18 Lessons from local transport transition projects for connected and automated transport

A discourse and hegemony theory-based assessment of new mobility services in Lower Austria

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1. INTRODUCTION

In this chapter, we will consider selected projects relating to the transport or mobility transformation[1] in rural and suburban areas, examining them in the context of connected and automated driving. The hypothesis outlined in this study is that, while connected and automated transport can fundamentally change the existing "system of automobility" (Urry 2004), the changes in question have to be seen in the context of specific local challenges and contemporary conflicts around mobility systems. This analysis therefore focuses on local mobility projects that look beyond simply replacing automobility's fossil fuel combustion systems, instead aiming to achieve a broader-based transition via new mobility services such as public transport microsystems, non-profit lift services and car-sharing schemes.

The analysis draws on an empirical investigation in the region of Lower Austria and takes discourse and hegemony theory as its frame of reference. In contrast to other socio-technical theories of transformation, which place greater emphasis on technological niches and their interplay with established systems or regimes (Geels 2012, Loorbach et al. 2017, Kemp et al. 2012), the chosen lens of discourse and hegemony theory focuses more on existing power relations and the role of societal consent in transformation processes (Laclau/Mouffe 2000, Nonhoff 2006, Wullweber 2012). According to Antonio Gramsci's concept of hegemony, change – and this includes the change required to transform transport systems – can only be achieved if there is a certain level of consent or consensus among the population.

Taking Gramsci's premise as its starting point, this empirical research examines recent transport transformation projects offering alternatives to fossil fuel-powered, privately owned cars, specifically in rural and suburban areas of Lower Austria. These case studies allow us to empirically identify contemporary challenges, tensions and contradictions in the implementation of such projects and to recognize which groups or institutions are ready to embrace the transport transformation and what needs can be met by new mobility services.

Here, three types of project are assessed: electric car-sharing schemes, non-profit lift services and ring-and-ride taxis, the latter serving as an example of centralized micro public transport systems. This analysis is then used to ascertain which of the structures inherent in such new mobility services are effective under current conditions and which might, in conjunction with the connection and automation of transport, play a key role in future. As per the theoretical premises outlined above, it assumes that today's relatively stable discursive structures would not significantly shape future actions; new developments and breaks with the past can happen at any time, but the current structure makes certain outcomes more likely than others. By way of background, the next two sections first briefly examine the politics of the transport transformation and illuminate the underlying premises from discourse and hegemony theory.

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1   Parts of this text are based on the dissertation project "Automobilität im Umbruch? Gegenwärtige Stabilisierungen oder Transformationen der automobilen Hegemonie", developed at the Institute of Spatial Planning's Research Unit of Sociology and TU Wien's future.lab. The terms transport transformation and mobility transformation are mostly used interchangeably in political discourse. For a more precise differentiation of the two terms, see Manderscheid in Chap. 4 of this publication.

2. THE POLITICS OF THE TRANSPORT TRANSFORMATION

In the realm of climate, energy and environment policy, there has been an increasing focus on transport in recent years, with pressure for political action resulting in legally binding targets[2] at international, national and regional levels. In Austria, both the Mission 2030 national climate and energy strategy and the recently published national climate and energy plan (a plan the EU's governance regulation 2018/1999 obliges each member state to draw up) stress the need for targets and measures for the transport sector and emphasize the key importance of an environment- and innovation-friendly transport and mobility transformation[3] (Federal Ministry for Sustainability and Tourism/Federal Ministry for Transport, Innovation and Technology 2018, Federal Ministry for Sustainability and Tourism 2019), while local politicians (Österreichischer Städtebund 2015) are increasingly recognizing the importance of such a transition. The term transport or mobility transformation is often interpreted in very different ways. In general, though, it revolves around the problematization of greenhouse gas emissions from transport, and from fossil fuel-based automobility in particular, and around aims to reduce car traffic volumes or replace private car journeys with other modes of travel such as public transport, new mobility services, walking or cycling. In politics, this call for a transport and mobility transformation has now become an established policy demand, one that is increasingly gaining broad-based societal support.

The specific policies and strategies proposed to achieve such a transition, on the other hand, remain highly controversial. It is reasonable to assume that decisive action needs to be taken both in passenger and in goods transport; after all, with greenhouse gas emissions still rising, especially in urban centres and along through routes, transport is a particular problem area relative to other sectors (Federal Ministry for Sustainability and Tourism 2019: 6). The focus of such proposals is on trends such as the sharing economy, new mobility concepts – especially in rural areas – and on boosting public transport and promoting active travel. From a technological perspective, key roles are envisaged for electrification and digitization, while connected and automated transport, which combines both, is also expected to help facilitate the transport transformation (Federal Ministry for Transport, Innovation and Technology 2018).

Despite decades of demands for such a transition, it has failed to happen on any significant scale (Schwedes 2011: 14), and the car remains the dominant form of transport in many contexts (Manderscheid 2014). Moreover, the transport sector's greenhouse gas emissions have increased in recent years, as has the number of vehicles on Austria's roads (Statistics Austria 2020). This raises questions as to why so little progress has been made towards the transport transformation, despite political acceptance of its necessity. The next chapter uses perspectives from hegemony and discourse theory in order to examine the politics of the transport transformation in theoretical terms.

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2   In Austria, these legally binding targets are primarily defined in the "transport sector targets" section of the country's climate protection act.

3   In line with the EU's Effort Sharing Regulation, Austria has pledged to achieve a 36% reduction in greenhouse gas emissions by 2030 compared to 2005 levels, a target also adopted by the provincial governments. The largest cuts are set to come in the transport and buildings sectors. Transport currently has the highest emissions of any sector, being responsible for some 46% of all emissions (excluding emissions trading). To hit that 2030 target, emissions need to be reduced by around 7.2 million tonnes of CO_2 equivalent to around 15.7 million tonnes. In 2017, greenhouse gas emissions for Austria's transport sector (excluding aviation) amounted to 23.6 million tonnes of CO_2 equivalent, which equates to a 73% increase since 1990, and almost two thirds of road transport's greenhouse gas emissions were caused by passenger transport.

3. PERSPECTIVES FROM DISCOURSE AND HEGEMONY THEORY

The notion of a transport transformation involves particular shifts in the hegemonic discourse around transport policies. The desire to see certain changes in the transport sector is driven primarily by environmental concerns, though safety considerations also play a role (see Chap. 10 by Mitteregger in this volume). The following theoretical appraisal of these shifts uses a discourse and hegemony theory-based frame of reference, applying this to the politics of the transport transformation. Thinking on how hegemony theory and concepts from discourse theory intersect often draws heavily on the work of Laclau and Mouffe (Laclau/Mouffe 2000; Laclau 1990, 2002), which was then developed and empirically operationalized by authors such as Nonhoff (2006), Vey (2015) and Wullweber (2012, 2014). The term hegemony refers to the predominance of certain patterns of articulation or social constructs. Hegemony is not fixed, however, but always in flux, resulting from a discursive practice that builds on and modifies given discursive structures (Nonhoff 2006: 137). Hegemonic practice forms part of the political realm's discursive structure and evolves within that realm. Demands for a transport transformation can be read as a hegemonic practice that seeks to reinterpret or alter the structures of automobility in a specific way.
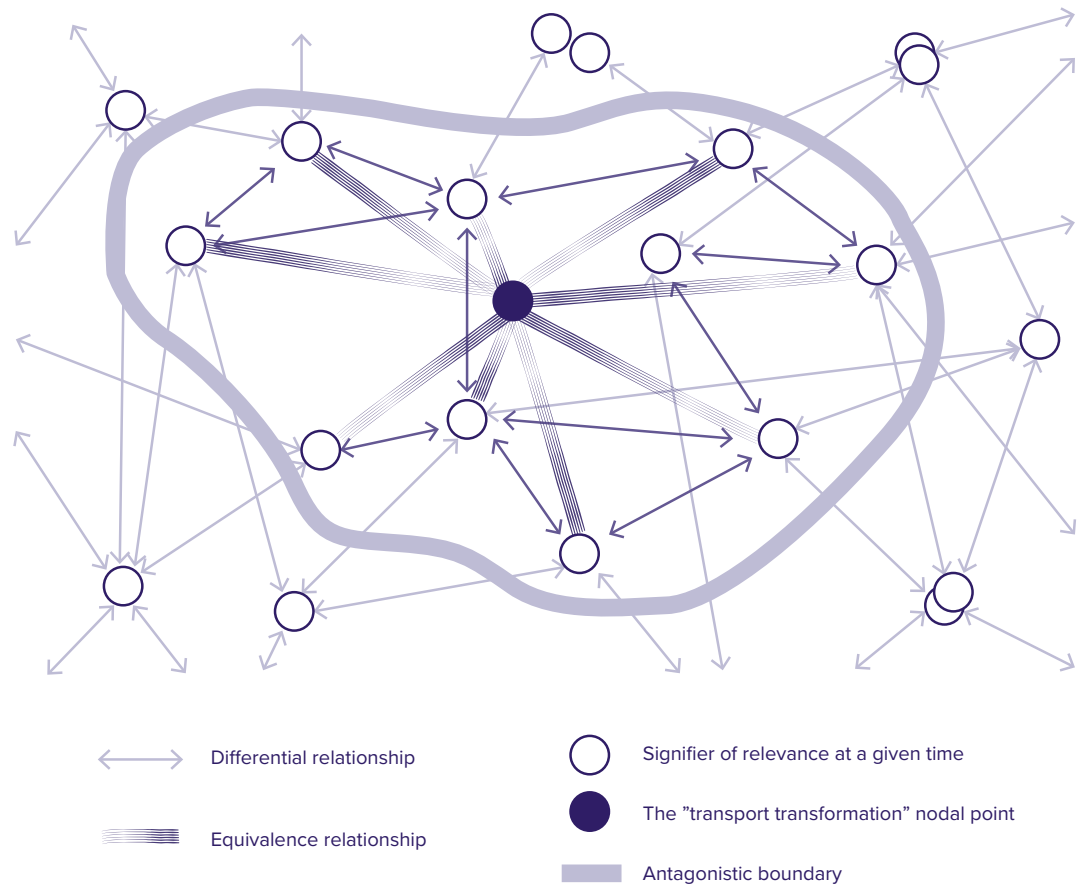
Today's automobility can be seen as a relatively stable discursive formation,[4] albeit one that, given the ever-louder demands for a transport transition, is contested and in need of reform. While demands for a decarbonization-based transport transition have not so far resulted in a counterhegemony that might rival automobility, there have nonetheless been various political articulations that challenge or call into question the universal primacy of the automobile (Federal Ministry for Sustainability and Tourism/Federal Ministry for Transport, Innovation and Technology 2018, Federal Ministry for Sustainability and Tourism 2019). New technologies such as electric vehicles, shared mobility, Mobility as a Service or connected and automated transport aim to move on from fossil fuel-based automobility and represent shifts in the hegemonic discourse. The demand for a transport transformation is gaining traction as a transport policy idea and forming a key nodal point[5] that has an extremely broad range of connotations, bringing together various issues relating to the future of mobility.

In the contemporary debate around the transport transformation, state interventions play a key role. Recent state interventions aimed at bringing about such a transformation have, however, also resulted in the establishment of new forms of subordination. Electric vehicles, for instance, remain controversial within society (Brunnengräber/Haas 2020), as do structural disincentives to car use (e.g. via taxation). Even the meaning of the term transport transformation itself is

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4   Socio-spatial and group-specific differences in car use play a key role. While the number of people owning a car is going down in many cities, car ownership continues to increase in rural areas (VCÖ 2015). The level of car use and the accompanying stability of automobility as a discursive formation is also linked to the quality of public transport services, while mobility researchers taking a milieu-based approach have highlighted the social differentiation associated with different mobility patterns and car usage (Dangschat 2017, Beck/Plöger 2008).

5   In discourse theory, this nodal point is described as an "empty signifier". The term "signifier" was coined by de Saussure, a semiotician who explored the relationship between language and reality. Signs consist of the signified (the thing being indicated, i.e. the concept) and the signifier (the thing doing the indicating; in the case of language, the "sound image"). The relationship between the signified and the signifier is essentially arbitrary, though given that the relationship is a product of society, not entirely random (Hagemann 2016: 16). The universalization of the specific that occurs in hegemonic projects renders the signifier empty, with the sign becoming detached from its meaning.

Figure 1: Transport transition as a nodal point

Differential relationship

Equivalence relationship

Signifier of relevance at a given time

The "transport transformation" nodal point

Antagonistic boundary

Source: the author, adapted from Glasze (2008: 194)

contested. Environmental demands thus exist in multiple forms that "depend upon the manner in which the antagonism is discursively constituted" (Laclau/Mouffe 2000: 210). These demands can be anti-capitalist, anti-individualist and authoritarian but they can also be libertarian, social-ist and reactionary. The nature of such an environmental demand is variable rather than fixed from the start; the manner in which the demand is articulated is by no means preordained.

The use of the term transport transformation creates specific equivalent relationships with oth-er important terms, such as technological progress, innovation, economic growth, safety and sustainability or renewable energy sources. These terminological relationships (equivalence relationships) point up problems with today's (car-dominated) mobility systems, lending them a positive aspect (Wullweber 2014: 291). At the same time, the term transport transformation sets itself apart from other key concepts such as fossil fuels or urban sprawl, thus forming a dif-ferential relationship and antagonistic boundary. Various societal actors regard their interests as being tied up with the concept of a transport transformation. In this context, there is now a largely established narrative relating to the transformational processes around electric vehi-cles, car sharing and automation.

The hegemonic shift towards a transport transformation is thus being driven by a range of so-cietal forces. As a result, this transformation, which aims to tackle key societal challenges, has now been successfully associated with the public interest.

4. NEW MOBILITY SERVICES AS EXAMPLES OF TRANSPORT TRANSFORMATION PROJECTS

To ascertain what shifts or schisms the push for a transport transformation has brought about in the discourse around automobility, it is worth looking in detail at existing transport transformation projects. By analysing key parameters and evaluating interviews with a range of relevant actors, this section aims to show what general demands have arisen in connection with new mobility services. It also looks at factors affecting the implementation and consolidation of these projects, examining where challenges and problems remain. The projects selected were station-based electric car-sharing schemes, non-profit lift services and ring-and-ride taxi services. Based in suburban or rural areas, these projects all aim to provide alternatives to private car use. The 12 interviewees were project initiators, representatives of local authorities or commercial providers of new mobility schemes. In addition to these interviews, talks and seminars given by representatives of the province of Lower Austria or of its energy and environment agency were also analysed. It was, however, not possible to also gather broad-ranging input on users' perspectives and perceptions of these services in wider society – more research is thus needed here.

Figure 2 below gives an overview of the various new project types being offered within the context of mobility as a service.

Figure 2: Mobility schemes (Mobility as a Service – MaaS)
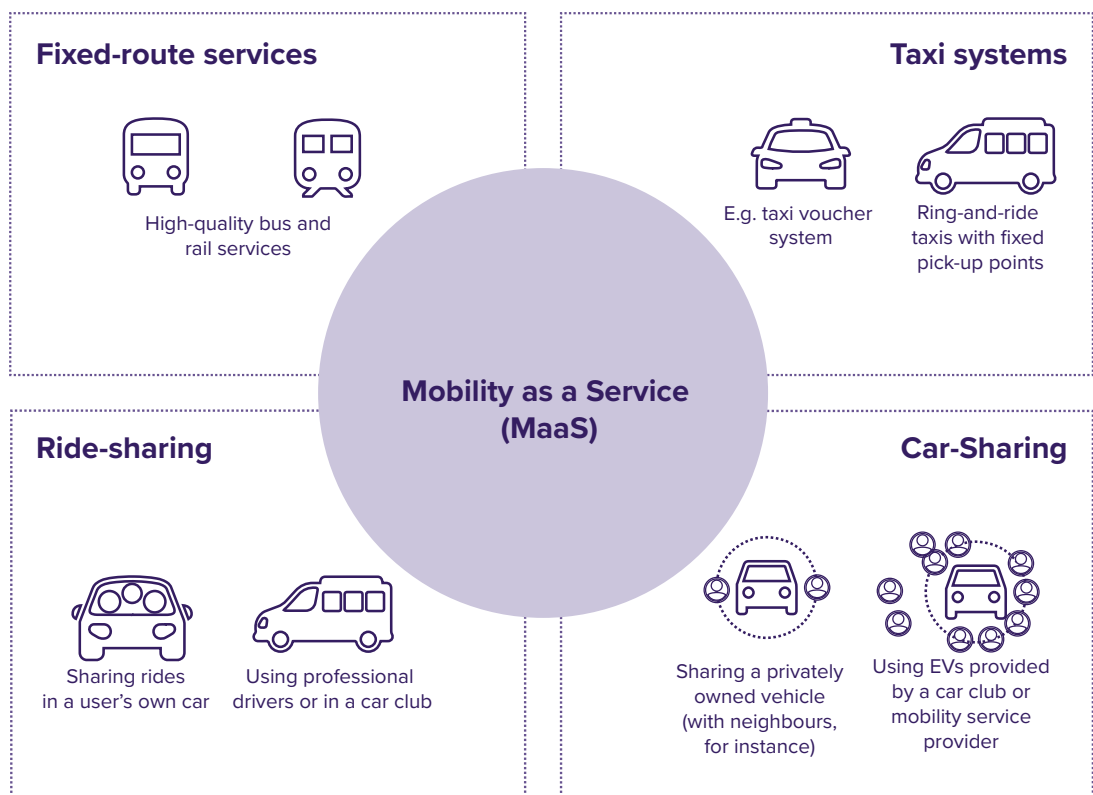
Source: the author, adapted from Danninger (2019)

Table 1: Comparison of selected mobility services

	Station-based electric car sharing	Non-profit lift services	Ring-and-ride taxi services
Primary operator	Municipality, company	Lift club	Municipality, region
Primary service type	Public sector, commercial (with public-sector support)	Private, non-commercial (with public-sector support)	Public sector (in conjunction with contracted commercial transport firms/platform operators)
Costs for users	Medium	Low	Medium
Responsibility for driving	Vehicles driven by the users themselves	Vehicles driven by volunteer drivers	Vehicles driven by professional drivers
Area covered	Vehicles accessed from fixed locations but can also be used beyond municipal boundaries	Services primarily operated within municipal boundaries	Operates alongside public transport, servicing predefined pick-up points

Source: the author

Table 1 above compares the three selected models – electric car sharing, non-profit lift services and ring-and-ride taxis – with regard to operator, service type, usage costs, responsibility for driving and area covered.

The aim in analysing these three different kinds of mobility service is to assess how transport transition projects can achieve a hegemonic shift in the relatively stable "system of automobility" (Urry 2004). The key question here is whether a large number of actors can be convinced that the implementation of such a project is essential to the public interest and persuaded to act accordingly.

4.1   STATION-BASED ELECTRIC CAR SHARING

In recent years, numerous electric car-sharing schemes have launched in suburban or rural areas; these are mostly locally based though some are regional. Electric car sharing allows a large number of users to try out and use an electric car in everyday situations. These schemes are often promoted as a way for households to avoid running a second vehicle. Compared to running a car of their own, the costs incurred by car-sharing users are relatively low. The innovative and sustainable nature of such projects provides an image boost for the operator – in rural areas, this is mostly the municipality. In Lower Austria, electric car-sharing schemes are mostly provided by a charity, municipality or professional operator, with the type of operator being key in determining whether the service is subject to commercial law.

For an electric car-sharing scheme to be economically viable, it needs 20 to 30 users per vehicle. Schemes can be initiated by private individuals, companies or municipalities. Users generally pay an annual charge of €100 to €300, plus a rate per kilometre (€0.10 to €0.20) and/or per hour (€1 to €5). Cars are generally booked via an app or some other online booking system. Caruso and Ibiola are among the platforms using such a booking system. The booking platform displays the availability of the scheme's vehicles and the requisite charging time between bookings. Lower Austria is considered a model province in the field of electric car sharing. More than 120 EVs are available in car sharing schemes across over 90 municipalities. Increasingly, such schemes are being operated in conjunction with EV-based lift services (Komarek 2019).

Figure 3: Electric car-sharing schemes in Lower Austria
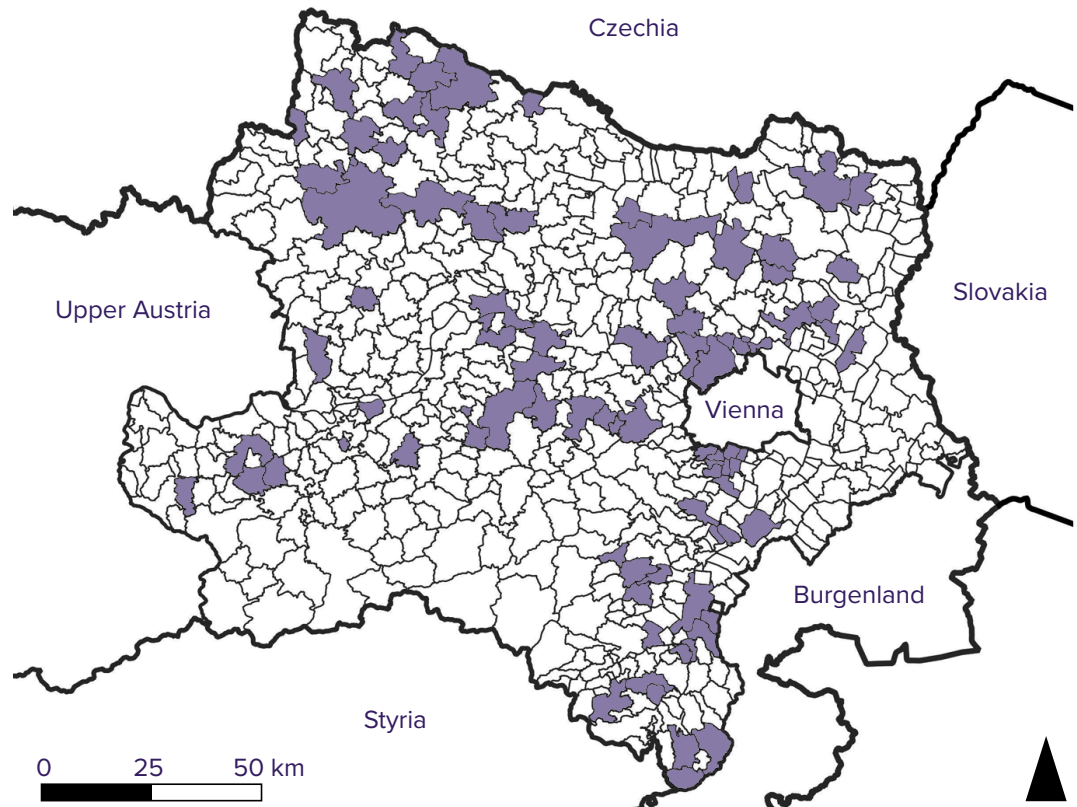
Source: the author, adapted from eNu data (2019)

It became clear from examining and talking about electric car-sharing schemes that, in rural areas, these tend to require strong political impetus, especially in the initial phase. They need someone involved in policy and planning to take up the issue and champion it in public. This is how an interviewee who had initiated an electric car-sharing scheme put it:

> *"In my opinion, what it takes to get these things off the ground is an organizer, i.e. a central contact person, ideally a political representative, who is prepared to take up the cause and sell it to people as a great thing."* (Interview A)

These new mobility schemes are often linked to a desire among local politicians to be innovative and attract attention. Municipalities celebrate their new mobility schemes and gain plaudits for them, for instance by entering the "Clevermobil" competition, via which the province of Lower Austria recognizes particularly innovative projects. This desire to be innovative can also be seen in the numerous networking meetings and seminars relating to new mobility services, at which there is a certain competitiveness and rivalry between political representatives when it comes to their municipality's innovations. Moreover, the implementation of new mobility services is strongly reliant on local commitment among a municipality's officials and representatives. Politicians or planners at higher levels of government are less likely to be involved in driving new electric car-sharing schemes, though they do sometimes provide additional support. Several interviewees referred to the need for commitment at municipality level. Responding to the question of how successful electric car sharing currently is, one car-sharing project's director stated:

> *"That depends a lot on municipalities' commitment and on how strongly they back it. Some municipalities are very active, and their schemes are going very well." (Interview B)*

That requisite degree of commitment at municipal level, however, often meets with criticism, exposing initiators to significant personal risk, particularly in rural areas. Another interviewee who championed the creation of a new electric car-sharing scheme (Interview E) describes the implementation of electric car sharing as a "constant battle". The benefits of such schemes often go unrecognized and unacknowledged, and experience has shown that, despite the efforts of local political representatives, there is often limited public interest in the use of electric car sharing, with many pilot projects not being taken forward as a result. For instance, several municipalities conducted surveys to assess public interest in electric car sharing, but did not receive a sufficiently broad response. Interviewees also emphasized the importance of choosing the "right" moment to launch such a scheme, with two municipal representatives describing their unsuccessful launches as follows:

> *"After I'd been to a talk at Lower Austria's energy agency in 2016 […], we just gave it a go […], publicizing it in the local newspaper. Only one person signed up though, so then we just dropped the idea." (Interview H)*

> *"We've put so much time into a potential electric car-sharing scheme already, organizing information events that generated only very limited interest. I've invested countless hours in it, but it all came to nothing. Practically no one turned up to the information events. Maybe we went for it too early and were a bit ahead of our time." (Interview D)*

The municipal representatives interviewed for this research described how expressions of interest were not forthcoming after postal or media communications on potential electric car-sharing schemes. That engendered a feeling of resignation among political representatives and a critical attitude towards electric car-sharing projects that were in operation elsewhere. Some sceptical municipal representatives also argued that electric car-sharing schemes being presented as success stories needed to be examined critically as the users they were attracting did not always correspond to the desired target group (car drivers switching to a sharing model). The project initiators interviewed here also raised long-term provision and continuity of usage as challenges for new mobility services such as electric car sharing. Electric car sharing can even lead to users eventually buying an EV of their own, after which they then hardly use the car-sharing scheme any more.

> *"Continuity of use is another challenge. What happens if people pull out because they've bought a vehicle themselves, for example? The system is then undermined." (Interview G)*

If it serves as a temporary solution until users buy a vehicle of their own, then car sharing can potentially further consolidate automobility's hegemony, even if more of the individual vehicles end up being electrically powered.

Interest in car sharing remains particularly limited in areas where most people own a car and are already heavily dependent on automobility. Interviewees repeatedly expressed scepticism regarding schemes celebrated as success stories by municipal representatives. Due to the high degree of rivalry around innovation in municipalities, many schemes are given an overwhelmingly positive spin, with any problems swept under the carpet. One municipal representative gave the following critical account of such spin:

"Many of the schemes only work because the municipality itself is 'obliged' to use it. That means all municipal politicians and officials are obliged to use the service, which is not the idea at all. These schemes are kidding themselves with their claims of success because they're not persuading people to switch to new mobility solutions. It needs to be driven much more by popular demand – with people saying to politicians 'Hey, let's do that, we want this!', but that isn't happening." (Interview D)

According to this interviewee's account, car sharing only works if it is also regularly used by municipal officials, meaning it fails in its actual aim of persuading people to ditch individual car ownership in favour of sharing cars with other users. The interviewee also describes the lack of popular demand for the introduction of electric car sharing. Despite these experiences and the scepticism around electric car sharing, such schemes have become increasingly prevalent in Lower Austria, though they differ greatly in how they are organized. The integration of these schemes into an overarching mobility platform is where observers see the greatest potential for further development, but such a move is hindered by their heterogeneous providers and organizational structures. Evidently, there is not always popular interest in electric car-sharing schemes; often they are not a response to broad-based subordinate demands for automobility to be transformed. On the other hand, they represent a very specific expression of opposition to automobility's hegemony, one driven primarily by state intervention.

Figure 4: Lift services in Lower Austria
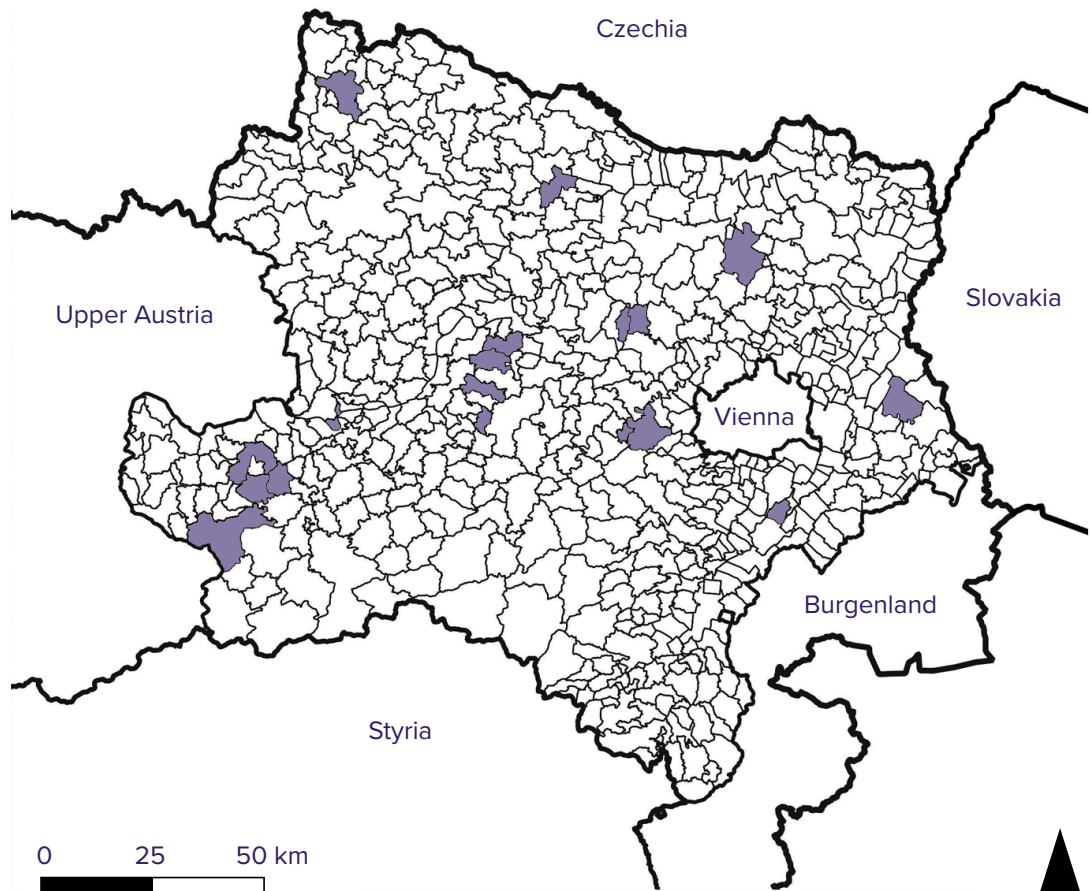
Source: the author, adapted from Wels-Hiller (2019)

4.2   NON-PROFIT LIFT SERVICES

Another niche examined in this chapter on practical transport transition projects is non-profit lift services. Using volunteer drivers, these schemes, in which volunteers drive members of a club from A to B by electric car, can be classed as decommodified mobility services. This model grew out of the community bus service, a citizen-initiated form of local transport launched in Lower Austria in 2011. The aim of non-profit lift services is to better integrate less mobile individuals into community life and to boost communication and interaction between different generations. In addition, it is hoped that lift services will reduce the need for existing pick-up/drop-off services for limited-mobility individuals (such as the elderly or children), while lift services are sometimes also associated with a boost to the local economy as they can be used for local shopping trips. Unlike electric car sharing, a lift service does not require the electric vehicle to be located in the immediate vicinity of the user's place of residence. Such services allow a large number of people to gain their first experiences of electric vehicles, something the provincial government of Lower Austria regards as an important objective, hoping to thereby raise awareness of electromobility. In the same context, lift services have also been discussed as a potential substitute for a household's second car. Their costs to users are relatively low and they can also complement public transport networks (Komarek 2019).

These services are mostly provided by an organized club, albeit with the backing of the municipality. They are non-profit-making and charge accordingly, though their status in commercial law needs to be checked with the district commission. Those transporting people for money generally require a licence (be it a public transport licence or a taxi or car rental licence). To simplify the legal situation, standardized statutes have been developed and made available by Lower Austria's energy and environment agency, while service providers are encouraged to work with taxi firms and driving schools in order to limit competition for trade and assess drivers' competence. Having enough motivated drivers is said to be the key factor in whether such a service is successful, with 20 to 30 thought to be the minimum number required. Another critical step is defining the service's operating times and planning drivers' shifts accordingly. Non-profit lift services are only allowed to carry officially registered club members. The latter pay monthly or annual membership fees. Mostly, lift clubs distinguish between regular and associate (accompanying) members. Schemes can charge flat-rate membership fees, though there is also the additional option of charging for individual journey costs. This is done via booking, billing and admin tools such as Emilio, Tullnerbacher or similar. In some cases, services are subsidized via Lower Austria's local public transport funding scheme (Komarek 2019).

Non-profit lift services are often run in combination with electric car-sharing schemes. In 2019, there were around 25 such services registered in Lower Austria, primarily in rural areas (ibid.). The province's energy and environment agency provides support for EV-based lift services, particularly in the launch phase, helping with rough cost calculations and advice on implementation, arranging a promotional evening event and providing standardized statutes as well as a communications package for residents.

As these lift services are organized as clubs, setting one up requires a high degree of local commitment and personal contacts with potential drivers. One interviewee involved in local politics who had experience of initiating a lift service describes the launch process as follows:

> *"It was a very stressful process, I spent days driving around and looking in coffee shops for people who might be interested. By just approaching and asking people, I found 25 members who were prepared to join up on the spot. Personal contact was very important; after that word got around."*
> *(Interview C)*

The process was thus heavily reliant on social media and on making personal contact. It is important for there to be a central contact person, particularly in the early set-up phase, and to decide which groups can be targeted: some interviewees cited younger pensioners as a key target group, along with young families keen to volunteer and make contacts in their new area. Another interviewee involved in local politics who had experience of setting up a lift service describes the starting point as follows:

> "We have a lot of newcomers in our municipal area – young families who have completed their studies and want to move back to the countryside. We're blessed with an extremely good location here [a municipality on the outskirts of Vienna]. It's just 30 minutes to Vienna, and the same to St. Pölten. But that also means many of those who move to the area hardly have any extended family here. We started off with a ring-and-ride taxi service, but in practice hardly anybody used it. Then after a bit of brainstorming, we came up with the idea of volunteer lift services, using electric vehicles of course and relying on volunteer drivers." (Interview F)

Setbacks were a recurring theme for many of those interviewed for this study. The launch of new mobility services did not always go well from the start. While the interviewee in Interview F reported that the launch of a ring-and-ride taxi service was initially unsuccessful, the lift service enjoyed greater success thanks to the specific social group targeted in that municipality and their particular needs. With many residents hardly having any extended family in the area, the willingness to volunteer and get involved in such clubs was high. A lift service not only serves to provide physical transportation, it also boosts the sense of community among members. The social contact afforded by the lift club thus performs a useful social function. This aspect was emphasized by multiple interviewees:

> "As I mentioned already, the social aspect of it all is key. Because it's so challenging, many older drivers view it as a way of keeping active in old age, because you have to think a lot and because it's important for older people to still have a purpose." (Interview F)

> "The people doing most of the driving are younger pensioners; they then meet up to clean the car, do maintenance on it, and so on. And the drivers tell me they find it very fulfilling, so in that sense our scheme is like a mini social project." (Interview H)

Those who describe working for a non-profit lift service as fulfilling are primarily older people. The way the service is marketed or framed plays a key role. Some lift services emphasize not only the contribution they make to sustainable mobility but also their economic benefits. One interviewee stressed that this broad-based framing is actually a must if the service is to be successful (Interview F). Desire for media coverage among local politicians can also play a key role in the setting up of a lift service. Both municipal representatives and lift club directors celebrate their role in such mobility services, earning commendations from higher political authorities for the innovative nature of their schemes. The interviewee describes this media coverage as follows:

> "It's also important to have the mayor on board, because then it'll be in the newspaper. That in itself brings in a lot of people who want to do some good, and then a lot of others who follow their lead." (Interview F)

Various interviewees emphasized that, in order to promote the service better, reach more people and gain broader popular support, it helps to have municipal representatives involved in the lift

club. Often the mayor also serves as club chair, which sends a positive message to the public and can help to boost the scheme. Promotion in local or regional print media also plays an important role in growing membership.

Judging by the interviews, dissuading households from running a second car and better integrating individuals with limited mobility are the primary reasons for establishing lift services. Achieving a far-reaching transformation of hegemonic automobility, on the other hand, is generally not among the immediate aims. When it comes to their driver pool, lift services attract a particular section of the population (primarily younger pensioners), while usage is only open to registered lift club members. Lift services thus remain a very specific solution. There does, though, seem to be a higher level of interest among the population than is the case with electric car sharing, though broader demands for far-reaching changes to the hegemony of the car are rarely voiced in conjunction with such services.

4.3   RING-AND-RIDE TAXIS

The third project type examined as part of this analysis is ring-and-ride taxi services. Ring-and-ride taxis and micro public transport systems in general serve to supplement regular public transport systems. They help to ensure broader coverage beyond fixed-route services (in metropolitan areas, on highly frequented routes and at peak travel times). On less frequented routes and at off-peak times, it is almost impossible to provide standard public transport cost-effectively, so local, demand-led mobility services are a useful way of filling gaps.

In Lower Austria, ring-and-ride taxi services are operated by taxi or car rental firms. Journeys can be booked for predetermined departure times, with passengers collected from set pick-up points, from where they are taken directly to specific drop-off points. Unlike conventional public transport operators, ring-and-ride taxi operators do not require a special licence. Passengers pay the standard fare for public transport plus a "convenience supplement". Use of ring-and-ride taxis is not limited to set public transport routes within the service area (Gausterer 2019).

The advantage of ring-and-ride taxis is that they enable local public transport to be provided more cost-effectively and allow standard schedules to be supplemented at times of low demand. As they are not tied to fixed routes, ring-and-ride taxis can service not just specific stops but also entire geographical areas, meaning target group-specific offerings can be created. The requirement to prebook by phone and the slightly higher fares, meanwhile, are cited as disadvantages.

When planning a ring-and-ride taxi service, the target group, operating times and service area all need to be defined. The specifics of the service have to be planned in conjunction with the municipality and the local transport authority. The municipality then calculates the cost of employing local taxi firms and draws up the necessary contracts. Often it will work with a mobility platform provider (such as ISTmobil). Initiators can apply for joint funding from federal, provincial and municipal authorities via Lower Austria's local public transport funding scheme (Land Niederösterreich 2020). Another benefit of ring-and-ride taxis is that, unlike lift services, they do not operate in a legal grey area. If need be, journeys can cross municipal boundaries as long as this is covered contractually. In addition, this kind of service is not reliant on the commitment of volunteer drivers, nor does a dedicated members' club need to be set up (Gausterer 2019). In contrast to volunteer lift services, ring-and-ride taxis are thus available to anyone and not just to members.

Interviewees stressed dedicated oversight and effective marketing as key to launching such a scheme successfully. Ring-and-ride taxi services benefit from clearer statutory regulation than

lift services and are mostly set up in conjunction with local taxi firms and bus companies. Interviewees described the launch process as very time-consuming and stressful:

> "Getting to that point was a very protracted process, requiring a great deal of patience and a lot of meetings. I see it as a process that's still ongoing, because there is regular need for improvements and we are constantly fine-tuning the concept." (Interview I)

Ring-and-ride taxis operate on specific public transport routes, servicing particular stops. Deliberate efforts are made to avoid competing with fixed-route public transport, however, with taxis picking up only at selected stops. One interviewee describes the local ring-and-ride taxi's service area as follows:

> "We've now got 634 pick-up points, some of which are in neighbouring municipalities because it makes more sense that way. We only go from stop to stop and we don't want to compete with public transport systems, which is why we put a lot of emphasis on ensuring the service feeds into the public transport system." (Interview I)

Figure 5: Ring-and-ride taxis in Lower Austria
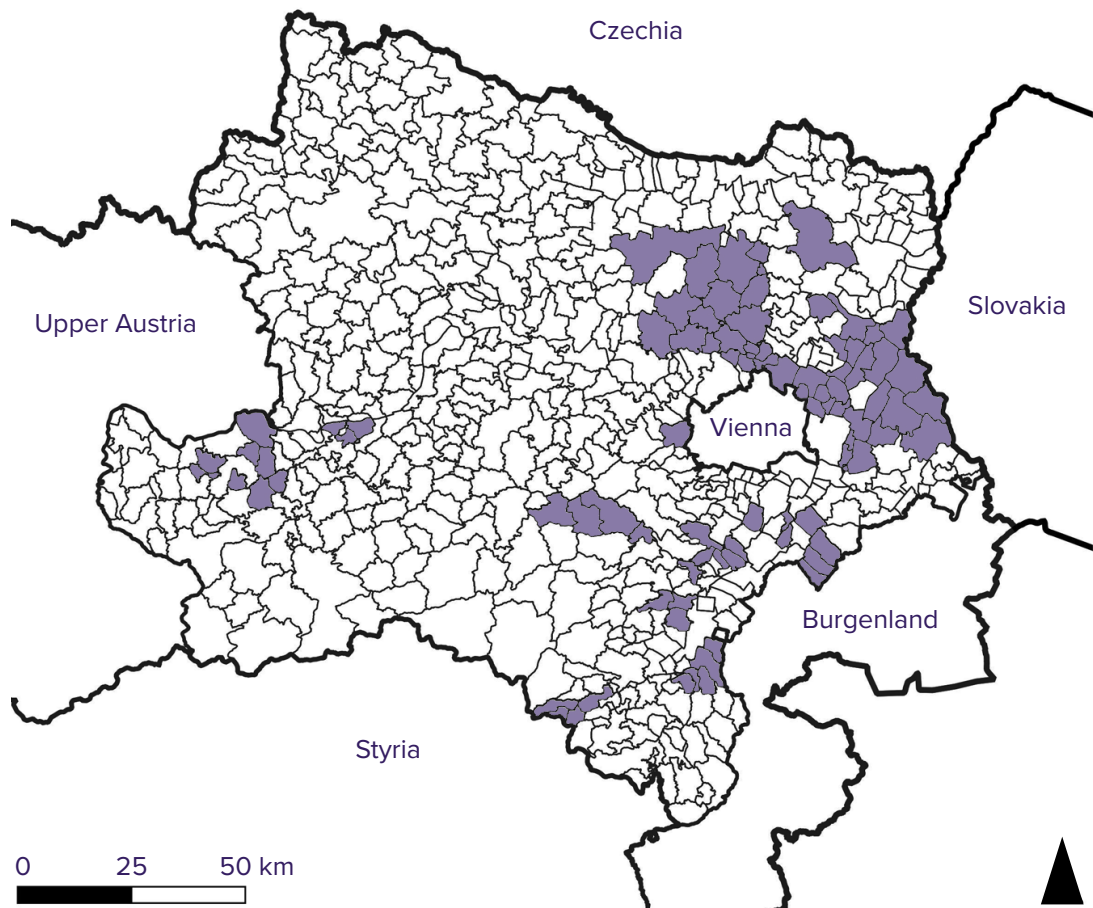
Source: the author, adapted from Wels-Hiller (2019)

Setting up a ring-and-ride taxi service is a long-term process in which pick-up points have to be regularly renegotiated. Launching and operating such a system comes at a high cost to the municipality[6] and also requires a great deal of legal, organizational and financial support from policymakers and planners at higher levels of government. Ring-and-ride taxi services generally operate between various fixed pick-up points. In order to meet the objective of integrating limited-mobility individuals, however, certain exceptions are considered:

> *"We generally don't operate door to door; limited-mobility individuals can apply for home pick-up however, but this has to be officially registered."* (Interview I)

As long as the service is sufficiently attractive and suitably promoted, ring-and-ride taxis tend to be well used (Interview I). The extent to which they persuade people to switch to public transport cannot yet be precisely gauged, though the limitations predefined stops and routes place on their potential use represent a clear disadvantage in comparison with owning a car or using lift services.

5.   HEGEMONIC SHIFTS WITH NEW MOBILITY SERVICES

New mobility services represent congruent but often very specific solutions (with regard to their target groups, operating times and service area) that fit into the existing transport transformation discourse. The innovations they represent act primarily within the "system of automobility" and do not therefore call that system into question. On the contrary: they seek to reshape it via new supplementary services (making it more sustainable or socially integrative) and thus to consolidate it. In many cases, there is neither a widespread desire for automobility to be renounced nor the acceptance within society that new mobility services should be introduced on a broad scale. Adding new facets to the existing mobility system, such services are thus not so much actively supported as passively tolerated.

As new mobility services are introduced, certain tensions become apparent. These include competitive relationships between new services and established firms, though state-run schemes make efforts to avoid these. Shoring up traditional sectors such as the taxi trade and public transport, on the other hand, creates its own tensions when it comes to the introduction of new mobility services. Another issue is the highly specific nature of these new mobility services, which vary greatly in how they are organized and have thus far not really lent themselves to integration within a common platform.

It is clear from the above analysis that these new mobility schemes do not generally call automobility's dominant status into question. Instead, they add supplementary mobility services that, at best, might allow households to do without a second or third car and individuals without a driving licence or vehicle to get out and about by car. In addition, such new mobility services are often not rooted in people's thoughts and actions, but brought about via state interventions as authorities compete to demonstrate innovation. As a result, these would-be transport transformation projects should be seen as political rather than as hegemonic. There is, after all, no attempt here to create services with the kind of universal meaning and validity required for

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6   The costs to the municipality are mostly charged in proportion to the number of inhabitants.

large sections of society to move away from today's high level of dependence on automobility. Antagonistic demands for more far-reaching change, as voiced by certain action groups, such as the campaign network Bürgerinitiative Verkehrswende Niederösterreich or the cycling lobby group Radlobby Niederösterreich, have been sidelined in the discourse. To a certain extent, transport transformation projects can thus help to consolidate automobility, even if the modes of transport used become more differentiated.

Nonetheless, hegemonic shifts can arise at any time as a consequence of new mobility services. The problematization of automobility arising from the transport transition debate opens up space for more universal calls for automobility's transformation, providing scope for projects that could challenge it to establish themselves and develop over the long term. Ultimately, the need for a transport transformation is now rarely questioned, with critical voices focusing merely on how and not whether it should happen. Despite its relative stability, automobility is thus by no means immutable; in fact, it is only as a discursive and dynamic phenomenon that it can maintain its predominance. The potential consequences of these insights for connected and automated transport are examined in the final section of this chapter.

6. CONSEQUENCES FOR CONNECTED AND AUTOMATED TRANSPORT

The study *AVENUE21. Connected and Automated Driving: Prospects for Urban Europe* presented a very ambivalent picture of the spatial and social impacts of connected and automated transport, which differ greatly according to the underlying policy and planning scenarios (Mitteregger et al. 2022: 99–140). The hopes and expectations associated with automated driving also vary (see Chap. 19 by Dangschat in this volume for more details), while the *AVENUE21* study provided a comprehensive overview of hopeful and sceptical expectations regarding automated transport (ibid: 33–46). The main positive expectations were a reduction in the number of accidents, efficient traffic flow management, enhanced regulation of vehicle speed and easier identification of available parking spaces, a drop in energy consumption and a decrease in the number of vehicles (and hence an increase in the available road space), the enhancement of intermodality, greater social inclusion for limited-mobility groups, stress-free driving and the ability to use travel time for other activities. On the other hand, there is much scepticism regarding assumptions around reduced traffic volumes and decarbonization, with doubts raised in particular by the enhanced convenience of CAVs and the increased attractivity of outlying residential areas, the potential increase in traffic levels due to empty runs and the integration of new road users previously unable to travel by car (Dangschat 2019). In addition, the impacts of automated driving could undermine the objectives of sustainable urban development (compact cities, cities of short distances, ecomobility). Many of the positive assumptions can only be realized once there is a high prevalence of automated vehicles and are particularly open to question if there is a lengthy period of mixed-traffic flows (Mitteregger et al. 2022).

For the positive expectations regarding the technology's environmental and socially integrative potential to be fulfilled, the synergetic effects of automation, electromobility and sharing need to be exploited (ibid.). While automated vehicles are for the most part still being tested in controlled environments, the mobility services analysed here have already been operational for some time. In some cases, these projects already combine electromobility and sharing,

while automation could be added in future. The spatial, economic, environmental and social impacts of automated driving are still highly uncertain (ibid.), which makes insights and conclusions derived from existing transport transition projects all the more useful. Given this general uncertainty around automation, it is worth examining three aspects of the empirical case study analysis and considering them in the context of connected and automated transport:

- New mobility services in rural and suburban areas have to date been very specific (with regard to target groups, operating times and service area) and have not always gone hand in hand with broad-based, popular demands to move away from automobility and towards a more holistic transport system. In a similar way, it is possible that automated vehicles and mobility services could be integrated into pre-existing structures without any politicization of demands for a transport transition. In addition, the nature of such a transport transition remains very much open to interpretation, which can lead to internal tensions. If the aim is for new mobility services to form part of a broad-based transport transformation, then they need to pose much more of a challenge to the current system of automobility. Only then will such mobility services establish themselves as hegemonic and be capable of breaking our high levels of car dependency and solving the problems that individual car ownership brings. If new connected and automated transport services aimed at combining electromobility, vehicle sharing and automation are to be implemented on a large scale, they therefore need to go hand in hand with widespread demands for the current system of automobility to be transformed and they need to enjoy broad-based support within society.

- Contemporary projects providing new mobility services differ greatly in terms of how they are organized and structured – they rely on strong local commitment, involve complex coordination between disparate actors and feature varying organization types, operational models or target groups. Bringing these diverse schemes together in one hegemonic transport transition programme is a major challenge, as is integrating them under one "Mobility as a Service" umbrella. The contemporary projects analysed here suggest that the introduction of connected and automated vehicles will be contested and require extensive coordination and negotiation processes. We should not therefore assume it will be a linear, conflict-free or top-down process. From a hegemony theory perspective, achieving the kind of change required for a transport transition requires popular consent, with the people also being granted the power to influence what form such projects take.

- In addition, implementing collective, shared or public transport systems requires a more broad-based value shift. Encounters with new mobility solutions can act as a trigger for this value shift: lift services, ring-and-ride taxis, car sharing, or testing environments for connected and automated driving can help to convey the advantages of these systems over today's automobility (in terms of cost, maintenance, space utilization, emissions, etc.) and to foster a value shift. In that regard, today's new mobility projects could also strengthen forces that are antagonistic towards hegemonic automobility. While non-profit lift services are likely to suffer as a result of automation, potentially losing their social function, ring-and-ride taxis are likely to benefit, thanks to a lowering of operating costs. Car sharing could become increasingly automated and potentially move from a station-based to a free-floating model. If automation allows for driverless operation in certain environments, we could see increasing convergence between car sharing and taxi systems or lift services. Connected and automated vehicles could then positively impact this value shift towards a broader acceptance of shared transport systems, in part at least because of the general fascination exerted by technological innovations.

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