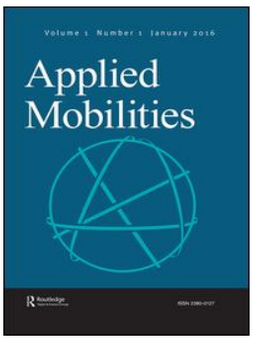

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# Mobility in the age of digital modernity: why the private car is losing its significance, intermodal transport is winning and why digitalisation is the key

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**ABSTRACT**

The private automobile is a central enabler for modern societies and is thus a culturally charged symbol. Can this societal promise of private car ownership and automotive mobility in the face of climate change and permanent congestion imply the continued guarantee of social participation? The digital options for transportation allow for a general safeguarding of mobility without the direct need for private vehicles, but the current market structures do not allow for that. It is obvious, that new business models triggered by digitalisation are struggling to find support in the current legal frameworks, although they increase the capacity and efficiency of transport and energy systems, reinforcing decarbonisation initiatives and eventually also address the citizens needs and interest in a more effective way. The dynamics of digitalisation are speeding up, eroding current patterns of mobility behaviour; the current legal framework, however, preserves the status quo and even contradicts the promise of social participation. Considerable restrictions on the private car need and will be implemented as urban and environmental pressures can no longer be mitigated. Electrification of the entire transportation sector is thus not only necessitated due to climate change mitigation, but is in line with the increased interlinking of different modes of transport into integrated mobility services. This shift will involve a fundamental transformation of the transport sector. It is driven not only by economic and technological factors, but importantly also by important societal developments and considerations. The use of digital technologies in order to economise the mobility sector, making it more efficient and intermodal, cannot be stopped. The automobile with its combustion engine was only the first generation appliance. Its broad success, however, has forced us to consider alternatives and reinterpret the product with the help of digital technologies.

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## 1. Introduction: the automobile as an icon of modernity

It is an established fact among social structural analysts that the principal feature of modern society is the increased process of differentiation. Individualisation tendencies are especially pronounced among the middle and upper social strata. Self-reliant and self-willed lifestyles

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are the key elements of modern societal development. From a spatial point of view, this individualisation is tied to the access and availability of transportation. Those of us who are able to freely and individually choose different means of transport and use them efficiently hold advantaged positions within this process of differentiation. A person's annual income and the total number of kilometres travelled each year are causally related (Infas, DLR 2010, 62), even today. Put briefly: those who want to earn more, need to overcome space and distance. Personal time and personal space are considered individualised appropriations of social participation and this perception in itself should be seen as a result of mass motorisation (Knie 1997).

The private automobile is a central enabler for modern societies and is thus a culturally charged symbol. The car is a prerequisite as well as a condensed socio-technical representation of modern societies, and it is thus inextricably linked with their development (Urry 2005). The number of registered private automobiles has been – and still is – employed as an indicator of prosperity and development. As such, policy-makers have prioritised the long-term availability of private and commercial vehicles.

The pivotal role that the car assumed in the development process of modern societies, particularly in the broadening of the participatory base, has been by no means self-evident or inevitable. At the beginning of the twentieth century, it was certainly not definite that the private automobile would prevail as the dominant means of transportation of the modern age. While in Europe the railway system dominated and private motorised vehicles were the prerogative of the rich and beautiful, it was only through the US invention of mass production that created the basis for this development (Flink 1990). However, popularising this new vehicle would have been far less successful had it been not for the creation of the necessary infrastructural and transportation policy framework geared towards prioritising the automobile: roads were built, supply networks set up and a legal structure established that would clear the way for the dominance of the car. Political will and policy measures were key components in framing private car use as the most attractive mode of transportation. It is particularly interesting to note that in Europe, especially, this system was set in place even before the car could be considered a mass commodity. In the discourse of urban planners in the East and West the private car soon became synonymous with modern life: The 1933 Athens Charter illustrates this approach as the key manifesto of high-modernist urban planning (Scott 1998, 103f).

Space was being primed and developed for the automobile at a time when there were hardly any cars on the street. One notable example being the construction of the "Reichsautobahn" under the German national socialist regime, which by the end of the war covered more than 4,000 kilometres (Overy 1994). This scheme was implemented at a time when there was virtually no private automobile market in Germany: In 1933, there were only 1.5 million registered cars in the entire country (for comparison: there are approx. 45 million registered cars in Germany in 2015). Another key guarantee for the automotive paradigm was the security of its crucial resource base. All major industrialised countries of the world have been mass motorising their societies on the basis of predominantly imported oil. Ever since the middle of the twentieth century, Western foreign interests seek access and security to cheap oil. The permanent political destabilisation of the modern Middle East, for example, is also a consequence of the Western interventionist foreign policy (Yergin 1991). At the same time, it is this fossil-fuelled base of the transportation sector that is increasingly problematic in the context of climate protection (cp. Urry 2011).

Looming political and environmental crisis and the many negative consequences of urban mass motorisation raise the central sociopolitical question: can this societal promise of private car ownership and automotive mobility retain validity in the future, and if so, does this imply the continued guarantee of social participation? And if not, what would effective intervention measures look like in a world where the automotive paradigm completely permeates the social and economic fabric of modern life? Much has been speculated about the transformation of the automotive society, and many times has the normative end of the automobile been proclaimed, yet with the collective guarantees of securing private mass motorisation intact – the current status quo remains. While there have been hopeful indications of "New Mobilities Regimes" (Sheller 2012; Dennis 2013), ultimately it will always be the political framework determining whether the current paradigm prevails.

## 2. Eroding promises and the laboratory of the future

Indeed, there have been glimpses of hope: in the last couple of years the general setting seems to be changing. While in the late 1970s environmental and peace movements were growing increasingly strong in Europe and North America, focusing primarily on nuclear energy, transport remained a non-subject: hardly discussed, criticised and was thus unaffected, despite the fact that the negative effects of mass motorisation were already clearly visible in cities. Only with the 1973 oil crisis and OPEC embargoing their oil supply, did the West fall into a moment of panic, rationing fuel and imposing temporary bans on driving in order to counteract potential supply shortages. But as spectacular as the images of deserted autobahns were, the Western dependency on imported oil was soon to be forgotten. Western national transport policies responded to the increased inner city congestion and air pollution with half-hearted appeals of taking the bus or a train once in a while. Citizens were encouraged to increase their physical activity, and even the subject of carsharing made an appearance in the public discourse of the 1990s – which, however, was never taken to be a realistic option by the policy-makers (Canzler and Knie 1994, 1998).

Germany's efforts to transit the entire energy supply to renewables, in short "Energiewende", have become a globally recognised flagship agenda. In the transportation arena, there is no such transition in sight: current attempts have been and still are mostly focused at researching and developing alternative fuel and propulsion technologies. Be the solution a hydrogen vehicle, a battery electric vehicle or the enhancement of fuels, all these measures have been fairly unsuccessful in reducing pollutants and greenhouse gases (cp. Transport & Environment 2014) – what's more, the measured reductions in the emission of conventional motors have proven to be unrealistic (cp. ICCT 2014).

Individual motorised transport takes an average share of approximately 85% of the overall transportation market in Europe and North America (Eurostat 2014). This predominance has taken its toll: the continuously growing number of vehicles threatens the provision for effective and flexible urban transport. The tailoring of cities towards automobile has exhausted the capabilities of urban and environmental planning. Transport planners had been predicting this for decades, and now even urban planners are starting to see the light. Urban populations identify car as the biggest threat to liveable cities, as surveys have reliably shown over the last 10 years (InnoZ 2015). Criticism of the car focuses especially on its functional shortcomings and general health risks due to noise and pollution. Furthermore, the car no longer functions as the established status symbol that it used to be. From Sao Paulo

and Los Angeles, to London, Paris, Moscow, Beijing and Shanghai: the speed of the traffic flow has been falling with the growing number of cars. The higher the share of motorised individual transport in the modal split, the lower the speed of the overall transport (ADL 2014). The private car thus, no longer guarantees social participation: the sheer amount of vehicles on the streets no longer allows serving the limited urban space without permanent disorder and delays – particularly if the normative commitment towards universal car ownership remains intact. Besides, younger generations are no longer willing to stand for the collateral damage done to climate and health by combustion engines. Even with big cities and dense metropolitan areas carrying the heaviest burden, traffic- and impact-wise, the private automobile delivers no longer the promise of social and economic prosperity for broader agglomeration regions, mainly because inter- and trans-regional transport can no longer provide a fast and convenient inner city connection via car, particularly during rush hour. What's the use of a car in the suburbs if one cannot use at crucial times to get to the city and even driving on a holiday is bound to be incredibly stressful?

The transport dimension of the preconditions allowing for societal differentiation will not be fulfilled by the private automobile. The premise of unlimited spatial mobility as an essential requirement of modern lifestyles is removed more and more from the preconceived notion of owning a private car. With this decline in functionality, the car will not be able to keep its credibility as a culturally charged icon of progress and expressive demonstrative consumerism. The secularisation of the car has already begun, this is particularly visible among younger generations which have experienced a decidedly digital socialisation (cp. Frontier Group/US Prig Education Fund 2012; Ifmo 2013).

Cities are the laboratories of the future (cp. Rode et al. 2014): here we can observe the deficiencies of the automotive paradigm in their most pronounced form, yet we also discover patterns of new, sustainable behaviours. Rather than waiting for policy-makers to adapt the framework to the changed environment in order to ensure continued individualisation, modern urbanites themselves seek alternatives. As a consequence, the bicycle has experienced a "renaissance"; the bike share has nearly doubled in most early-motorised countries – although with great regional discrepancies (cp. Gehl 2010). With diminishing marginal utility of the car, the utility of the bike increases (cp. Freudendal-Pedersen 2015). The desire for personal time and space as a central driver of modern societies is fulfilled by the bike – as long as urban and transport planning provide the respective framework, which are, for example, given in Copenhagen and very much less so in Los Angeles. However, it is also clear that the bicycle cannot make up for the functional and symbolic devaluation of the private automobile.

Apart from the increased bike use, intermodality features as an increasingly prominent urban transportation trend – not only in overcrowded and polluted megacities like Delhi. The number of trips undertaken by car is stagnating and at times even slightly decreasing, while the combination of different means of transport is increasing. This indicates that the increasing restrictions of the private car are being compensated by – at least temporarily – switching onto alternatives whenever and wherever available. Obviously, the choice of transport modes and access options is perceived as particularly attractive when this variety can be managed and engineered to an extent. In major German cities, for example, already most urbanites make use of this intermodality, rather than exclusively relying on a private vehicle. These urbanites tend to be well educated, have an above-average income and a high affinity to new media and information technology that allow working out new transportation

options. There is a strong indication that the close link of modernity and private car use is beginning to dissolve, and new attitudes towards urban mobility that make use of variable modes of transportation are evolving (cp. LSE Cities and InnoZ 2015).

The influence of new digital media has moreover had a direct effect on the choice of transportation. The hypothesis of the private automobile losing importance can be additionally justified with arguments from the sociology of technology: everyday life is permeated with polyvalent information and communication technologies which undermine the monopoly of car in its formerly unique functionality as the sole, reliable transport option, opening up the decision horizon for the individual. They also allow for new mobility services and offers to be conceived, and in turn establish those services. Urban digital natives are used to manoeuvring within various spheres with diverse access rights already. The inception of an access regime based on securing short-term limited use of assets, which replaces the paradigm of private property, as postulated by Jeremy Rifkin (cp. Rifkin 2000), seems especially salient in the context of digitalisation and service orientation in the transportation sector. Corresponding to this measurable segmentation in demand, changes can be observed in the attitude towards automobility. It is because the car is losing its importance among young urbanites that the openness towards new intermodal transport services is growing. The number of under 26-year-olds holding a driving licence, being one indicator of many, has been significantly falling in all of Europe. Only with the age of 30 does the overwhelming majority of Europeans hold a driving licence (cp. Ifmo 2013). At the same time the share of public transport is rising among young urbanites' modal split. The private car – once *the* status symbol and instrument of demonstrative consumerism – has now strong competitors: smart phones, computers, clothes and travelling seem to be more suitable for personal differentiation. Social participation is no longer uniquely dependent on the private automobile.

Apart from the functional shortcomings of the private vehicle, it is also the context of urban mobility that has experienced drastic changes. Internet, Wi-Fi, and high-performing smartphones are already taking centre stage in this development. Their near ubiquitous spread has impacted the general relation of space and time. Communication and societal access are removed from their direct spatial component, eventually redefining the requirements of social participation. It is to be expected that competences in digital media will grow increasingly important in order to access and partake in social life (cp. Tully 2013). The rapid digitalisation has only accelerated this shift away from the private car as a societal guarantor of mobility and individual development, to the smartphone as guarantor for ubiquitous access to virtually all societal resources.

## 3. Persistence of normative guarantees

Paradoxically, despite this above-described shift, policy-makers in North America, Europe and Asia continue to be fixated upon and promote private automobile as the central pillar in transportation policy. All aspects of transportation governance are aligned with the (indirect) sponsorship of private car ownership and the use of respective vehicle. The new mobilities paradigm (Sheller 2014) has been largely ignored, although the ownership question in transportation is rendered less pertinent or even irrelevant if we consider the true alternatives: does the highly active and self-determined urban citizen want to have access to a broad set of flexible transportation alternatives or does he want to be restricted in his personal mobility and autonomy by choosing a private car with today's inherently limited

usage options. Whether there will be broad societal acceptance of the first scenario over the latter will ultimately not only be dependent on given anthropological factors such as the desire for personal ownership, but rather what range of integrative mobility solutions can be offered in a reliable, cost-effective and spatially coherent way. Besides, broadening the scope and range of these services would be facilitated through digital platforms. Many factors point to the fact that this behaviour of being constantly "online" has already become a customary practice among many which eventually promotes these new mobility patterns.

It remains to be seen what the policy framework and the guarantees of social participation would look like if private car ownership and use really are a thing of the past. Increased environmental and health risks as well as financial deficits force municipal policy-makers to make restrictions: access restrictions, banning of vehicles, as well as new kinds of traffic regulations and usage fees will be far more common than before (cp. EU Com 2011). Leading to an overall reduction of the technical, economic, legal and infrastructural flexibility and mobility of the urban core and the people within it. Rather than levelling the playing field and making the world "flat" as globalisation did, the norm of the private automobile creates obstacles and adds to the impenetrability of the system. Past tendencies were marked by "simplification via standardisation", illustrated by the design and organisation of airports (cp. Kesselring 2009). Intuitive use was always an argument for car, with traffic lights and signs following the logic of simplification and standardisation. Congestion charge, dedicated lanes and access restrictions are proving to be ever more effective and popular measures of urban transport and traffic policy. This will result in a more heterogeneous mobility environment that is increasingly complex to understand and navigate. Users require more competences and experience in order to identify a convenient and appropriate transport option; it progressively demands more "motility" (Kaufmann et al. 2010).

Apart from the driving restrictions of conventional combustion engine cars, the progressive introduction of user financing in transport is becoming another key driver in the heterogenisation of the sector. The underlying economic principle of those who actually use the transport infrastructures should pay for it directly rather than paying for it indirectly via taxes – as currently in practise in Europe and North America. Construction and upkeep can no longer be funded by redistribution. This would have twofold implications for the usage fees: firstly, usage fees would now need to include not only the operation costs, but also previous external costs; secondly, usage fees might differ throughout the day depending on the traffic volume. If demand is high, so are the corresponding peak prices. With this shift to user financing, transport infrastructure loses its status as a universal, public and accessible good. Choosing travel times and routes freely will be more dependent on disposable income than ever. A consistent user financing scheme will thus exacerbate the diverging mobility options available to different social groups. Social participation through access thus gains an additional dimension in this context. The access to streets, parking, and expected orientation skills in a heterogeneous traffic landscape is thus becoming a question of individual competence in addition to financial ability. The socio political convention of a car which used to promise societal differentiation, is now threatening to turn itself into its opposite: while the car used to function as prerequisite for individualisation in the past, today a certain degree of individualisation is required first simply in order to use a car. The automobile goes back to being a privilege of the "rich and beautiful" again. If transport planners and policy-makers fail to reshape a new social contract of societal participation and stick to the automotive paradigm, significant social frictions will be start to emerge.

## 4. Speculating about future developments

Clinging to the past guarantees for the private automobile adds to its costs and complicates its use, thus undermining the claim that ownership and usage of a private car irrevocably lead to broad social participation. At the same time the emerging digital revolution has already impacted the transportation sector; bringing profound change to the market that will ultimately uproot existing systems and paradigms. They also result in new market dynamics, which are shaping up to be momentous shifts in power: if facebook were to be a state by economic parameters, it would play in the same league as China or India; Research – be it for private or business purposes – is mostly unthinkable without Google. The key element of modern lifestyles, endeavouring individuality and differentiation, can be taken to a new level and freshly interpreted thanks to digital media and technologies. It is mainly due to the use of these new digital forms that past standards, structures and obligations are beginning to disintegrate. The internet has accelerated the collective transition from society to individuals and promoted the shedding of conventions, be they temporal, local or social.

Many everyday life aspects are already starkly affected by constant digital access. While it may be true that a hotel room can be booked conventionally and there are many ways of going about it, this no longer holds true for other services (see Molz and Paris 2015). Not least the mobility and transport sector is impacted (cp. Canzler and Knie 2016): New services such as flexible carsharing were only made possible through the ubiquity of the smartphone. After registering, customers can spontaneously access and rent vehicles all over the city via their smartphone. An app shows the user where he can find the next vehicle. This offer is only digitally available to people – everyone who does not own a smartphone cannot make use of these flexible, shared vehicles since even accessing the car only works via the app.

This suggests a completely new and changed approach to choosing one's transport options. Originally, the physical characteristics determined the choice of means of transport: the technical specifications of a car, bike, bus or train were the essential factors – apart from cost and travel time – when choosing the transportation mode. With the automobile, moreover, the vehicle brand was a crucial differentiating feature. Car manufacturers based their brand identity – "Vorsprung durch Technik" or "The Ultimate Driving Machine" – on genuine/supposed distinct technical specifications and characteristics. Potential users judged the different vehicles based on availability, price, quality and secured exclusive access through purchase or leasing. Flexible carsharing thus, demonstrates a shift in perception and decision-making. Carsharing users appreciate the fact that they can quickly and conveniently access a vehicle; the decision is usually made in a split second and they do so with the expectation that there will be cars available. Digital coverage has completely changed users' expectations and demands. The low transaction cost option to access a suitable vehicle at any time and any place in the city has, in fact, changed personal needs: the instant need and/or desire to drive now find immediate corresponding facilitation.

The competition among the different mobility options is now relocated to the digital marketplace. The provider offering the biggest and most comfortable selection enjoys a competitive advantage. Features such as number of cylinders, volume of engine and power become less important. Automated driving should be considered in the same context: it is less about the actual propulsion technology and other technical specifications, and more about the seamless and comfortable driving and being driven. Automated driving fundamentally changes our understanding of the automobile (cp. Bertoncello and Wee 2015).

Furthermore, autonomous parking yields huge potentials for carsharing (OECD/International Transport Forum 2015).

Consequently, digitisation does not only change the dynamics of competition, but also the value creation chain (in general cp. Rifkin 2014). This structural transformation from production to service provision has already affected the automotive industry (cp. Firnkorn and Müller 2012), but will continue to accelerate and ultimately will become a radical force. Manufacturer brands will no longer matter; cars will be downgraded to be mere "vehicular appliances" and controlled on a digital marketplace, where new actors decide over the use. A proud industry, steeped in tradition, will be ruled by app developers simply because the place where decisions are formed and made has shifted.

What makes the digital world so popular and powerful is the fact that the user takes the driver's seat and has a broad set of options at his hands. Users can with as much as a click decide over an entire range of service offers. If the preferred car is not available, there is no hesitation, and the next best vehicle is chosen. It is one of the subtlest effects of the digital marketplace: desires and needs, the overall consumption behaviour, are being changed using smartphone without the individual consciously noticing. One is seduced to act opportunistically and uses what is offered in digital form. The original decision criteria such as brands and technical specifications are being suppressed or disappeared as a whole.

When digital access and availability become the new criteria in choosing a vehicle, this equates to a revolution in the choice of transportation mode. The newly won sovereignty of the user has even further consequences. With the internet of things capturing every means of transportation and turning it into a digitally bookable object – meaning that information about position, availability, access and cost can be visualised and requested dynamically – this entails that the physical heterogeneity is cancelled out. Trains, buses, bikes and cars can be found on the same digital platform (cp. Lyons 2015). While in reality they all differ in their specifications, access and have diverse payment structures, these diverse means of transport become more equal in the digital world. In the end, the user only looks at different slots or routes that can be offered and demanded – just as described by Rifkin 15 years ago.

In the first step this (in general: cp. Rifkin 2014) development leads to a completely different user perception of the different transportation modes. The former advantage of a car – complete usage flexibility in terms of time and space – may be applied to the other modes as well. This particularly affects public transport: arrival and departure times, ticketing information and access were once hard to understand for inexperienced users. The car promised an easy path of self-determination. This bonus is, however, disappearing as restrictive traffic regulations lead to a sharp drop in flexibility. Digital access thus, makes all applicable and essential information available to most modes of transport via smartphone. The smartphone becomes the digital key to an intermodal world.

Obviously, no human being is physically moved by digital processes. The actual travel experience remains an important factor, and will continue to make a difference between the different modes of transportation – even in the digital future. There will always be a difference in driving a convertible on a warm summer night along an empty coastal road (however singular those moments may be) and taking a packed commuter train. But the travel experience will be replaced as the dominant decision criterion by the quality of the digital presence of the different modes. This is due to the fact that digital media also changes the travel experience, albeit in a different way: authentic experiences are superseded by digital ones, especially as commuting times are spent on the phone and online. Public transport thus

offers the ideal opportunity to browse the web or communicate – notably not with fellow passengers, but with peers somewhere across the globe. With the exception of travelling on a holiday or adventure, the commute and similar travel experiences are growing to be increasingly individual experiences. The smartphone, thus bridges the formerly big divide between the private commute by car and the one undertaken on public transport. One could speculate that the individualisation process started by the automobile is continued, and even heightened, with the smartphone – mainly because the processes of participation are extended and happening in a virtual yet global context.

## 5. Conclusions: the next necessary turns in transport policy

In this context it is immediately clear why and how young start-ups of the digital economy have been so successful in raising serious amounts of capital in the shortest of times. The most prominent example of the transportation sector in general, and the mobility market in particular, being the Californian rideshare provider Uber of course. Founded in 2009, the company with a market value of over 50 billion US dollars epitomises the prospect of seamless travel without having to invent new means of transportation or building new infrastructure. Uber's philosophy is about reorganising already existing vehicles and the distinction between provider and client is broken down. The truly disruptive result of digitalisation is the overcoming of the traditional roles of producers and consumers, allowing a direct interaction of demand and supply that is low in transaction costs. The digital economy will also continue to dissolve the distinction between the employer and employee. The fact that unions are opposed to this tendency is only natural. But it seems unlikely that traditional organisation of workplaces can be defended in the face of the spread and high acceptance of digital media.

Uber is also the financial markets' darling because the business model builds on traditional and trusted social practices, but interprets them anew in a digital context: providing a rideshare and taking a rideshare are simultaneously introduced. If this, moreover, means that the already existing set of vehicles can be used more efficiently, then the usage of a private transportation service is no longer attached to the notion of a private vehicle and can be organised much easier. In the past, the establishment of a suitable marketplace was considered too complicated and simply not feasible. This attitude has changed since the emergence and popularity of Uber and similar digital platforms. Despite Uber currently only seeking to provide rideshares and consequently feeling the wrath of taxi lobbies worldwide: the path towards new mobility services is paved. An intermodal transport provider whose sole focus is on information, ticketing and billing of trips, rather than also taking care of operation and vehicle provision, is now a viable option. The digital marketplace presents the technological foundation.

It seems paradox that especially the respective national policy-makers with their guarantees safeguarding the promise of private car ownership are obstructing the development of efficient and environmentally friendly mobility services. In most countries private ridesharing is not envisioned, oftentimes even illegal. In Germany and France there is a sharp distinction between private and public transport, and the respective legal frameworks protect this separation. Everyone wanting to transport groups of people needs a licence to do so. These licences are granted only on a limited spatial scale and predominantly to trusted public transport companies or the licenced taxi sector. New business models struggle to find their

place in this context, which ultimately increases the tension between technological and societal developments on one hand, and traditional regulation frameworks on the other.

The digital options for transportation allow for a general safeguarding of mobility without the direct need for private vehicles, but the current market structures do not allow for that. It is obvious, that new business models triggered by digitalisation are struggling to find support in the current legal frameworks, although they increase the capacity and efficiency of transport and energy systems, reinforcing decarbonisation initiatives and eventually also address the citizens needs and interests in a more effective way. The dynamics of digitalisation are speeding up, eroding current patterns of mobility behaviour; the current legal framework, however, preserves the status quo and even contradicts the promise of social participation. Considerable restrictions on private car need and will be implemented as urban and environmental pressures can no longer be mitigated. Electrification of the entire transportation sector is thus not only necessitated due to climate change mitigation, but is in line with the increased interlinking of different modes of transport into integrated mobility services.

This shift will involve a fundamental transformation of the transport sector. It is driven not only by economic and technological factors, but importantly also by important societal developments and considerations. 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. As long as our democracies are organised according to market capitalist principles, national policy-makers will always resort to considering societal integration as an essential element of economic prosperity allowing for individual lifestyles. 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. From a sociological perspective, the fixation with safeguarding the current product paradigm will, sooner or later, have to give way to a new generation of transportation.

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