Inclusive and sustainable future of urban mobility in Europe

Final Version

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1. Executive Summary

a. Summary

This report, developed by the Expert Group on Urban Mobility (EGUM), Subgroup 6: Future of urban mobility and inclusive and sustainable urban space. It addresses the future of urban mobility in Europe, emphasizing inclusivity and sustainability. Urban mobility in Europe is undergoing significant transformation driven by technological advancements, societal changes, and environmental imperatives. The expert group, tasked with exploring these trends, has identified several key trends and formulated number of recommendations aimed at enhancing urban mobility systems across the EU.

Key Trends Identified:

1. **Inclusive, Safe and Accessible Mobility**
2. **Resilient and Adaptable Systems**
3. **Environmental Sustainability**
4. **Electrification of Transport**
5. **Autonomous Vehicles**
6. **Sustainable Urban Planning and Proximity Cities**
7. **Smart Mobility, Data Analytics, and Artificial Intelligence (AI)**
8. **Connectivity**
9. **Mobility and Logistics Hubs**
10. **Innovative Aerial Services**

Alongside key trends, some challenges and gaps have been recognised:

- Lack of infrastructure to support the transition to sustainable mobility, particularly in rural and peri-urban areas.
- Data gaps, particularly regarding the safety of pedestrians and cyclists.
- Resilience of the cities and its transport networks to the physical and digital threats, from natural disasters to human made risks, also associated with the increased digitalisation of the mobility systems.
- Ensuring mobility for all, particularly children, elderly, people with disabilities, and other vulnerable groups, is critical from an equity perspective.
- Mobility divide driven by socio-economic disparities including transport poverty.
- Need for more inclusive governance models and better data sharing for mobility planning.

The report emphasises the need for continued collaboration between various levels of government and the private sector to achieve the goal of a sustainable, inclusive, and efficient urban mobility future for Europe. The conclusions are twofold, the subgroup provides the key recommendations, but also suggests continuous activity in observing the developments in technology and society and providing perpetual advice to the policy makers.

b. Recommendations

The overall work of the subgroup concluded with ten (10) recommendations, at three levels (European Commission, Member States / National and at Local (Regional) Authorities). Furthermore, the subgroup prioritised the top three (3) recommendations for each governance level, which are shared below. Full list of recommendations, and associated actions can be found in **Chapter 4 Recommendations** of this document.

European Commission	
1	**Environmental Sustainability:** Set targets for modal split evolution and incorporate health benefits of active mobility into transport project cost-benefit analyses, if applicable. **Action**: The European Commission should consider establishing modal split indicators and promote tools like the WHO Health Economic Assessment Tool (HEAT), where relevant[1].
2	**Inclusion of innovation:** Facilitate inclusion of innovative solutions into urban transport schemes, incorporating innovation procurement and fostering the participation of startups and SMEs within the local ecosystems. **Action**: The European Commission should provide funding mechanisms to accelerate the innovation in urban areas and to create guidance which should encourage local institutions like PTAs and PTOs to cover extended responsibilities such are sharing mobility schemes, active mobility planning or new forms of public transport (ride hailing, demand responsive transport etc.) as part of their exclusive market participation.
3	**Mobility Network Management:** Facilitate a truly integrated multimodal mobility network (or traffic) management system which encompasses multimodal transport options (on both demand and supply side[2]), to optimise and tailor Mobility-as-a Service (MaaS) solutions. **Action**: The European Commission should make sure that the relevant framework is implemented and provide funding for the pilot projects showing the generated customer value by integrating the most important stakeholders into a integrated multimodal mobility network management system.

[1] World Health Organisation (WHO) *Health economic assessment tool (HEAT) for walking and cycling* (2023). Available at: https://www.who.int/europe/tools-and-toolkits/health-economic-assessment-tool-for-walking-and-cycling (Accessed: 15 May 2024).

[2] MTMC *Multimodal Traffic Management: Roadmap for 2030 and beyond* (2024); available at https://www.frontier-project.eu/MTMC_Roadmap_Oct2024.pdf (Accessed: 25 October 2024).

Member States/National Level	
1	**Public and Shared Autonomous Vehicles (AVs):** Highly prioritise AVs as public and shared transport options, strongly avoiding simple replacement of private cars with private AVs. **Action**: Member States should support the relevant framework being implemented and provide funding for the pilot projects for public and shared AV infrastructure.
2	**Environmental Sustainability:** Set targets for modal split evolution and incorporate health benefits of active mobility into transport project cost-benefit analyses. **Action**: Member States should integrate these targets and tools into national transport policies.
3	**Inclusivity and Accessibility:** Enhance accessibility and inclusivity in transport designs to cater to all users, including those with impairments, and consider gender issues. **Action**: Member States should develop national guidance for inclusive transport design.
Local (Regional) Authorities	
1	**Inclusivity and Accessibility:** Enhance accessibility and inclusivity in transport designs to cater to all users, including those with impairments, and consider gender issues. **Action**: Local Authorities should implement the guidance for inclusive transport design in public transport systems and infrastructure projects.
2	**Urban Space Design:** Reorganise urban street space to optimise sustainable modes of transport and overall transport system efficiency, considering both local and network-wide impacts. **Action**: Local Authorities should develop comprehensive (sustainable) urban mobility plans.
3	**Public Engagement and Testing:** Engage residents in temporary redesigns of street functionality and allow public testing of alternative transport modes (e.g. Tactical Urbanism). **Action**: Local Authorities should organise initiatives like Ghent Living Streets and facilitate public testing of new transport modes.

2. Introduction

The European Commission (EC), and its department DG MOVE, who are responsible for EU policy on mobility and transport, has established the expert group on urban mobility ('EGUM', 'the group') in 2022, with a dedicated subgroup "future of urban mobility and inclusive and sustainable urban space" ('WG6'). Annex 6.b of this document lists the organisations that participate in WG6.

According to its Terms of reference, the subgroup delivered recommendations on:

1. How to deal with limited urban space and conflicting demands for it (between transport and other users), taking into account social, climate and environmental goals?

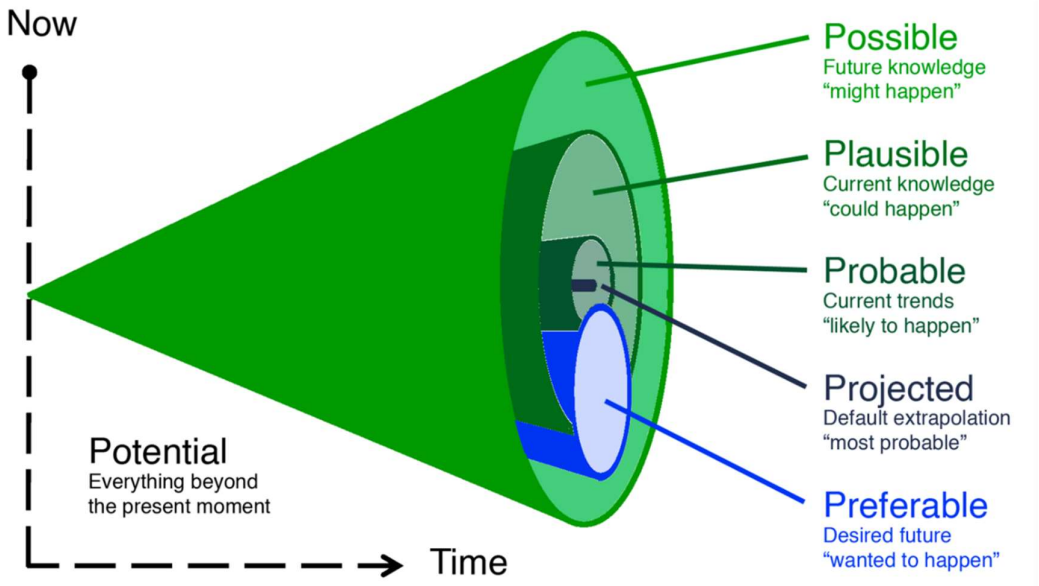
2. What are the gaps, needs and short-term priorities to pave the way for the long-term inclusive and sustainable future of urban mobility?

This report is in response to answer the second question above, and assists EU, Member State and Local / Regional policy makers by providing the first set of guiding points and instructions, to the challenges facing over coming years, and sometimes, even decades.

Sub-Group WG6 by nature has a horizontal focus, spanning all the aspects of transport and mobility in the urban environment. It differs to other five sub-groups operating with the EGUM framework who look at very specific item or topics within the subset of urban mobility, for example, public transport or active modes or urban logistics.

This deliverable within WG6 had the specific task of describing the future of urban mobility, spanning all the aspects of transport and mobility in the urban environment and trying to foresee what key trends might have an impact on how people and goods move in cities and towns in Europe in foreseeable future.

Participants in WG6 were inspired to discuss about what an *inclusive and sustainable future of (urban) mobility* might look like. A business strategy tool, The Cone of Uncertainty (as shown below) was used in the interactive workshops the subgroup to stimulate conversation about the trends, the gaps and the future (noting there are multiple future possibilities).



The Cone of Uncertainty, Source: https://www.linkedin.com/pulse/embracing-cone-uncertainty-strategic-product-planning-mac-johnston/ (Accessed: 29 September 2024).

a. Definition & scope

The scope of the report is framed by the discussions and decisions of the sub-group and:

- aims to capture all the key trends relevant to the future state of mobility,
- understands and reports the gaps between the current and the future state, and
- provide the recommendations for the way forward.

Two aspirations were considered within the scope of the report, *inclusivity* and *sustainability*, as means to describe how the future should look like, from a societal point of view:

What is *inclusivity*, in the context of the deliverable?

The definition of inclusivity[3] states it is *"the fact of including all types of people, things or ideas and treating them all fairly and equally"*. We indeed want to have the future transport system in Europe truly inclusive, providing a myriad of options and opportunities to all, whilst maintaining the fundamental principles being safe, efficient, affordable and not producing any detrimental effects on people and nature, thus being truly sustainable and smart. Reference documents for this approach are the:

- **"Sustainable and Smart Mobility Strategy"**[4] which sets out targets for transport in 2030, 2035 and 2050 as well as setting out requirements for Inclusive Connectivity in Transport.
- **Revised TEN-T Regulation[5], which** strengthens the concept of urban nodes and increases the number of metropolitan areas categorised under this regulation to 431. Each Urban Node is required to have a Sustainable Urban Mobility Plan (SUMP) by 2027, multimodal passenger hubs by 2030, and freight terminals by 2040. SUMPs aim to improve quality of life for all residents.
- **Revised ITS (Intelligent Transport Systems) Directive 2023/2661**[6] which mandates the digitalisation and sharing of mobility-related data for urban nodes. This means that the Commission has introduced EU policy references for implementing the Urban Mobility Framework, the strategic plan aimed at enhancing the efficiency, sustainability, and integration of urban transport systems across Europe.

What is *sustainability*, in the context of the deliverable?

Sustainability[7] is also defined in the United Nations Brundtland Commission as "*meeting the needs of the present without compromising the ability of future generations to meet their own needs."* It is very important to link the work and philosophy of the sub-groups thinking to the

[3] Cambridge Dictionary (2024) *Inclusivity* https://dictionary.cambridge.org/dictionary/english/inclusivity (Accessed: 15 May 2024).
[4] European Commission (2021), *Sustainable and Smart Mobility Strategy* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0789 (Accessed: 15 May 2024).
[5] Regulation (EU) 2024/1679 of the European Parliament and of the Council of 13 June 2024 on Union guidance for the development of the trans-European transport network https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32024R1679
[6] European Commission (2023), *DIRECTIVE (EU) 2023/2661* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023L2661 (Accessed: 25 September 2024).
[7] United Nations (2024) *Sustainability* https://www.un.org/en/academic-impact/sustainability (Accessed: 15 May 2024).

one setup up by the UN's **Sustainable Development Goals**[8] as the blueprint to achieve a better and more sustainable future for all. In essence, they address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice. The 17 Goals are all interconnected the target for the achievement them all is 2030. In the context of urban mobility, the cities represent the future of global living and SDG 11 (Sustainable cities and communities) is the closest link.

Whilst SDGs referenced above are globally applicable, the report's focus is very specific – it's the European Union. The European Union is one of the most urbanised areas in the world. Out of 447 million European Union inhabitants it is estimated that 75% live in urban areas – cities, towns and suburbs[9]. Predictions show that the share of urban population in Europe will continue to grow, and it is likely to reach more than 80% by 2050[10]. The way how we develop urban areas has a major impact on the sustainable development of the entire European Union and its citizens. And all of them must have an inclusive and sustainable (urban) mobility in the future, very well linked with the peri-urban, inter-urban and rural segments of the human geography.

[8] United Nations (2024) *Sustainable Development Goals (SDG)* https://www.un.org/sustainabledevelopment/sustainable-development-goals/ (Accessed: 15 May 2024).
[9] Eurostat (2024) *Urban-rural Europe - introduction* Urban-rural Europe - introduction - Statistics Explained (europa.eu) (Accessed: 25 October 2024).
[10] "2018 Revision of World Urbanization Prospects" Population Division of the UN Department of Economic and Social Affairs (UN DESA)

3. Description

The report represents the summary of the discussions which have happened in the workshops organised to discuss the topic of inclusive and sustainable future of urban mobility in Europe. The format of the work and the presentation in the document can be defined though a mathematical 10/10/10 structure. The first 10 is for the ten key composite trends for the future of urban mobility, as understood and captured by the sub-group. These are the dominant technological, political or societal trends which influence the overall transport and mobility sector and are represented in the first sub-chapter.

The second 10 continues the above formula, and it's a reflection of the discussion comparing the current state in the industry, and a perceived, hypothetical future state, with an indication of the gaps and challenges between these two points.

Finally, the considerations within the sub-group converged into the key recommendations, ten (10) of them, which are described in the final sub-chapter, and the key elements were derived and transferred to the beginning of this document.

a. Key trends in the Future of Urban Mobility

Urban mobility is undergoing a transformative shift driven by technological advancements, environmental imperatives, and changing societal needs. The key future trends in urban mobility reflect a growing emphasis on sustainability, efficiency, and accessibility. Here are the pivotal trends shaping the future of urban mobility in a summary list, elaborate further in the text below.

1. **Inclusive, Safe and Accessible Mobility**
2. **Resilient and Adaptable Systems**
3. **Environmental Sustainability**
4. **Electrification of Transport**
5. **Autonomous Vehicles**
6. **Sustainable Urban Planning and Proximity Cities**
7. **Smart Mobility, Data Analytics and Artificial Intelligence (AI)**
8. **Connectivity**
9. **Mobility and Logistics Hubs**
10. **Innovative Aerial Services**

1. Inclusive, Safe and Accessible Mobility

Ensuring that urban mobility systems are accessible to all, including people with disabilities, the elderly, and those with limited financial means, is crucial. Inclusive mobility aims to provide equitable transportation options for diverse (gender, race, ability, age, etc.) populations. A number of sources are hereby provided, as the documents and various initiatives have been developed by the EC and are already available, which support this key trend:

- Best practices guide on the carriage of persons with reduced mobility[11] [within the report, Annex 4 "Booklet of best practices" and Annex 5, "Guide on future measures, policies and strategies aimed at creating a PRM-inclusive transport system in Europe"]
- Women in Transport – EU Platform for change[12]

Key Points:

- Design of barrier-free public transport systems and vehicles.
- Implementation of fare subsidies and discount programs for low-income riders.
- Development of user-friendly technology interfaces for all abilities.
- Mitigating Transport Poverty: implement measures such are: car and motorcycle scrappage schemes, carpooling bonuses, cycling programs, free public transport passes, and mobility wallets for low-income residents.
- Ensure Accessibility across the entire customer journey, considering the needs of all kinds of handicaps, gender-specific issues, and improvements for those with impairments.
- Use of Public Transport Accessibility Levels (PTAL)[13] to assess and improve public transport accessibility in transport planning and provide low to none cost (telephony) connectivity solutions for journey planning and ticketing.
- Mobility services for residents in peri-urban and rural areas, such as carpooling policies, on-demand mobility services, flexible bus services in low-density areas, and demand-responsive transport services.

[11] EU (2019) *Best practices guide on the carriage of persons with reduced mobility,* https://op.europa.eu/en/publication-detail/-/publication/bb3b7e92-df40-11e9-9c4e-01aa75ed71a1 (Accessed: 31 October 2024).

[12] EC (2017) *Women in Transport – EU Platform for change* https://transport.ec.europa.eu/transport-themes/social-issues-equality-and-attractiveness-transport-sector/equality/women-transport-eu-platform-change_en (Accessed: 31 October 2024).

[13] Transport for London (TfL) *Public Transport Accessibility Levels (PTALs)* (2017). https://data.london.gov.uk/dataset/public-transport-accessibility-levels (Accessed: 15 May 2024).

2. Resilient and Adaptable Systems

Urban mobility systems must be resilient to withstand disruptions caused by natural disasters, pandemics, and other unforeseen events. Building adaptable systems that can quickly respond to changing conditions is essential for maintaining continuity and reliability. Valuable reference for this key trend is the European Climate Risk Assessment report[14].

Key Points:

- Development of emergency response plans for urban transportation networks.
- Investment in infrastructure that can withstand extreme weather conditions.
- Education / skills development for innovative and resilient solutions in mobility.
- Foster multimodality for increasing fall-back availability of transport modes.

3. Environmental Sustainability

Reducing the environmental impact of urban mobility is a key priority. This involves not only promoting low-emission vehicles but also encouraging the use of renewable energy sources and sustainable materials in transportation infrastructure.

Key Points:

- Transition to renewable energy for powering public transport and EV charging stations.
- Use of sustainable construction materials for transport infrastructure projects.
- Promotion of eco-friendly practices, such as carpooling and telecommuting.

4. Electrification of Transport

The transition from fossil fuel-powered vehicles to electric vehicles (EVs) is accelerating. Governments worldwide are implementing policies to phase out internal combustion engines and promote EVs through incentives, subsidies, and charging infrastructure investments. The benefits of this shift include reduced greenhouse gas emissions, lower air and noise pollution, and decreased reliance on fossil fuels.

Key Points:

- Expansion of EV charging networks.

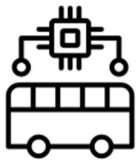
[14] EEA (2024) European Climate Risk Assessment report, https://www.eea.europa.eu/publications/european-climate-risk-assessment (Accessed: 22 November 2024).

- Advances in battery technology, increasing range and reducing charging times.

- Introduction of electric bicycles, scooters, cars, buses, trucks, and even aircrafts.

5. Autonomous Vehicles

Self-driving technology is set to reshape urban mobility by improving safety, efficiency and accessibility. Autonomous vehicles (AVs) can reduce traffic accidents caused by human error and optimise traffic flow through better integration, planning and operational management.



Key Points:

- Increased testing and deployment of AVs in cities, in particular shared and public transport.

- Development of regulatory frameworks to ensure safety and integration with existing transport systems. In this context, the SHOW project deliverable D3.3 should be considered[15].

- Potential for autonomous public transport solutions, such as shuttles and buses.

6. Sustainable Urban Planning and Proximity Cities

Cities are increasingly adopting sustainable urban mobility planning principles to reduce car dependency and promote active transport modes like walking and cycling. Compact, mixed-use developments encourage shorter commutes and more vibrant, liveable communities, thus creating so called “proximity cities”.

Key Points:

- Creation of pedestrian-friendly zones and car-free areas. Expansion of cycling infrastructure, including protected bike lanes and bike-sharing programs.

- 15 minutes city as paradigm, with an aim to better use urban land space. Kerbside dynamic management and on demand utilisation of the space.

- Green urban spaces that promote walking and community engagement.

- Enhancing public transport services and user multimodal experience.

[15] SHOW project (2024) D3.3: Recommendations for Adapting Regulatory and Operational Strategies for CCAV deployment at Local and Regional Level, https://show-project.eu/media/deliverables/ (Accessed: 20 January 2024).

7. Smart Mobility, Data Analytics and Artificial Intelligence (AI)

The use of big data and advanced analytics is transforming urban mobility by enabling smarter, more responsive transport systems. Data-driven decision-making can optimise urban mobility planning, traffic management, enhance public transport operations, and improve user experiences.

Key Points:

- Deployment of IoT sensors and connected infrastructure to monitor and optimise traffic conditions.

- Use of AI and machine learning to predict and manage mobility patterns.

- Development of integrated mobility platforms that offer personalised travel recommendations.

- Deployment of Mobility Data Spaces - digital ecosystems where data related to transportation and mobility is collected, shared, and utilised for monitoring and planning purposes.

8. Connectivity

Connectivity in transport refers to the seamless integration and accessibility of different transportation modes and networks within and between urban and peri-urban areas. It ensures that people can move efficiently and conveniently, whether they are traveling within the city or commuting from suburban or rural areas. Connectivity encompasses both physical and digital dimensions.

Key Points:

Physical connectivity:

- Linking peripheral areas with urban centres: Enhancing public transport to connect suburbs and rural areas with city centres.

- Multimodal Passenger Hubs and Freight Terminals: According to the revised TEN-T regulation, developing integrated hubs in urban nodes to facilitate smooth transitions between different transport modes for both passengers and freight.

- On-Demand and Demand-Responsive transport services: Flexible, real-time transportation options like ride-hailing and micro-transit that adapt to user needs and dynamic routing.

Digital connectivity:

- Mobility as a Service (MaaS): Integrating various transport modes into a single digital platform for planning, booking, and payment.

- Real-time information systems: Providing up-to-date travel information to optimise user decisions.

- Contactless payments and ticketing: Streamlining the user experience with digital payment and electronic ticketing systems.

9. Mobility and Logistics Hubs

Mobility hubs are centralised locations where different modes of transport converge, making it easier for people to switch between them. These hubs facilitate seamless multimodal travel and can include amenities like (cargo) bike rentals, EV charging stations, and co-working spaces.

Key Points:

- Strategic placement of mobility hubs at key locations.

- Integration with public transport and shared mobility services. Provision of parcel delivery and collection, thus alleviating last mile logistics pressure, including use of the cargo bikes.

- Development of community-centric spaces that offer additional services and conveniences with a variety of shared transport options.

10. Innovative Aerial Services

Innovative Aerial Services, including Urban Air Mobility (UAM) are an emerging trend that envisions the use of drones and / or electric vertical take-off and landing (eVTOL) aircraft for urban deliveries, inspection (aerial operations) and transportation. There is a potential to alleviate ground traffic congestion and offer rapid, point-to-point travel within cities.

Key Points:

- Development and testing of eVTOL aircraft within the overall mobility mix, with the emphasis on considerate use cases (medical, security, logistics).

- Creation of vertiports and infrastructure to support aerial mobility in conjunction with the city's planning goals.

- Regulatory advancements to ensure safety, cybersecurity and integration with existing ground and airspace, including the integration of UAM into SUMPs.

- Stakeholder and citizen engagement to investigate user acceptance and tailor solutions to effective needs.

b. Gap analysis of Urban Mobility

The following summary outlines ten critical gaps identified in the current landscape of mobility, as per the sub-group's work and discussions. These gaps highlight the challenges and opportunities in integrating technological advancements, addressing socio-economic disparities, improving governance models, and planning for future trends in mobility. As such, they are not the exhaustive list of challenges, but a very good starting point, which led WG6 towards key recommendations, presented in the next chapter.

1. Inclusive participation

To develop well-rounded recommendations, it's essential to include users, i.e. surveys among citizens (as the cities' "users"). This approach prevents solutions from being confined to a narrow perspective and ensures that the needs and preferences of a diverse population are considered. Engaging citizens in the decision-making process helps to gather valuable insights and feedback, which can lead to more effective and accepted mobility solutions. Including a wide demographic in surveys ensures that policies are inclusive and reflect the actual mobility challenges faced by all community members, including those from marginalised groups. The citizens should have strong interface with the professionals within the public authority. It's recognised that more often than not, this is not the case. Overall, it is really valuable to organise participation not solely on project-base, but realise a general understanding (two-ways) between the City administration and citizens. One example can be via a specific neighbourhood approach in which a regular contact between City representatives and citizens is facilitated.

2. Use Cases for Emerging Technologies

New technologies such as Cooperative, Connected, and Automated Mobility (CCAM), Artificial Intelligence (AI), and Urban Air Mobility have various applications that can enhance traffic efficiency, safety, and environmental sustainability. Identifying and integrating these technologies into urban frameworks is crucial for realising their potential benefits. For example, CCAM can improve traffic flow and reduce congestion through real-time data sharing between vehicles and infrastructure. AI can enhance predictive maintenance and operational efficiency, while Urban Air Mobility can offer innovative solutions for last-mile delivery and emergency responses (e.g. medical defibrillators), alleviating ground traffic congestion or overcoming the negative side effects of it.

3. Addressing the Mobility Divide

The "mobility divide," influenced by income and education disparities, poses a significant challenge. Equitable access to transportation services is vital to ensure that all population segments benefit from advancements in mobility, reducing socio-economic inequalities. Low-income individuals and/or those with limited education often face barriers to accessing reliable and affordable transportation, which can affect their employment opportunities, healthcare access, and overall quality of life. An observation of "transport poverty" has also noted by the WG6, i.e. lack of transport options to the underprivileged and low-income categories of the users (citizens). Addressing this divide requires targeted policies that provide subsidies, improve public transport infrastructure in underserved areas, and promote affordable mobility options. Additionally, the visions of proximity/15-minute cities should aim to reduce the risks of 1) gentrification, which are evident in cities that have significantly improved services and mobility in central areas but not in peripheral and suburban areas, and 2) exacerbated social tensions, such as those arising from the mandatory use of zero-emission vehicles, which are still costly.

4. Governance and Data Management

Effective governance models are needed for data accessibility and sharing. Clear guidance and frameworks can enhance transparency, support data-driven decision-making, and facilitate the integration of various mobility solutions. Establishing standardised protocols for

data collection, storage, and sharing ensures that all stakeholders, including public agencies, private companies, and researchers, have access to accurate and relevant data. This can lead to more coordinated efforts in developing and implementing mobility strategies, ultimately improving service delivery and innovation. For sure the EU co-funded projects about (cities and regions) Mobility Data Spaces, e.g. PrepDSpace4Mobility[16], deployEMDS[17] and Member States empowered NAPCORE[18] are the way forward in addressing the above challenges.

5. Cybersecurity in Mobility

The digitalisation of mobility systems increases the risk of cyber-attacks. Developing robust risk mitigation strategies and resilience plans is essential to protect critical infrastructure and maintain public trust in these systems. Cybersecurity measures should include regular vulnerability assessments, implementation of advanced encryption technologies, and educational efforts, including for example, employee training on cybersecurity and best practices. Additionally, establishing protocols for incident response and recovery can help minimise the impact of cyber-attacks and ensure a swift return to normal operations, safeguarding both data and physical infrastructure.

6. Data Gaps in Mobility Metrics

There is a significant lack of data on fatalities and injuries per distance/time travelled for pedestrians and cyclists, hindering accurate safety assessments. Collecting and analysing exposure data is necessary for targeted interventions to improve safety. This data can provide insights into high-risk areas and the effectiveness of current safety measures, guiding infrastructure improvements such as better lighting, pedestrian crossings, and dedicated bike lanes. Accurate exposure data also helps in benchmarking progress and setting realistic safety goals, ultimately reducing fatalities and injuries.

7. Infrastructure for Urban and Inter-Urban Travel

The lack of infrastructure and vehicles for urban-rural and / or inter-urban coach and bus transport, including electric tourist coaches, is a barrier to sustainable mobility. Enhancing the linkage between the Trans-European Transport Network (TEN-T) and complementary non-private car services is crucial for developing an efficient transportation network. Investing in electric long-distance coaches and / or rail can reduce carbon emissions and provide a greener alternative to car travel. Additionally, improving infrastructure such as charging stations, bus/rail terminals, and seamless transfer options between different modes of transport can enhance the overall travel experience and encourage the use of sustainable transport options.

8. Equity in Mobility Access

Ensuring mobility for all, particularly children, elderly, people with disabilities, and other vulnerable groups, is critical from an equity perspective. Designing policies and infrastructure to accommodate diverse needs can promote inclusive transportation. This includes implementing features such as wheelchair-accessible vehicles, tactile paving for visually impaired individuals, and safe routes for children to travel to school. Policies should also address fare affordability and provide targeted support to ensure that vulnerable groups are not disproportionately affected by transportation costs, thus promoting social inclusion and equal opportunities.

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[16] PrepDSpace4Mobility (2023) *Laying the foundation for a common European mobility data space* https://mobilitydataspace-csa.eu/ (Accessed: 15 May 2024).

[17] deployEMDS (2024) *Towards a common European mobility data space (EMDS)* https://deployemds.eu/ (Accessed: 15 May 2024).

[18] NAPCORE (2022) *National Access Point Coordination Organisation for Europe* https://napcore.eu/ (Accessed: 15 May 2024).

9. Financing and Business Models

Securing financing, funding and developing sustainable business models are fundamental challenges in implementing new mobility solutions. Innovative funding mechanisms and public-private partnerships can support the development and scaling of sustainable transportation projects. Examples include leveraging private investment through public subsidies, implementing congestion pricing to fund infrastructure projects, urban space rental schemes, dynamic pricing for the kerbside management, and ultimately exploring new revenue streams such as advertising or service subscriptions, are a few of these options. These financial strategies can help overcome budget constraints and ensure the long-term viability of mobility initiatives, fostering a more sustainable and integrated transportation system. Moreover, innovation procurement plays a crucial role in this context. Engaging with SMEs and startups to foster open innovation partnerships is essential. This involves providing seed funding and adjusting procurement methods to prioritise innovation, thus avoiding the disruption of successfully tested solutions that otherwise face lengthy tender procedures. By streamlining procurement processes, cities can more effectively incorporate innovative mobility solutions and support the growth of emerging businesses in the transportation sector.

4. Recommendations

a. Key Recommendations

1. Mobility Network Management:

Recommendation: Facilitate a truly integrated multimodal mobility network (or traffic) management system which encompasses multimodal transport options (on both demand and supply side[19]), to optimise and tailor Mobility-as-a Service (MaaS) solutions.

- Addressed to: All relevant governance levels
- Priority: Medium term
- Contributors: European Commission, Member States (national policies and regulations), Local Authorities (local implementation and enforcement)

Actions:

- The European Commission should make sure that the relevant framework is implemented and provide funding for the pilot projects showing the generated customer value by integrating the most important stakeholders into a integrated multimodal mobility network management system.
- Member States should develop national strategies and support local implementation.
- Local Authorities should implement Mobility Network management systems tailored to their specific needs.

2. Environmental Sustainability:

Recommendation: Set targets for modal split evolution and incorporate health benefits of active mobility into transport project cost-benefit analyses.

- Addressed to: All relevant governance levels
- Priority: Short term
- Contributors: Member States (national policies), Local Authorities (local implementation)

Actions:

- The European Commission should consider establishing modal split indicators and promote tools like the WHO Health Economic Assessment Tool (HEAT), where relevant[20].
- Member States should integrate these targets and tools into national transport policies.
- Local Authorities should implement projects that encourage active mobility (i.e. walking & cycling) and track their health benefits.

[19] MTMC *Multimodal Traffic Management: Roadmap for 2030 and beyond* (2024); available at https://www.frontier-project.eu/MTMC_Roadmap_Oct2024.pdf (Accessed: 25 October 2024).
[20] World Health Organisation (WHO) *Health economic assessment tool (HEAT) for walking and cycling* (2023). Available at: https://www.who.int/europe/tools-and-toolkits/health-economic-assessment-tool-for-walking-and-cycling (Accessed: 15 May 2024).

3. Public and Shared Autonomous Vehicles (AVs):

Recommendation: AVs should be supported for all transport options, especially for public and shared transport.*

- Addressed to: All relevant governance levels
- Priority: Short term
- Contributors: Member States and Local Authorities (planning and regulations)

**It is fair to say that during the discussions within subgroup 6, there were different views considering prioritisation within the above recommendation.*

Actions:

- The European Commission should make sure that the relevant framework is implemented and provide funding for the pilot projects for public and shared AV infrastructure.
- Member States should support the relevant framework being implemented and provide funding for the pilot projects for public and shared AV infrastructure.
- Local Authorities, including PTAs and PTOs, should develop policies and participation models to encourage the shared use of AVs and integrate them into its public transport systems.

4. Urban Space Design:

Recommendation: Reorganise urban street space to optimise sustainable modes of transport and overall transport system efficiency, considering both local and network-wide impacts.

- Addressed to: All relevant governance levels
- Priority: Long term
- Contributors: Local and Regional Authorities (regional planning and support), European Commission (funding and best practices)

Actions:

- Local Authorities should develop comprehensive (sustainable) urban mobility plans.
- Regional authorities should support with regional planning and integration.
- The European Commission should provide funding and share best practices.

5. Inclusivity and Acessibility:

Recommendation: Enhance accessibility and inclusivity in transport designs, as well as provision of the proper maintenance of the public areas and pavements, to cater for all users, including those with impairments and consider gender issues.

- Addressed to: All relevant governance levels
- Priority: Short term

- Contributors: Local Authorities (local implementation), Member States & European Commission (guidance and funding)

Actions:

- The European Commission should support through funding and sharing inclusive design best practices.
- Member States should develop national guidance for inclusive transport design.
- Local Authorities should implement the guidance for inclusive transport design in public transport systems and infrastructure projects.

6. Skills and Training:

Recommendation: Promote continuous skills development for city and public sector staff, focusing on new technologies and regulations and integrated mobility system planning.

- Addressed to: All relevant governance levels
- Priority: Medium term
- Contributors: Member States (national training programs), Local Authorities (local implementation)

Actions:

- The European Commission should fund training programs and establish skill development guidance.
- Member States should implement national training initiatives.
- Local Authorities should ensure local staff participate in continuous professional development.

7. Inclusion of innovation:

Recommendation: Facilitate inclusion of innovative solutions into urban transport schemes, incorporating innovation procurement and fostering the participation of startups and SMEs within the local ecosystems.

- Addressed to: All relevant governance levels
- Priority: Medium term
- Contributors: European Commission, Member States (national incentives), Local Authorities (local business models)

Actions:

- The European Commission should provide funding mechanisms to accelerate the innovation in urban areas and to create guidance which should encourage local institutions like PTAs and PTOs to cover extended responsibilities such are sharing mobility schemes, active mobility planning or new forms of public transport (ride hailing, demand responsive transport etc.) as part of their exclusive market participation.
- Member States should offer national incentives for sustainable transport options.

- Local Authorities should develop and implement business models tailored to their local contexts, including startups and SMEs as part of the local ecosystems to enable the development, business sustainability and upscale of innovative solutions.

8. Public Engagement and Testing:

Recommendation: Engage residents in temporary redesigns of street functionality and allow public testing of alternative transport modes (e.g. Tactical Urbanism).

- Addressed to: All relevant governance levels
- Priority: Short term
- Contributors: Regional Level (support and coordination)

Actions:

- Local Authorities should organise initiatives like Ghent Living Streets and facilitate public testing of new transport modes.
- Regional authorities should support local initiatives through coordination and resources.

9. Implementation and Pilot Projects:

Recommendation: Remove administrative obstacles to implement new solutions (e.g. to provide necessary charging infrastructure), promote pilot projects to evaluate market deployment potential, and establish Living Labs as permanent and continuous ecosystems for local innovation, involving the private sector.

- Addressed to: All relevant governance levels
- Priority: Medium term
- Contributors: Local Authorities (local implementation), European Commission (funding and guidance)

Actions:

- Member States should streamline administrative processes for the installation of charging infrastructure.
- Local Authorities should implement pilot projects and establish Living Labs to foster innovation and upscale at the local level.
- Local Authorities should actively involve the private sector in these initiatives to leverage their expertise and resources.
- Local Authorities should implement and manage charging points and pilot projects.
- The European Commission should provide funding and develop guidance for pilot project implementation and the establishment of Living Labs. The European Commission should provide funding and share best practices for public engagement.

10. Communication and Education

Recommendation: Mobility is in many aspects about communication and perception. People make decisions based on their perception and therefore, it is important for cities and mobility professionals to understand the power of communication, participation and marketing.

Furthermore, we need to empower the next generation of both professionals, but also users of the future transport and mobility systems through training and education.

- Addressed to: All relevant governance levels
- Priority: Medium term
- Contributors: Local Authorities (local implementation), Member States and European Commission (funding and guidance)

Actions:

- Develop education and training initiatives to equip professionals with necessary digital, green, and social skills.
- Promote training academies and interdisciplinary degrees, integrating green skills, digital competencies, and social justice into curricula.
- Foster collaboration between academia, industry, and government to align educational programs with market needs.
- Ensure continuous adaptability and proficiency in latest technologies for transport professionals.
- Provide training and capacity building activities for city planners and policymakers to adopt and manage innovative practices and technologies effectively.
- Educate cities and mobility professionals on the importance of communication and marketing strategies to influence public perception and behaviour.
- Promote public engagement campaigns and the use of modern marketing techniques to increase awareness and acceptance of new mobility solutions.

5. Conclusion

In summary, the report, and the sub-group, apart from the presented key recommendations, concludes, that the future of urban mobility in Europe is something that can't be easily predicted. In particular this is the case, as the forecasting horizon elongates, and the number of variables and uncertainties in the world change/increase.

Therefore, the main suggestion of the sub-group to the EC DG MOVE is to continue its efforts, perhaps under the auspices of EGUM to assist whenever possible in establishment of inclusive and sustainable future urban mobility framework in Europe, for the benefit of all citizens.

6. Annexes

The document present two annexes, one is the list of acronyms and abbreviations used in the document, and the second one is the list of participants in the work of the sub-group.

a. List of acronyms and abbreviations

AV	Autonomous Vehicle
CCAM	Cooperative Connected and Automated Mobility
EC	European Commission
EGUM	Expert Group for Urban Mobility
EV	Electric Vehicle
eVTOL	Electric Vertical Take-Off and Landing
HEAT	Health Economic Assessment Tool
IoT	Internet of Things
MaaS	Mobility-as-a-Service
MS	Member States
PTA	Public Transport Authority
PTAL	Public Transport Accessibility Levels
PTO	Public Transport Operator
SDG	Sustainable Development Goals
UAM	Urban Air Mobility
UN	United Nations

b. List of organisations participating in the subgroup

Nominated representatives of EGUM members		
Vladimir Vorotovic	ERTICO-ITS Europe	ORG
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Ceri Woolsgrove	ECF	ORG
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