



Subjectification, Technology, and Rationality – Sustainable Transformation of the Mobility Sector from a Governmentality Perspective

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Abstract. Shared mobility services play an essential role in a sustainable mobility transition and unfold among so-called smart technologies. Although this can positively affect mobility, it also poses challenges for the development of sustainable urban mobility, for example, because the smart options are not equally available to all people or are inaccessible. Issues of social or ecological inequality as well as the digital exclusion of people in the mobility sector are increasingly becoming the focus of attention. Largely unexplored in this context is how the subjects of shared mobility services will be conceived, and what knowledge, skills, and resources they should bring to use smart and shared mobility services in the future. We contribute to closing this research gap by investigating the rationalities that sustainable smart and shared mobility transformation follow, which developments are triggered by the technologies, and in which ways identification offers address subjects. Foucault's concept of governmentality is used as a theoretical perspective and nuanced with critical (feminist) literature on identity formation. Methodologically, this article works with qualitative content analysis of policy documents and an ethnographically oriented observation of registration conditions in various car-, bike-, electronic moped, and scooter-sharing services. The results show that subjects are addressed in a rather general way, and their (special) needs are hardly considered. Instead, they are addressed as flexible citizen-consumers and correspond with the rationality of (green) economic growth and the liberal paradigm. Accordingly, the technologies aim for innovation, fair competition, and the provision of public space by the state.

1 Introduction: Sustainable and Smart Mobility Policy¹

With the Paris Agreement on Climate Change (2015) and the Sustainable Development Goals (SDGs), fundamental aims for climate protection and sustainable development were agreed upon internationally. In the transport sector, greenhouse gas emissions

¹ We thank the reviewer for the relevant comments. The mobility plans analyzed here, are subject of another article in German with a similar question. The article is currently under review.

are caused mainly by private motorized transport, which (still) continue to increase. In addition, there are negative externalities due to sealing, noise, air pollution, and land consumption. In urban areas, in particular, private motorized transport places an additional burden on the already scarce resource of available urban space (European Commission 2019).

The transformation of the mobility sector is an essential part of a (strongly) sustainable, i.e., ecologically sensible and socially just, development in urban areas and is addressed with increasing urgency as a political task (Banister 2008; May 2013). For example, the EU Clean Energy for all Europeans Package (EU 2018/1999) stipulates the preparation of National Energy and Climate Plans (NECPs). In these plans, all member states commit to reducing greenhouse gas emissions. Germany aims to reduce emissions in the transport sector by 40–42% by 2030 (German Federal Government 2019). Numerous cities in Europe and many German municipalities are looking for environmentally sound solutions for updating urban development and mobility plans. It is increasingly discussed to switch from private cars to extended environmental modes (public transport, cycling, and walking as well as shared forms of mobility) under the term multimodality. In this context, shared mobility services offer higher flexibility and enable users to switch smoothly between different modes according to individual travel needs.

The political endeavor for multimodal sustainable mobility options is often realized with internet-based, i.e., digitally supported (smart) solutions. *The Smart and Sustainable Mobility Strategy* of the European Commission (2020) proposes a “twin transition” of sustainability and digitalization to reshape and economically revitalize the transport sector². This includes new mobile services³, particularly the so-called shared (micro-) mobility (Docherty et al. 2018). Sharing options, such as car- and bike-sharing systems as well as electronic scooters and mopeds-, promise to be easily accessible and ecologically more sensible alternatives to private cars. These options are accessible to users via GPS-supported location and digital booking and billing systems. In this way, sustainability strategies for shared modes of transport are closely linked to the policy field of digitalization.

Approaches such as the new mobilities paradigm or mobility justice understand mobility as the potential for movement (motility) that is not necessarily limited to a physical change of location; communication is viewed as a journey of information, and speechlessness is understood as immobility (Sheller and Urry 2006, 2016). The ability to move of different social classes, gender, or ethnic affiliations thus becomes just as much a focus of attention as the connection between socio-demographic factors (such as income, education, and health) and (im)mobility (Lucas 2012; Sheller 2018, Martinez and Keserü in this volume). Forms of discrimination and disadvantage are thus inscribed in people’s mobility behavior and their access to mobility options and are regarded as a power-laden and political phenomenon (Cresswell 2010).

² “The transition to safe, accessible, inclusive, smart, resilient and zero-emission urban mobility requires a clear focus on active, collective and shared mobility underpinned by low- and zero-emission solutions” European Commission (2021, 2f.).

³ Mobile services are discussed under the catchword Mobility as a Service (MaaS), including traditional businesses such as taxis, but also new business areas of the sharing economy, leasing models or future services such as travel with autonomous shuttles.

Using Foucault's (2004a, 2004b) concept of governmentality and Judith Butler's (1995) work on identity formation, we follow the few examples of constructivist mobility research. In this paper, the digitally supported sustainable transformation of the mobility sector is consequently understood as a socio-cultural and political negotiation process, including the constitution and reproduction of identity options (Deffner; Sonnberger and Graf 2021). While technology is often in focus, potential users of smart and shared transport options are mostly left out in the political and scientific debates. Consequently, it is mainly unexplored which knowledge, qualifications, and resources users of shared mobility services should and must bring actually to use them. In other words: how are they conceived as subjects of new technologies? Moreover, considering transport development, it usually remains open to which rationalities the transformation follows and how technologies unfold in society. We address this research gap by investigating who smart and shared mobility services target and with what intention (rationality). Also, we examine what preconditions are tied to the use of technologies and what consequences this has for the formation of subjects. Therefore, we ask: Which rationalities does the sustainable smart mobility transformation follow? Which developments are triggered by technologies? And how are subjects addressed and identity options offered? This article aims to make these processes associated with the transformation of mobility visible, question them in terms of their steering effects, and ultimately outline them regarding the goal of a sustainable and inclusive mobility transformation. Local mobility plans of three German cities and ethnographic observation of registration requirements for different sharing services are used for an empirical illustration in this paper.

The article is structured as follows: first, the background to shared mobility is explained and critically classified in section two. Then, the theoretical framework based on the concept of governmentality and the applied heuristics is explained. The methodological approach is described in the fourth section. In the fifth section, the analytical results are presented in three subsections. Finally, we discuss our results concerning the research question in the conclusion.

2 Mobility, Transformation, and Shared Mobility

2.1 Mobility Instead of (Only) Traffic

Transport is considered as the physical manifestation of mobility needs and, thus, the actual realization of ways (Mattioli 2016). Mobility instead includes a comprehensive system of socio-cultural, technical, political, and legal factors, which together result in motility, which is the potential to be mobile. Mobility is a means of achieving and fulfilling everyday actions and needs (Mullen and Marsden 2016). Consequently, social science research is increasingly looking at mobility as a sociocultural system linked to *agency* (Graf and Sonnberger 2020; Sonnberger and Graf 2021).

The new mobilities paradigm (Sheller and Urry 2006, 2016) views social and physical processes of mobility as embedded in social structures. In this understanding, Cresswell (2010) addresses the political dimension of mobility. Like other domains, mobility is influenced by social factors and relations such as class, gender, ethnicity, religious affiliation, etc. Accordingly, mobility can be understood as a resource accessed and perceived

differently by different actors. Hence, people have different kinds of access to mobility as well as experiences with it.

Direct and indirect mobility-related disadvantages are discussed under the term *transport poverty*. Lucas (2012) describes how social factors can link to more difficult access to mobility options and thus lead to mobility poverty (transport poverty), which in turn leads to immobility and thus - in a circular fashion – again to inaccessibility of places and services. These forms of exclusion often interact with other categories of difference and mutually reinforce one another (Lucas 2012). Therefore, mobility behavior can also be reflected in affiliations, language barriers, implicit codes of conduct, social networks, or value systems (Priya Uteng 2009). Additionally, there are fear-based as well as physical and space-based exclusions, which in turn can show unequal access to mobility options and thus can ultimately lead to different forms of immobility (Médard de Chardon 2019; Lubitow et al. 2020; SHARE-North 2021). The usage of shared mobility services depends on the digital skill of people, which can lead to further disadvantages in terms of these modes (Groth 2019; Horjus et al. 2022).

2.2 Transformation of the Mobility Sector

As described above, multimodality intends to facilitate the switch from environmentally harmful and space-consuming car use to more sustainable mobility options. This means that journeys should not be made with one vehicle alone but with multiple different modes of transport instead. For example, a car journey is replaced by walking to the next public transport stop from where a train or bus takes subjects to another stop, where they can reach their actual destination with a bicycle - possibly a shared bike⁴. In this context, sharing services in the field of (active) mobility play a significant role. They can be used for the flexible realization of the so-called ‘first/last mile’ to get from a train or bus station to the destination (European Environment Agency 2019). Proponents of a smart transition of the mobility sector describe:

“a vision of the future in which mobility will be framed as a personalized ‘service’ available ‘on demand’, with individuals having instant access to a seamless system of clean, green, efficient and flexible transport to meet all of their needs” (Docherty et al., pp. 114f.).

Along with socio-technical transitions towards smart mobility come changes in the governance of such systems. Marsden and Reardon (2018) describe the changing role of state power so that different spatial and functional networks of public, private, and non-governmental organizations come into focus of the analysis. Secondly, a change ‘from ownership to usership’ is described. Consequently, the marketplace of mobility services is also changing fundamentally. Individual travel and travel times are becoming increasingly commoditized, which could further fuel the long-term trend of neo-liberalization of the mobility sector (Gössling and Cohen 2014).

⁴ Shared means of transport, such as the rental bike at the train station or the car in car sharing, rely on the principle of use without linking this to ownership at the same time. They thus touch on the area of the sharing economy and, depending on their orientation, are located at different points on the continuum between non-commercial, partly solidarity-based and partly dissident initiatives and commercially constituted services, partly belonging to large companies.

Besides digitalization dynamics, the mobility sector is also being transformed by laws such as the German Car-Sharing Law (CsgG) or the Electric Mini Vehicles regulation (eKFV), which regulates the introduction of small electric vehicles (such as electric scooters) at the federal level in Germany. An amendment of the Passenger Transportation Law (Personenbeförderungsgesetz – PBefG) of 2013 sets the goal of complete accessibility in public transport by 2022. It thus integrates the inclusion of people with disabilities into binding federal legislation. So far, citizens are perceived as users and as a source of mobility data that is collected automatically (Docherty et al. 2018). Shared mobility should enable smart as well as ecologically and socially sustainable mobility options. In the long term, a kind of networked ecosystem⁵ of different mobility services could emerge in which the boundaries between various forms of mobility seem to merge fluidly into one another (Hietanen 2014). These developments result in the greater significance of shared mobility services.

2.3 Critical Reflections on Smart and Shared Mobility

Following critical research on ecological modernization and its linkage to the logic of (neo)liberal market economies (Hajer 1997; Schwanen et al. 2011), the proximity to market-based and technology-based solutions is also problematized concerning smart and shared mobility. Gössling and Cohen (2014) describe an optimism toward technological innovation that is, at least in part, the product of strong interest groups. In this context, state actors are primarily assigned the role of facilitating innovation and creating market-based regulatory approaches. On the other hand, behavioral changes should be chosen as voluntarily as possible by subjects. Politics on smart mobility tends to emphasize the role of consumers as end-users of a service, so-called citizen-consumers (Mattioli and Heinen 2020). This might result in a stronger focus on user-friendliness than democratic values (Kronsell and Mukhtar-Landgren 2020). In the context of MaaS, Pangbourne et al. (2020) describe potential ideological pressure toward governance to enable revenue streams out of previously public goods, such as public space. This could result in increased neglect of social and ecological sustainability.

Smart mobility is often envisaged as a solution that enables mobility and carbon emission reductions because mobility is expected to be electrified, shared, and more efficient. Following this logic, achieving smart mobility is often expressed as a goal on its own (Paulsson and Hedegaard Sørensen 2020). Still, it is argued that smart mobility can fulfill its desired societal outputs if steered in that direction (Docherty et al. 2018). Reliable measures towards smart and shared mobility must be actively brought in line with the sustainability paradigm instead of following the logic of an automatic equation (Lyons 2018; Heinen and Mattioli 2019; Paulsson and Hedegaard Sørensen 2020).

3 Governmentality as a Perspective on Sustainable Mobility Transformation

Constructivist or post-structuralist approaches have found their way into mobility research but are still rare. Although there are some exceptions, they are hardly used

⁵ This is often discussed under the keyword 'Mobility as a Service' – MaaS.

for empirical studies and often focus exclusively on the actions of collective actors (state, NGOs, associations) instead of considering the subject's role. The geographer Tim Schwanen and his colleagues (2011) use a governmentality perspective to show that so-called ecological modernization can be understood as a neoliberal project. Referring to Hajer (1997) and some others, they identify dominant logics of the market economy, such as technology optimization, steering the market through prices, and disregarding rebound effects or path dependencies. Governmentality explains the difficulties of integrating alternative forms of knowledge production - beyond the logic of economics, engineering, or psychology - on concrete governmental decisions at the national or local level or on mobility providers (Manderscheid et al. 2014).

3.1 Rationalities, Technologies, and Subjects

Mobility can be understood as a political component of modern societies that (re)produces inequalities and power relations. In our approach, we use the concepts of rationality and technology with references to Foucault and Judith Butler's idea of subject formation.

The term "governmentality" is composed of the concepts of governing ("gouverner") and the way of thinking ("mentalité") (Lemke et al. 2015, p. 8). Governmentality is based on a comprehensive understanding of government and includes additional actors besides the state. Societies seem to govern themselves out of themselves. This does not necessarily happen through direct control or explicit prohibitions but through the ability to induce subjects to act in a certain way and to influence the field of possibilities of individuals (Foucault 1987, p. 255). Discursive necessities are formed, which are internalized by individuals and accepted and desired as guidelines for their own actions. Consequently, power can be found in certain forms of knowledge and truth as well as in the use of technologies of the self (Lemke et al. 2015).

Referring back to Foucault's concept of governmentality (2004a, 2004b), rationalities are described as hegemonic logics of society. These are explicit or implicit logics that influence the individual's way of thinking (Reuber 2012; Lemke et al. 2015). For this article, these can be the rationality of sustainable development, a neoliberal mode of government, or the premise of technological innovation.

Following Foucault, Schwanen et al. (2011, p. 998) describe *techné* as "means, mechanisms, procedures, tactics, vocabularies, etc. [that] are employed to modify the actions of the agents to be governed." The epistemic system describes "which forms of knowledge and expertise are implicated in, constitutive of, and produced by government" (Schwanen et al. 2011, p. 998). Dean (2010, p. 33) also describes this dimension as "specific ways of acting, intervening and directing, made up of particular types of practical rationality ('expertise' and 'know-how') and relying upon definite mechanisms, techniques, and technologies. These concepts are close to the idea of technologies because they conceptualize how the exercise of power works precisely and how theoretical considerations are applied to concrete modes of transport (e.g., shared mobility services). Drawing on Foucault, the concept of technologies describes how governmental goals and logics are translated into regular patterns of action, perception, and judgment. They include material and symbolic instruments, which can act as external technologies or

internalize as technologies of the self (Reuber 2012). External technologies in the context of mobility could be obligatory speed limits, traffic lights, or access restrictions for certain vehicles.

The characteristics and effects of technologies and rationalities reveal themselves in the concrete subject formation or subjectification. This describes another element of the governmental exercise of power. The concept of subjectification will be discussed in more detail below.

3.2 Formation of Subjects

In addition to rationalities and technologies, the formation of subjects is also important in sociocultural mobility research. Schwanen et al. (2011, p. 998) address the dimension of *subjectification* with the questions “how are the agents to be governed understood, represented and imagined? What are they to become?”. Similarly, the consideration of subjects is found in the work of sociologist Katharina Manderscheid (2014). She describes an ‘automotive dispositive’ that produces individuals as automotive subjects. These are closely interwoven with discourses and collective symbols such as freedom, progress, and individuality. In her work, the mobility dispositive appears as an interplay of complex technologies and material landscapes, forms of knowledge and symbolism, as well as governmental subject formation. Manderscheid (2014, pp. 19f.) emphasizes that a dispositive analytical view of automotive subject formation also includes emotions, preconscious sensations, dispositions, and bodily experiences. Nevertheless, the form in which this can be addressed in empirical research is not explained and is less central concerning her epistemological interest in describing the ‘automotive dispositive’.

Subject theorists such as Judith Butler study the formation of subjects more closely. The subject is thus the addressee of regulation. At the same time, subjectification means the constitution of the self via recognition of one’s own identity. In this perspective, the incorporation of knowledge and norms leads to a position in which the subject itself influences its own options for action. Foucault’s understanding of the subject can be recognized in this double structure:

“There are two meanings of the word ‘subject’: subject to someone else by control and dependence, and tied to his own identity by a conscience or self-knowledge” (Foucault 1982, p. 781).

However, in contrast to Foucault’s genealogical perspective and the sense of the *performative turn*, Butler (2001, 2006) focuses more on the process of identity formation and, with the concepts of performativity and intelligibility, looks at the desire of the subjects.

Butler shares the understanding of power with Foucault and also considers the process of identity formation as an exercise of power (Butler 2006; Reckwitz 2010). Two heuristics are central to the process of identity formation: *Intelligibility* and *Performativity*. She describes the process of the subject becoming intelligible with the idea of invocation, according to Althusser (1977). According to this, a subject becomes intelligible when it can establish a relation between a particular significant (meaning of a linguistic sign) and itself. This act is only about to work if the attribution cited in the significant is accepted and appropriate (Butler 2001). In the process of discursive identity formation, the subject integrates a particular discourse fragment into the view of the self

by simultaneously rejecting other identity options in the act of choosing one particular identity component. In Butler's sense, the features to enable a subject's intelligibility are appropriate categories that will allow the subject's positive identification and desire for identification, which Butler describes as desire.

Next to the subject, which becomes intelligible in the act of self-interpretation, Butler adds performativity to analyze identities⁶. In doing so, she refers to the concept of performativity by Derrida and Gasché (1972). By performativity, Butler means the ritualized or habitual citation of speech acts. She argues that the ritualized moment constitutes a "condensed form of historicity" that is "an effect of antecedent and future invocations of convention" (own translation, Butler 2006, p. 12). Identity formation is thereby accomplished through repetition (rite) in everyday use. It is further characterized by convention, the relative independence of time, and the potential for shifting in its content⁷.

In the view of urban mobility, the government of subjects as 'traveling bodies' plays an important role (Bonham 2006). Changes or innovations in transport technologies are thus associated (positively or negatively), on the one hand, with the freedom for individuals to move away from social or societal contexts. On the other hand, the understanding of transport as movement from one point to another, to be able to participate in related activities there, enables the objectification of mobility practices. This is accompanied by a corresponding production of knowledge about the efficiency of the movement undertaken. This gives rise to the idea of an 'efficient traveler' or 'efficient body' (Bonham 2006).

3.3 Heuristics for Considering Smart and Shared Mobility Services

After cursorily exploring the concept of governmentality via the concepts of technology, rationality, and subjectification following the approaches of Butler (2006) and Schwanen et al. (2011), the following points crystallize for the empirical illustration:

Rationality

- What logics, strategies, expertise, competencies, and resources are addressed in governmental action?
- How is mobility seen? How is it discursively constituted and justified?

⁶ The empirical material in this paper does not allow the study of performativity. Instead, we address how subjects are understood as well as represented and with what properties they are constructed.

⁷ The two sections on performativity and intelligibility are oriented in an abbreviated form to the subject-theoretical extension of the business power approach, according to Fuchs (2007) in Graf (2016).

Technology

- What means (technologies) are used to translate rationalities into everyday practices and patterns of perception and judgment?
- With what intentions do technologies unfold?
- How is mobility embodied; in terms of bodily attributes and experiences?

Subjectification

- How are subjects understood or represented? With what characteristics are they constructed?
- Which identity options can be identified (intelligibility)?

4 Methodology

This paper combines two methodologies to address the research question and illustrates it with empirical research. We use qualitative content analysis to examine local mobility plans (Schreier 2012; Rädiker and Kuckartz 2019). Local mobility plans are strategic documents of municipalities or regions. They summarize political goals, measures, and indicators in the mobility sector for 10 to 15 years. They provide information about mobility planning as well as the intentions, plans, and strategies of key stakeholders. Consequently, they are a useful source for the empirical illustration of mobility policies. Furthermore, based on a ‘mobilized ethnography’ (Sheller and Urry 2006; Hein et al. 2008), observation and reconstruction of registration requirements and the conditions for using sharing services are carried out.

The literature corpus consists of four documents in three cities. We got to this corpus by first researching the mobility plans of all sixteen German state capitals. We focused on urban contexts because they appear to be particularly relevant. In cities, companies have begun to launch shared mobility services since densely populated areas represent particularly profitable conditions for sharing services. The development of local mobility plans takes about two (or even more) years. Medard de Chardon (2019, p. 406) describes a “deluge” of free-floating docking-less bike-sharing systems in Europe and North America in 2017, which brought the regulation of shared mobility up on the political agenda, additionally electronic scooters only entered German cities with the Electric Micro-Vehicles Ordinance (eKFV) in 2019. Therefore, we only included documents from before 2019 were not included. In a third step, a lexical search for the terms “sharing”, “leih*” (borrow), “miet*” (rent), “geteilt*” (shared) was conducted to identify relevant documents and passages.

Table 1. Selected documents from mobility plan research.⁸

City	Document	Abbreviation	Content
Berlin	Stadtentwicklungsplan Mobilität und Verkehr Berlin 2030 // City Development Plan – Mobility and Transport Berlin 2030 (2021)	B	General mobility plan
Magdeburg	Verkehrsentwicklungsplan 2030plus // Transport Development Plan 2030plus (2019)	MD	General mobility plan
Munich	Mobilitätsstrategie 2035 - Einstieg in die Teilstrategie Shared Mobility // Mobility Strategy – Introduction to the Sub-Strategy on Shared Mobility (2022b)	M	Specific scope on shared mobility (sub-strategy of the general plan)
	Mobilitätsstrategie 2035 - Entwurf einer neuen Gesamtstrategie für Mobilität und Verkehr in München // Mobility Strategy 2035- Draft of a Strategy on Mobility and Transport (2021)	M*	General mobility plan

The analysis of the material is carried out with the analysis software MAXQDA. According to an inductive coding process, the categories are developed directly from the material. Here sequences of the material are analyzed in more detail and assigned to different categories (Rädiker and Kuckartz 2019). The empirical investigation of these plans does not represent a comprehensive analysis of the mobility policy of these cities in terms of a case study but rather serves to approach the research question and illustrate the heuristics developed above.

First, passages with descriptions of subjects and their characteristics, goals, or needs mentioned in connection with mobility were coded. Text passages that describe concrete measures, such as promoting any sharing services, were coded as well. These codes, secondly, allowed inferences to be made about applied technologies. Thirdly, text passages were coded that describe the logic of action of (state) actors, for example, which roles, tasks, and responsibilities are defined and which forms of knowledge are articulated. These codes were then systematized with regard to the research question and based on the developed heuristic of rationalities, technologies, and the process of subjectification.

⁸ The abbreviations will be used in the following sections to facilitate the reading. The number indicates the page where the quote originates, for example, MD 12 for the document from the city of Magdeburg and page number 12.

The second data collection used for this paper is ethnographic observation (Sheller and Urry 2006; O'Reilly 2012). The registration process of different sharing services was performed exemplary to identify preconditions for using such services. In addition, information was obtained from the general terms and conditions as well as the companies' websites. A total of nine providers were examined. Among them were two car-sharing, three (e-)bike-, one cargo bike-, one electronic moped, and two scooter-sharing providers.⁹ The results of this second survey are used in particular for the analysis of the technologies. This enables a more precise understanding of these services beyond the mere mention in mobility plans.

5 Shared Mobility as a Discursive Practice

The following analysis is based on the previously described heuristics for considering mobility transformations from a governmentality perspective. The results of the investigation will be presented based on the concepts of subjectification, technology, and rationality.

All examined mobility plans address shared and smart mobility. The plans of Berlin and Magdeburg are general transport development plans and partly contain targets, indicators, and measures related to general mobility transformation. Shared mobility is dealt with as part of this planning. The city of Munich has also formulated a general strategy with its Mobility Strategy 2035, which includes numerous sub-strategies. The first sub-strategy to be adopted is the Shared Mobility Strategy, which is particularly interesting to the present study.

Consequently, all plans contain general statements promoting smart and shared mobility services. For Berlin, for example, the formulated goal is:

“Strengthening inter- and multimodality and the shared use of vehicles with the aim of a significantly reduced share of MIV in transport” (B 17)¹⁰.

The Munich strategy sets the goal:

“to expand or promote the existing offers city-wide in such a way that they are easily accessible for all and represent a part of everyday mobility for the population” (M 44).

Magdeburg writes under the term Smart Mobility:

“In the future, urban transport should be low-emission and energy-efficient, but also safe, cost-effective, and health-friendly. It is, therefore, not just a matter of increasing digitalization. Rather, a change in mentality and understanding of shared or communally usable and climate-friendly models of locomotion is also crucial” (MD 10).

⁹ The documentation of this survey can be found in the Annex (see Annex 1). The providers chosen operate in at least one of the cities analyzed.

¹⁰ Originally, this quotation and all following in this section are in German and have been translated by the authors. MIV (German: Motorisierter Individualverkehr) means individual motorized traffic; it includes cars, vans, motorbikes, etc.

5.1 Subjectification

Subjectification describes how subjects are addressed, understood, or represented and what characteristics are attributed to them (cf. section three). The quotes presented above make it clear that all the plans studied take up the concept of shared mobility. However, no specific subjects are addressed. There is only mention of “increased use”, accessibility “for all” or “for the population” (see above). Nevertheless, some patterns concerning subjectification become apparent. These will be illustrated under the thematic references of barrier-free accessibility, general subject groups, subjects as citizens in need of protection, and subjects as flexible individuals and consumers.

Barrier-Free Accessibility

Subjects or subject groups with specific characteristics only become apparent in a few places. A central motif is accessibility or the needs of mobility-impaired persons. All cities take up this topic and recognize these groups as subjects. The city of Magdeburg, for example, describes the barrier-free development of the interface between public transport and individual transport (MD 42). The Berlin plan provides for the “establishment of barrier-free accessibility” (B 18) and “equal mobility opportunities for people with mobility impairments” (B 20). At the same time, the plan emphasizes the need for special assistance, which defines a deviation from the ‘normal’ body and its abilities. Thematically, consideration is given to safety, social participation, and the use of public space or public transport (see, for example, B 20, 27; MD 42, 60, 61; M 48). Consequently, there are many references to accessibility or barrier-free construction, but none discuss the needs of people with reduced mobility with regard to shared mobility access and usability.

General Subject Groups

Other subject groups are addressed, but often in very general collections of identifying characteristics. People of different ages (seniors, children, and teenagers), people regardless of their gender, and social or financial background are listed more than described in their individual needs. According to the Munich Strategy.

“all individual mobility needs are met quickly, cheaply, and conveniently with a sensible and attractive overall offer. Social backgrounds, age, gender, and physical condition should play no role in this” (M 15).

The other cities have used similar formulations regarding general mobility opportunities (B 20; MD 42, 60).

An exception to these lists is the Munich strategy: here, “spatially but also target group-specific large service gaps” are mentioned, which leads to the fact that “individual service models or products address particular target groups (e.g., tech-savvy young men, or rather above-average earners with a higher level of education)” (M 21). This at least recognizes and describes the unequal use of different subject groups. The strategy does not describe concrete measures or explain how this could be remedied.

Subjects as Citizens in Need of Protection

All cities refer to the ‘vision zero’ in their general objectives, which states that no more people should be killed or seriously injured in traffic (B 11, 19, 20; MD 43; M* 17f.). In other places, the general safety of all road users is also addressed, which seems to have all users as a whole in mind (B 18, 26; MD 6, 43; M 8, 16). For the city of Magdeburg, the goal is defined as increased “objective and subjective road safety” (MD 43) for all road users. It is thus acknowledged that perceptions of safety underlie subjective interpretations and are not experienced in the same way by all people.

In addition to the understanding of subjects who are in need of safety, health is intensively discussed and increasingly associated with walking and cycling, as with shared mobility (B 11; MD 79). In all plans, healthy conditions of living as well as awareness for issues of health and environmental-friendly behavior are defined as objectives. Health aspects are understood in two ways. On the one hand, environmental impacts, such as traffic emissions (noise, air pollution, etc.) can affect subjects, and on the other hand, subjects themselves can make health-conscious decisions (B 26, 33, 51; MD 10, 26; M* 6, 37)¹¹. This can again be seen as a protective measure but also as a hint to people to realize health-conscious lifestyles with the help of shared or active forms of mobility. Health-conscious actions are linked in the plans to the identity proposition of a healthy lifestyle. In both themes, it is implicitly the motorized individual transport that must be overcome to realize (public) health.

In addition, there is the role of the subjects as democratic citizens. In the Berlin Plan, for example, public space is described “as a focal point of public life” (B 27). Mobility is understood as an opportunity to participate in public life. Further, the quality of stay in urban space is emphasized (B 20, 33; M 11, 16). The Munich Strategy, for example, describes the conversion of vacant areas of stationary traffic to increase the quality of stay in public spaces (M 11). In addition, the Munich strategy emphasizes the acceptance of the citizens. In this respect, additional reference is made to the (democratic) legitimacy of decisions, on which all planning and political decisions should measure their quality (B 10, 16; M 11, 35, 57). The linking of mobility transformations with questions of political participation can thus be found rudimentarily in the plans but is not yet sophisticated.

Subjects as Flexible Individuals and Consumers

Individuality and flexibility are prominently described as necessary resources for the subjects. “Individual direct connections” as well as “flexible intermediate stops” (M 10) are decisive criteria for the use of different mobility options. A broad vehicle portfolio in shared mobility would enable more individualization and flexibility (M 15). Comfort, reliability, and privacy are described as further needs of mobile subjects (B 15; M 12, 25, 26, 38, 47). Subjects are thus described in terms of an ‘efficient body’ (Bonham 2006). For the Shared Mobility Strategy of Munich, a strong link between the role of citizens and users becomes clear. The strategy pursues “as its highest priority a strong orientation

¹¹ The second reading could also be understood in terms of self-technology. Insofar as people take up the rationality of a health-conscious lifestyle and translate it with the help of shared or active forms of mobility, governmental governance would emerge here. However, an association with health-conscious actions is increasingly associated in the plans with walking and cycling, rather than shared mobility (B 11; MD 79).

towards people as citizens and users” (M 15). In addition, subjects are described as the target group of new users of sharing services (M 15, 21, 28, 49, 51). From this, an understanding of citizens as so-called *citizen-consumers* can be read. In addition to their role as citizens in need of protection, citizens are also understood as consumers whose consumption decisions impact urban mobility. In this context, the factors of individual and flexible use of transport modes are mentioned as decision criteria. The possibility of choice and the power of individuals to decide are equally emphasized here and can ultimately be traced back to liberal notions of freedom.

5.2 Technologies

Technologies are instruments to realize everyday actions, perceptions, and judgments. Technologies can pursue different intentions, forms, or strategies. In the following, various forms of technologies will be outlined in the sense of an exemplary clarification from observation.

All the cities studied take up the facilitation of sharing offers in their mobility planning. The role of city administration and politics is predominantly seen in creating appropriate regulations for sharing services. This includes providing space and creating incentives for users and companies (B 32; MD 67, 71, 72; M 7, 15, 16, 17, 51). In Munich, for example, a “‘level playing field’ for non-discriminatory and fair competition” is to be created (M 16). Nonetheless, there is also the approach of intervening in a regulatory manner if supply gaps open up (see above). The operational business of shared mobility services is then no longer the responsibility of municipal institutions but of private companies. The provision of (public) space for private entrepreneurial use of mobility services also promotes the commodification of public space.

The exemplary observation of shared mobility registration processes (see Table 1 in the appendix) shows their usage requirements. A mail address and some form of proof of identity are required for all services. Using the service without personalized registration is impossible, as one can with buses or trains. Except for a cargo bike rental and a local car-sharing provider, a smartphone with mobile data and GPS function is required. For the smartphone, the usage of an app is foreseen, which can be downloaded via an Apple ID or PlayStore ID. Alternative operating systems are accordingly not supported for these services. Almost all the services examined are operated commercially, so a credit card or online payment service (Paypal, Apple Pay) must be used. The use of online payment services, in turn, requires certain liquidity and usually the existence of a bank account. For the operation of motorized modes, such as the car, a driver’s license must also be available. The official age limit for using the mobility options is 18 years. The eKfV allows usage at the age of 14 years. Providers implemented higher age limits due to insurance coverage and reliability.

In addition to these formal access requirements, additional skills that are needed can lead to exclusionary dynamics. For example, in addition to owning an appropriate smartphone, one must also be proficient in using it (see also Groth 2019). The actual use of the services requires physical as well as psychological skills. Micro-mobility services can also be used for individual purposes. For example, car-sharing offers do not include child seats, which means that families or people providing care work can only use these offers with considerable additional organizational effort. Similar hurdles arise

for bike-sharing. The bicycles are standardized one-size-fits-all and are therefore only aimed at people within a certain physical norm. Especially with free-floating services, there is often competition for space on sidewalks (B 26; MD 60f., 79), so that especially those who walk are negatively affected. From a statistical point of view, in Germany, this is mainly the case for children up to 9 years of age, as well as people over 70 years of age, and more women than men (Nobis and Kuhnimhof 2018). Initial studies on sharing service users show that mainly young, male, and above-average educated residents of urban areas use these services (Médard de Chardon 2019; Laa and Leth 2020; Pangbourne et al. 2020; Reck et al. 2022). Regarding the concept of intelligibility, these mobility services seem appropriate for specific user groups only. Subjects outside this group seem to regard different sharing offers as less or not at all appropriate offers.

5.3 Rationalities

Rationalities are forms of knowledge and representations that implicitly presuppose or (re)produce governmental action. All cities refer to the concept of sustainability in their mobility plans. Often the connection with climate protection goals, as well as the promotion of the environmental alliance, is mentioned (B 6, 17, 20, 24; MD 44, 57, 121; M 11, 18, 44; M* 3). The Munich strategy establishes a direct link between shared mobility and climate neutrality:

“Shared Mobility actively contributes to the achievement of city-wide climate neutrality and becomes exclusively climate-neutral and low-emission by 2035” (M 18).

The plans of Berlin and Magdeburg make this connection less explicit. Nevertheless, the promotion of shared mobility is also included as a measure in the plans here (see the section on technologies).

Furthermore, all plans apply the standards of efficiency and profitability to the mobility system. Thus, the guarantee of an “attractive door-to-door travel time” (MD 42), increased efficiency and interconnectedness in the transport sector, profitability as well as the functioning of commercial transport are formulated as demands or goals (B 50; MD 38, 42, 57, 59; M 16, 17, 44, 47, 49). This logic implies solving problems in the mobility sector by creating more alternative and efficient options without problematizing environmentally harmful and unequal forms of mobility comparably.

Another strategy can be seen in the attempt to upgrade public space with sustainable mobility. In this perspective, sustainable mobility virtually pays for the attractiveness of locations because new businesses are established, or more areas are freed up for greening. The Berlin Mobility Plan states: “Berlin is an attractive market for new (mobility) offers” (B 6). The Munich strategy, for example, describes the conversion of vacant areas of stationary traffic for the benefit of the quality of stay in public space or to enable new offers for shared mobility (M 11). This reading brings the efficient use of public space and its commodification back into focus.

6 Conclusion

Current transport policy emphasizes the role of shared mobility services, such as car- and bike-sharing, as well as shared e-scooters and mopeds-. With the help of a governmentality perspective, promoting these services can be understood as governance impulses for society and individuals alike. With the content analysis of different local mobility plans and the observation of registration requirements for sharing services, the theoretical concepts of subjectification, technology and rationality could be applied to practical mobility plans and shared mobility services. The results show that the constitution of individual and flexible citizen-consumers corresponds with the rationality of a social and economic structure oriented towards (green) economic growth. Rationalities such as fair competition or locational advantages through sustainable development further underline this impression.

The promotion of shared mobility services unfolds its governmental power in two ways: On one hand, they enable subjects to behave according to a sustainable and smart mobility transformation. On the other hand, they imply certain preconditions for use. Governmental regulation of shared mobility services focuses on providing and enabling additional services so that subjects are guided to use them. The identity formations for a healthy, environmentally friendly, modern transport behavior are suitable for shaping individuals' desires and are equally suitable for municipalities' efforts towards sustainable and smart transformation. However, the analysis of local mobility plans and the observation of registration requirements of micro-mobility allow only a limited perspective on subjectification processes. The extent to which individuals accept these identification offers (performativity), for example, seeing themselves as citizens in need of protection or as citizen-consumers, cannot be answered within the framework of this evaluation. This could be explored, for example, by conducting (narrative) interviews.

Our explanations show that shared mobility services are not (or cannot be) used equally by everyone. A twofold inequality accompanies this. On the one hand, existing disparities in mobility behavior are not addressed accordingly, and, on the other hand, inequalities are partly reproduced and consolidated. Shared mobility services are primarily aimed at people who conform to physical and social majority norms - for example, in the case of shared bicycles. It is also necessary to have a smartphone that can be operated and used. Finally, the physical prerequisites in the sense of a certain age and physical and mental abilities are needed to enable legal and unproblematic use. In light of the construction of citizen-consumers, this seems particularly relevant: People who, for whatever reason, do not appear as users of shared mobility services may no longer be perceived as stakeholders, so their interests are easily pushed to the background or get overlooked (see also Kronsell and Mukhtar-Landgren 2020). Thus, mobility as a social and democratic issue becomes more urgent. The purely quantitative increase of mobility services can only break up the existing inequality to a limited extent. Without accompanying measures for barrier-free and affordable access to mobility services and regulating negative externalities, smart and shared mobility services threaten to remain trapped in a (neoliberal) logic of growth. To put this provocatively: People with high potential for mobility gain additional mobility options through shared vehicles, whereas people who are already threatened or affected by immobility seem to be (still) denied access to new mobility services.

The impulses for the transformation of the mobility system, such as changed legislation regarding accessibility and shared mobility, digitalization, or intensified climate policies outlined at the beginning, are relatively new. They require expanding mobility services for less mobile subjects to catch up with the average mobility level. On the other hand, developing comprehensive local mobility plans can take several years. It is, therefore, not possible or meaningful to make a conclusive assessment at this stage.

Concerning shared mobility services in our cases, policies and governmental use of power are revealed mainly through the support of technical innovations as well as the creation of fair competition among different providers. Additionally, the enabling role of the state is emphasized but often only manifests itself in the commodification of public space. This enabling role of policy is potentially multifaceted. In various urban contexts, increasing regulation of free-floating shared mobility services can be seen. For example, no-parking zones can be defined, a proof-of-parking picture can be required, and clear parking facilities for micro-mobility can be created in (car) parking areas to reduce thus conflicts on curbsides (Marsden et al. 2020; Munich 2022a). Possible conclusions from this could also be a stronger focus on diversified forms of shared mobility. For example, shared cargo bikes or car-sharing with child seats could enable additional uses. Locally or publicly funded and/or supported sharing operators can offer lower-threshold services. In addition, driving training or the integration of underrepresented user groups can help to make the services available to marginalized subjects. In addition, all forms of shared micro-mobility depend on appropriate transport infrastructure. Thus, walking and cycling paths, in particular, are used by these mobility modes. A consistent expansion of these paths and decelerating road traffic should be additional supporting measures in future mobility development plans.

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