Less is More – Exnovation and the Urban Mobility Transition





Recommended course of action for implementing the sustainable mobility transition through exnovation

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Contents

List of illustrations

1 Ten key messages

The objectives of the urban mobility transition have been clearly set out: gaining more space for urban living, reducing noise and emissions that have a negative impact on the climate and improving air quality. That means less traffic in cities and more trips made using environmentally-friendly modes of transport – i.e., walking, cycling or foot scooters or public transport. In transport policy, the focus is generally on innovative approaches to shaping the mobility transition. New mobility services such as car-sharing and on-demand options are being promoted and tested, the potential of digitalisation in the public transport sector is being exploited, new ticketing systems are being introduced and mobility hubs for multimodal networking are being set up. All of these are important measures to promote alternative options to using a car. In terms of the scale of the shift required, however, these changes to people's mobility are nowhere near sufficient. Using one's private car to travel into town is still too attractive and convenient. Exnovation, i.e., policies aimed specifically at making car travel less appealing, are often ignored or only considered reluctantly. That is why these restrictive policies represent an important parallel thread alongside innovation-driven approaches and can expand the range of options for working towards the mobility sector transition. The ten key messages of this "Zukunftsimpuls" are summarised below.

1. **Exnovation in the context of the urban mobility transition means the reduction of auto mobility to an absolute minimum.**
2. **Exnovation creates robust guidance, offers developmental space for innovations and facilitates an ambitious trajectory for climate protection.**
3. **The community-based design options of exnovation are wide-ranging and have already been tested in many places (on a small scale).**
4. **Lack of support, inadequate legal security and uncertainty frequently lead to the failure of pilot projects.**
5. **Examples from other countries show what a holistic exnovation approach can look like.**
6. **Politicians and municipal and district administrations assume key roles in actively developing the transition.**
7. **The framework of conditions must be created at federal government level.**
8. **A holistic approach to exnovation is necessary for implementation at the community level.**
9. **It is important to exchange experiences in order to learn from success stories and avoid repeating mistakes.**
10. **Science makes an important contribution to the implementation of the approach and in terms of upscaling through evaluation and accompanying research.**

This "Zukunftsimpuls" aims to explain the concept of exnovation in the context of the urban mobility transition and to underpin it using specific practical examples. In the course of this process, it is intended to identify the obstacles that stand in the way of rolling out the concept on an area-wide basis in order to deduce strategies and courses of action for expanding the concept in the future.

In order to introduce the concept of exnovation, we will first explain what problem areas the concept of exnovation addresses and to what extent exnovation potentially represents an appropriate solution.

2 Why exnovation is necessary

In view of the climate targets that have been established, the trend in greenhouse gas emissions in Germany clearly show that it is not possible to "just carry on in the same vein".

2.1 The increasingly intense pressure means that reducing auto mobility indispensable.

The federal climate protection targets

Under the Federal Climate Protection Act, the German government has set itself the target of becoming carbon neutral by 2045 and of reducing emissions by at least 65 per cent as compared to 1990 levels by 2030. In terms of transport, a sector-specific reduction is currently envisaged, which means a reduction of 48 per cent in greenhouse gas emissions as compared to 1990 levels by 2030. However, draft legislation with modifications has been agreed which no longer envisages considering the emissions of the past in a sector-specific way, but rather considering the entire annual emission levels from 2021 to 2030 in an overall assessment across sectors and years. (BMDV, 2023)

The mobility sector emitted around 148 million tonnes of CO_2-eq greenhouse gases (GHG) in 2022, which equates to about 20 per cent of the total emissions in Germany. GHG emissions from the mobility sector are therefore around 1.1 million tonnes higher than the previous year, 2021, and around nine million tonnes over the permitted annual emission level of 138.8 million tonnes of CO_2-eq stipulated for 2022 by the Federal Climate Protection Act. Transport is the only sector that not only failed to reach the annual target but also recorded an increase in emissions. So emissions have risen once again, despite the interim increase in fuel prices and the temporary introduction of EUR 9 tickets. (UBA, 2023c). This shows how difficult the mobility transition is currently becoming.

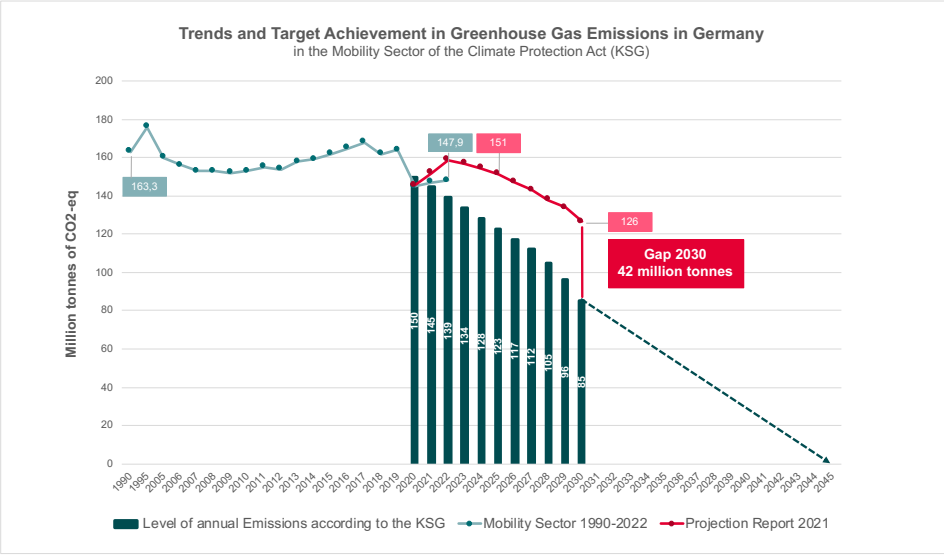

Figure 1: Trends in greenhouse gas emissions in the mobility sector in Germany, stylised according to UBA (2023b)

According to the federal government's 2021 projection report, the GHG emissions from the mobility sector could be reduced to around 126 million tonnes CO_2-eq by 2030 by implementing the climate protection measures agreed at that time (Öko-Institut, 2021, p. 271). That would mean a failure to meet the 2030 target by 42 million tonnes CO_2-eq when compared to the target of 85 million tonnes CO_2-eq (ibid). Despite the agreed legislative change in the law on climate protection, the mobility sector will have to do its bit towards achieving emissions reduction, even without any specific target for the sector. For the road transport sector, above all, which is responsible for the major share of transport-related emissions, this represents crucial leverage.

In cities and metropolitan areas, the transport problems are particularly evident. Since 2019, more and more cities, such as Konstanz, Heidelberg and Wuppertal, are declaring a climate emergency: they admit that the measures taken up until now to mitigate climate change are insufficient. Climate change movements are attracting attention, demanding that climate protection targets be adhered to, and protests are increasing. Alongside the impact of car traffic on the climate, air polluting emissions, noise, accidents, limited freedom of movement and spatial conflict also represent considerable problems in cities, making the departure from auto mobility particularly crucial. Many cities have already reached, or even exceeded, their capacity limits in terms of their transport systems and are looking for solutions to achieve sustainable mobility.

The pressure on auto mobility is growing. In the field of transportation science, there is a consensus that the current transport system is not sustainable and that a mobility transition is urgently needed. A solitary shift to alternative drive systems for auto mobility will not be enough to address the problems that exist in the fields of climate and environmental protection; the targeted reduction of auto mobility is necessary.

2.2 The interaction of innovation and exnovation

Mainly innovative approaches have been used to design the mobility transition. New products, concepts and services are being developed and tested. Moreover, there is the hope that these innovations will present alternatives to the car and that a shift away from the private car can be created. In the mobility and transport sector, for example, these innovations include transport-sharing services (car, bike, foot scooter and scooter-sharing), on-demand offers, new ticketing systems (EUR 365 ticket, EUR 9 ticket, Germany ticket), as well as mobility hubs for multimodal networking of mobility offers. But this also includes innovative improvements to public transport services as a result of digitization, as do innovations in city and transport planning such as the concept of bicycle lanes. Scientific research into these innovations shows, however, that although the shift effect of these intermittent innovations is evident, it does not exist to the desired or necessary extent. These offers often fall short of reaching their own potential.[1]

The reason for this is that the private car continues to be an attractive and preferred option. The new transport services are perhaps adopted for specific trips, but having

[1] In an extended understanding of this, it is not just completely new products, concepts and services that are understood as innovations. Conventional measures can also include innovative aspects, for example if they are broadly implemented. In the understanding of innovation presented here, measures are therefore understood as promoting eco-friendly modes of transport in a new way.

one's own private car outside the front door is often favoured for reasons of convenience and comfort. In addition, the existing structures also make it necessary to use the car for many trips due to the lack of alternatives. In end effect, the car is firmly embedded in many people's day-to-day lives and is part of their daily travel habits. Breaking these routine habits and developing new ones is a complex matter and they often cannot be broken by the additional options on offer.

A good example of this is the EUR 9 ticket, which was tested for three months across Germany in the summer of 2022. At the same time, the energy tax on fuel, known as the "Tankrabatt" (fuel discount) was introduced as a cost relief. Various studies have shown that although the ticket did have a definite positive effect on the general use of public transport, the direct effect on reducing auto mobility was relatively limited. (WiWo, 2022). This clearly demonstrates that the real potential of the innovation was not realised because the car did not simultaneously become less attractive. On the contrary, parallel structures developed which led to even more traffic: public transport was used more frequently, but private cars were not left at home to the same degree.

At this point, the concept of exnovation comes into play. If I bring something new, an innovation, to the market, I also need to ensure that old, outdated products, practices and services are withdrawn from the market in a targeted way. Exnovation can thus be understood as a parallel thread to innovation, which ensures that the innovations can really achieve their potential and competing parallel structures are avoided. Some time ago, Joseph Schumpeter coined the expression "creative destruction", where the implementation of the new can lead to the downfall or even the destruction of the old. (Schumpeter, 1934, p. 101, 1943, p. 80–86; Weis, 2012, p. 11).

2.3 The concept of exnovation

According to this, the objective of exnovation is to reduce old, unsustainable infrastructures, technologies, products and practices to an absolute minimum or to eliminate them altogether (Heyen et al., 2017, p. 326). In the mobility and transport sector, it is therefore a question of reducing auto mobility, which is not deemed to be sustainable in light of its impact on the environment and climate. This enables the space to be created so that (innovative) alternatives in terms of environmentally friendly modes of transport can develop and become established (Wetzchewald, 2023, p. 31, 145).

2.4 The opportunities and risks of exnovation

The main opportunity presented by exnovation is that an innovation can become established more effectively if the old system is eliminated or reduced to a minimum, rather than if parallel structures running counter to changing or adapting behaviour continue to emerge due to the old system. The relationship between the various means of transport only changes marginally or not at all if all means of transport are encouraged. If we want to achieve a shift, it makes no sense to encourage parallel structures. The element we want to reduce must also be encouraged less or not at all, or made more difficult by imposing restrictive measures. Exnovation can thus prepare the way for innovation or support innovation as a parallel thread. Through the targeted reduction of old and unsustainable features, the combination of innovation and exnovation is clearly more effective than a purely innovation-oriented approach. An exnovation that is planned well in advance and communicated to people provides planning

security to all those involved, so they are prepared for the exit. At the same time, the change can be actively designed through exnovation, whereby more directional security can be provided in terms of the mobility transition. To put it in simple terms – if travelling by car is restricted in a calculated way and thereby made unattractive, a sustainable change in behaviour can be brought about. If, on the other hand, only innovative alternative options are offered, travelling by car continues to be available and a change in behaviour may occur, but does not necessarily have to. The combination of innovation and exnovation, conversely, means that a sustainable change in behaviour can be established.

Alongside the opportunities presented by exnovation, there are also risks. For one thing, problems of acceptance frequently accompany the planning and implementation of exnovation. While innovations tend to be welcomed as they do not automatically entail restrictions, the restrictive approach of exnovation is accompanied by a constraint, a sacrifice or a need to adapt one's behaviour. This often leads to a defensive reaction as existing routines may have to be reconsidered, altered or learned. This makes well thought through and socially acceptable design and implementation of the exnovation all the more important. On the other hand, there is a danger that it may lead to noticeable restrictions. In the mobility and transport sector, however, it is essential that mobility is ensured and people remain mobile so that they can continue to manage their everyday lives. This means that, at the time of the exnovation, an appropriate alternative option must be available which is capable of competing with the private car, so that people can continue to be mobile.

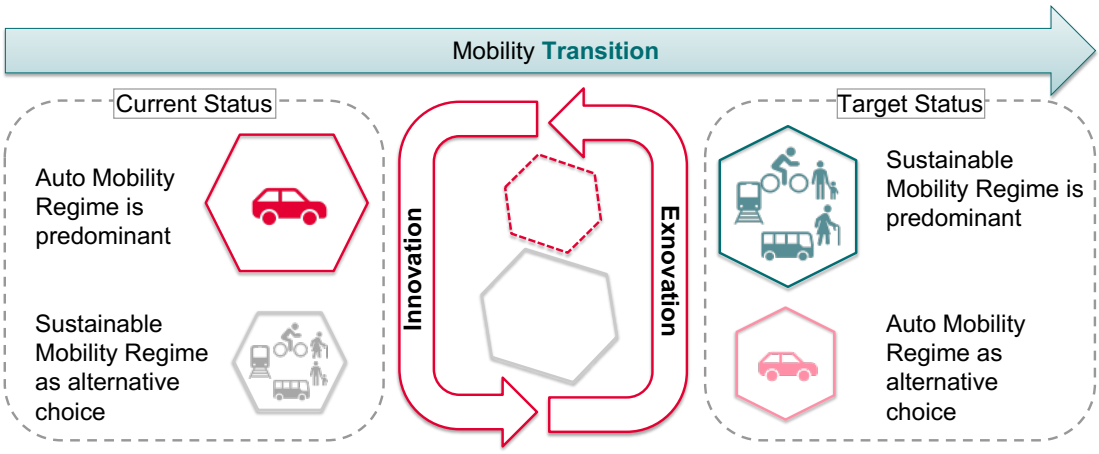

Figure 2: The transition from the Auto Mobility Regime to the Sustainable Mobility Regime, author's own compilation

2.5 Relevance of the topic

There is consensus in the field of transportation science that ambitious and restrictive approaches concentrating on achieving the mobility transition are urgently needed. The role of exnovation in the transport sector, in particular, has been the focus of scientific research recently (Graaf et al., 2021; Wetzchewald, 2023) and has been the subject of a large-scale research project in Brussels.[2] In the practical arena, too, the issue is gaining momentum and the future of the car in (inner) cities is under discussion in many German cities. Individual cities have already set specific targets to reduce car use. Stuttgart wants to reduce car use by 20 per cent by 2030 as compared to 2010. Hanover (base year 2020 with 35 per cent car use) and Marburg (base year 2018 with 42 per cent car use) are even planning to cut car use (right-of-way for private vehicles) in half by 2035. (Landeshauptstadt Stuttgart, o.J.; Region Hannover, 2023; Stadt Marburg, 2021). Until now, however, individual measures such as car-free streets or zones that were established as pilot projects, whereas large-scale flagship projects can be found in European countries outside of Germany, such as Barcelona, London, Paris and Oslo. In Oslo, for example, a 1.3 square kilometre zone with reduced traffic access was introduced in the city centre between 2015 and 2019, which was subsequently expanded to include the neighbouring residential area.

[2] The socio-technical regime is a term found in transition theory. In simple terms, a regime describes a prevailing system, which comprises the established practices, convictions, standards, routines, stakeholders and technologies linked to it.

[3] Further information on the GOSETE research project “Governance of transitions towards a sustainable economy: challenges of exnovation” is available on the project website: https://exnovation.brussels/en/governance-sustainable-economy-transition-challenges-exnovation/

3 Exnovation in practice

What does exnovation look like in practice and what measures are needed to implement exnovation in cities?

Exnovation is to be understood as an overarching strategy, which aims to limit auto mobility in cities or neighbourhoods to an absolute minimum. Various measures can be used in combination with each other to implement this strategy. In this context, the following types of intervention may be distinguished in the area of municipal transport planning (Wetzchewald, 2023, S. 148 f.):

- **Structural measures**, such as removing car parks and vehicle lanes for car traffic
- **Traffic regulations**, such as traffic-calmed zones, pedestrian zones, environmentally-friendly vehicle lanes or zones
- **Fiscal measures**, such as a congestion charge or parking fees
- **Organisational measures**, such as urban development concepts for car-free cities and reduction targets for private motorised transport
- **Persuasive measures**, i.e. communication and outreach measures, such as car-free days

Furthermore, the measures can vary in terms of:

- their absolute nature (prohibition or limitation),
- their scope of application (intermittent, district-wide, city-wide),
- their time span (short-, medium-, long-term) and
- their longevity (permanent or temporary).

While exemplary individual measures can already be identified in numerous cities in Germany, there is a shortage of examples of holistic approaches where the target of reducing auto mobility is strategically pursued and implemented by means of an agreed set of measures.

It is therefore worth taking a broader view and looking abroad where not only interesting, specific restrictive measures but also holistic approaches aimed at reducing auto mobility can be found.

3.1 Oslo's city centre with reduced traffic access

In Oslo, a car-reduced city centre was implemented between 2015 and 2019. In 2015, the newly-elected city administration at the time announced their plans to transform the city centre of Oslo into a car-free area, or rather a zone with reduced traffic access. The area, which measures 1.3 square kilometres, encompasses the inner city's main commercial centre with its shopping streets, office buildings, restaurants and hotels. The residential population is relatively low there, numbering only about 1,000 people. Following an initial planning phase, from 2017 the city of Oslo implemented a large number of measures to transform the city centre. The key measures included a new traffic management system; driving directly through the city centre was forbidden using a network of one-way streets and entry bans. Although access to the city centre is still allowed for lorries, they can only drive in a roundabout way and at greatly reduced speeds. In addition, the city of Oslo gradually removed around 760 public car parks. The areas that were freed up were turned into walkways and bicycle lanes or replaced

by seating, playgrounds and as spaces for leisure and recreational activities. By implementing measures that could be put in place temporarily and in the short-term, the transformation of the city centre quickly became visible, and people were soon able to experience it, which increased public acceptance of the redesign project.

Alongside this, substantial long-term measures were initiated. Planning guidelines and the development plan were reworked and the prioritisation of road users were reversed – pedestrians took priority over cyclists, who in turn took priority over public transport, with cars coming last in the hierarchy. New types of street designs were defined, such as "Market Street", which has extra-wide pavements and a joint bike-friendly one-way lane measuring up to 4.5 metres; this can only be used by motor vehicles at a reduced speed of 20 kilometres per hour. This type of speed limit has the advantage of reducing the speed differences between road users, meaning that cyclists and motorists, in particular, move at the same speed, increasing road safety. What is more, the city has its own design standard known as the "Oslo Standard", which includes extra-wide cycling lanes. A cycling lane network that follows this standard was planned and implemented in the urban area. Likewise, pedestrian zones were extended in the city centre and a coherent network of footpaths was created.

Evaluations show that 14 per cent more pedestrians and 47 per cent more people spending their free time in the city centre have been recorded. Motorised transport in the city centre dropped by about 11 per cent between 2016 and 2018 according to transport censuses and decreased by 19 per cent between 2018 and 2019; acceptance has also been steadily increasing. In the interim, the programme has also been successfully expanded to the neighbouring districts of Toyed and Grønland. (City of Oslo, 2020a, 2020b; Wetzchewald, 2021, 2023).

3.2 Superblocks in Barcelona

Superblocks – also known as Superilles or Supermanzanas – are an urban planning concept in which four to nine neighbouring blocks of houses are joined together to form a large residential block with little traffic within an area of about 400 by 400 metres. Motor vehicles are prohibited from entering as far as possible, with the exception of residents' cars, emergency vehicles and delivery vehicles. Motorised transport is diverted to main roads outside of the superblocks. The roads inside the superblocks mainly consist of lanes where the maximum speed limit is 20 kilometres per hour. The traffic areas are classed as mixed-use areas where there is an increased prevalence of bike riders and pedestrians, to whom motor vehicle drivers have to give precedence, or where people can relax. Spaces that are freed up can be used for cycle paths, green spaces, seating, playgrounds and sports areas or can be transformed into open spaces to spend one's free time, socialise and enjoy recreational activities.

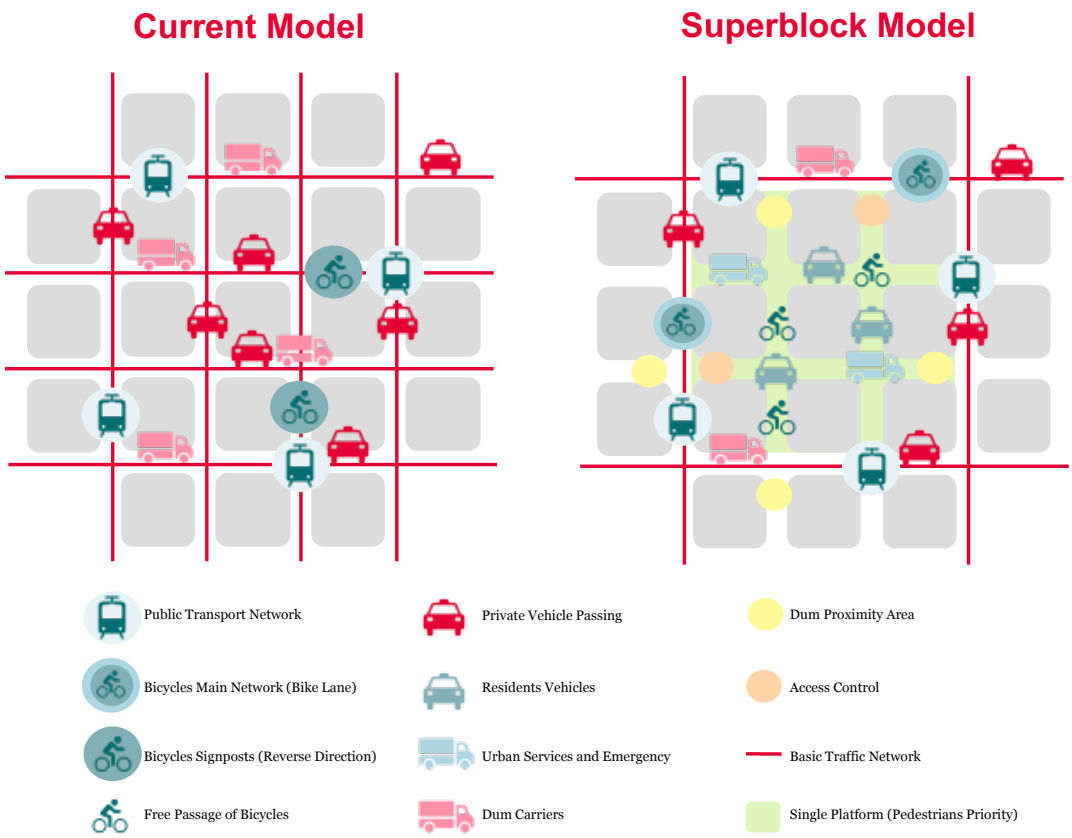

Figure 3: The Superblock Model in Barcelona, stylised by the Town Hall of Barcelona, 2014

The city of Barcelona has been experimenting with pedestrian-friendly ideas since the 1980s. In 1993, the neighbourhoods of La Ribera and El Born were closed to traffic and the first superblock was created. Ten years later, two more superblocks were trialled in the neighbourhood of Gracia. At that time, superblocks served first and foremost to prevent congestion. Superblocks were systematically integrated into the metropolitan mobility plan in Barcelona from 2013 to 2018. The first superblock implemented under the new action plan was established in Poblenou in 2017.

It is planned to build a total of 503 superblocks by 2030. Currently, six superblocks have been built and 21 more are at the planning stage, to be built in the near future.

The impact of the superblock in Sant Antoni was evaluated two years after it was set up and showed key improvements: motorised transport in the superblock had been significantly reduced (82 per cent fewer vehicles in the neighbourhood), air quality had improved locally, and transport noise pollution had also decreased accordingly. In the surrounding streets, traffic had increased, but only marginally, so the overall amount of traffic had decreased. (UBA, 2021; Wetzchewald, 2023).

3.3 Low traffic neighbourhood ("Mini-Holland") in London

In 2013, the Mayor of London announced the so-called Mini-Holland project, for which the 18 outer suburbs of London could apply. The three suburbs of Waltham Forest (ca. 39 square kilometres), Kingston (ca. 37 square kilometres) and Enfield (ca. 82 square kilometres) received the subsidy and thus the financial support to transform

the suburbs' roads into quality spaces with reduced traffic that are accessible to all the residents. It was mainly the pedestrian and cycle path infrastructure that was improved based on the Dutch model. The overriding goal of the project was to improve the air quality, health and economic development of the neighbourhoods and simultaneously create quality living spaces.

The project was implemented using a combination of measures. A protected cycling infrastructure was set up in the neighbourhood, featuring secure crossings and traffic-calming structures on the residential streets that were closed to through traffic. Speed limits of 30 kilometres per hour were introduced, along with filters (access restrictions for specific types of vehicles) to reduce traffic, and car parks were converted into bike stands or recreational spaces.

The Waltham Forest neighbourhood is considered an international model, where, in just five years, more than 1,200 bike stands, seven bike parking garages, 300 bike parking spaces, 22 kilometres of protected cycle infrastructure, 100 improved intersections, 40 modal filters, 700 newly planted trees and 15 mini parks ("pocket parks") have been established and implemented. The evaluations indicate a positive impact: the volume of traffic has been reduced by almost half, people's active mobility has been increased, air pollution has decreased. In addition, retail business has been stimulated and the number of empty commercial premises has been reduced. (ADFC, 2020; Goodman et al., 2020; London Borough of Waltham Forest, 2015; London Cycling Campaign & Living Streets, 2018b, 2018a).

A study undertaken by the University of Westminster researched 46 low traffic neighbourhoods (LTN) using traffic censuses and reported a 32.7 per cent (median) decrease in car traffic inside the zones or a reduction of 46.9 per cent (on average). On the fringes of the LTNs, the volume of traffic saw a slight increase (1.3 per cent), so this can only be described as a minimal traffic shift. (Thomas & Aldred, 2023).

3.4 The circulation plan in Ghent

Ghent is one of the best-known examples in terms of the debate on reducing motorised transport in towns and cities. A key measure here was the introduction of its 2017 traffic circulation plan, which significantly changed traffic routing and therefore road use behaviour in the city centre, too. The aim was to keep through traffic out of the city centre. To this end, six districts were defined along with a large, car-free pedestrian zone. Now, when a vehicle from one of the six districts wants to go to another district, it cannot cross directly through the city centre, but instead has to take a detour via a ring road. In the wake of this, a comprehensive one-way road network was set up and a monitoring system installed. Thus, the city centre is still accessible to motorised transport but at the same time the volume traffic has been significantly reduced.

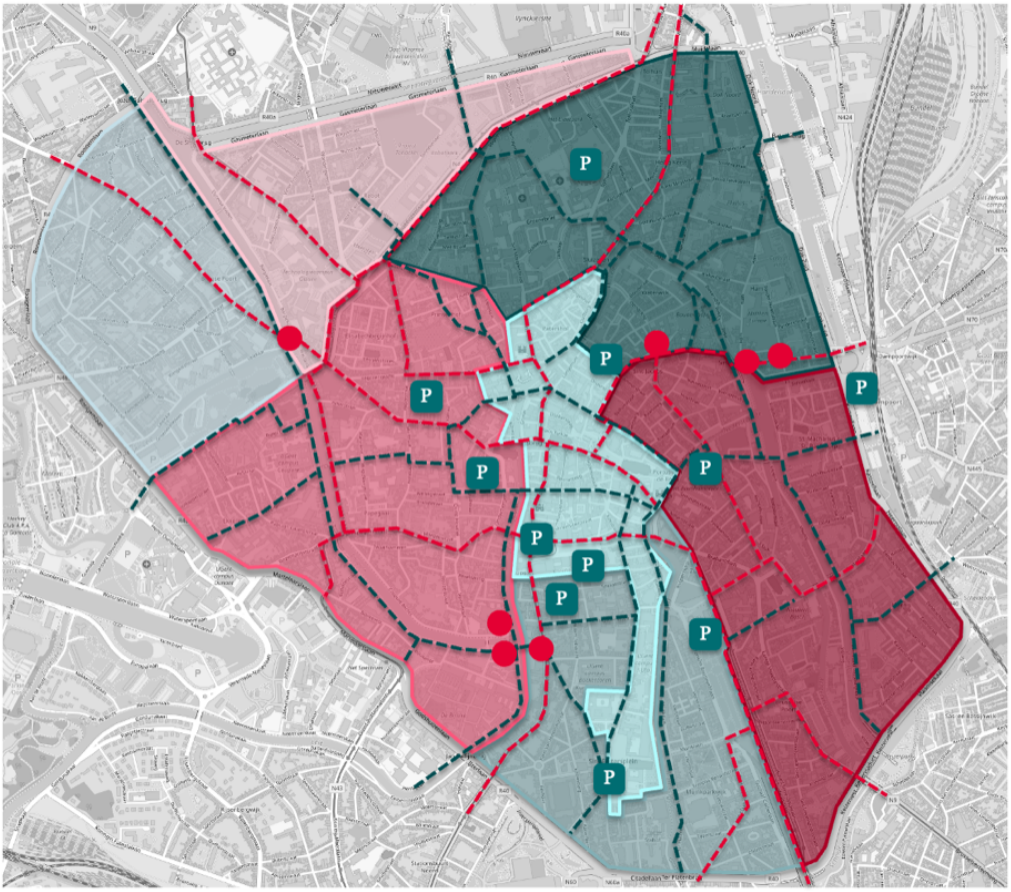

Figure 4: Circulation plan in Ghent, Map source: OpenStreetMap.Org

Another measure is the implementation of what are known as “Living Streets”, which also primarily help to increase acceptance of the car-free streets. In the context of the Living Streets, roads are temporarily blocked to motorised transport and made available for alternative usage. Living Streets are authorised at the request of residents, so the residents also determine the alternative usage. The main aim was to give people a vision of city life without cars. (Eltis, 2017; Mc Askie, 2021; Stad Gent, 2023b, 2023a).

3.5 Looking to the future: the 15-minute city in Paris

The Parisian mayor, Anne Hidalgo, wants to turn Paris into a 15-minute city – a city that can cover all the residents’ needs within a radius of 15 minutes. This goal was part of the electoral campaign for the 2020 municipal election, during which she was elected. She aimed to make it possible to access workplaces, leisure activities, a range of shops, schools and kindergartens, restaurants, clubs, cultural sites and green spaces in 15 minutes on foot or by bicycle. The idea came from Carlos Moreno, a professor at the Sorbonne Business School in Paris. With this concept, he proposed an urban structure based on compactness and proximity. By having destinations at close proximity, it is possible to save time, increase movement through active mobility, strengthen the sense of belonging to a neighbourhood and support the local economy. One impact of this is that dependence on one’s own car is reduced.

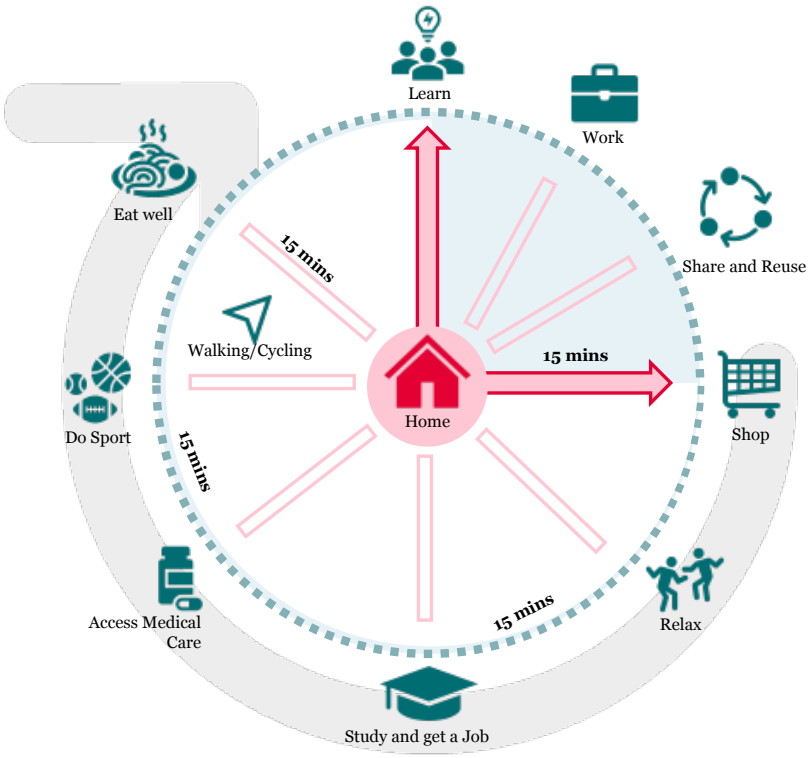

Figure 5: The concept of the 15-minute-city, stylised on the basis of Michael/Paris en Commun

Paris has already taken the first steps toward achieving this goal. New cycle lanes have been established, motor vehicles have been banned along parts of the banks of the Seine, 30 km/hour speed limits have been extensively introduced in the city centre and public car parks have been turned into recreational spaces. Every first Sunday of the month, the Champs Élysées is closed to cars under the motto “car-free Sunday”. School yards serve as centres for each neighbourhood and are being turned into attractive leisure areas. This is accompanied by an initiative entitled “Rues aux écoles”, which bans cars on the roads near schools and kindergartens. Pedestrian zones have been planned around a total of 168 schools, the majority of which have already been implemented.

In the future, there are plans to transform more car parks into green spaces, playgrounds and open spaces for neighbourhood use and to make all the streets in Paris bicycle-friendly. More cycle lanes and bike parking facilities are planned. In addition, more traffic-calmed districts in the city centre are planned to keep through traffic out of the city. (C40 Cities, 2023; Mijatovic, 2022; Schauenberg, 2023; Ville de Paris, 2022).

3.6 Key factors relevant to implementing exnovative measures

These examples from abroad make it clear that holistic approaches to reducing car traffic are increasingly being pursued. The pressure is mounting and the search for solutions is forging ahead in the first pioneering cities.

It is becoming particularly clear that it is not just reducing motorised transport that takes precedence within this concept, but that it is a question of holistic and integrative approaches that primarily aim to develop neighbourhoods worth living in. Alongside less motorised transport and thus less noise, fewer emissions and security risks, as well as the space gained, the concepts also focus on promoting social interaction, the local economy and people's health. Unlike many German cities, it is not just individual measures that are being implemented but rather holistic concepts that consist of an agreed set of measures. Given the success stories, the question arises as to what key factors were decisive for the success of the exnovation.

The evaluations of the successful examples often show strong parallels in terms of their successful elements. The following list summarises ten selected key factors (ADFC, 2020; UBA, 2023a; Wetzchewald, 2023).

Define the goals. The goals need to be clearly formulated, scheduled, set well in advance and communicated, as well as being politically anchored. They can be accompanied by an ambitious and courageous vision – making it clear which direction it is going in.

Take advantage of opportunities. The timing can be crucial for the success of the measure. Favourable situations, so-called windows of opportunity, can be exploited here and may arise as a result of a local change of government, renovation plans or existing pressure due to problems, for example. Good starting points with a corresponding alternative option in terms of public transport and for pedestrians and cyclists, or parallel project activities such as climate protection or urban development can also constitute an opportune moment.

Make changes visible and experiential. As well as long-term and comprehensive building works, measures that can be carried out in the short-term should be included, as they are quick and easy to implement and make changes visible and experiential, thus helping to promote acceptance. Positive experiences should be paramount, so the short-term provisional measures should also be well thought through and must offer high-quality results.

Implement measures little by little. District-wide changes should be implemented step-by-step, then evaluated and scaled up slowly on the basis of the lessons learned. Temporary measures can help to generate learning experiences, based on which permanent solutions can subsequently be implemented.

Evaluate the implementation of measures. Each individual measure should be evaluated and monitored from the start at the same time as it is being implemented. In this way, challenges can be addressed immediately, and a good data base can be created, which is indispensable in order to develop a line of reasoning that can be used to market the project.

Communicate changes promptly and transparently. Changes can encounter dissent quickly and prematurely. Therefore, prompt communication is crucial so that the project is presented in a transparent manner.

Involve the general public and any interest groups. In order to take the needs and concerns of the general public into account, it is important to speak to the locals. People in the neighbourhood should be included in designing the measures without

handing over control of the decisions regarding these measures. The focus should be on those groups particularly affected such as small business owners, who should be encouraged to participate and cooperate. They can quickly dominate public discussion without necessarily representing the opinions of the majority.

Create a good premise. In the case of exnovative measures, resistance must be taken into consideration at all times – low level acceptance and opponents will also continue to exist in the future. To dispel doubts about the project at an early stage and confront sceptics immediately, a good basis for argumentation founded on your own data or on facts from comparable projects needs to be developed. It is possible to prepare good, fact-based arguments in response to repeated counter arguments, such as concerns about loss of sales or shifting traffic to other streets, so that sceptics can be convinced. A good premise and staying power are needed to address resistance.

Communicate the added value. The exnovation is accompanied by restrictions and potentially also by prohibitions as driving or parking one's own car in certain streets will no longer be permitted, for instance. These issues are more difficult to communicate to the public. The emphasis of the communication strategy should be on added value, such as the city becoming a better place to live.

Indicate a willingness to enter into discussions and show a willingness to make compromises. While the complete elimination of auto mobility is ideally the long-term goal, it is necessary to indicate a willingness to develop a socially acceptable solution, for instance by reducing motorised transport to an absolute minimum rather than banning it entirely.

Our European neighbours seem to be further advanced in their development in this respect. Why that is so and what potential obstacles to the implementation of exnovation exist in Germany are examined in the following section.

4 Obstacles to exnovation

Other countries are showing the first substantial success stories in terms of exnovation. In Germany, too, good initial indications of a mobility transition can be observed in selected cities, including some (individual) exnovative measures. Implementation of such measures across the board is, however, not being observed in Germany. What is more, there have recently been repeated reports of setbacks in pilot projects [3], in which motorised transport was systematically reduced.

Alongside success stories, however, these kinds of examples where setbacks had to be faced or which even resulted in failure also demonstrate the crucial lessons that can be learned from these experiences: for example, in terms of existing obstacles or the need for action that becomes apparent. In view of this, a few German examples are given below, which tested exnovative measures in the context of urban mobility experiments, but which have had to be terminated (at least for the time being).

4.1 Examples of setbacks in Germany

One of the best-known examples is that of **Friedrichsstrasse in Berlin**. A 500-metre stretch of the street was blocked to traffic in August 2020 and a pedestrian zone and provisional cycle lanes were introduced. In addition to the criticism from a number of business owners, the experiment was deemed to be illegal by the Higher Administrative Court of Berlin, with the result that the experiment was abandoned in November 2022. In January 2023, a renewed instantaneous closure of the section to motorised transport took place, but this was lifted for legal reasons in June 2023.

The senate administration in **Berlin** also had similar experiences with the **pop-up cycle lanes** in Friedrichshain-Kreuzberg, Mitte and Charlottenburg: the cycle lanes were temporarily introduced during the Covid pandemic but had to be take out again after less than six months.

In **Frankfurt,** the **car-free bank of the River Main** was tested as a transport experiment. After one year of the trial phase, there was no legal evidence to support carrying on with it, so the project was ended and there are now only temporary closures during special events.

In **Mannheim,** the twelve-month experiment for a liveable **city centre** terminated at the end of its regular run time. Through traffic was interrupted on two routes using a barrier and a different type of traffic management. Heavy criticism was expressed by business owners.

In **Hamburg** during the **"Ottensen makes space"** experiment in 2019, parts of the Ottensen neighbourhood were declared a car-free zone. The Higher Administrative Court granted two emergency appeals from two business owners, so the project was declared illegal as no hazardous situation could be proven, which was the legal requirement at that time.

[3] In Germany, the Road Traffic Regulations, as per section 45, paragraph 1, sentence 2, number 6, allow the implementation of experiments "to investigate accidents, traffic behaviour and traffic flow and to test planned measures to ensure traffic safety or to regulate traffic."

In **Bielefeld**, a car-free zone in the old city was tested out for nearly eight months in the "**Altstadt.Raum"** experiment. Following a decision by the Higher Administrative Court in Minden, legally sound continuation of the pilot project was not possible, so the project petered out and was dismantled after the test phase.

On **Detmolder Strasse** in **Paderborn**, a separate test cycle lane was installed at the expense of lanes for motor vehicles. When the temporary experiment came to the end of its six-month period, the cycle lane was removed, and the lanes were made available to motor vehicle transport again.

The city of **Münster** trialled a car-free zone on **Hörsterstrasse**. The street was closed to through traffic for two months in the summer and 50 car parking spaces were transformed into recreational space. When the two-month period expired, the barriers were removed, and the trial was evaluated.

In **Aschaffenburg**, an **Environmental Street** was tried out in Luitpoldstrasse in the city centre. Initially, the experiment was limited to a year, then extended for a further year but then discontinued. The Environmental Street only allowed access for active mobility, buses and taxis; other motorised transport was not allowed. A lack of checks led to a high level of illegal through traffic, however. After two years, the government of Lower Franconia announced that experiment had been aborted.

Halle in Westphalia implemented its biggest **Tempo-30-Zone** in an experiment. This changed right-of-way regulations, car parking spaces were abolished, and roads were narrowed to reduce speed. The trial which was scheduled for six months was ended by the mayor after two weeks due to safety concerns. Primarily, the fire brigade was mentioned due to the restricted access for emergency vehicles.

In **Giessen** on **Anlagenring**, on a trial basis, cars can only drive on a one-way road on the outside lanes, while a cycle path has been created on the inside lanes. Following an appeal from two residents, the local administrative tribunal judged the experiment to be illegal. The city still intends to lodge a complaint; should the ruling become effective, however, the experiment will have to be terminated prematurely.

In **Cologne**, two well-known experiments are already testing traffic calming on **Venloer Strasse** and **Deutzer Freiheit.** The two trials are still at the implementation stage, but both have been widely criticised. In the case of Deutzer Freiheit, even though a citizens' appeal to abort the trial was rejected, motor vehicles can now use some segments as a result of an adjustment.

4.2 Obstacles to implementing exnovation in Germany

If we compare the failed experiments, it is possible to draw parallels in some areas, and these give indications of the obstacles to exnovation that exist in Germany.

Lack of legal certainty. Some of the experiments have been deemed to be illegal by the presiding administrative courts. For a long time, urban mobility experiments could only be introduced if there was extensive evidence of a significantly increased risk. Although this changed following the amended road traffic regulations in 2020, the relevant prerequisites have proved to be one of the main bones of contention in the case of more recent experiments. In Giessen, for example, there continues to be evidence of straightforward risk. The result is that elaborately planned experiments are blocked

and predominantly frowned upon by opponents. If no legally compliant solutions are possible and simple appeals lead to the termination of experiments, this deters many municipalities from implementing exnovative measures in the first place.

Experiments are set up for a specific time from the outset. In the case of some of the experiments mentioned above, there was no follow-up plan for continuation of the measures since the experiments were only scheduled for a limited period of time – in some cases for just a few weeks. They were supposed to be subsequently evaluated to find a long-term solution. In the meantime, the measures were withdrawn which caused a rupture in implementation. It is only possible to permanently change mobility habits and routines at a very slow pace. Experiments offer the opportunity to initiate this kind of change. If the trial is terminated after only a short time, however, it is highly likely that old patterns will return. The examples from other countries indicate that experiments have proven successful when they are in place for a longer period of time. If a trial is accompanied by an evaluation process, it can be fine-tuned on the spot and a concept for its continuation can be developed within the time frame of the project, as can be seen from the example in Oslo.

The focus is on transport-related changes; the added value for the public is not clear. Many of the projects in Germany are seen purely as transport projects. In some cases, positive side effects are only announced tangentially. So the focus is on the restrictive interventions – the bans and constraints –, which automatically provoke a negative response. At the same time, the real added value, such as improving quality of life, reclaiming public space and gaining opportunities for cultural activities and commerce, is lost. The underlying necessity and paramount goal, namely combating climate change, should also be communicated. The car-free city centre in Oslo, for example, was consciously promoted using the notion of a better quality of life for the duration of the project. The was to happen by reducing motorised transport, but in essence it was a case of revitalising the city centre and increasing the quality of life.

Lack of willingness to compromise. In the examples of projects in Germany, motorised transport was often completely banned. A total ban, however, frequently cannot be implemented in a way that is socially reconcilable, at least not within a short time span. The European examples of best practice have predominantly chosen solutions where motorised transport is still allowed, but restrictive transport measures make it unattractive to drive through the city.

Weak premise. Mobility is an emotionally laden subject which affects everyone's daily life. If restrictive measures are implemented, opposition is generally to be expected. In the German examples mentioned above, there is increasing opposition from business owners and in part from local residents who are affected. When examining the various examples, such as Friedrichstrasse in Berlin, Ottensen in Hamburg and the city centre in Mannheim, we soon see a recurring scenario with similar issues amongst those affected. Confrontation can, however, be prevented (at least in part), by developing a good premise. On the one hand, this can be done through studies and evaluations of similar projects, or through one's own evaluation, which is carried out in parallel to implementation and refutes opponents' arguments. For London and Oslo, for example, investigations were carried out into the impact on the local economy, so the argument of loss of revenue could be very quickly refuted. Likewise, in London and

Barcelona, it was also possible to refute the argument that traffic was being transferred to neighbouring streets.

Intermittent measures often show little impact or effect. In some of the measures observed in Germany, it is a matter of small-scale measures and implementation frameworks. This entails the risk that the measures cannot reach their full potential in terms of their impact. The successful examples from other countries, on the other hand, are set in urban districts. Although implementation may be staggered within the district so that individual streets or selective measures are started before these are extended to the district as a whole, the area under consideration is larger from the outset.

Lack of (innovative) alternatives. In some of the examples examined, the exnovative measures that reduced auto mobility were implemented without giving consideration to a suitable alternatives. This ultimately leads to overall reductions in mobility – which in turn leads to rejection and problems with acceptance. The examples in London, Oslo and Gent clearly show that a high-quality alternative offer with innovative solutions using sustainable transport modes is needed before motorised transport can be systematically made less attractive using exnovative measures.

Lack of transparency and communication lead to problems with acceptance. Some of the German examples show that the relevance of transparency and communication of the changes is underestimated. This often leads to uncertainty amongst the general public or can even spread false information about the project. Similar experiences also occurred in Barcelona and Oslo, for instance. So the problem is not new, but it repeatedly causes great problems with acceptance in Germany regarding restrictive transport projects. The media offer an important medium to further influence acceptance through positive coverage.

Lack of political support. In the German examples, it is apparent that to some extent politics does not fully support the projects implemented. At the first sign of opposition, the projects were discontinued without a replacement, or the overthrow of political parties strengthened the general public's uncertainty. In this respect, too, the international examples such as Paris and Oslo show how important political courage and political will are for the successful implementation of projects of this kind.

Lack of control mechanisms. Urban transport experiments usually go hand in hand with new traffic regulations for the respective area. That means that mobility habits and routines need to be aligned. It may be the case that parking in a certain place has recently been prohibited, that new speed limits are in place, that certain streets are now blocked off or only accessible from a certain direction. In a transition phase, this can easily lead to new regulations not being observed (either intentionally or inadvertently). If it is made known to the public that the regulation may continue to be ignored without sanction, the measure will become ineffective, as was the case in Aschaffenburg where a high number of cases of illegal thoroughfare was recorded on streets where motor vehicles were restricted. The city of Gent, on the other hand, has established a control mechanism that evaluates the cases of illegal thoroughfare via CCTV and penalises them accordingly.

Criticism from business owners. In nearly all experiments that restrict motorised transport in city centres or key areas, the main argument from a number of business

owners is that restricting auto mobility leads to a drop in sales. In a fair number of experiments, it is the appeals from business owners that also eventually mean the end of the trial. The argument of lost sales can be countered, however, through numerous evaluations. In fact, individual projects have indicated that there was a crisis in the retail sector for various reasons even beforehand which was then attributed to a new transport experiment. For instance, high-priced product ranges, the increase of online shopping, the impact of the pandemic and local factors frequently play a key role, which exerts a negative influence on the retail sector regardless of any transport measure. Contrary to this, in the pioneer cities, the reduction of motorised transport resulted in a positive impact for most business owners, probably because more passing trade could be enticed into the premises.

Concerns about a shift effect. Another key argument facing a lot of urban mobility experiments is that motorised transport is only reduced selectively and is instead transferred to neighbouring routes. This needs to be checked in individual cases, of course. However, there is a wide-ranging database of existing experiments which indicates that there is often a shift effect, but that this is much smaller compared to the traffic reduction in the trial location. The traffic reduction, in particular, must be taken into consideration, because driving is rendered less attractive as a result of the restrictions, which in turn generates doubt regarding the car as the preferred means of transport and suggests it should be avoided in future, at least for trips where attractive alternatives are available. This reduction may then have an impact on the neighbouring road network as feeder routes.

Dissatisfaction with the transport situation is attributed to the experiment. The transport situation in many cities in Germany is already the source of much exasperation in its current state – irrespective of whether this is due to traffic jams, delays or lack of parking. Giessen and Paderborn observed that an existing dissatisfaction with the transport situation was attributed to the experiment, even though a railway crossing had already been causing traffic jams beforehand.

The obstacles mentioned indicate very clearly the great range of challenges facing the implementation of exnovation. At the same time, however, they also offer points of reference to meet these challenges. The question that we must ask against this background is what recommended course of action can be deduced from this to actively develop exnovation and the mobility transition of the future?

5 Recommendations for action

The following recommendations for action have been drawn from the aforementioned considerations and practical examples. It is important to emphasise that there is no magic formula for implementing either exnovation or the mobility transition. In fact, the contexts and conditions in which municipalities find themselves are extremely different in a number of ways, and these require a strategy that is tailored to the specific local circumstances.

Different conditions result from the following, for instance (Horn, 2022, p. 8):

- **Organisation of the municipality**
  e.g. size, responsibilities, administrative structure
- **Financial strength**
  e.g. financial resources of the municipality, transport budget
- **Social and economic structure**
  e.g. economic and social strengths and resilience, local economy
- **Spatial-geographic situation**
  e.g. topography, spatial network
- **Political climate**
  e.g. political constellation, majorities, stability, alignment
- **Civic involvement**
  e.g. initiatives and non-governmental organisations

At the same time, the stakeholder landscapes of the local areas can be very different, and the influence of individual stakeholders or groups of stakeholders can also vary immensely. Common stakeholders who need to be involved in the mobility transition process and can also help to shape it are listed in the following chart.

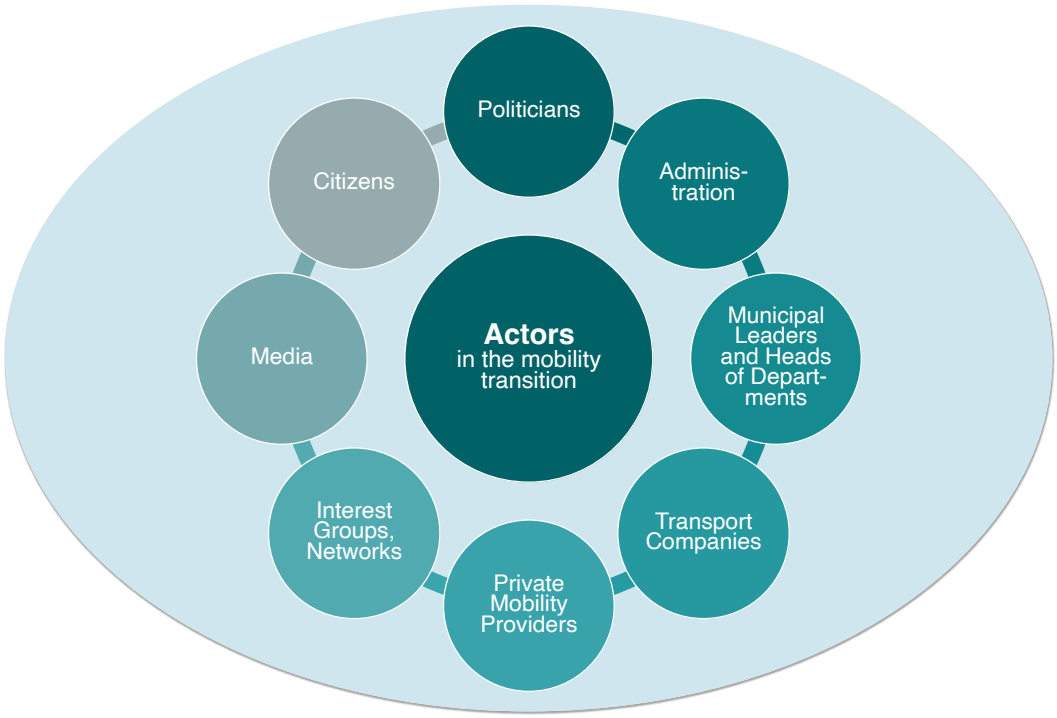

Figure 6: Actors in the urban mobility transition, author's own compilation

Politicians and administrations, in particular, are needed in this context to actively help shape exnovation and the mobility transition in the locality. Furthermore, if a broad knowledge base on how to proceed already exists in terms of strategies and measures, the sluggish transformation ensures that further obstacles to implementation exist and that implementation cannot simply take place under the motto "just get on with it". Specific recommendations for action are extrapolated below (cf. Wetzchewald, 2023), and these demonstrate what municipalities need to do to plan exnovation, and how they can also be supported at the federal level.

The recommendations for action are shown in summary below and are concretised in the next subchapters.

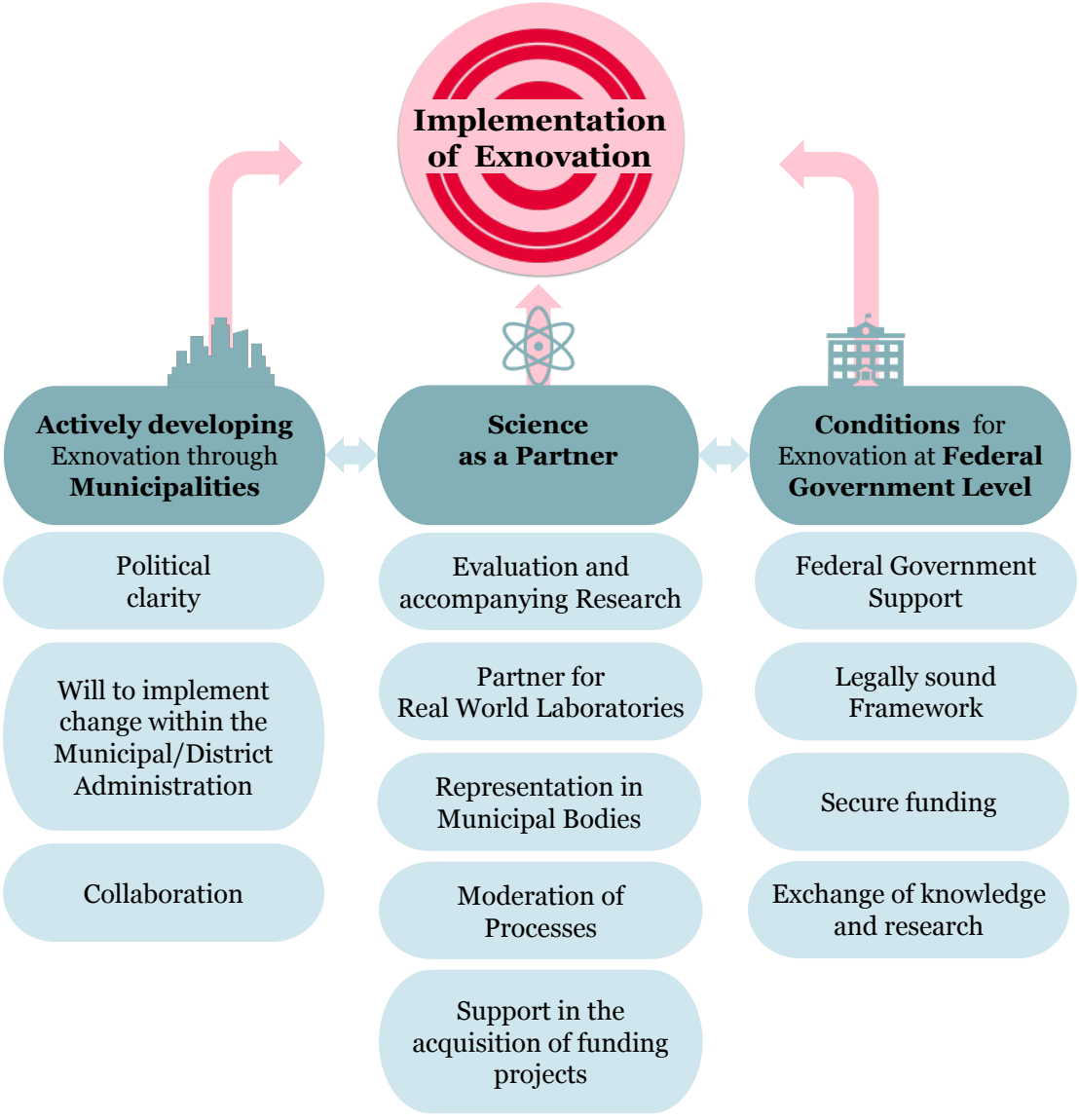

Figure 7: Recommendations for action to implement the urban mobility transition, author's own compilation

5.1 Actively developing exnovation through municipalities – what is required?

Exnovation requires political clarity. Political backing is fundamentally important for exnovation. Clear vision, consistent political support with clear priorities and consistent transparency and communication are crucial elements of the political support that is required.

Exnovation requires the will to implement change within the municipal/district administration. The administrations are largely responsible for implementing transport planning measures. Here, the extent to which the municipality already has a positive attitude towards the mobility transition in what areas work is still needed can be seen. A decisive municipal/district administration has a number of characteristics: first, it has the necessary **human resources** in place; i.e. a sufficient number of suitably qualified staff are available. In many administrations, old-fashioned and outdated attitudes represent a key obstacle to change. Instead, staff training regarding the new planning approaches is important, but it is also vital that they are receptive to change and new concepts. For the mobility transition, we recommend reliable and readily accessible points of contact with clear responsibilities, either in terms of appropriate assignments, such as individuals assigned responsibility for footpaths, cycle lanes or local mobility, or mobility managers and climate protection managers. Alongside human resources, **financial resources** are a decisive aspect in terms of implementing exnovation. Most municipalities struggle with a poor budgetary position, so the financial resources available have to be used strategically. At the municipal level, an appropriate budget needs to be planned for the mobility transition; this must be allowed to be spent flexibly and not allocated in advance to specific projects. Financial leeway can be expanded by means of funding programmes. At the same time, human resources for the acquisition of these funds and (subsequent) costs must be considered, for example own assets, maintenance and running costs. As well as human and financial resources, **clear administrative structures** are needed. Responsibilities must be regulated and competencies defined and assigned. Collaboration between the various resources is necessary and must be organised, and administrative and technical processes such as approval processes must be routine so that no obstacles or delays arise.

Exnovation requires collaboration. Collaboration takes place at various levels. **Politicians and the municipal/district authorities must** work closely together and in a spirit of trust. Any departmentalised thinking can quickly lead to the exnovation's failure. Within the municipal/district administration, cooperation is vital between the various departments such as urban, transport, economic and environmental planning in order to develop and implement holistic concepts. Beyond this, collaboration with **local stakeholders** is needed to implement mobility services, carry out needs surveys, develop joint solutions and gain supporters in the locality. The cooperation and involvement of **civil society** is of particular importance in order to gain the support of the citizens for exnovation and to establish the required acceptance. Furthermore, exnovation and the mobility transition should not be viewed as an isolated solution. Regional cooperation should be sought so that neighbouring municipalities or districts are all working together towards the same goals. Learning effects can thus be shared, resources can potentially be saved, and communication can be strengthened, too. Finally, collaboration across **municipal networks** is recommended to

promote networking and knowledge sharing between municipalities. Using these networks, municipalities and communities can exchange experiences and obtain valuable assistance.

5.2 Creating the conditions required for exnovation at the federal government level

Exnovation requires federal government support. Alongside political support at the municipal level, federal and state government support is also important. The federal government should specify clear policies regarding climate targets, the mobility transition and restrictive measures. German government policy is currently very innovation-oriented and supportive of new drive technologies, the expansion of public transport and innovative mobility services, whereas exnovative approaches are neglected. To allow municipalities to implement exnovation, a change in direction is necessary at federal government level, both in terms of climate protection and transport policy, so as to communicate the need for action and provide a good example, as well as to muster courage for the necessary restrictive measures.

Exnovation needs a legally sound framework. The aforementioned projects that have failed in Germany show that implementing exnovation in a legally sound manner it is an ongoing challenge. To avoid these kinds of projects failing, a legally sound framework is required, which must be created at federal government level. The German government's coalition agreement already announced a review of the road transport laws, i.e. road transport law and road traffic regulations. In addition to the flow of traffic and traffic safety, this updated version is supposed to take climate and environmental protection targets into account, alongside health and urban development (SPD et al., 2021, p. 41). A proposal for the revised version of the road traffic regulations currently exists. It is not currently possible to judge definitively how great the additional scope for action and legal security will actually be for municipalities. Regarding exnovation, the road traffic regulations have to approve transport planning measures for climate and environmental protection, and these do not have to be justified by existing risks. It must be clear in what form restrictive measures can be legally implemented so that appeals are less likely. In this respect, handouts, precedents and legal protection counselling for municipalities would be helpful, so that legally sound solutions can be found, and municipalities can deploy human and financial resources in a targeted way without wasting them on projects that are doomed to failure.

Alongside the road traffic regulations, the decisive guidelines for transport planning need to be revised. The Research Association for Roads and Transport (FGSV), which compiles and publishes the guidelines considered to be the current state of the art and implemented in transport planning, has announced a review of the guidelines. In addition to climate protection, traffic safety and quality, particularly for pedestrians and cyclists, are thought to be the focus of the review. This revision is a further milestone in the implementation of exnovation in municipalities since the latter will gain access to new design leeway to specifically plan the transport infrastructure.

Furthermore, a current point of discussion at government level is speeding up planning, which the traffic light government has set as a goal. Existing plans for land use and development plans, for example, could become an obstacle in terms of the implementation of exnovation since alternative uses are not foreseen. The proposal includes

shorter approval deadlines, so that the processing and approval of land use and development plans can be accelerated. Accelerated municipal planning is thus also a key aspect for implementing exnovation.

Exnovation needs secure funding. The difficult budget conditions of many municipalities in Germany have already been mentioned. Financial support for municipalities is crucial for implementing the mobility transition. Municipalities not only need to invest in expanding alternative options, but also in exnovative measures. While some measures are very cheap to implement, infrastructural measures in particular usually involve high costs. On the one hand, funding can be made available through the Local Community Transport Financing Act (GVFG-funds) but it can also come in the form of support and research programmes. Exnovative measures should also be explicitly considered in these programmes in the future. In addition to this, access barriers need to be dismantled; for instance, the fact that funds cannot be requested to cover administrative costs and difficulties suitable funding programmes, the necessary human resources or the required co-payments. Providing the funds is only expedient if they can also be requested by municipalities for appropriate purposes. This hurdle could be dismantled by means of standardised procedures and further support for the municipalities.

In the context of austerity measures, budget cuts in the transport sector are also currently under discussion at the federal level. The question could thus be posed as to where funds for exnovation and the mobility transition should come from the federal level. In this case, we refer at this point to the existing call by environmental associations to reduce environmentally and climate-damaging subsidies in the transport sector and to invest these subsidies in forward-looking mobility transition projects. In this context, the so-called company/official car privilege, the commuter's tax allowance and energy tax reliefs for diesel fuels are repeatedly mentioned. In an analysis by the German Federal Environmental Agency, environmentally harmful transport subsidies in Germany amounted to EUR 30.5 billion in 2018 (Burger & Bretschneider, 2021).

Exnovation requires an exchange of knowledge and research. On the one hand, research projects and real world laboratories are needed in order to promote the exchange of experience. On the other hand, platforms are needed where this exchange is promoted and learning effects are shared. At the federal level, the research focus can be placed both on the relevant research projects and real-world laboratories, but platforms and networks can also be created where the municipalities can exchange their experiences.

5.3 The role of science in implementing exnovation at the municipal level

The implementation of exnovation can be supported by science. In the classical sense, science can provide theoretical and conceptual knowledge and clarify the necessity of exnovation. It can make a further vital contribution in the field application-oriented research and become an important partner for carrying out experiments in the form of real world laboratories. Municipalities receive support from scientific institutions to help access funding projects and raise funds and at the same time are supported by accompanying scientific research. They thus receive external expertise and can also conserve their internal resources. However, science can also provide support in the

conceptual development of projects and real world laboratories. At the level of funding agencies, they can provide important knowledge about which measures and projects have been successful and how great the respective potential of (packages of) measures and holistic concepts is.

Moreover, scientists can take part in municipal bodies and support the argumentation for the mobility transition and exnovation from a scientific perspective. Alongside this, ad hoc consultations are possible if expert knowledge or even neutral moderation of processes is required. Finally, science can make a valuable contribution to the further training and development of staff and is thus an important partner in terms of implementing exnovation.

Outlook and concluding remarks

In view of the climate crisis, the climate protection goals set and the increasing problems in cities, such as air pollutant emissions and land conflicts, as well as with regard to traffic safety, health and justice, a sustainable change in transport and a reduction of auto mobility in cities is urgently needed.

Exnovation, i.e. the targeted reduction of auto mobility to the absolutely minimum necessary, represents a key approach in order to give (innovative) sustainable alternatives the space to develop and assert themselves and thus accelerate the mobility transition.

In this way, the directional certainty of a sustainable mobility transition can be increased, and fundamental and far-reaching change can be ensured at an appropriate scale and speed.

Cities and municipalities thus play a central role in actively shaping the urban mobility transition through urban and transport planning. In order to do this, they need political backing - both at the municipal level, but also at higher political levels such as the federal level in particular. To this end, the scope of action by cities and municipalities must be expanded so that restrictive transport measures can be implemented with legal certainty with regard to environmental and climate protection. At the same time, politicians need to have the courage to take steps toward a car-reduced, liveable city and to support city and district administrations in implementing this.

European best practice examples demonstrate courageous steps and show what such a development can look like. The added value and the effect of car-reduced neighbourhoods can already be experienced there. At the same time, important learning effects result from the implementation and experience of these examples which can help German cities to plan and implement exnovation.

While good examples from European cities are repeatedly mentioned in the context of the mobility transition, less successful or even failed projects also offer important learning effects. So far, these examples have been less intensively examined, so that potentials can still be seen here to learn not only from examples of success, but also from those examples that were less successful and thus provide information on the causes of failure.

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