energies

MDPI

Article

Stakeholders' Views on Multimodal Urban Mobility Futures: A Matter of Policy Interventions or Just the Logical Result of Digitalization?

Jens Schippl [1,*] and Annika Arnold [2]

[1] Institute of Technology Assessment and Systems Analysis (ITAS), Karlsruhe Institute of Technology (KIT), 76133 Karlsruhe, Germany

[2] ZIRIUS–Center for Interdisciplinary Risk and Innovation Studies, 70174 Stuttgart, Germany; annika.arnold@zirius.uni-stuttgart.de

* Correspondence: jens.schippl@kit.edu; Tel.: +49-721-608-23994

Received: 21 February 2020; Accepted: 1 April 2020; Published: 8 April 2020

Abstract: It is widely acknowledged that strategies to decarbonize energy systems cannot omit the mobility sector. For several decades, particularly in urban areas, a shift from car-based mobility to more environmental-friendly modes has been high on political agendas. Progress has been made in many urban areas, but so far only in small, rather incremental steps. The dominance of the car has remained largely stable in urban transport. For some time now, many experts have argued that processes of digitalization will co-evolve with societal trends and lead to multimodal urban mobility regimes in which private car usage will lose its dominance. In this paper, we examine if stakeholders active in the field believe that, despite digitalization, policy interventions are essential to achieve such a transition. The analysis draws on concepts from transition research and is based on 10 semi-structured interviews with providers of innovative mobility services that may contribute to more multimodal urban mobility systems. Geographical focus is on the City of Stuttgart (Germany). Results indicate broad agreement amongst the interviewees that digitalization alone is not sufficient for achieving a full-scale transition towards multimodal urban mobility. Policy measures that restrict car-based mobility would also be needed. However, many of the interviewed actors doubt that the essential policy mixes will find the necessary political and societal acceptance. Finally, the paper indicates ways to overcome this dilemma.

Keywords: urban mobility; sociotechnical transitions; policy mixes; multimodality; stakeholder interviews

1. Introduction

For several decades voices in scientific and political debates have been growing louder in demanding a large-scale transition in the mobility system [1–3]. The main reasons for this are the contributions of the transport sector to climate change and air pollution, as well as problems induced by congestion and consumption of space. Many experts point out the urgent challenges particularly connected with the growing consumption of fossil energy in the mobility sector [4].

Promising developments can be observed in recent decades. Examples are improvements in the efficiency of engines or the increasing acceptance and use of electric vehicles. However, even though cleaner technologies play an important role in achieving a more sustainable urban transport system, they are not a sufficient solution [5]. For this, measures to reduce the use of private cars are considered to be just as necessary [6,7]. Considering this, changes can be observed in many European cities. In many German cities, which are in the focus of this paper, shares of cycling and public transport have increased remarkably within recent years [8]. This can be seen as a result of a shift in planning

paradigms. In the age of mass motorization after World War II, the model was car-friendly city-guided urban transport planning. This has gradually shifted. For several decades the "paradigm of sustainable development" [9] has materialized, at least to a certain extent, in the organization and design of urban mobility systems [10].

Many cities have developed transport development plans or sustainable urban mobility plans (SUMP) [7] with the overall targets of increasing the sustainability of urban mobility. Based on these planning frameworks, policies, or rather policy mixes or policy packages, were implemented to increase the attractiveness of public transport and cycling, and/or to reduce the attractiveness of cars [11,12].

In a position paper from 2018, the German Association of Cites explicitly acknowledged the progress that has been made in urban transport in Germany, but states that the conditions for non-car transport are still not satisfactory [13]. So far, progress in terms of sustainable mobility has been of a rather incremental nature in most urban areas. In most cities, the dominance of the private car has remained relatively stable. The number of registered cars and mileage has continued to grow steadily. Over decades, a "configuration that works" [14] developed around the private car, which is deeply established and difficult to change [15]; transport is a sociotechnical system, embedded in and stabilized by technological, infrastructural and institutional settings [3].

But it now seems the time is finally here when technological advances in the field of digitalization can deliver the much needed push for the urban—personal—transport system to adopt new sustainable modes. A growing number of experts argue that the process of digitalization may co-evolve with societal trends and lead to new forms of urban mobility regimes [16–20] Recently, we can observe the emergence and growth of a broad range of relatively new services such as app-based booking options, different forms of car-sharing, ride-sharing and similar concepts, strongly supported or even enabled by digitalization. These services are often considered to be highly promising niche applications that will trigger a transition towards inter- and multimodal urban transport regimes. The term "mobility as a service" (MaaS) is often used to describe digitally based and flexible mobility services [21,22]. Furthermore, several experts argue that autonomous vehicles (AVs) will enable new options for transport, such as flexible and affordable mini-shuttles that will fill gaps in public transport networks and enable "seamless" mobility. Private cars will become largely obsolete in such visions of urban futures [23,24].

But, at the same time, it can be observed that there are also indicators in the German mobility sector pointing to developments in the opposite direction, towards a further stabilization of the car-dominated urban transport regimes. For example,

- Even though car-sharing services experienced impressive growth over recent decades in Germany, there are still only about 22.000 car sharing cars on the roads [25], which is an extremely small number compared to the 47 million registered non-sharing cars.
- In spite of a growing public awareness of climate change, emissions of pollutants and scarcity of space in urban areas, large SUVs and off-road cars are enjoying increasing popularity among car owners, as the latest numbers of car registrations in Germany show [26]. Together with Vans their market share is reaching 30% amongst new cars sold in Germany.
- Car usage is increasing amongst elderly people, and concomitantly the German population is ageing.
- Recent data from a large scale survey in Germany [8] shows that public transport is the least popular mode of transport.

It remains open to what extent the future of mobility will be more multimodal and less car-dominated. Even if there are good reasons to assume that digitalization is supporting the development of a less car-dominated and more sustainable urban transport system, the car-dominated regime appears to be quite resistant to change. It is therefore interesting to examine the expectations and reasoning of actors working for organizations that offer "new" services which are vital to a more multimodal urban mobility regime. Based on a series of interviews with 10 of these actors, this paper

asks to what extent, and under what conditions, digitalization can lead towards more sustainable urban mobility in Germany in general and in Stuttgart in the City of Stuttgart in particular.

We are particularly interested in what expectations these actors have towards necessary policy strategies to enable such a transition: Do actors in this field expect that processes of digitalization enable new services that are so attractive that a transition of urban mobility systems takes place without strong governmental interventions? Do actors expect that MaaS will become competitive "automatically", without striking changes in the selection environment of the mobility regime? Or is it rather expected that without strong policies to stifle the competitiveness of private car transport in urban areas, multimodal approaches will remain in a sort of niche-like status, in spite of all the new developments enabled by digitalization and other societal trends? In other words: We aim at a better understanding of the policies or policy mixes that are necessary to enable or accelerate a transition towards an urban mobility regime, dominated by multimodal mobility patterns. Against this backdrop, the analysis of the interviews presented in this paper will particularly focus on the following sub-questions:

1) To what extent do the actors have similar expectations on the future of multimodality in urban areas?
2) Which drivers and barriers are considered relevant for transitions? What are the decisive triggers for change and factors for stability at different levels (regime, niche, landscape)?
3) What do the actors expect from politics? How can or should policies support or accelerate a transition towards more sustainable urban mobility?

The conceptual background of our research is introduced in Section 2, methods are presented in Section 3 together with the geographical context. Section 4 summarizes the results. In Section 5 we discuss the findings together with potential implications for policy-making in this field, before we draw conclusions in Section 6.

2. Conceptual Background

Conceptually, the paper draws on approaches from transition research. In particular we use the heuristic of the Multi-Level Perspective (MLP), which understands transitions as the interplay between three distinct levels of a socio-technical system [3,27]:

- The landscape, which is the environment in which a sociotechnical system is embedded;
- The regime, which is the established configuration of infrastructures, institutions, actors, routines, skills, etc. that make up the mobility system as we know it;
- Niches, in which radical innovations emerge.

As explained below we further use ideas from strategic niche management. A sociotechnical regime, such as the mobility regime, is shaped by the co-evolutionary dynamics between various technical and non-technical factors. Infrastructural changes are understood as long-term processes in which technologies co-evolve with non-technical factors such as changing actor constellations, behavioral patterns, and the formal and informal institutions which guide actors' perceptions and activities [3]. The core of a sociotechnical system is usually understood as a prevailing regime, which is a rather stable configuration of various elements, such as technologies and regulations, but also more informal settings such as the way things are "normally" done, the rule-set, "grammar", routinized practices, skills and procedures, ways of defining problems or ways of handling relevant artefacts and persons [14]. According to Rip and Kemp [14], a sociotechnical regime can be understood as a stable, deeply institutionalized "configuration that works". If a transition takes place, it has to come with changes in the deep-structures of a sociotechnical regime and new, preferably more sustainable "configurations that work" need to be established.

The idea of institutional change is central to the field of transition research. Fuenfschilling and Truffer ([28], p. 774) argue that the strength of a regime can be described by the degrees of

institutionalization of its core elements. In a stable configuration, institutional elements can align coherently and exert a high degree of structuration. Regimes may be populated by different institutional logics, which is in particular evident in dense urban mobility systems where the logic of car transport is often in conflict with the logics of other modes such as cycling or public transport [10]. The question of whether urban mobility systems will become more multimodal or if the dominance of the car will prevail is also a question about which kind of institutional logic will dominate future urban mobility systems. In particular, a transition towards a multimodal regime strongly depends on the degree to which users are willing to change their behavior. Thus, deep-structural changes will affect users as well.

According to the MLP, regimes are embedded in a landscape. Dynamics within the landscape affect, trigger or hamper developments in the regime, but regime actors do not have a direct influence on landscape factors. Geels and Schot [29] show that landscape dynamics can differ vastly from one another, including long-term societal changes like an ageing population, but also unforeseeable shocks such as the Fukushima catastrophe, which had significant influence on energy transitions in several countries. It appears quite obvious that various megatrends can be observed that may have an impact on urban mobility systems. Truffer et al. [15] mention, amongst others, increasing climate awareness among citizens, individualization, demographic change, the development of an on-demand economy, and digitalization or virtualization of processes and services. Such landscape developments may put pressure on the regime and contribute to the development of "windows of opportunity", which help innovative and more sustainable niche configurations to break through, and ideally become dominant within the regime.

The third level in the MLP-heuristic is the niche. A niche is characterized by its innovations because the niche offers a selection environment that differs in various aspects from the conditions reigning in the regime [14,30,31]. A typical case is, for example, the early development of photovoltaic (PV) technologies, which was able to grow in its niche environment, protected from selection mechanisms by feed-in tariffs and other political measures. According to [32], successful strategic niche management is characterized by three factors: A clear articulation of vision, multi-level learning processes, and the building of social networks among advocates. In particular, the issue of expectations towards MaaS is of high relevance for our case. Given the somewhat contractionary developments sketched above, it is interesting and important to improve understanding of the extent to which the actors working in the field of MaaS have similar or diverging visions on urban mobility futures, and what they consider as necessary to achieve desirable futures.

It can be considered to what extent concepts of multimodality or MaaS fully fit with the very idea of a niche. In contrast to a single technology such as PV, multimodality and MaaS—by definition—encompass the integration of a broader range of technologies and services which might be conceptually described as a cluster of niches [33]. However, some of these services, such as traditional public transport or taxis are not new at all; in many cases they are operated and controlled by long-established incumbent actors. Multimodal and intermodal transport, for example a combination of public transport and cycling for different trips during a certain period, usually a week (multimodality), or a combination of public transport and cycling within the same trip, e.g., for commuting (intermodality) is far from a new phenomenon. It is a long established practice in European cities, as the modal split for many German cities illustrates [8]. This conceptual aspect, however, is not the focus of this paper. But what is helpful for our case is the notion of niches as specifically protective spaces in which an innovation or a new and "initially unstable configuration" [29] develops, with the aim to become dominant at the regime level. In the study presented, we ask under what conditions development towards a MaaS-dominated regime is possible or likely, and whether trends that fit with the notion of the landscape may support such developments.

Even if niches appear to be somewhat difficult to confine in the case of multimodality or MaaS concepts, we adhere to some of the basic notions of the niche concept, since it allows us to use a differentiation introduced by Smith and Raven [31]: The idea of strategic niche management,

in particular the differentiation between fit-and-conform and stretch-and transform strategies to empower niches ([31], p. 1030):

- "Fit-and-conform" empowerment is understood as a process that makes niche innovations competitive with mainstream socio-technical practices in otherwise unchanged selection environments" ([31], p. 1030). The idea is to improve the attractiveness of a new approach without changes in the general settings of the regime or in the "rules of the game".
- "Stretch-and-transform" empowerment implies that the growth and diffusion of the innovative practice interferes with other processes of change within the regime and in the broader society and economy. Such processes "re-structure mainstream selection environments in ways favorable to the niche" ([31], p. 1030). Here, "niche empowerment is to convince the wider social world that the rules of the game need to be changed" ([31], p. 1033).

This differentiation can be somewhat rephrased to bring us to one of the key questions of urban mobility transitions, which also guides our analysis: will new developments become so competitive or attractive that users change their mobility behavior "voluntarily" and use less private cars? Or are stronger policy interventions necessary to change the selection environment in ways favorable for MaaS and multimodal mobility patterns? The latter can be understood as stretch-and-transform empowerment: "Stretch-and-transform empowerment will include 'control' policies such as environmental regulations, fiscal measures or quotas, which incline (regime) actors more favorably towards investment in niche solutions" ([31], p. 1031).

The interview study which this paper reports aims to contribute to a better understanding of how providers of new mobility services assess this question. As regards stretch-and-transform developments, it is of particular interest which policy measure the actors in this field consider to be both effective and also implementable or acceptable. Raven et al. [34] indicate that, in general, stretch-and-transform strategies are more difficult to implement than fit-and-conform because acceptance is more likely when new approaches fit with the established, and widely accepted, regime settings [35].

3. Methods and Geographical Context

In this study, a qualitative research design was chosen. We carried out semi-structured interviews with stakeholders in the field. In addition, a short questionnaire preceded the interviews: 4 theses on potential future developments were assessed by the interviewees.

As was highlighted in Section 2, we understand transport as a sociotechnical system that is shaped by the dynamic interplay between industry, markets, policy, culture and civil society [36]. To get a deeper understanding of stakeholders views on the future development of this complex configuration, a qualitative approach is adequate. Qualitative interviews are able to take up expectations and assessments of the many potential cause-effect relationships between very different factors in a sociotechnical system [37]. The heuristic offered by the MLP is helpful to structure this complex field. For example Whitmarsh [38] highlights, that the MLP can be useful as an analytical tool for engaging with stakeholders, because its broad, system-wide focus brings benefits for researchers. The three levels of the MLP and the ideas from strategic niche management guided the interviews and their analysis. The differentiation between regime and niche also helped in mapping the positions of the interviewees in the sociotechnical system (see Table 1).

In 2018 10 interviews were conducted with providers of relatively new services that can be considered as alternatives to private car usage (see Table 1). Some of the actors are well-established in the mobility regime (e.g., transport associations and operators), others can be considered as typical niche actors (e.g., sharing schemes, ride-sharing apps) in the understanding of the multi-level perspective [3]. The sample of interviewees can be characterized as follows:

- All actors are active in the field of mobility, but differ in their degree of experience and seniority;
- All actors are in one way or another engaged in new developments in the mobility sector that can be linked with MaaS-related concepts;

- All actors are to a certain extent working on alternatives to private car usage;
- All actors, with one exception, offer their services in Stuttgart; the exception operates in a neighboring region;
- Two organizations are typical incumbents: well-established organizations active in public transport; five actors are relatively new in the field and can be described as niche actors, whereas three actors are a mix of the two types: two of these are concerned with car sharing and thus offer niche services, but are well-established in the field. The third is an affiliation of a car company, but offers a new platform for mobility services, and thus an innovative niche product.

Table 1. Overview of the interviewees.

Interviewee Number	Organizational Background	Position in the Regime/Niche
1.	Public transport sector	Incumbent
2.	Start-up for rental of electric vehicles	Niche actor
3.	Peer-to-peer car sharing	Niche actor
4.	Mobility platform provider	Hybrid
5.	Established car sharing organization	Hybrid
6.	Rental service for cargo bike	Niche actor
7.	Ride-sharing app for commuters	Niche actor
8.	Software provider for mobility apps or platforms	Niche actor
9.	Established public transport organization	Incumbent
10.	Established car sharing association	Hybrid

The interviews took between 30 and 70 min. The analysis was supported by the software MAXQDA. The following guiding questions were used during the interviews:

- How do you expect mobility systems to develop in larger urban areas in Germany over the next 20 years?
- What are the main triggers for change, what are stabilizing factors or what are developments that hamper changes?
- Which actors do you see in the driver's seat?
- What is the role of politics?
- Which external framework conditions or developments (e.g., demographics, climate targets, energy prices, urbanization etc.) do you consider as relevant for developments in the mobility sector?
- Will new mobility options, including integrative concepts such as "on-demand-mobility" or MaaS, lead to a significant modal shift? How important are flexible services (e.g., flexible shuttles, ride- or car sharing) and apps or mobility platforms in this context? What is the role of traditional public transport in future mobility systems?
- Do you consider automated driving as a blessing or a curse—and for what reasons?

Most interviewees filled out the preparatory survey, sent by email ahead of the interview. This enabled a first impression of the interviewee's perspectives to be obtained, which allowed for a better focus on the most interesting issues. The results of the survey helped to get a rough overview on fields of agreement and diverging perspectives on the panel. In two cases, the survey was filled out at the beginning of the interview since the interviewees did not complete it in advance. The survey presented the following 4 theses about future developments in the transport sector:

- Thesis 1: Nearly all citizens in urban areas will use and combine different modes of transportation in a flexible and spontaneous way. Fixed preferences for a single mode will become rare.
- Thesis 2: In all larger German cities regulations are implemented that hamper or forbid the usage of private cars.
- Thesis 3: In urban areas, the collaboration of mobility service providers will enable apps that allow seamless planning, booking and payment of mobility services ("one-stop-shopping" experience).

- Thesis 4: Driverless ("autonomous") vehicles for personal transport will be an established element of urban transport systems.

Interviewees were asked to assess each thesis with regards to:

a) The likeliness and time-wise development of its realization,
b) The desirability of its realization,
c) The degree to which the interviewee's organization can influence its realization.

The geographical context of the project was the City of Stuttgart, in the south of Germany. Stuttgart has approximately 630,000 inhabitants and is one of the most important and influential centers of the German automotive industry. The public transport system is well developed, but about 40% of trips are done by car (see Figure 1). Partly due to its location in a basin, the share of cycling is quite low, compared to most other larger German cities.

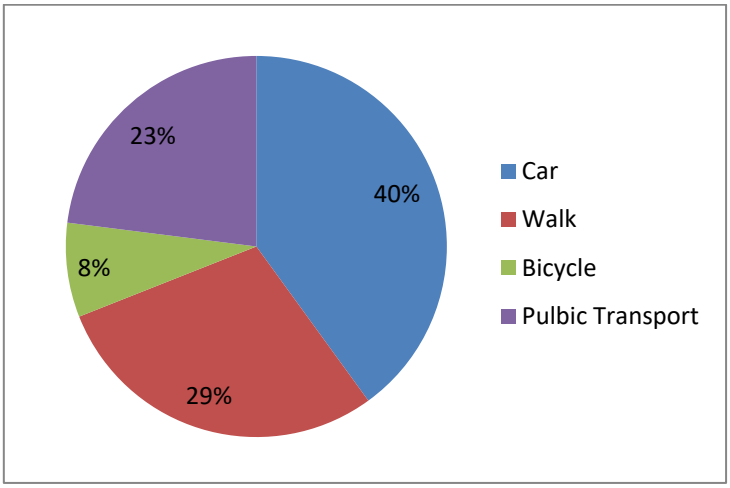

Figure 1. Modal split in the City of Stuttgart in 2017 (data taken from [39]).

4. Results

In this section, we present a summary of the results of the predatory survey questionnaire (Section 4.1) and of the interviews. The three sub-questions mentioned in the introduction of this paper structure the presentation of the results of the interviews in Sections 4.2–4.4.

4.1. Results of the Preparatory Survey

In general, interviewees view the development of a more multimodal transport system quite positively. Many think their organization has a significant influence on such developments. The selected sample of interviewees expects a more multimodal transport system within the next 10–15 years, but there are two more skeptical voices (Thesis 1). Most of the interviewees consider such a development as very desirable. All agree that today, or at least in a couple of years, there is/will be a strong integration of different mobility services based on apps and platforms, and all consider this a desirable or very desirable development (Thesis 3). The answers become more diverse when it comes to the implementation of restrictive measures for car usage (Thesis 2). Most say this will be the case soon, or at least by 2035. Such measures are welcomed by most interviewees—but not by all of them. Regarding autonomous vehicles (Thesis 4), the assessment does not provide a clear picture: There were some positive attitudes, but the majority was rather neutral. This reflects the high degree of uncertainty regarding the development trajectories and potential short-term and long-term impacts of autonomous vehicles on the design and sustainability of future mobility systems.

4.2. Interviews: To What Extent Do Actors Have Similar Expectations for the Future of Multimodality?

As the results of the survey concerning Thesis 1 indicate, in general, interviewees expect more multimodal urban mobility futures. But the interviews also show that it remains somewhat open and controversial how much more multimodality is realistic. The visions and expectations share much common ground, but also some striking differences. Some see multimodality as becoming the "standard form of urban mobility" (Interviewee 8), accompanied by an increasing disinterest in private car usage. Incumbent actors and some others envision a larger-scale transition of urban mobility systems; with one interviewee stating that, "it will be a revolution that will also change society in general" (Interviewee 4). All actors expect changes to a certain degree and they all see their own organization as being able to contribute to these changes. However, not all interviewees agree that such changes will inevitably lead to deep structural changes within the regime. Some of the envisioned mobility futures can better be described as a somewhat extended niche, in which the new services might gain additional market shares, maybe supported by political measures, but ultimately do not prevail in the regime. Several niche actors and hybrids assume that in principle, cars will remain attractive and important to many people in urban areas. Interestingly, all these actors have ride- or car sharing at the core of their business model.

All interviewees agree that public transport needs to remain the backbone of future urban transport, in spite of all the developments in the fields of MaaS. This expectation is shared among all interviewed actors. Interviewee 1 considers it unrealistic to transfer all public transport in a large city to Mini-Shuttles. At the same time, several actors state that the boundaries between public and private transport will increasingly become blurred, particularly once automated cars become usable; interviewee 10 expects that in the beginning this may only be the case in distinct areas and then successively be extended to entire cities. Furthermore, several interviewees state that the capacities of public transport will have to be extended, if there is a modal shift away from cars.

Several conceptions of the organization of multimodality are expressed. Some describe a vision of a multimodal system, maybe based on a sort of "mobility allowance" (Interviewee 4), or a "service package" (Interviewee 10) that may include different kinds of public transport, sharing-concepts as well as a number of taxi trips per month to increase flexibility. One actor formulated a vision of mobility hubs in every neighborhood, where citizens can rent all kinds of (electric) vehicles including bicycles, cargo bikes, cars and smaller motorbikes. Important in this vision, which was also an issue in other interviews, is the establishment of personal relationships or a kind of community building as a side-effect of new mobility services (for example Interviewee 2).

Explicitly mentioned by some actors in the context of new mobility concepts is a vision of a more livable city, made possible especially by reducing the number of cars.

4.3. Interviews: Which Drivers and Barriers Are Considered Relevant to Transitions? What Are the Decisive Triggers for Change and Factors for Stability in the Regime, Niche or Landscape?

4.3.1. Observable Developments in Landscape and Regime

In general, interviewees support the perspective that external or landscape developments are important to open up opportunities for new approaches. In general, the actors consider current landscape dynamics to be favorable for multimodality. As one person put it: "Framework conditions have never been so favorable for public transport in urban areas than today" (Interviewee 1).

When it comes to the identification of important landscape trends that are external to the mobility system, nearly all interviewees mention digitalization as a key driver for new mobility services. Autonomous driving is usually linked to this, and most interviewees see huge transformative potential here. Increasing environmental awareness and demographic change (ageing) are mentioned by several interviewees as additional influential trends that may co-determine changes in the mobility regime. Interestingly, the widely discussed global megatrend of urbanization is considered less relevant and influential in Germany.

On the regime level, recent discussions about the pollutants emitted by ICE (internal combustion engine) vehicles are mentioned by several actors. Many cities in Germany face the problem of NOx emissions exceeding European thresholds. Consequently, cities are forced to take action, often resulting in bans for conventional combustion engines, in particular older diesel models, in specific, badly affected areas. Because of the topographic situation, Stuttgart experiences the highest NOx emissions when compared to other large cities in Germany.

Another development on the regime level is an alleged declining interest in car ownership, particularly amongst younger people in urban areas. Some interviewees refer to this trend and argue that attitudes towards cars have become more pragmatic, and that cars are losing their role as status symbols, especially among young people. However, other actors doubt that this trend applies to the vast majority of this societal group. One interviewee argues that for many younger people cars are still interesting and associated with "fun", and that private car ownership is still a status symbol (Interviewee 2). Another interviewee does not expect too many changes in the regime; from this perspective the relevance and status of the car will remain relatively stable in the coming decades (Interviewee 5).

Regarding a "voluntary" decline of car use in urban areas, several interviewees expressed clear doubts: some actors explicitly point at stable configurations that make the regime resistant to change, in spite of new developments (see Section 4.3.2. on new mobility services). In this context interviewee 2 states: "I think real changes in car usage can only be achieved with hard regulations such as bans for cars". Referring to the public perception of car usage, one interviewee stresses how policy measures related to car use experiences higher public support than those that aim at popularizing public and other modes of transport: "Cars are met with more acceptance" (Interviewee 6). Some other interviewees expressed the notion that current car use is already stifled by driving conditions in densely populated urban areas, such as traffic jams and scarce and expensive parking spaces.

4.3.2. Niche Dynamics: Potential of New Mobility Services as Triggers for Change

Many actors see digital platforms/app-based platforms and a stronger integration of services as crucial for successful multimodal mobility patterns. One argues that "the smart phone is the new key to the mobility system" (Interviewee 1), which will replace the car key in the future. Other interviewees are rather skeptical when asked about the transformative potential of those platforms. One person points out that in particular commuting is strongly routinized. For such routines people do not need platforms that offer a multitude of options (Interviewee 5).

The control over and organization of such platforms poses different challenges altogether. In particular, incumbents and some hybrids stated that cities or public transport providers should control and operate those platforms. This perspective addresses the concern of a potential monopoly, i.e., the rise of an "amazon in mobility services" (Interviewee 9). Competition among providers is considered an important component for the creation of user-friendly intermodal platforms. Incumbents argue that trust is important for the acceptance of platforms and multimodal mobility. This brings advantages for regional providers, and for well-known and established transport organizations. Along the same lines it is argued that most people travel inside a certain region, at least on a daily basis, where it is sufficient to have a platform covering a region (Interviewee 10). However, some niche actors see that services are better organized by private entities. They are skeptical when it comes to an overly strong involvement of politics or administration.

Several interviewees argue that the potential of ride- and car sharing services should not be overestimated. They tend to agree that it will be difficult to reduce the individual usage of private cars. Some interviewees doubt that a majority of people are willing to lend their cars to strangers. Regarding ride-sharing, doubts are raised whether a majority will feel comfortable to be this close to complete strangers. It is argued that many people already try to avoid public transport because it is not clean enough, and they want to avoid being in such close proximity to strangers. One person with experience in the car sharing sector argues that after decades of trials and pilot projects with

ride-pooling in Germany, it still hardly works amongst employees of a company: "So, why should it work with strangers?" (Interviewee 5). Anonymity and hygiene factors could be crucial factors for the acceptance of ride-sharing services. Further, it is argued that the costs of maintenance are usually strongly underestimated in the debates about driverless ride-sharing or robo-taxis. One person emphasizes that car ownership strongly determines mobility behavior (Interviewee 10). Accordingly, reducing ownership rates is important for achieving a significant modal shift—and for achieving the required deep-structural changes. But they further argue that free-floating car sharing does not necessarily reduce car traffic—the contrary might be the case if free-floating cars replaced traffic from public transport, walking or cycling.

The topic of autonomous vehicles was discussed rather heterogeneously, mirroring the answers in the survey. Many interviewees see autonomous shuttles (robo-taxis) as a flexible and promising amendment to public transport that will support the diffusion of multimodality. On-demand services increase their profitability effectively once wages for professional drivers and other restrictions linked to a human workforce are eliminated. Other interviewees point out the risk that automated cars may increase the attractiveness of car-based mobility, and thus strengthen the existing regime.

So, there is a broad agreement that new, digitally driven services come with a huge transformative potential, at least in principle. This is supported by the results of the preparatory survey. But in the interviews more skeptical views come to the fore. In-depth discussion reveals that there are also doubts whether this potential can really be tapped to substantially change the German mobility regime. One of the crucial factors for tapping this potential is urban transport policy, which is addressed in the following section.

4.4. Interviews: What Do the Actors Expect from Politics? How Can/Should Policies Support or Accelerate a Transition towards More Sustainable Urban Mobility?

Most interviewees agree that without policies to restrict car usage in cities, multimodality or MaaS will not disseminate extensively within the regime. Many argue that strong policies are needed to break the habits and routines of users.

With regards to the role of political actors, the views of incumbents and niche actors differ to a certain extent. Incumbents and some hybrids argue that politics and administrations should implement policy frameworks for strong and distinct restrictions of car usage. As indicated in Section 4.3, according to these views public organizations may also contribute to the development, operation and control of digital umbrella services, such as multimodal mobility platforms, including on-demand services. Niche actors also stress political actors' roles in implementing restrictions on car usage. However, when it comes to providing transport services (MaaS, digital platforms, etc.), private companies are perceived as better prepared for the role in terms of efficiency, expertise, and innovation capacity.

In the survey responses, the interviewees mostly indicated that they expected more restrictive measures for car transport to come, sooner or later. However, the expectations and appraisals mentioned in the interviews are more skeptical of and hesitant towards the successful implementation of measures that restrict private car usage on a broad scale. Most argue that restrictions for car mobility are desirable, but difficult to implement. Two interviewees expressed more reserved attitudes towards the desirability of such measures. One was clearly against general restrictions for cars; this interviewee (7) was a niche actor, and felt such restrictions may impede the business of their start-up in the field of ride-sharing.

There is considerable disagreement when it comes to the question of which kind of restrictive measures are advisable. Some say that congestion charges/inner city tolls would be ideal measures to control urban car transport. Interviewee 7 sees price-based mechanisms, such as congestion charging, as the ideal policies to regulate car-based mobility. Others argue that congestion charges/inner city tolls should be avoided, since these may lead to social exclusions and inequity. A general ban for private cars would be an alternative option.

Nearly all interviewees expressed the opinion that societal acceptance for restrictive measures is difficult to achieve in German cities. Interviewee 5 says: "Nobody will implement congestion charges or inner-city tolls in Stuttgart since it would mean political demise". Similarly, Interviewee 9 sees it as "very, very difficult to take away space dedicated to cars in German cities". In the opinion of Interviewee 10, no measures have been implemented or planned that significantly reduce private car mobility on a broader scale – in spite of all the debates about NOx and other pollutants. After Interviewee 3, there is a lack in comprehensive concepts for urban mobility. According to this view, only small measures have been implemented, with limited impacts on car usage. What is needed are concepts to integrate and synchronize different policies. Furthermore, such concepts need clear and ambitious targets such as, for example, a reduction in private car usage by 50%. In the opinion of Interviewee 2, pilot projects are needed to demonstrate the positive impacts of fewer or no private cars in an urban area.

Another issue concerns the need for more effective communication of new services. According to this, alternative options should not be presented in a purely ecologic frame, but their potential for providing a more comfortable and tailored travel experience should be stressed. In the view of Interviewee 8, the gamification aspect should be emphasized, i.e., a shuttle is a fun and highly flexible way to get around, including its presentation as a fun way to contribute to climate mitigation and avoid pollution.

The results of the survey show that most of the interviewees see their own organizations as being able to contribute to a more integrative and multimodal urban mobility system. But the survey also shows that the actors see their organizations' influence on changing regulatory frameworks in this socially and politically sensitive field as limited.

5. Discussion

Overall, the interviewees display broad agreement about the increasing market penetration of multimodality and MaaS-concepts; however, opinions differ when it comes to assessing the extent of that dissemination. Interviewees pinpoint various triggers for transformation, on the landscape, regime and niche levels. They expect that digitally-driven services, together with landscape trends, will lead to a window of opportunity for MaaS and more multimodal mobility patterns. But it is also believed that routines and persisting attitudes towards private car use can be resistant to change. Therefore, it remains questionable whether certain societal trends in the landscape, i.e., concerns about climate change or the environment in general, can develop sufficient influence and power to enforce a full-scale transition towards a MaaS-dominated or multimodal urban mobility regime. There is broad agreement that a full-scale transition requires changes in the political framework conditions and, accordingly, in the rules of the game. Stakeholders' views indicate that developments that match with a fit-and-conform approach are necessary but not sufficient to achieve a full-scale transition to a sustainable mobility system. To achieve the deep structural changes required for a sustainable transition, changes in the selection environment are needed which correspond to a stretch-and-transform approach.

From the interviews, it can be concluded that a variety of policy measures are needed to enable a transition of urban mobility. Firstly, measures are required to increase the attractiveness of MaaS and the underlying mobility services. Some of the interviewees mentioned concrete policy measures, such as drop-off zones for flexible shuttles, parking dedicated to car sharing services or public transport companies supporting integrative ticketing or platforms. All measures which fall into this category are associated with no, or at most minimal, disruption to car traffic. It can be assumed that issues of political and social acceptance are not a major obstacle to their implementation. Secondly, stronger restrictions of private car usage are deemed inevitable. Most stakeholders clearly acknowledge a need to destabilize the established sociotechnical regime, which resonates well with recent thinking in transition research (e.g., [40]). Kemp and Rotmans ([41], p. 152) argue that control policies are required if a transition to sustainable mobility is to be achieved. Examples are City Maut, or very high fees for parking. Such measures increase the relative attractiveness of MaaS, and thus change the selection environment in the sense of Smith and Raven ([31], p. 1030). Such strategies, and corresponding measures,

require more profound changes in the priority-setting of urban transport policy. The results of the interviews indicate that acceptance issues in this case can be a major hindrance.

Similar demands for such policy combinations are often found in transition literature and transport studies. For example, Kivimaa and Kern [42] come to the conclusion that combinations of niche support policies and policies to destabilize regime structures are more likely to accomplish a sustainable transition. They introduce the concept of "motors of creative destructions", which appear to fit well with concepts of pushing back the dominance of the regime of private cars. Along the same lines, Dijk et al. [43] argue for policy mixes which include measures to reduce car usage with the aim of inducing a "virtuous cycle" of positive feedback that leads to more resource efficient urban mobility. Other authors also emphasize the need to combine complementary policies to facilitate the diffusion of environmental innovations both in general [44], and in particular to support approaches for sustainable transport [41,45,46].

The approach for policy-packing suggested by Givoni et al. [45] stresses that it is not only the effectiveness of policies or policy packages which is of importance, but also their implementability. Often, the first of these two dimensions attracts attention while the latter is not really considered. "The most effective policy measure will not make any impact until implemented, an obvious but often overlooked aspect" ([47], p. 2). This leads us to perhaps the most important challenge revealed by the interviews. While there seems to be broad agreement that restrictions for private cars are inevitable to enable a real transition towards multimodal transport, many of the interviewed actors doubt that such measures will find the necessary political and societal acceptance. Denominating heavy restrictions for cars as "political demise" (Interviewee 5), indicates the importance of not only political but also societal acceptance for such measures. As David Banister puts it: "public acceptability drives political acceptability and it is only when there is sufficient public support for change, that action will take place" ([9], p. 76). In this way, it becomes obvious that the concept of a "selection environment" cannot be limited to political and other institutional actors, but must also include citizens in their roles both as transport users and as part of the political opinion-forming process.

Another finding of the study, related to questions of acceptance, also points to difficulties in the implementation of the stretch-and-transform strategy. In the literature, common expectations shared by many actors are seen to be an important factor to empower niches and enable transitions [32,34]. However, this study reveals that there is no clear agreement on the ideal pathway to achieve a sustainable transition in urban mobility. All interviewed actors express a commitment to more sustainable transport, but a closer look at their views shows that their visions and expectations towards the future of urban transport are not as homogenous as it may seem at first glance. All agree that increased shares in multimodality are likely, and all emphasize the importance of traditional public transport for a functioning urban mobility system. However, views of what exactly a MaaS-dominated regime configuration can and should look like differ. Stakeholders come to different assessments as to which restrictive measures are the right ones. Some consider congestion charging to be an appropriate measure, but others reject it because it may lead to social exclusion and thus undermine the conditions for societal acceptance. In transition studies it is emphasized that transitions need to be guided by long-term strategies [48,49]. Otherwise, a lack of common visions and openness to pathways to get there (also referred to as "directionality failures" by Weber and Rohracher [50]), may impede the existing window of opportunity from being used. What is needed is a more sophisticated and comprehensive understanding of how a sustainable transport regime dominated by MaaS and multimodal mobility can be designed. What exactly does it look like in a specific geographical context, what modal shares are envisioned, which policies are needed, and who is operating the services (etc.)?

Overall, it becomes apparent that in spite of the new options enabled by digitalization, there still appears to be an urgent need for a stronger focus on the conditions for societal and political acceptance, or on the legitimization of mobility concepts that aim at making private car usage less attractive. Further research should therefore not only look at what is sustainable in terms of GHG-emissions, pollutants or modal split. What also seems to be needed are concepts that include aspects of quality of

life or individual capabilities. Hillerbrand et al. [51] recently assessed the potential development of automated vehicles based on the capability approach [52]. Such a broader focus on the capabilities of individuals to organize their daily lives in multimodal and MaaS-dominated urban mobility regimes may help to get a better understanding of how to achieve the political and societal acceptance for restricting individual car transport – restrictions that are obviously needed to accelerate transitions towards multimodal urban mobility regimes. Moreover, future research activities could analyze more in-depth which factors take influence on the social and political acceptance of restrictive measures. Of particular interest surely are socio-demographic factors and differences in the built environment [5]. For example, Dingil et al. [4] recently highlighted the relation between urban structures and transport energy consumption. The findings presented in the paper at hand could be compared with findings from similar research carried out in other urban environments.

From the perspective policy making, a way forwards could be structured learning processes in the form of experiments or real-world laboratories, which early on were seen as an important element of the governance of transitions [41,53]. One of the interviewees explicitly demands pilot projects to demonstrate the benefits of less car traffic. Furthermore, Kemp and Rotmans ([41], p. 148) argue that because of the long-term orientation of transitions, "creation and maintenance of public support is a continuous concern". They highlight participatory decision-making and the social choice of goals as a way forwards. From today's perspective, such approaches are not new. They have been applied in several urban planning and mobility project. However, new mobility options are now emerging in the course of digitalization. A new starting position is thus developing, which makes large-scale, highly participatory experiments on sustainable mobility systems appear more promising than ever before.

6. Conclusions

The research presented in this paper indicates a window of opportunity: there surely is a potential for MaaS and related services to trigger a sustainable transition of urban mobility regimes. But at the same time, the results point to at least two shortcomings that appear to hamper the implementation of effective policy packages or policy mixes: firstly, a lack in visions that are clear enough to be able to provide the necessary guidance for the transition process, and secondly, a lack of understanding of how to facilitate the necessary societal acceptance. Both shortcomings are more closely related than it may seem. An understanding of how to facilitate acceptance should at the same time help to identify feasible pathways towards multimodal urban mobility regimes.

The lack in clear visions is particularly striking, considering that the interviewed actors all deal with concepts or business models that will profit from an increase in multimodal transport. The study reveals that there is no clear agreement on the ideal pathway to achieve a sustainable transition, in spite of a common commitment to more sustainable transport. In Section 5, we suggest that experiences gained in large-scale, participatory real-world laboratories could help to identify feasible pathways.

Such experiments may also be a helpful to overcome the second shortcoming. According to the results of this interview-study, the transition process in the transport sector poses a dilemma between the measures that are needed and those that are feasible for policy-makers. According to the interviewed stakeholders, effective policy mixes or policy packages need to include forceful restrictions on private cars. At the same time, there seems to be a lack of societal and political acceptance for such restrictions. It remains to be seen if new services allow for more comfortable, affordable, cleaner and accessible transport services beyond the use of private cars. In the event that a broad majority considers these services to be attractive, it is at least imaginable that private cars will be perceived as less essential for transport in urban areas. In turn, the acceptance of restrictive measures may increase. Landscape pressures, such as increasing climate concerns and growing societal pressure to combat climate change, may support such developments [15]. Against this backdrop, it appears promising to

test and demonstrate more intensively which benefits MaaS- concepts can bring to urban mobility and quality of life.

So, even in the course of rapidly advancing digitalization, an automatic transition to sustainable urban mobility cannot be assumed. However, the conditions for a sustainable transition appear to be improving as new mobility options emerge that make less car-dominated mobility regimes more attractive and thus more acceptable.

Author Contributions: Conceptualization, J.S. and A.A.; methodology, J.S. and A.A.; software, A.A. and J.S.; validation, A.A. and J.S.; formal analysis, J.S. and A.A.; investigation, A.A. and J.S.; resources, J.S. and A.A.; data curation, J.S. and A.A.; writing—original draft preparation, J.S.; writing—review and editing, A.A.; visualization, A.A.; J.S.; supervision, J.S. and A.A.; project administration, A.A. and J.S.; funding acquisition, A.A. and J.S. All authors have read and agreed to the published version of the manuscript.

Funding: We received financial support to carry out this research from the German Federal Ministry of Education and Research (Reference: 03SFK4P0, Consortium ENavi, Kopernikus).

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Bulckaen, J.; Keseru, I.; Macharis, C. Sustainability versus stakeholder preferences: Searching for synergies in urban and regional mobility measures. *Res. Transp. Econ.* **2016**, *55*, 40–49. [CrossRef]
2. Esztergár-Kiss, D.; Tettamanti, T. Stakeholder engagement in mobility planning. In *Autonomous Vehicles and Future Mobility*; Coppola, P., Esztergár-Kiss, D., Eds.; Elsevier: Amsterdam, The Netherlands, 2019; pp. 113–123, ISBN 978-0-12-817696-2.
3. Geels, F.W.; Kemp, R.; Dudley, G.; Lyons, G. *Automobility in Transition? A Socio-Technical Analysis of Sustainable Transport*; Routledge: New York, NY, USA, 2012; ISBN 978-0-415-88505-8.
4. Dingil, A.E.; Schweizer, J.; Rupi, F.; Stasiskiene, Z. Updated Models of Passenger Transport Related Energy Consumption of Urban Areas. *Sustainability* **2019**, *11*, 4060. [CrossRef]
5. Zijlstra, T.; Avelino, F. A socio-spatial perspective on the car regime. In *Automobility in Transition? A Socio-Technical Analysis of Sustainable Transport*; Taylor & Francis Group: Oxford, UK, 2012; pp. 160–179, ISBN 978-0-415-88505-8.
6. VCÖ. Multimodale Mobilität erfolgreich umsetzen. In *Mobilität mit Zukunft*; VCÖ: Vienna, Austria, 2015; pp. 1–48.
7. CEC. *Sustainable Urban Mobility: European Policy, Practice and Solutions. Commission of the European Countries*; MI-02-16-275-EN-N; Publications Office of the European Union: Luxembourg, 2017; ISBN 978-92-79-66651-3.
8. Nobis, C.; Kuhnimhof, T. *Mobilität in Deutschland–MiD Ergebnisbericht [Mobility in Germany-MiD Report on Results]. Studie von infas, DLR, IVT und infas 360 im Auftrag des Bundesministers für Verkehr und Digitale Infrastruktur*; Institute of Transport Research: Bonn/Berlin, Germany, 2018.
9. Banister, D. The sustainable mobility paradigm. *Transp. Policy* **2008**, *15*, 73–80. [CrossRef]
10. Schwanen, T. The Bumpy Road toward Low-Energy Urban Mobility: Case Studies from Two UK Cities. *Sustainability* **2015**, *7*, 7086–7111. [CrossRef]
11. Dudley, G.; Chatterjee, K. The Dynamics of Regime Strength and Instability: Policy Challenges to the Dominance of the Private Car in the UK. In *Automobility in Transition? A Socio-Technical Analysis of Sustainable Transport*; Routledge: Abingdon, UK, 2012; pp. 83–103, ISBN 978-0-415-88505-8.
12. Schippl, J.; Puhe, M. *Technology Options in Urban Transport: Changing Paradigms and Promising Innovation Pathways-Final Report*; European Parliament-STOA/ETAG: Brussels, Belgium, 2012.
13. Horn, B.; Kiel, T.; von Lojewski, H. *Nachhaltige Städtische Mobilität für alle. Agenda für Eine Verkehrswende aus kommunaler Sicht Positionspapier des Deutschen Städtetages*; Sustainable Urban Mobility for All; Agenda for a Mobility Transition from Municipal Perspective; Position Paper of the German Association of the Cities; Deutscher, S., Ed.; Positionspapier des Deutschen Städtetages: Berlin, Germany, 2018; ISBN 978-3-88082-318-1.
14. Rip, A.; Kemp, R. Technological change. In *Human Choice and Climate Change. Vol. II, Resources and Technology*; Battelle Press: Columbus, OH, USA, 1998; pp. 327–399, ISBN 1-57477-046-2. [CrossRef]
15. Truffer, B.; Schippl, J.; Fleischer, T. Decentering technology in technology assessment: Prospects for socio-technical transitions in electric mobility in Germany. *Technol. Forecast. Soc. Chang.* **2017**, *122*, 34–48. [CrossRef]

16. 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]
17. Docherty, I.; Marsden, G.; Anable, J. The governance of smart mobility. *Transp. Res. Part Policy Pract.* **2018**, *115*, 114–125. [CrossRef]
18. Noy, K.; Givoni, M. Is 'Smart Mobility' Sustainable? Examining the Views and Beliefs of Transport's Technological Entrepreneurs. *Sustainability* **2018**, *10*, 19. [CrossRef]
19. Shaheen, S.; Cohen, A. Shared ride services in North America: Definitions, impacts, and the future of pooling. *Transp. Rev.* **2018**, *39*, 427–442. [CrossRef]
20. Transport & Environment. *Less (Cars) is More: How to Go from New to Sustainable Mobility*; Transport & Environment: Brussels, Belgium, 2019.
21. Hirschhorn, F.; Paulsson, A.; Sørensen, C.H.; Veeneman, W. Public transport regimes and mobility as a service: Governance approaches in Amsterdam, Birmingham, and Helsinki. *Transp. Res. Part Policy Pract.* **2019**, *130*, 178–191. [CrossRef]
22. Schikofsky, J.; Dannewald, T.; Kowald, M. Exploring motivational mechanisms behind the intention to adopt mobility as a service (MaaS): Insights from Germany. *Transp. Res. Part Policy Pract.* **2020**, *131*, 296–312. [CrossRef]
23. Trommer, S.; Kolarova, V.; Kröger, L.; Kickhöfer, B.; Kuhnimhof, T.; Lenz, B.; Phleps, P. *Autonomous Driving—The Impact of Vehicle Automation on Mobility Behaviour*; IFMO Institute of Mobility Studies: München, Germany, 2016.
24. UITP. *Autonomous Vehicles: A Potential Game Changer for Urban Mobility*; UITP: Brussels, Belgium, 2017.
25. BCS CarSharing in Zahlen. Available online: https://carsharing.de/alles-ueber-carsharing/carsharing-zahlen (accessed on 12 March 2018).
26. KBA. *Kraftfahrtbundesamt Zulassungsstatistik. Federal Motor Transport Authority Vehicle Registration Statistics*; Kraftfahrtbundesamt: Nairobi, Kenya, 2019.
27. Geels, F.W. Technological transitions as evolutionary reconfiguration processes: A multi-level perspective and a case-study. *Res. Policy* **2002**, *31*, 1257–1274. [CrossRef]
28. Fuenfschilling, L.; Truffer, B. The structuration of socio-technical regimes—Conceptual foundations from institutional theory. *Res. Policy* **2014**, *43*, 772–791. [CrossRef]
29. Geels, F.W.; Schot, J. Typology of sociotechnical transition pathways. *Res. Policy* **2007**, *36*, 399–417. [CrossRef]
30. Geels, F.W. From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Res. Policy* **2004**, *33*, 897–920. [CrossRef]
31. Smith, A.; Raven, R. What is protective space? Reconsidering niches in transitions to sustainability. *Res. Policy* **2012**, *41*, 1025–1036. [CrossRef]
32. Schot, J.; Geels, F.W. Strategic niche management and sustainable innovation journeys: Theory, findings, research agenda, and policy. *Technol. Anal. Strateg. Manag.* **2008**, *20*, 537–554. [CrossRef]
33. Arnold, A.; Schippl, J.; Wassermann, S. *Von der Nische in den Mainstream? Über Akteure, Angebote und das Diffusionspotential von Mobility as a Service. From Niche to Mainstream? About Actors, Services and the Potential Diffusion of Mobility as a Service*; Institut für Sozialwissenschaften, Abt. für Technik- und Umweltsoziologie: Stuttgart, Germany, 2018.
34. Raven, R.; Kern, F.; Verhees, B.; Smith, A. Niche construction and empowerment through socio-political work. A meta-analysis of six low-carbon technology cases. *Environ. Innov. Soc. Transit.* **2016**, *18*, 164–180. [CrossRef]
35. Johnson, C.; Dowd, T.J.; Ridgeway, C.L. Legitimacy as a Social Process. *Annu. Rev. Sociol.* **2006**, *32*, 53–78. [CrossRef]
36. Geels, F.; Kemp, R. The multi-level perspective as a new perspective for studying socio-technical transitions. In *Automobility in Transition? A Socio-Technical Analysis of Sustainable Transport*; Taylor & Francis Group: Oxford, UK, 2012; pp. 49–79, ISBN 978-0-415-88505-8.
37. Denzin, N.K.; Lincoln, Y.S. Introduction: The Discipline and Practice of Qualitative Research. In *The Sage Handbook of Qualitative Research*; SAGE Publications Ltd.: New York, NY, USA, 2005; pp. 1–32, ISBN 978-1412974172.
38. Whitmarsh, L. How useful is the Multi-Level Perspective for transport and sustainability research? *J. Transp. Geogr.* **2012**, *24*, 483–487. [CrossRef]

39. Eggs, J. *Mobilität in Deutschland–MiD Kurzreport Europäische Metropolregion Stuttgart. Mobility in Germany-MiD Brief Report Metropolitan Region Stuttgart. Studie von Infas, DLR, IVT und Infas 360 im Auftrag des Bundesministers für Verkehr und Digitale Infrastruktur (BMVI) (FE-Nr. 70.904/15)*; BMVI: Bonn/Berlin, Germany, 2019.
40. Turnheim, B.; Geels, F.W. The destabilisation of existing regimes: Confronting a multi-dimensional framework with a case study of the British coal industry (1913–1967). *Res. Policy* **2013**, *42*, 1749–1767. [CrossRef]
41. Kemp, R.; Rotmans, J. Managing the transition to sustainable mobility. *Syst. Innov. Transit. Sustain.* **2004**, 137–167. [CrossRef]
42. Kivimaa, P.; Kern, F. Creative destruction or mere niche support? Innovation policy mixes for sustainability transitions. *Res. Policy* **2016**, *45*, 205–217. [CrossRef]
43. Dijk, M.; Backhaus, J.; Wieser, H.; Kemp, R. Policies tackling the "web of constraints" on resource efficient practices: The case of mobility. *Sustain. Sci. Pract. Policy* **2019**, *15*, 62–81. [CrossRef]
44. van den Bergh, J.C.J.M. Environmental and climate innovation: Limitations, policies and prices. *Technol. Forecast. Soc. Chang.* **2013**, *80*, 11–23. [CrossRef]
45. Givoni, M.; Macmillen, J.; Banister, D.; Fieltson, E. From Policy Measures to Policy Packages. *Transp. Rev.* **2013**, 1–20. [CrossRef]
46. Justen, A.; Schippl, J.; Lenz, B.; Fleischer, T. Assessment of policies and detection of unintended effects: Guiding principles for the consideration of methods and tools in policy-packaging. *Transp. Res. Part Policy Pract.* **2014**, *60*, 19–30. [CrossRef]
47. Givoni, M. Addressing transport policy challenges through Policy-Packaging. *Transp. Res. Part Policy Pract.* **2014**, *60*, 1–8. [CrossRef]
48. Edmondson, D.L.; Kern, F.; Rogge, K.S. The co-evolution of policy mixes and socio-technical systems: Towards a conceptual framework of policy mix feedback in sustainability transitions. *Res. Policy* **2019**, *48*, 103555. [CrossRef]
49. Elzen, B.; Geels, F.W.; Hofman, P.S.; Green, K. Sociotechnical scenarios as a tool for transition policy: An example from the traffic and transport domain. In *System Innovation and the Transition to Sustainability: Theory, Evidence and Policy*; Edward Elgar: Cheltenham, UK, 2004; pp. 251–281, ISBN 978-1-84376-683-4.
50. Weber, K.M.; Rohracher, H. Legitimizing research, technology and innovation policies for transformative change: Combining insights from innovation systems and multi-level perspective in a comprehensive 'failures' framework. *Res. Policy* **2012**, *41*, 1037–1047. [CrossRef]
51. Hillerbrand, R.; Milchram, C.; Schippl, J. The Capability Approach as a normative framework for technology assessment: *TATuP-Z. Tech. Theor. Prax.* **2019**, *28*, 52–57. [CrossRef]
52. Banister, D. *Inequality in Transport*; Alexandrine Press: Abingdon, UK, 2018; ISBN 978-0-906661-01-7.
53. Turnheim, B.; Kivimaa, P.; Berkhout, F. *Innovating Climate Governance: Moving Beyond Experiments*; Cambridge University Press: Cambridge, UK, 2018; ISBN 978-1-108-41745-7.