Mobility strategies for innovation and experimentation of eight cities in Europe

TrEx

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Munich Cluster for the Future of Mobility in Metropolitan Regions

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TrEx

The MCube lighthouse project Transformative Mobility Experiments (TrEx) aims to systematically understand experiments for sustainable and scalable mobility transformations, develop them in a participatory way and strengthen them with new tools and perspectives. TrEx sees experiments and crisis experiences of various types as key to the transformation of mobility.

MCube
Munich Cluster for the Future of Mobility in Metropolitan Regions

The Munich cluster for the future of mobility in metropolitan regions (MCube) - of the Technical University Munich - uses the unique agglomeration of actors in the fields of mobility innovation to turn Munich into a pioneer for sustainable and transformative mobility innovations.

The goal of the cluster is: to test and research leap innovations in the mobility sector and develop scalable solutions with model character for Germany and worldwide - from autonomous driving and electromobility to new legal foundations for mobility investments; from connected, AI-driven mobility control to the redesign of our cities and public spaces to the redesign of our cities and public spaces.

Introduction

In an era of rapid urban transformation, mobility dynamics receive significant attention. Mobility planning and innovation have become critical drivers for improving the quality of life. Cities increasingly rely on real-life experimentation to implement and govern mobility innovations.

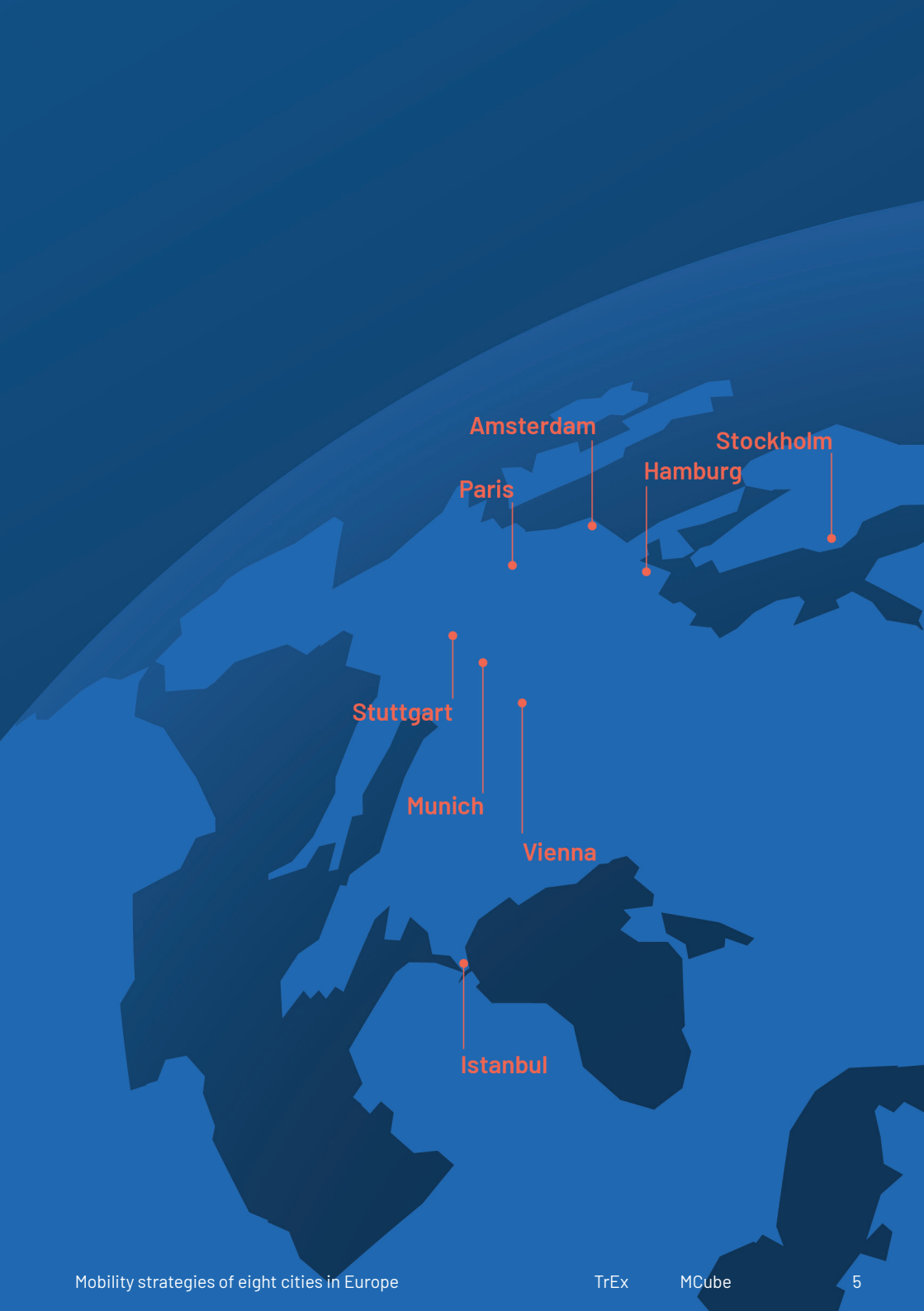
Comparing eight European cities, this policy report presents the roles of experimentation and innovation to overcome current urban mobility challenges based on published mobility strategies. The report follows the questions:

What is the role of experimentation in urban mobility strategies?

What are the expectations for innovation and digitization?

What the overall vision for future mobility in the cities' strategies?

The cities were selected for their comparability to Munich (Amsterdam, Hamburg, Stockholm, Stuttgart) and outstanding mobility strategies (Paris, Istanbul, Vienna). The comparison shows the differences in how these cities approach their urban mobility transformation to surpass the challenges and current infrastructural constraints. The overview in this report is developed to inform and inspire the makers of future mobility strategies to define the use and expectations of mobility experimentation.


Amsterdam
Stockholm
Hamburg
Paris
Stuttgart
Munich
Vienna
Istanbul

Amsterdam

"An accessible, livable, and less polluted city: this is what we'd like to achieve for Amsterdam's residents, visitors, and businesses today and for future generations. Smarter and cleaner mobility can help us realize these aims."[1]

Hot mobility topics

- Accessibility
- Tourism
- Pollution
- Safety

Experimentation focus

- Emerging public transport services
- Smart Mobility innovations (AV, Urban Air Mobility, etc.)
- Digital traffic steering
- Digital mobility service

Last published mobility strategy: 2019 [2]

Image: Unsplash, Pedro Cunha

The strive for smart and sustainable mobility

Amsterdam greatly emphasizes promoting smart and clean innovations to shape the city`s mobility. The city strives to develop sustainable and environmentally friendly transportation solutions that meet its citizens' needs while addressing tomorrow's challenges. Amsterdam`s mobility strategy focuses on actively anticipating research and innovation projects to shape the future proactively. Amsterdam aims to become a pioneer in the implementation of innovative smart mobility concepts to ensure the city's quality of life.

Experimentation: smart mobility champion

In the awareness of the constant change of mobility, the challenge is to seize innovation opportunities while ensuring they are equally available to all. To achieve this goal, the city relies on testing and scaling mobility innovations through experimentation. By testing new approaches and technologies in a targeted way, potential solutions to future transport problems can be identified and assessed regarding their practicality. For example, Amsterdam already established test beds for parcel delivery via drone. Additionally, experiments are being planned for light electric vehicles, such as microcars, while the buildup of a real-world test bed for autonomous vehicles is currently being planned.

City planners are aware that it is of great importance that these innovations are designed to be inclusive and accessible to all segments of the population. Thus, Amsterdam sees the experimental approach to sustainably improve mobility while meeting the needs of a diverse and growing population. Amsterdam intends to be an important testing ground for (smart) mobility solutions that are tested in a real-life environment.

The potential of digitalization

Amsterdam focuses on digitalization as a crucial element in developing new solutions and optimizing existing mobility services. The city sees enormous potential in the new digital mobility services. By integrating digital technologies, innovative and efficient transport solutions are meant to better meet the needs of citizens. With a clear view of the future, Amsterdam is investing in the digital transformation of the transport sector to shape a sustainable and modern mobility landscape. To implement new solutions, experiments are supposed to play a fundamental role in testing new forms of mobility in a real-life environment.

Overall vision to solve the emission problem

The mobility transformation in Amsterdam is under constant change while maintaining its fundamental values: Accessibility for all, efficient use of space, improved traffic safety, good working conditions, transparency, and democratic control are top priorities. Amsterdam intends to establish a strong culture of innovation characterized by its flexibility and focus on digitalization. Experiments are playing a pivotal role in shaping the mobility landscape. These innovations are supposed to realize the goal of becoming a smart city for mobility to overcome the city's congestion and emissions issues.

Hamburg

"Hamburg takes action to become an emission-free, sustainable, and user-friendly mobility capital of the future." [3]

Hot mobility topics

- Accessibility
- Pollution
- Safety

Experimentation focus

- Smart mobility innovations
- Bicycle infrastructure
- Innovation for intelligent traffic steering (ITS)

Last published mobility strategy: 2017 [4]

Image: Unsplash, Aditya Gosh

Making mobility digital

Hamburg views technological progress as a core factor for a strong and competitive economy. The focus is on Intelligent Transport Systems (ITS), generating new mobility innovations and expanding mobility services. ITS is envisioned to have enormous potential to change the existing mobility behavior and to solve the city's congestion problems by replacing the car as the dominant mode of transport. Consequently, Hamburg is pursuing the goal of pioneering in developing ITS applications and establishing itself as a European model city for future mobility.

Experimentation: Becoming a model region for mobility

Since ITS applications are highly dynamic, it is necessary to constantly access the technologies and to readjust the strategy. The ITS applications must be piloted through prototypes in small projects and, if suitable, transferred to more broadly based standard applications. Thus, Hamburg sees itself as a "Metropolitan Model Region of Mobility" [5]. The city intends to become a testing ground and cooperation partner for industry, science, and research, as well as for partners in national, European, and international administrations. Innovative mobility formats are supposed to be tested experimentally to determine whether they are economically feasible. The experiment provides the basis for deciding their permanent use in Hamburg. The City of Hamburg is aware that not all projects will be equally successful and assigns great importance to failures in the innovation process since they help to create a flexible climate for innovation and experimentation.[6]

Flexible integration of digital mobility innovations

Since ITS applications are mostly digital solutions, digitalization is crucial for Hamburg. Digitalization is to be promoted in suitable initiatives and projects in which the city is directly or indirectly involved, mainly in experiments. To completely digitize and interconnect the city, Hamburg is aware that working closely with various stakeholders is necessary. A particular focus lies in the flexible integration of these ITS services.

Overall vision to be an interconnected city

To overcome the city's congestion and emissions problems, Hamburg intends to lead the development of ITS applications. The goal is for the City of Hamburg to be completely interconnected and for mobility to be accessible to everyone. The vision entails that the transition to a digital and interlinked mobility environment will profoundly change the movement of people and goods. Enormous potential is seen in the rapid technological development of ITS applications. Hamburg wants to be a European role model in testing and scaling ITS mobility innovations.

Istanbul

"An inclusive and innovative transport system, focusing on people and the environment, providing the right mix of safe, integrated, accessible, and affordable mobility alternatives." [7]

Hot mobility topics

- Traffic congestion
- Air pollution
- Accessibility
- Traffic safety

Experimentation focus

- Inclusive mobility services
- Active mobility modes
- Sustainable mobility services
- Intelligent traffic steering (ITS)

Last published mobility strategy: 2022[8]

Image: Unsplash, Fatih

Solving traffic congestion

Istanbul uses innovation to further develop and optimize its infrastructure. Thus, Istanbul focuses on redesigning existing mobility services through innovation, which is seen to resolve traffic congestion while improving social inclusion. Moreover, Istanbul plans to change existing infrastructures to promote environmentally friendly forms of mobility, such as bicycles and public transport, and to replace the car as the primary mode of transportation. This shift should help to solve the extreme congestion problem and realize the goal of being climate-neutral by 2050.

Experimentation: Replace the car

Istanbul is focusing on redesigning its infrastructure while digitalizing the transportation landscape is less of a priority. The mobility strategy focuses on solving the problems of congestion, accessibility, and emissions. To surpass these problems, Istanbul wants to promote new mobility concepts and innovation, increasing the modal share of bikes, public transport, and pedestrians. Consequently, the flexible integration of new mobility concepts into the mobility landscape is seen as a success parameter. Further, it is essential to test new mobility concepts and innovations with a wide range of stakeholders to tailor them to the needs of all citizens. To ensure the success of these new mobility concepts, Istanbul considers international best practices and professional experience.

Overall vision to redesign the infrastructure

To realize its goal of becoming climate-neutral by 2050, Istanbul focuses more on improving and building new infrastructures and less on experimenting with new forms of mobility. Thus, the focus is on creating infrastructures for bicycles and pedestrians to integrate active mobility into the mobility landscape. These mobility forms are envisioned to solve the city's extreme congestion problem, as Istanbul is currently the 4th most congested city in the world. Therefore, the goal is to create an accessible, affordable, and inclusive infrastructure that reduces traffic congestion and decreases the dependence on motorized vehicles.

Paris

"Get around more easily, in greater comfort, more safely, with better access, protect the environment, and stay connected with new services within easy reach. All this is possible while saving time." [9]

Hot mobility topics

- Air pollution
- Accessibility
- Traffic congestion

Experimentation focus

- Digital mobility services
- Public transport systems
- Bicycle infrastructure

Last published mobility strategy: 2022 [10]

Image: Unsplash, Earth

The 15-minute city

As part of her 2020 election campaign, re-elected mayor Anne Hidalgo introduced the concept of a 15-minute city. The idea is that citizens can reach their everyday surroundings, such as shopping, doctor's appointments, etc., within fifteen minutes by foot or bicycle. While the concept of the 15-minute city is not explicitly mentioned in the mobility strategy, the individual sub-strategies aim to realize the "15-minute city". Thus, Paris uses the mobility strategy to redesign the existing infrastructure to become a 15-minute city to overcome the city's emission and congestion problems. At the same time, Paris increasingly relies on innovation for new mobility solutions to increase accessibility for all and simultaneously replace private motorized transport.

Experimentation: Failures are allowed

Since the introduction of mobility innovation is highly dynamic, the planners are aware that innovation requires ongoing reassessment of the process. Hence, the developments in mobility innovation must be constantly monitored to react to these dynamic developments. Experiments are crucial to test and scale emerging mobility innovations in a "trial and error" process. Paris is focusing on experiments that help to integrate new ways of moving into the mobility landscape to overcome mobility challenges. Banning electric scooters in 2023 showed that the city only welcomes specific mobility modes if they contribute to the mobility goals. Further, the city allocates a budget to its citizens to ensure participatory urban development. Citizens are encouraged to apply with own experimental projects for this budget to actively participate in the testing and development of mobility innovations. The results of these experiments are supposed to help the city planners in their future decision process. Therefore, Paris sees the development of the mobility landscape as an open-ended process, which is difficult to plan long-term due to the dynamic development of mobility innovation. Moreover, citizens are encouraged to actively participate in the process by conducting experiments in which they test and develop various emerging mobility innovations by themselves.

Overall vision to become the 15-minute city

Mobility innovation around mobility is supposed to help overcome the city's mobility challenges, such as air pollution, traffic congestion, and accessibility. The mobility strategy aims to implement energy-efficient and low-emission mobility solutions to promote sustainable and socially just mobility. Moreover, it is envisioned to innovatively redesign the mobility landscape to become a 15-minute city. Experimentation is seen as a central part of achieving this goal, while failure is allowed in an open and dynamic "trial and error" process.

Stockholm

Stockholm has a detailed policy vision backed up by high levels of investment in public transport infrastructure. The city wants to be a pioneer when it comes to the adoption of technology and environmentally sustainable initiatives.

Hot mobility topics

- Traffic congestion
- Traffic safety
- Unequal road distribution

Experimentation focus

- not explicitly mentioned*

Last published mobility strategy: 2012 [11]

Image: Unsplash, Ernest Ojeh

The walkable city

Stockholm's goal is to become a "Walkable City". This means that the entire city is accessible to pedestrians. At the same time, Stockholm aims to become the city whose inhabitants use public transport the most worldwide. To achieve these goals, Stockholm relies on three interlinked sub-strategies: (1) urban planning, (2) infrastructure planning, and (3) transport planning.

The focus on redesigning the existing infrastructure

To realize the vision of the "Walkable City," Stockholm mainly focuses on transforming the existing infrastructure. The current infrastructure is supposed to be redesigned so that the current dependence on the car is solved and the use of public transport is promoted. Innovation is seen as complementary, only implemented where it makes sense.

Overall vision to promote public transportation systems

The redesign of the existing infrastructure and the considered use of mobility innovation are intended to solve the current congestion problems and to improve the quality of life. Experiments and digitalization are not explicitly mentioned in the mobility strategy. The focus is on large infrastructure projects to create an extensive, sustainable public transport system. Stockholm wants to enjoy a highly accessible public transport system with good coverage throughout the urban area. The city already has a variety of modes of transport, and its public transport system is efficient and modern. The measures are accompanied by redesigning the existing infrastructure to promote active mobility. Moreover, Stockholm also considers its citizens responsible for solving the current mobility challenges. While decision-makers are aware that they can redesign infrastructure, it is the citizens' responsibility to change their mobility behavior: "You are not stuck in traffic - you're a part of the traffic."

*Compared to the other cities in this report, Stockholm's strategy dates back the longest, which might be a reason for the lack of experimental approaches

Stuttgart

"The aim is to provide the Stuttgart residents with customized mobility offers – these should be comfortable, inexpensive, and environmentally friendly." [12]

Hot mobility topics

- Air pollution
- Traffic congestion
- Accessibility

Experimentation focus

- Mobility innovation for public transportation systems
- Innovations for a strong bicycle and pedestrian network
- Digital mobility services
- Intelligent traffic steering (ITS)

Last published mobility strategy: 2014 [13]

Image: Unsplash, Christian Lue

A city of short distances – "a city of mobility"

The mobility planners of Stuttgart try to overcome the existing fixation on privately owned cars by creating multifaceted mobility services in their mobility landscape. To achieve this goal, Stuttgart increasingly relies on innovation as a synonym for change. Thus, the use of innovation is intended to solve the city's existing congestion and emission problems, as these have a negative impact on the quality of life. Moreover, Stuttgart wants the city to be accessible to everyone. Hence, Stuttgart is increasingly focusing on mobility innovation that frees citizens from private transport and significantly increases the share of public transport, bicycles, and pedestrians. The city intends to interconnect all transportation options to promote intermodal and multimodal offers, which are seen as a critical element for digitalizing mobility to make the services better available.

Experimentation: Strong cooperation with the industry

Stuttgart wants to remain an attractive business location and pursues strong cooperation with the industry. Consequently, innovative forms of mobility are jointly tested with industrial partners in the form of experiments and, where appropriate, implemented permanently. Mobility planners are aware of the dynamic nature of innovation. Therefore, Stuttgart is, jointly with the industry, testing and scaling new innovative mobility in a real-life environment. The test beds are constantly reassessed due to the ongoing changes in the mobility landscape. In 2023, the City of Stuttgart and industry partners tested hydrogen-driven cargo bikes to change the current city logistics. Further experiments will test mobility innovation that relieves the city from traffic congestion and pollution in the near future [14].

Overall vision to create a diverse mobility landscape

Stuttgart wants to be a "city of short distances" and strives to solve the existing problems of congestion, emissions, and accessibility by implementing (digital) mobility innovations. To be able to implement these mobility innovations, experiments are supposed to play a fundamental role in creating an interconnected and accessible mobility environment. Close cooperation with the industry is central to maintaining an attractive business location. Stuttgart, the home of Mercedes-Benz, wants to replace the privately owned car as the dominant means of transport while not losing its most crucial industry partner(s). Thus, Stuttgart sees the joint testing and development of mobility innovations with industry partners as essential in overcoming existing mobility challenges like air pollution, traffic congestion, and accessibility.

Vienna

Vienna embodies a future-oriented urban mobility policy that is not only ecologically, but also economically and socially acceptable and hence sustainable.

Hot mobility topics

- Social exclusion
- Air pollution
- Traffic congestion

Experimentation focus

- Bicycle network
- Public transportation system
- Digital mobility services

Last published mobility strategy: 2015 [15]

Image: Unsplash, Leyre

Fighting social inequalities

Vienna wants to create a low-emission and socially resilient mobility. In doing so, Vienna wants to drastically reduce motorized private transport and vigorously promote alternative forms of mobility to make mobility accessible to everyone and to reduce emissions in the city. To achieve this goal, the existing infrastructure is supposed to be expanded and optimized so that everyone has access to a sustainable and socially inclusive mobility infrastructure.

Experimentation: A flexible development

Mobility innovation plays a vital role in achieving Vienna's goals. Yet, since future innovation developments can only be predicted to a limited extent, the development of mobility trends and people's mobility behavior must be regularly monitored and evaluated. Experiments are essential to understand and optimize mobility services to achieve Vienna`s mobility goals. Mobility planners are aware that some innovative solutions will fail while others can only succeed after certain regulatory and infrastructural readjustments. Therefore, the city implemented several experimental spaces to test and scale innovation with various stakeholders to jointly develop and, if successful, implement the solutions. Another crucial factor for successfully implementing mobility innovation is the communication work to ensure societal acceptance of a changing mobility landscape.

The standardization of data

Digitalization is crucial in Vienna`s mobility strategy to improve citizens' mobility behavior. A key aspect is the digital networking and integration of different mobility services to ensure an efficient and seamless mobility experience. It is essential to create legal foundations for digitalization to ensure data protection, security, and responsible data handling. A comprehensive data standardization is necessary to ensure smooth interoperability of the various systems and to create a thorough evaluation and analysis system. Vienna`s mobility planners are convinced that digitalization can significantly contribute to social and sustainable mobility. Yet, the challenge is to create a legal and standardized database to guarantee smooth and safe data exchange.

Overall vision to be a role model for social mobility

Vienna prioritizes making mobility accessible to every citizen. Already existing measures like the 365€ ticket underline these ambitions. Additionally, mobility innovations that have been successful in the experiment are supposed to be permanently included in the mobility landscape of Vienna to further reduce the share of privately owned vehicles. Another decisive success factor is engagement with citizens, and a strong communication campaign is essential to increase citizens' acceptance of changing mobility. Lastly, the potential offered by digitalization should be used to understand and optimize mobility behaviors and services.

Munich

Munich's mobility strategy focuses on promoting sustainable and efficient transportation options, including extensive public transit, cycling infrastructure, and reduced reliance on private cars, to enhance urban livability and reduce congestion and emissions.

Hot mobility topics

- Air pollution
- Traffic congestion
- Traffic safety
- Unequal road distribution

Experimentation focus

- Mobility innovations to redistribute space
- Bicycle infrastructure
- Public spaces
- Public transportation network
- Digital mobility services

Last published mobility strategy: 2022 [16]

Image: Unsplash, Asimina Mitrothanasi

Redistributing space

The Mobility Strategy 2035 is the roadmap for Munich's mobility transition. It safeguards the city's quality of life and public welfare, which are the essential prerequisites for individual and social life and entrepreneurial activity in Munich. Thus, the Mobility Strategy 2035 is about people-oriented mobility in a people-oriented city. The goal is for all people and goods to reach the city's destinations quickly and safely. In addition, a redesign of the infrastructure is crucial since street spaces should not only serve traffic but also create a more livable city.

Experimentation: Staying a dynamic city

Innovation is one of the critical factors in achieving these goals. However, since mobility innovation is dynamic, the mobility landscape is constantly changing. To cope with this dynamic change, new approaches to solutions are to be developed, tested, and, if successful, adopted in regular operation. By establishing "summer streets," the city already showcased its will to make the mobility landscape more livable through experimentation. Thus, experiments test mobility innovations in a dynamic city like Munich and potentially scale them to the needs of its citizens. Therefore, the City of Munich is aware of the importance of creating space for research and innovation.

Becoming a smart city

Moreover, there is a focus on developing mobility innovation emerging from digitalization. Digitalization plays a central role as a megatrend and driver of smart mobility. Mobility planners are convinced that alternatives to private cars can only be made attractive by digitalization services. Accordingly, digitalization improves the access and monitoring of mobility services.

Overall vision to increase the quality of life in Munich

Munich wants to replace the car as the dominant mode of transport by expanding the bicycle and public transport infrastructure. (Digital) mobility innovations, which are being tested and developed in close cooperation with research and industry, significantly impact achieving this goal. Moreover, the City of Munich would like to change and improve its infrastructure to positively affect the city's quality of life and public welfare. Decreasing the amount of privately owned cars should create a more equal road distribution and relieve the streets from traffic congestion. To shape mobility according to the needs of the citizens, citizen participation is crucial in the design process for mobility innovation. Lastly, vital communication work is seen as an essential factor in creating acceptance of the underlying change.

Summary

Comparing the role of experimentation in urban mobility strategies

	Amsterdam	Hamburg	Istanbul	Paris
Mobility topics	Accessibility Air pollution Overtourism Safety	Accessibility Air pollution Safety	Accessibility Air pollution Traffic congestion Traffic safety	Accessibility Air pollution Traffic congestion
Experimentation	Important testing ground for (smart) mobility solutions, tested & scaled in a real-life environment Plays a key role in shaping the mobility landscape	Testing ground and cooperation partner for industry, science, and research Helps to test and understand mobility innovations	For flexible integration of new mobility concepts Builds on best practices from other countries	Crucial for mobility innovations to betested and scaled „Trial & error" process Helps to decide on implementation of mobility innovations
Digitization	Develops new solutions and optimizes existing services Closely interlinked with the mobility strategy	City as role model for Intelligent Traffic Systems (ITS) Aim to be completely digitalized and interconnected	No major role in the mobility strategy Focus on redesigning infrastructure to reduce mobility emissions	Closely linked to new forms of mobility Optimizes existing forms of mobility
Vision for mobility	City of intelligent mobility	Metropolitan Model Region of Mobility for ITS	Sustainable and inclusive mobility landscape; climate neutral by 2050	15-minute city; inclusive and climate friendly mobility landscape

Stockholm	Stuttgart	Vienna	Munich
Traffic congestion Traffic safety Unequal road distribution	Accessibility Air pollution Traffic congestion	Air pollution Social exclusion Traffic congestion	Air pollution Traffic congestion Traffic safety Unequal road distribution
No crucial role in Stockholm's mobility strategy	Helps to test and develop innovations in real-life environment Innovative forms of mobility jointly tested with industrial partners	Important to understand and optimize mobility offers Experimental spaces to test and scale innovations with various stakeholders	Develop, test, and, if successful, adopt mobility innovations Establish real-life test spaces for mobility innovations
No major role in the mobility strategy Focus on redesigning infrastructure	Decisive role in integrating mobility innovations Optimizes current mobility services	Crucial role in mobility strategy to improve citizens' mobility behaviour Making public space equally accessible for all forms of mobility	Megatrend Become a smart city key element in breaking dependency on privately owned vehicles
Walkable city; city with most public transport use in the world	City of short distances; attractive partner for the industries in the region	Low emission and low-cost mobility for everyone	Safe, needs-based, climate-neutral, and accessible mobility for all

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Authors:
Tom Grossmann, Manuel Jung, Michael Mögele & Alexander Wentland on behalf of the TrEx Team

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Lukas Peschmann

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Transforming Mobility and Society (TraMS) lab, part of the School of Social Sciences of the Technical University of Munich

MCube - Munich Cluster for the Future of Mobility in Metropolitan Regions

www.mcube-cluster.de
info@mcube-cluster.com