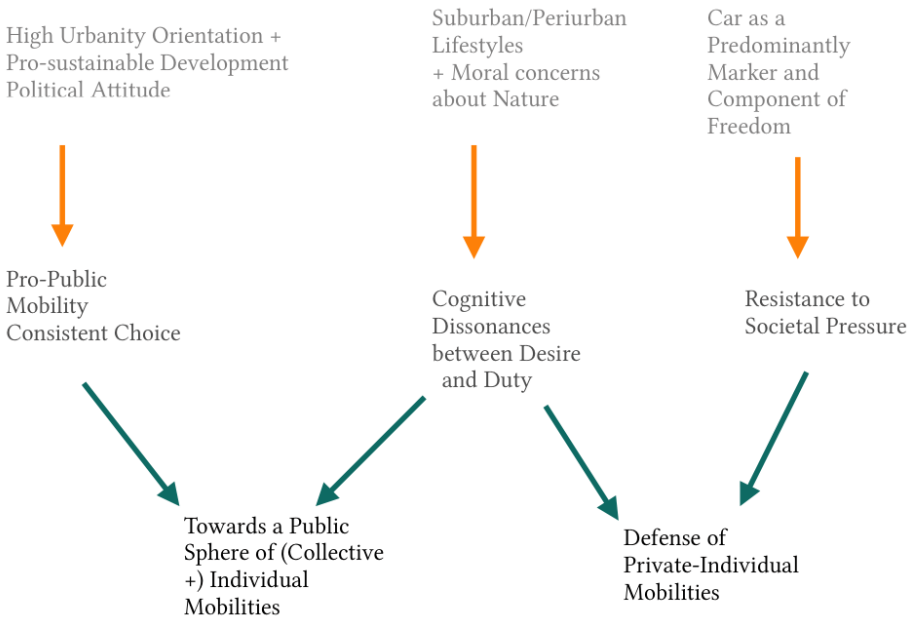

Figure 3 : Attitudes and Combinations.

Emerging signals.

Beyond this complex ‘twilight zone’, some outcomes of PostCarWorld research suggest new reasonable, credible avenues to address possible changes. Thus, the possibility of including a new, intermediate metric between walking and riding bus, tram or urban trains, by setting up a whole network of accelerating moving walkways is convincingly presented by sub-project B2 (directed by Michel Bierlaire, with Riccardo Scarinci and Iliya Markov).

New urbanity scenarios set up by subproject C (directed by Elena Cogato Lanza, with Farzaneh Bahrami and Matthew Skjonsberg) with the collaboration of Monique Ruzicka Rossier and Jade Rudler, from subproject A3, demonstrate that the urbanistic translation of a no-car mobility system admits different variants whereby the combination of various intensities of mobility and various modes to carry them out generates distinct urban configurations. Testing these different scenarios through a focus group of Arc Lemanic inhabitants provided the conclusion that there is a good amount of mind-openness among people living there about the transformations of their daily practices a beyond-car society would induce. More precisely, Jade Rudler has explored situations in which *affordances* (a concept coined by environmental psychologist James Gibson ; in French : *prises*) sought by inhabitants to attain their objectives in daily-life practices can be completed by *prompts* (in French : *invites*) installed by urbanists. This inhabitants/experts dialogue can be a modest yet efficient way to produce changes in mobility performances without clear-cut disruptions but with the shared goal to promote post-car mobilities.

With different methodology, the simulation model implemented for the Swiss territory and proposed by PostCarWorld’s central research team (Jacques Lévy, André Ourednik, Patrick Poncet, with Christian Kaiser’s cooperation) converges with these observations. The model examines a situation where non-car transportation has become exclusive. Public supply of mobility is supposed delivered in the same conditions as today, carrying out an as-optimal-as-possible match between the intensity level of demand and the response of the transportation network. In brief, the observed outcome is that, due to the given demand increase, all types of locations in the mobility map see a dramatic service upgrading. The peri-urban areas get a suburb-style supply and

suburbs get a city-centre-type service, as centres see their comparative advantage confirmed and reinforced. This is the result obtained without any change in habitat spatial configuration. If individuals and households encompass new mobility conditions in the location of their own daily-life places, they generate a new map that concentrates habitat in mobility nodes. The model suggests different variants which combine options in habitat, mobility and tele-communication. The general outcome is that, given a constant GDP, a constant demographic base, and a stability in the overall share of transportation inside GDP (with only some internal redistributions in favour of public transport), there is no clear technical obstacle to a general car pull-out.

A pivotal object : the autonomous vehicle.

Today, the spectacular technical improvement of self-driven vehicle's performances can open up on a large array of scenarios, which can be grouped into two families, pro-car or beyond-car, as the graph below show.

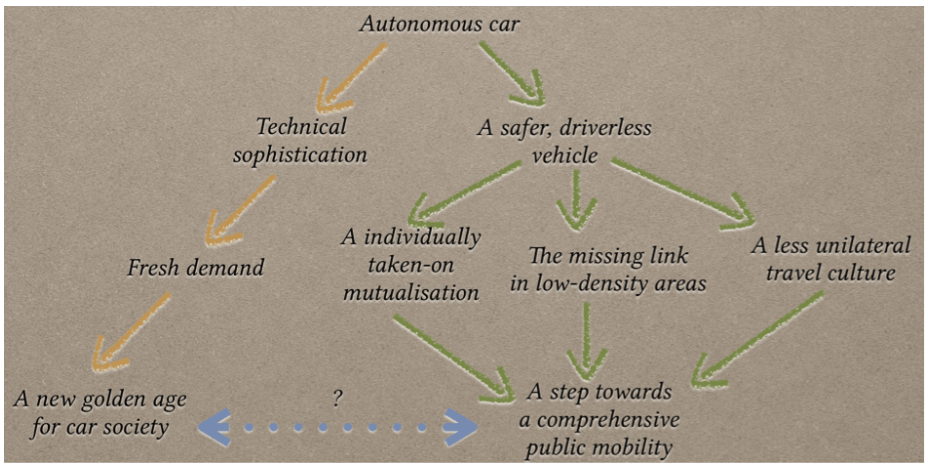

Figure 4 : Two Possible Dynamics for the Autonomous Vehicle.

The emerging integration of individual vehicles into public mobility rationale : post-ownership, shared, self-driven cars are seen by many inhabitants or experts as a promising, pragmatic way for change. In this perspective, the autonomous vehicle can be a disruptive innovation on five interrelated points.

1. Through safety and ecological standard compliance, a disconnection between vehicles and drivers.
2. Through new possibilities for inter-individual, collective, company, or public sharing, a disconnection between vehicles and private ownership.
3. Through inclusion in government-driven general mobility schemes, a new boost towards integration of individual mobile vehicles into the public sphere.
4. Through a large array of uses and situations, the possibility of integration of low-density areas in a beyond-car society trend.
5. Through a new relationship between vehicles and the individual, a window of opportunity to lower thresholds between pro-urban and anti-urban urbanity models.

The autonomous vehicle poses with a particular strength the issue of the dissociation between mobile objects, mobile people, and mobility system. It is an excellent study-case to imagine a beyond-car society.

A theoretical debate on future role of individual vehicle would be urgently useful. It is highly probable that this innovation will profoundly affect public debates on mobility in the next years.

How far can these outcomes help stakeholders design relevant public policies ? Five recommendations.

As a conclusion, we would like to propose some recommendations to economic and political actors of mobility systems.

1. Focus less on objects, more on systems, less on technical systems, more on encompassing social systems. Car-world is not only a technical object or a technical device : it is a whole, consistent society. If we aim at changing it, we should address it as a societal system.
2. The spatial dimension of societies is a good angle because it brings together space and spatiality, that is environments and agency. Social models of mobility are models of inhabiting too, because stay and movement are mutually interdependent. A beyond-car society is fundamentally a fresh inhabiting way of life.
3. Big changes are technically possible, main issues are in mobile inhabitants' minds. Imagination to prompt people to change their practices is required.
4. The main leverage power for change resides in people's choices, not in a supposed emergency situation that would be self-sufficient to impose radical mutations. In such a complex, rooted set of practices as car-society is, examples, incentives, ethical involvements will work better than authoritarian decisions, punishments, or moral injunctions.
5. The best and first to-do thing : listen to actors, as small and contradictory as they can be, take their ideas, expectations, and imaginations seriously as the best foresight tools.

Note

[1] For further information, please follow the link.

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