


# Sustainable Automobilities in the Mobile Risk Society

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Sustainable automobilities is one of the key topics of the mobile risk society and the future of modern societies in general. The rising “system of multiple mobilities” has the potential to become the new grand narrative of future mobility and transport. It is widely undisputed that the current carbon-based automobile system calls for a social-ecological transition since its levels of energy consumption and low use of renewables are highly unsustainable. There are high hopes that a system “after the car” could solve some of the wicked problems of modern mobility. Namely it is the low efficiency and unsustainable ecological footprint of the current organization of individual mobility, and automobility in particular. This special issue on sustainable automobilities presents new research on the risks and chances of the urgently needed transformations towards sustainable automobilities. It brings together key authors in the field and innovative young researchers aiming for a better understanding and analysis of the current developments.

If there is such a thing as a grand narrative for the future of mobility, then it is the discourse on risks and chances of the rising system of multiple mobilities [1–5]. It is widely undisputed that the current carbon-based automobile system calls for a social-ecological transition since its levels of energy consumption and low use of renewables are highly unsustainable. The “automotive industry is facing the probably biggest upheaval in its history. Fossil propulsion is being replaced by electric propulsion and the human driver is being displaced by algorithms. In addition, new generations that have grown up with the Internet and digital services are shaking up established ways of use and business models. A transformation of the mobility sector ( . . . ) to digital services is emerging” [1] (Translation from German by the Author, p. 7).

There are high hopes that a system “after the car” could solve some of the wicked problems of modern mobility. Namely it is the low efficiency and unsustainable ecological footprint of the current organization of individual mobility, and automobility in particular. The simple fact that a privately owned car spends about 97 percent of its lifetime standing still [6], might be enough to indicate this. It comes together with the fact that people systematically underestimate the real costs of automobility by up to 50 percent [7]. These efficiency potentials seem to be part of the driving logic behind the idea of re-inventing modern mobility and transport. Together with the digitalization as a mega trend this coincides with a paradigm shift. Many buzzwords and concepts are in the air these days. Some of them are promoted by scientists, planners and designers, some by the automobile industry and some by non-governmental and advocacy organizations: multimobility, connected and cooperative mobility, fusion mobility, Mobility-as-a-Service (MaaS), sharing mobilities, the whole complex of automation and artificial intelligence and then, of course, smart mobility and smart cities. Topics such as new drivetrains, new fuels and energies and renewable materials just fit into these discursive frames since the vision of integrating different elements into a structure that enables seamless transitions between different modes of transport, infrastructures and technological networks—on a systemic level. All



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this seems to be driven by the goal to increase the efficiency in the organization of mobility without prioritizing a specific mode of transport:

*“The use of digital technologies in order to economise the mobility sector, making it more efficient and intermodal, cannot be stopped. It is the fundamental paradox that it was the private automobile—originally—that generated a degree of individualisation and pluralisation that is now continued and accelerated by digital media. There is no going back. ( . . . ) The automobile with its combustion engine was only the first generation appliance. Its broad success, however, has forced us to consider alternatives and re-interpret the product with the help of digital technologies” [8] (p. 65).*

As in many other topics, where technologies play a key role in restructuring society and the social and economic relations in it, there are optimistic and pessimistic readings of the situation. Those discussions between the “transformationists” and the “sceptics” [9] and their different interpretations and assessments of the risks and chances within these processes have been present throughout the past few years in the research program. By far not every PhD project has been dealing with the transformations of the automobile industry in a strict sense. But since the “system of automobility” stands as a proxy for the Fordist and Post-fordist organisation of modern societies and the cities in the focus, in particular. In line with Urry the system of automobility is

*“an extraordinarily powerful complex constituted through technical and social interlinkages with other industries’, car parts and accessories; petrol refining and distribution; road-building and maintenance; hotels, roadside service areas and motels; car sales and repair workshops; suburban house building; retailing and leisure complexes; advertising and marketing; urban design and planning” [2] (p. 26).*

As such it prestructures modern architectures and materialities, the disciplined way of life arising from Fordism for the past 100 years. Work-life relationships, maintenance facilities, logistics of raw materials, labour, knowledge and knowhow, supply chains and so forth, all this has been prestructured through automobility and the production of mobility associated with it.

Demoli and Lannoy [10] show that the global success of the automobile was driven by the inventions that overcame the obstacles to its diffusion. These inventions are of different kinds:

There are first of all those which allowed to transform the automobile product, as the work to the chain to be able to produce cheaply, or more recently the low cost car, as the catalyst to fight against the pollution of the art or the air bag to fight against the road mortality.

Then there are inventions that have transformed the context to make it more favourable to the acquisition of cars to disqualify alternative means of transport. In this register, there is the intense work of persuading the public authorities to favour road over rail and to invest in highway networks and urban bypasses, or, another older example, the various strategies aimed at favouring the internal combustion engine over its alternatives.

Finally, there are innovations that aim to transform collective representations and orient public opinion, such as making the automobile a symbol of modernity backed by the idea of freedom and the exhilaration of speed, or, more recently, the development of premium models or the advertising hype about the low-polluting car. The automobile has left its mark on the imagination of Western countries. Since the 1950s, the car has been a sign of social success, synonymous with comfort and ease of travel. Owning one is a strong aspiration, a dream. This very powerful imaginary of the car is also found in the literature of the 20th century.

The discursive power of restructuring societal imaginaries, visual and textual production from film to literature, law and all sorts of power-driven scripts from corporate travel guidelines and regulations to traffic rules and so forth is a very important lever to the automotive system. Imagining a post-fossil future—and such a city in particular—is inextricably connected to new forms of individualized and motorized mobility, public transport,

micro-mobility, freight transport and logistics and the Internet of Things (IoT). Alone in the German federal state of Bavaria with its 13 million inhabitants roughly 400,000 employees work in the wider automotive sector. 215,000 workers are employed in the vehicle manufacturing business itself [Figures are based on calculations published by the German trade union IG Metall Bayern]. The discussion of the electrification of vehicles shows the challenges connected with re-thinking the mobilities of people, cities and regions [11]. The structural change in the automobile industry will have strong impacts on the number of jobs in Germany. Estimates before the Corona crisis by the National Platform for the Future of Mobility indicate that about 410,000 jobs are at stake since technological change will need new job profiles and competences. Electric mobility is much less labour-intensive than carbon-based mobility (quoted after Burmeister 2020, p. 75) and it opens up comparably easy market access for companies without decade-long histories in the business (i.e., Tesla). Recent calculations show that this will lead to significant changes in the labour market. A recent study commissioned by the German Ministry of Economic Affairs and Energy expects the approximately 640,000 jobs in the automotive trade and aftermarket, today, to decrease by 20 to 24 percent by 2030. By 2040, the authors expect a decline of up to 48 percent. Almost two thirds of today's jobs could even be lost by 2050 [12].

We elaborate these aspects since it clarifies what makes sustainable mobility so highly political and socially sensitive. Re-thinking the diverse mobilities which are possible, today, and the different pathways into sustainable mobility futures is a process that interferes right into people's very private and intimate spheres of life. It effects jobs, employments and livelihoods, social security, daily routines and practices identities, social belongings and the social circles and networks that are being built and maintained across distances. Aiming for sustainable urban mobility on the basis of the United Nation's sustainable development goals (SDGs) does not work with business as usual. As we wrote before, high hopes are in the deployment of connected and integrated mobility systems. But recent studies demonstrate, electric mobility and automated mobility, together with new mobility services—as i.e., shared mobility and the like—would not live up to the necessary paradigm shift. Significant and lasting positive effects on the sustainability of transport and travel must come along with a new mobility culture.

An analysis of public policies to decarbonize mobility using the method recommended by the United Nations (according to the IMPROVE, SHIFT, AVOID triptych—Improving the energy performance of modes, Shifting from cars alone to less emitting modes, or Avoiding travel) is edifying: at the international level, 80% of policies to limit transport-related CO<sub>2</sub> emissions focus on improving the performance of cars or their fuel.

With regard to “shift” strategies, it appears that public authorities are essentially relying on incentives for modal shift from cars to public transport, which can be based on internationally standardized models (e.g., BRTransit buses running at high frequency in dedicated lanes with very high capacity. A model invented in Brazil and disseminated throughout the world) or policies to restrict the use of cars in favour of soft modes? Policies encouraging the use of alternative modes that associate them with values such as quality of life, modernity, and sociability are much rarer in the world.

Moreover, it should be noted that the issue of travel avoidance is almost never addressed in public policy. One exception is the “low carbon Auckland 2040” plan, which aims to reduce travel by 30% by that date, as summarized by a New Zealand telework promoter: “Transport professionals will build roads until they are saturated, then they will start to promote public transport, then they will encourage active modes such as walking and cycling, and only then will they realize that they could have started by thinking about eliminating the need to travel as such.

Long story short: this new mobility culture prioritizes shorter distances, active mobility and regional mobility and logistic patterns. At the end of the day, this also means: less travel and less consumption of distance. In other words: increases in efficiency will not do the whole job; sustainable mobility with significant changes in mobility behaviour can only be reached when sufficiency approaches become everyday practice [13–16].

The articles in this special issue bring together new research on these topics:

Elisabeth M. C. Svennevik explains in her contribution “Providers and Practices: How Suppliers Shape Car-Sharing Practices” how social practice theories can be useful for studying changes in mobility systems as regards automobility practices. Her study focuses on the role of providers in car-sharing practices, using data from household interviews with car-sharing users, stakeholder workshops, and interviews with providers of car-sharing services. She offers a critical view of how the providers contribute to various kinds of car-sharing understandings, as well as the implications for policy and practitioners.

The impact of Automated Driving (AD) is what Kerstin Stark and Anton Galich are dealing with under the title “Acceptable Automobility through Automated Driving. Insights into the Requirements for Different Mobility Configurations and an Evaluation of Suitable Use Cases”. They ask whether AD will make alternatives to the private car more attractive and facilitate the transition to sustainable transport or what unintended consequences of automated driving are to be expected. They provide empirical insights into the design of acceptable forms of AD by investigating specific use cases with respect to the requirements of different mobility configurations. Special attention is being paid to people who travel with children. Their conclusion is that automated mobility use cases should meet the requirements of different mobility configurations to promote the transformation from private to shared automobility and, eventually, less automobility overall.

In their contribution Tobias Haas and Hendrik Sander analyze “Decarbonizing Transport in the European Union: Emission Performance Standards and the Perspectives for a European Green Deal” the efforts of the European Commission to strengthen the decarbonization of the EU at the end of 2019 by publishing the European Green Deal (EGD) communication. They focus on the controversy surrounding the emission performance standards for cars adopted in spring 2019. Car manufacturers must reduce the average carbon emissions of their fleets by 37.5% between 2021 and 2030. In their view it is crucial for mobility research to critically engage with lobbying power in the EU and with concepts such as environmental leadership, which often underexpose the structural power of incumbent actors and existing path dependencies.

Platform-based “shared mobility services” are quite new. In Lisa Ruhrort’s article “Reassessing the Role of Shared Mobility Services in a Transport Transition: Can They Contribute the Rise of an Alternative Socio-Technical Regime of Mobility?” such car-, bike-, and e-scooter-sharing services (so called shared mobility services, SMS) are discussed as a possible component of sustainable mobility politics. The article concludes that supporting and regulating SMS will be key to steering their growth in the direction of sustainability.

Amelie Ewert, Mascha Brost, Christine Eisenmann and Sylvia Stieler deal with the subject of light vehicle e-mobility. In their article “Small and Light Electric Vehicles: An Analysis of Feasible Transport Impacts and Opportunities for Improved Urban Land Use” they ask how three-wheeled and four-wheeled vehicles contribute to more efficient use of space in urban areas. Due to the fact that technology application is restricted by travel behaviour and political support, support by public bodies is needed. They come to the conclusion that also restrictive measures for conventional cars are necessary.

Ina Richter and Tobias Haas’ contribution “Greening the Car? Conflict Dynamics within the German Platform for Electric Mobility” points out that the environmental crisis due to air pollution, high CO<sub>2</sub> emissions, noise from traffic and soil ceiling requires profound changes to the car-dependent transport system. This article examines the political dynamics of German transport politics, focusing on the National Platform for Electric Mobility.

Johannes Enzmann and Marc Ringel focus on European policies and their article “Reducing Road Transport Emissions in Europe: Investigating A Demand Side Driven Approach” presents a provocative and future oriented approach in road pricing. Since the European Union aims at net-zero emissions by 2050, a key sector to achieve this goal is road transport, where emissions show no signs of reducing but continue to grow.

A new understanding of mobility transition interlinked with the cultural values of modern societies is needed in the view of Malene Freudendal-Pedersen, Katrine Hartmann-

Petersen, Freja Friis, Malene Rudolf Lindberg and Thomas Skou Grindsted. In their contribution “Sustainable Mobility in the Mobile Risk Society—Designing Innovative Mobility Solutions in Copenhagen” they make plea to create sustainable mobility practices which need to be robust, socially coherent, and inclusive. They explain this demand using the example of the traffic turnaround in Copenhagen.

Luca Nitschke argues in his article “Reconstituting Automobility: The Influence of Non-Commercial Carsharing on the Meanings of Automobility and the Car” that non-commercial carsharing, a self-organized form of carsharing, poses a major challenge to the hegemonic meanings of automobility on the level of everyday practice. His optimistic assumption is that non-commercial carsharing bears the potential for substantially altering the reproduction of the system of automobility.

Last but not least Liqiao Wang and Peter Wells present an analysis, informed by socio-technical transitions theory and the socially derived concept of automobility, of the impact of the SARS-CoV-2 virus and resulting COVID-19 pandemic on automobility in Europe. Under the heading “Automobilities after SARS-CoV-2: A Socio-Technical Perspective” they argue that strong behavioural changes in physical and virtual mobility associated with the pandemic are particularly significant. They observe that mobility sharing will reduce, while the acceptance of electric cars will increase. However, in their view the hegemony of private automobility is not in itself threatened by pandemic outcomes.

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## References

1. Daum, T. *Das Auto im Digitalen Kapitalismus: Wenn Algorithmen und Daten den Verkehr Bestimmen*; Oekom Verlag: Munich, Germany, 2019.
2. Dennis, K.; Urry, J. *After the Car*; Polity: Cambridge, UK, 2009.
3. Geels, F.W. *Automobility in Transition? A Socio-Technical Analysis of Sustainable Transport*, 2nd ed.; Routledge: New York, NY, USA, 2012.
4. Hoffmann, S.; Weyer, J.; Longen, J. Discontinuation of the automobility regime? An integrated approach to multi-level governance. *Transp. Res. Part A Policy Pract.* **2017**, *103*, 391–408. [[CrossRef](#)]
5. Kesselring, S. Networks, flows and the city of automobilities. In *Handbook of Urban Mobilities*; Jensen, O.B., Lassen, C., Kaufmann, V., Freudendal-Pedersen, M., Gøtzsche Lange, I.S., Eds.; Routledge: London, UK, 2020; pp. 31–40.
6. Nobis, C.; Kuhnimhof, T. *Mobilität in Deutschland—MiD. Ergebnisbericht*; Bundesministerium für Verkehr und Digitale Infrastruktur: Bonn, Germany, 2018.
7. Andor, M.A.; Gerster, A.; Gillingham, K.T.; Horvath, M. Running a car costs much more than people think—Stalling the uptake of green travel. *Nature* **2020**, *580*, 453–455. [[CrossRef](#)] [[PubMed](#)]
8. Canzler, W.; Knie, A. Mobility in the age of digital modernity: Why the private car is losing its significance, intermodal transport is winning and why digitalisation is the key. *Appl. Mobilities* **2016**, *1*, 56–67. [[CrossRef](#)]
9. Elliott, A. *The Culture of AI: Everyday Life and the Digital Revolution*; Routledge: Milton, UK, 2018.
10. Demoli, Y.; Lannoy, P. *Sociologie de l'automobile. Collection Repères, 718*; La Découverte: Paris, France, 2019.
11. Frieske, B.; van den Adel, B.; Schwarz-Kocher, M.; Stieler, S.; Schnabel, A.; Tözün, R. *Strukturstudie BWe mobil 2019. Transformation durch Elektromobilität und Perspektiven der Digitalisierung*; e-Mobil BW GmbH: Stuttgart, Germany, 2019.
12. Hagedorn, M.; Hartmann, S.; Heilert, D.; Harter, C.; Olschewski, I.; Eckstein, L.; Baum, M.; Henzelmann, T.; Schlick, T. *Automobile Wertschöpfung 2030/2050*; IPE Institut für Politikevaluation GmbH: Frankfurt, Germany; fka GmbH: Aachen, Germany; Roland Berger GmbH: Munich, Germany, 2019.
13. Banister, D. The sustainable mobility paradigm. *Transp. Policy* **2008**, *15*, 73–80. [[CrossRef](#)]
14. Blanck, R.; Hacker, F.; Heyen, D.A.; Zimmer, W. *Mobiles Baden-Württemberg—Wege der Transformation zu einer nachhaltigen Mobilität. Abschlussbericht der Studie*; Baden-Württemberg Stiftung gGmbH: Stuttgart, Germany, 2017.
15. Nitschke, L. Reconstituting Automobility: The Influence of Non-Commercial Carsharing on the Meanings of Automobility and the Car. *Sustainability* **2020**, *12*, 7062. [[CrossRef](#)]
16. Sachs, W. *Zukunftsfähiges Deutschland in Einer Globalisierten Welt: Ein Anstoß zur Gesellschaftlichen Debatte*; Fischer Verlag: Frankfurt, Germany, 2008.