How to ensure prioritization of public transport in urban areas to enable the operation of multimodal, quicker and more punctual, and reliable services (=real-time travel information and more operational efficiency) that will increase the use of public transport?

Public Transport EGUM Subgroup – Topic 2

Register of Commission Expert Groups and Other Similar Entities, code number E03863

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1. Executive Summary

This report explores the metropolitan public transport market and elaborates policies, strategies and tactical solutions to prioritize public transport and increase its ridership in Europe's urban areas. To this end, this report limits its scope to public transport services with significance to daily mobility in functional urban areas and their surrounding regions and utilizes a traditional definition of the notion public transport: collective passenger transport by motorized rail and road vehicles operated in consistent services patterns and available to the public at set fares.

Transportation services operate in a networked market. Consequently, integration of the different public transport modes available in an area into a unified urban and ideally metropolitan public transport system produces the most successful systems with regard to mode share, satisfaction and performance. Public authority oversight of the planning, organisation and delivery of urban mobility remain key to achieving the EU's social and environmental goals

With the withdrawal of the UK and governance changes in Poland, nowadays, all EU member states employ an authority-centric governance model for local and metropolitan public transport, where competent authorities seek to provide the overarching coordination of services necessary to overcome the natural dysfunctions of networked markets.

Public transport fares in Europe are not a market outcome but set politically and often used as a policy tool in itself. Public transport demand is widely considered rather price-inelastic. Thus, investment in public transport service level is suggested to deliver greater ridership increase on commuting and daily mobility journeys than respective fare reductions. As introduced in the overall introduction to the subgroup reports, the overall quality of a public transport system is composed by its accessibility, its connectivity, its reliability and the quality of its servicescape. In order to prioritize public transport and increase its use in urban areas, effort is required across these four system quality determinants along the following ten axis:

A. Develop and modernize public transport networks
Public transport in Europe's functional urban areas must develop itself from a commuter-oriented system to a general mobility backbone. Congested inner-city bottlenecks require capacity enlargement while areas with currently no or poor service require infrastructure and service investment to make public transport a true choice for the vast majority of journeys. Modern networks must encourage multimodal interchange from private motor vehicles into public transport at an early stage of a journey, enabled by connections to mobility hubs and park and ride facilities.

B. Produce adequate levels of service
The majority of transport demand must be met with adequate supply of public transport both temporally (e.g. late night and weekend service) and spatially (intra suburb, suburb-to-suburb, in addition to current, often city-centre oriented services). Sustainable and reliable public transport supply also drives public transport demand through sustained modal shift away from the car and by providing journey options for citizens that are currently mobility poor.

C. Improve the Public Transport Servicescape and immediate environment
Stations, stops and vehicles – and increasingly also digital interfaces must provide an overall positive backdrop of the transport service. While reliability of the service is most important, safe and pleasant station environments, comfortable rolling stock with adequate capacity, safety and security considerations and competent customer support are essential to make public transport the mode of choice. Beyond the public transport system itself, stops and stations must be well accessible from the neighbourhoods they serve.

D. Integrate into a consistent metropolitan public transport system

Public transport is most successful if fully integrated into a metropolitan public transport system, organised by a public transport authority. This allows for seamless journeys across PT modes through integrated timetabling, ticketing, information provision and incident management. Public investment and public oversight of public transport remains key to achieving our social and environmental goals.

E. Employ effective service awarding procedures and contract design

To guarantee the quality of the public transport network, PTAs and local authorities must be further enabled to leverage private sector capabilities without losing oversight or integration. Well-defined, robust and transparent competitive tenders or awarding procedures that take account of workers' needs and rights together with well-designed, innovative procurement contracts that give greater weight to quality aspects, have proven highly effective. The mandate of local and transport authorities using these tools must be further clarified.

F. Simplify fares and ticketing processes

In many European urban areas, fares and ticket systems are highly complex and can act as a barrier for new users. However, the ticket purchase is one of the few interactions between the public transport system and the customer and can be an opportunity for customer service and insight to increase public transport success.

G. Use effective Data strategies for customer information and digital service innovation

Public transport service data are generally available as open data. Data quality differs vastly across the EU and uptake as well as quality of digital services is still lacking. PTAs and their operators should aim at providing their existing customer base with state-of-the-art digital services. Opening additional streams of data, such as ticketing channels, may provide additional innovation potential and facilitate MDMS/MaaS Services, yet the transparent and non-discriminatory conditions for such re-sale must be set by the competent transport authorities that bear the real-world risks of service production, ideally according to a harmonized framework of conditions agreed on by the sector at EU level.

H. Align Urban Development with public transport planning

To increase public transport demand and reduce car dependency, sustainable land-use development must base on public transport and active-mobility-centric planning. This improves the accessibility of urban areas and enables citizens to travel less overall and make necessary journeys in a sustainable manner. Ensuring alignment of urban and commercial development with public transport early on allows for land-value capture that make public transport development more financially feasible. Ideally, adequate public transport connectivity is established in an area before residents and businesses establish themselves.

I. Orchestrate and manage mobility demand

Adjusting transport and infrastructure supply to meet increasing demand should be complemented and supported with mobility demand management policies that are capable of influencing peoples' travel behaviours, habits and mobility patterns.

J. Decarbonise public transport

The vast majority of rail-bound public transport is electric. Public transport by road, with buses and smaller vehicles like vans. is being decarbonised and great progress is being made in many urban areas in Europe. The cost of bus operation with electric vehicles is moving closer to respective diesel operation but the initial transition cost remains substantial and requires financial support – not only for vehicles but also for infrastructure at depots and along routes, and supply grid reinforcement.

2. Introduction

This report is produced by the Subgroup on Public Transport of the Expert Group on Urban Mobility, setup by the European Commission. It corresponds to the second topical focus of the subgroup: **Prioritization and ridership increase for public transport in urban areas.**

This report and the subsequent reports of the subgroup refer to specific concepts and notions related to Public Transport and the Shared Mobility realm. These included aspects related to a) Transportation as ecosystem of networked markets, b) public transport governance and market structure in Europe, c) the characteristics of public transport pricing and c) the dimensions of the public transport service level that define the quality of public transport (accessibility, connectivity, reliability and the servicescape).

These concepts and notions are defined and introduced in the subgroup's Introductory Report: The Context of Public Transport in Europe. This introductory report is a foundation to this and the subsequent reports of the EGUM subgroup on Public Transport, that all make use of these concepts and notions without further in-text explanation of these notions.

The topical reports 1-4 of the EGUM Subgroup on public transport will refer to the concepts and notions introduced in this introductory document without further explanation. The subsequent topical reports are structured as follows:

- The first topical report concerns the funding and financing of public transport and shared mobility. *(Expected at the end of Q1 2024)*
- The second topical report elaborates on strategies to increase the use of traditional, collective public transport through prioritization and operational excellence. *(This report)*
- The third topical report concerns the complementation of traditional, collective public transport with Shared Mobility services and elaborates on the wider ecosystem of Shared Mobility services in particular. *(Expected at the end of Q1 2024)*
- The fourth topical report is subdivided into focused reports: 4A concerns public transport inclusiveness and inequalities in accessing public transport services and 4B deals with the public transport sector workforce, in particular addressing skill requirements and strategies to mitigate the ongoing worker shortage. *(Both reports available already)*

This report explores the metropolitan public transport market and elaborates policies, strategies and tactical solutions to prioritize public transport and increase its ridership in Europe's urban areas. The following chapter 3 sets the scope of this report. Chapter 4 outlines the needs of public transport customers. Chapter 5 outlines overall societal needs in relation to public transport. Chapter 6 entails the actual requirements and recommendations to prioritization and ridership increase of public transport. Chapter 7 concludes the analysis and chapter 8 outlines a set of case studies utilized in the elaboration of this report.

3. Definition and Scope

As described in the introductory report, the EGUM subgroup on Public Transport **focuses on public transport services with significance to daily mobility in functional urban areas and their surrounding region.** The subgroup embraces the emerging, overall definition of Public Transportation [1] that includes any forms of transport, which are available to the public. This includes buses, trains, metros, tramways, cable cars, bike- and car- moped- and scooter-sharing, taxis, ride hailing, demand-responsive transport and ride-pooling, publicly availably forms of car-pooling, etc.

This broad definition starts at the notion of access without ownership, acknowledging that a vast variety of transport services exist that are available to the general public to fulfil mobility needs without the prerequisite to privately own a transport asset, such as a car or a bicycle.

However, this particular paper elaborates on the prioritization of those services that have more traditionally been described by the notion Public Transport, such as buses, tramways, metros and trains. In the scope of this very report, **Public Transport describes collective passenger transport by motorized rail and road vehicles, as well as boats, operated in consistent services patterns and available to the public at set fares.**

4. Needs of public transport customers

Within a city's boundaries, public transport usually acts as a generic mode of transport that, while morning and afternoon peak supply does exist, is able to service a large variety of journeys (e.g. getting to work, to a public service, to visit friends, to get healthcare, for cultural and recreational purposes) throughout the day. When looking beyond a city's limits and into the metropolitan area and surrounding regions, public transport services generally become less frequent as population density decreases and distances increase. Services become often somewhat focused on specific mobility demands (e.g. getting children to school or commuter traffic for general office hours). In many metropolitan areas, public transport has historically been developed in the first place to facilitate commuter journeys, connecting cities, towns and villages with big city centres and otherwise large employment centres in the mornings and reverse in the afternoons. As a result, public transport has historically been weak in serving journeys outside of these peak-demand corridors (e.g. within suburban towns or from suburb to suburb along the outskirts of cities) or other types of journeys (e.g. recreational). Many cities and regions currently heavily invest to serve these historically somewhat overlooked corridors and mobility demands. And where these investments have already materialised, customer demand is often greater than expected.

This translates directly into the modal share of public transport, which is generally higher within cities, as more types of journeys are served, when compared to the metropolitan area (so the city and its urban and suburban surrounding), as public transport is competitive for fewer journey motives. This is due to lower overall service levels but also relates to the characteristics of the built environment: location density decreases, location density decreases and distance increases, leading to lower potential to bundle demand for collective transportation. In addition, the infrastructure system that gradually developed since the 1960s further exacerbates these effects: set out to facilitate and induce car journeys, the increased

[1] Redefining public transport. (n.d.). Retrieved from https://www.uitp.org/projects/redefining-public-transport/

demand for road- and parking space further increases distance and decreases density, making public transport services – in combination with walking – an ever less competitive offer. For citizens living and working in suburban environments, there has often been no other logical choice than owning private automobiles and drive to facilitate a large percentage of their journeys.

Nevertheless, public transport services in Europe's cities and metropolitan areas are overall advanced and facilitate millions of journeys each day already today. Some of these customers make use of public transport services due to a lack of other mobility options - think, for example, of youngsters who are underage to drive cars or elderly citizens who feel physically unable to cycle, walk extended distances or drive anymore. Also, citizens whose economic situation does not permit the purchase of a private automobile or any other transport asset in that regard. Without a minimum, adequate level of public transport, these members of society would be severely limited in their freedom and possibility to participate and use their socio-economic potential. [2]

Many public transport customers do have alternative options for all or some of their journeys but do chose public transport actively for some of their journeys, because of the specific comfort, speed or convenience of the connection in question or the overall cheaper price point and full cost transparency of public transport.

Nevertheless, many non-customers of public transport prevail, even in cities with excellent levels of service. Non-customers often perceive the private car as more attractive or more convenient option by default, also for journeys where public transport may offer an objectively better option. This may be explained by the perception of sunk cost associated with the purchase and upkeep of a transport asset. Also, the fact that next to objective characteristics of a given journey, like travel time, cost, comfort and flexibility, transport mode choice is often influenced by habits, emotions and symbols or behaviour of perceived status.

Public transport is to become the backbone urban mobility and must therefore become a true choice for citizens and a majority of their journeys. In this regard, not only aspects that determine the objective quality of public transport (e.g. travel speed, frequencies, density of the network, operating hours and pricing) but also aspects that influence the perceived quality of the system (reliability and the quality of the servicescape, potential for identification with the system, social acceptability, etc.) need to be taken into account.

A survey for the European Commission's Report on the Quality of life in European cities asked people about the key aspects that determined the satisfaction of public transport: affordability, safety, accessibility (stops are easy to get to), frequency, and reliability of service (public transport arrives on schedule). All five aspects have a significant impact on satisfaction with public transport, but the physical access to a public transport stop was ranked as the third most important factor in relation to satisfaction. [3]

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[2] Martens, Karel. (2017). Transport Justice: Designing Fair Transportation Systems.

[3] N.d.). Retrieved from https://ec.europa.eu/regional_policy/information-sources/maps/quality-of-life_en#:~:text=Results%20from%20the%202023%20survey,cities%20in%20eastern%20Member%20States

Connectivity, as determined by frequency of service, was identified to have the greatest impact (If a resident is satisfied with public transport frequency, his or her average satisfaction with transport increases) followed by reliability, accessibility (proximity to the network and numbers of locations accessible with the service) and safety. Affordability or price in general seem to be the factor that contributes the least to satisfaction, which is consistent with the literature (See Introductory Report of EGUM Subgroup on PT).

As Public transport is not able to fulfil all mobility demand by itself, particularly when taking a metropolitan- or functional urban area view of urban mobility, it is essential that public transport services that do exist are well integrated amongst themselves and with Shared Mobility services that are able to extend its reach or provide the most sustainable possible alternative for those journeys public transport cannot serve (See topical report 3 of the EGUM Subgroup on PT).

5. Societal Needs

The latest report by the Intergovernmental Panel on Climate Change (IPCC) has confirmed the responsibility of human activities for global warming. Despite all our efforts, the effects of climate change are here. They are weakening ecosystems, affecting human health and threatening the resilience of networks, such as transport networks, and consequently the continuity of many economic activities.

The effects are already visible all over the world. Over the past few months, we've all experienced these increasingly frequent disruptions. To limit the extend and impact of climate change and fulfil its commitments made in the Paris Agreement, the EU and its member states will have to decouple our economic well-being and development from the use of hydrocarbon fossil fuels. As acknowledged in the Green Deal and subsequently in the Smart and Sustainable Mobility Strategy, the transport sector has an important role to play and does not live up to this responsibility: Transportation is the only sector in the EU that has so far not been able to reduce its emissions, which increases its relative impact as other sectors, like energy and industry, decarbonise at sometimes slow but steady pace. [4]

The Green Deal sets out a path to a climate neutral Europe that is just transition with the goal to address and ameliorate social matters in this techno-economical shift as well. A shift towards a mobility system with public transport as its backbone addresses this multitude of goals quite effectively: A well designed and managed public transport system is very resource efficient (regarding material inputs required, energy efficiency and emissions, as well as use of space), inclusive, affordable and safe, while it reduces noise and air pollution, supports an overall healthy lifestyle (as it always comes in a package with walking and ideally cycling as well), spurs economic development and creates local jobs. [5]

All these dimensions of sustainable development are naturally achieved if public transport truly becomes the backbone of urban and metropolitan mobility, meaning it becomes a true choice – ideally the preferred choice – for citizens for the majority of their journeys in cities and functional urban areas. Amended with Shared Mobility services (as described above and in topical report 3), that extend the access to the publicly accessible, sustainable mobility system

[4] (N.d.-a). Retrieved from https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-transport

[5] (N.d.-a). Retrieved from https://cms.uitp.org/wp/wp-content/uploads/2022/01/Public-Transport-Benefits-Mobility-for-YEU-Benefits-for-all.pdf

beyond the reach of public transport and provide the most sustainable possible alternative for those journeys public transport cannot serve at all.

In addition to the need of a just transition that public transport can support formidably, the need for adjustment to the effects of climate change must not be overlooked. Heat waves, cold snaps, storms and heavy rain and floods affect all transport networks. Transport infrastructure – and in the case of public transport also the rolling stock and services cape in general - must therefore become more resilient and adequately address this new reality (flood-proof infrastructure, heat-resistant railway lines, air conditioning in vehicles and waiting areas, etc.)

6. Recommendations for more PT Prioritization & Ridership

A. Adequate development and modernization of the public transport networks

Priority: high
Levels of Action: All levels (EU, National, Regional and local authorites, Public Transport Authorities/PTA, Public Transport Operators/PTO, PT Supply Industry)

Public transport in Europe's functional urban areas must **develop itself from a commuter oriented system to a general mobility backbone**, for it to deliver the best possible contribution to the multitude of policy goals at EU, national, regional and local level. Nowadays, public transport systems are organised in a way that correlates well with commuter demand, meaning public transport infrastructure (e.g. railway lines) and service patterns (e.g. times, days and frequencies of operation) are optimized to facilitate commuting journeys. The further outside of a city centre and into the suburbs, towns and villages of a functional urban area the more transport networks become radial, oriented at the city centre of the metropolis which traditionally hosts most employment and education opportunities. Services run frequent towards to city in the morning and out of the city in the evening but may become infrequent, irregular or even non-operational during the day, in the evenings at night or in weekends. Journeys that do not align with this daytime commuter travel pattern – a predominantly male mobility pattern - are less easily undertaken by public transport.

To support multistop-journeys – a predominantly female mobility pattern, suburb-to-suburb commutes, and address the travel patterns and mobility demands that are becoming increasingly obscure due to more flexible work arrangements, Europe's metropolitan public transport needs to develop into a true backbone for the majority of journeys within functional urban areas. This must include:

- a change of orientation, introducing decent tangential connections in the networks, connecting the city's outskirts, suburbs, towns and villages with one-another, so citizens do not have to travel into the centre for a suburb-to-suburb journey.
- A decent service level at evening and nighttime, to allow shift workers commutes (e.g. in the medical sector) and leisure travel to take place sustainably and safely.
- A decent service level on weekends and holidays, also addressing particular leisure transport demands. Citizens that require a car for their weekend journeys, will likely use it for other journeys as well.

Many **public transport services are highly congested**, particularly during peak times towards the urban core, while other parts of functional urban areas suffer from an overall lack of service. Development of adequate networks thus requires both:

- a removal of inner-city bottlenecks where public transport is congested through infrastructure upgrades, new – often somewhat parallel - infrastructure to relief

bottlenecks and increased rolling stock and station capacity, and reallocation of roadspace.

- the introduction of totally new PT routes and an increase of service level where public transport services are currently poor and do not provide the connectivity required to be a first choice for a majority of journeys.
- Include push factors to get rid of what creates bottle necks in the inner-city: the use of private car. Active policies to reduce car traffic such as congestion tax, conversion of traffic lanes to bus lanes, removal of parking spaces, toll zones and lowering of the speed limit for cars.

B. Production of adequate levels of service

Priority: high
Levels of Action: National, Regional and local authorites, Public Transport Authorities/PTA, Public Transport Operators/PTO, PT Supply Industry

The public transport experience can be improved through reliable and easy-to-use services. Networks of services should be required to be:

- Frequent: with adequate capacity for the peaks;
- Reliable: providing even service intervals when frequencies are high and running to time when they are low.
- Simple: easy for passengers to understand and remember, and well integrated with other public transport;
- Comprehensive: providing service to all areas and recognising the needs of local people from all sections of the community

It is important to match transport demand with adequate supply of service both temporally and spatially, for instance through real time monitoring of demand, special timetables for special days, high capacity vehicles to meet the peak daily or hourly demand, integration with other modes of transport, optimisation of maintenance schedule of trains enhance reliability by reducing deboarding, interruption, regular monitoring how these measures are improving customer satisfaction.

C. Improvement of the Public Transport Servicescape and immediate environment

Priority: high
Levels of Action: National, Regional and local authorites, Public Transport Authorities/PTA, Public Transport Operators/PTO, PT Supply Industry

Invest in high quality and efficient operations focusing on availability, frequency, reliability, punctuality, safety and security, comfort, cleanliness. Frequency and passenger information are a top priority. The time spent waiting for the service can be a major part of total travel time and the environment this time is spent in can impact the experience of the entire journey.

Citizens and visitors want reliability and accurate information about the service on scheduling, routes and pricing but in particular real-time performance before and during their journey.

High quality and efficient operations also mean high-capacity systems, with comfortable seating and smooth and safe driving, easy and fast boarding and an inclusive design. It means also having service that are not stuck in traffic but have reserved lanes and priority at traffic signals. This aspect is important to ensure the punctuality and reliability of the system but also to make public transport the preferred mode of transport, as travelling with public transport is then faster than with one's private car and reinforce this message through its public image.

A corporate culture focusing on service excellence should, by default, ensure that the workforce represents the citizens it serves. As a service for all, public transport must strive to recruit people from of all types of backgrounds, better representing the customer's needs and making them feel welcome. Studies point out that a diverse workforce increases productivity promotes innovation and improves decision making or problem solving. There are several measures that public transport can implement to make its workforce diverse and inclusive, and become competitive in the recruitment market. This is further explored in Topic 4 of the EGUM Subgroup on public transport.

D. Integration into a consistent metropolitan public transport system

Priority: high
Levels of Action: All levels (EU, National, Regional and local authorites, Public Transport Authorities/PTA, Public Transport Operators/PTO, PT Supply Industry)

Ideally, there is one transport authority (or a well-established collaboration of the local and regional transport authorities in a given region) in place for managing and co-ordinating all public transport services in the city, metropolitan area and surrounding region. This allows for seamless intermodal integration and timetabling, smart ticketing and apps for users to find information and carry out their journeys effectively and comfortably. These transport authorities need legal certainty, clear mandates from different levels of government and flexibility to organise and provide public transport services, promote active modes and enable meaningful complementation with Shared Mobility.

European legislation, particularly the PSO Regulation on land transport for passengers, generally recognises competent transport authorities and acknowledges these agencies as a product of local and regional decision making within the national public governance and jurisdiction frameworks. Such speciality authorities at local or regional scope, however, may not have a legal footing or clarity of jurisdiction in all Member states. Member states should enable local and regional bodies to form transport authority organisations or collaborations with clear mandates at the metropolitan scope, reflecting the interconnection of communities within functional urban areas and their surrounding regions and provide the capacity and resources to these authorities for:

- Set up regulatory framework and market structure (contracts, concessions, in-house direct award, etc.) for the various local (city level) and common metropolitan mobility ecosystems
- Define minimum levels of service, integrate timetables and fares into a consistent system, potentially with a clear overarching brand, sales capabilities, information and customer service channels
- Create a clear, fair and transparent market for transport providers and control natural/legal monopolies through contractual relations and dialogue.
- Liaise with the wider mobility ecosystem. This means engaging with all actors.

The mandate of these public speciality organisations or collaboration bodies might not be limited to public transport but could include tasks associated with infrastructure management, toll collection, urban development, etc.

E. Effective service awarding procedures and contract design

Priority: high
Levels of Action: EU, National, Public Transport Authorities/PTA, Public Transport Operators/PTO

Having well-defined contracts and clear tendering documents that are defined in cooperation with the mobility stakeholders including trade unions are efficient tools to influence the quality

of the public transport network and the connection between the stakeholders. They are also a way to promote clean mobility and consider the integration of all sustainable mobility services.

The organization model for the provision of public transport services to passengers varies from one network to another. Public investment and control of public transport remains key to achieving our social and environmental goals.

However, Quality Incentive Contracts can help to provide a significant increase in ridership and revenues, while implementing its route-by-route approach. The contractual agreement also provides flexibility for the private contractors to propose changes in the provision of services to better meet the demand, which can be highly beneficial for passengers. With a particular focus on quality of the services metrics of performance, can allow for operators and contractors to take leadership in offering new features to facilitate accessibility for and developing new technologies. The strong partnership collaboration approach, has been shown in cities to increase the level of satisfaction of passengers, as demonstrated in customers surveys.

In general, the greater the alignment of objectives between the community, the agency, the operator and trade unions -- with the community's objectives guiding the rest and being evaluated on a regular basis – the more effective such a partnership can be.

F. Simplification of fares and ticketing processes

Priority: medium
Levels of Action: National, Regional and local authorites, Public Transport Authorities/PTA,

Fares structures and ticketing processes should be developed and realised in a way that makes them an enabling aspect of public transport rather than a barrier to the use of services. Fare and ticketing needs to be available, accessible, affordable and acceptable for everyone.

- **Available** – Information on fares and ticketing possibilities must be clear and available at least at every entry point into the network. Digital ticketing solutions support this, however, analogue ticketing must be provided as well, to deal with aspects of digital illiteracy as well as enhanced privacy for passenger that deem this aspect important.
- **Accessible** – As a baseline infrastructure of modern society, public transport must be accessible to all groups of citizens and visitors. Ticketing processes and fare information must therefore be accessible in both digital and analogue channels - also to member of society in precarious situations (e.g. unbanked, homeless, etc.)
- **Affordable** – people should not be 'priced out' of using public transport services and see their mobility restricted as a result. Different pricing grids could be put in place, including social tariffs designed to be affordable for people with low incomes and offering reduced fares for school children, the elderly and the disabled. While fare simplicity is an important aspect, one size does not fit all. It should therefore be easy for people to find and access a range of fare products that meet their needs and offer the best value while maintaining simplicity and consistency within the fare structure.
- **Acceptable** – For many citizens and visitors, the ticketing process may be the only customer interaction with the public transport authority or its respective operators. This process should be designed in a way that is acceptable, welcoming and established a sense of trust and ownership of the public transport systems.

It is important that making sure ticketing and information systems are integrated to provide seamless travel. Ticketing systems should allow easy transfer between modes, operators and other mobility services. Automatic fare collection systems and contactless smart cards, contactless bank card payment and post pay capping offer high performance, and advantages

in terms of cost, reliability, security and speed of transaction. Trusted data-sharing policies and standards will enable the integration of information, booking, ticketing and payment and make it easier to go multimodal. One key step for the public transport sector is bringing their information, ticketing and payment systems up to speed to enter the digitalised and MaaS era.

In this respect, when it comes to EU-wide approaches to integrated ticketing, it will be important to recognise the importance of local diversity and the principle of subsidiarity. As such, oversight and powers to orchestrate this market should remain with local and regional transport authorities but that any regulation or policy initiative must be applicable to all types of mobility operators and not be limited to public undertakings, while recognising the specific nature of the contract between PTAs and PTOs. Local solutions work best for local markets and one size does not fit all.

G. Effective Data strategies to foster (non)customer information and service innovation

Priority: high
Levels of Action: All levels (EU, National, Regional and local authorites, Public Transport Authorities/PTA, Public Transport Operators/PTO, PT Supply Industry)

Data is one of the crucial enablers for the public transport sector to lead on the innovation and digitalisation needed to benefit all citizens and mobility modes. However, the public there is a lot of potential for enhancement, but it will not solve all urban mobility problems on its own. MaaS platforms can become a valuable tool to develop shared use of transport services, and to support public authorities in transforming mobility patterns across their areas, even though its business models are precarious, (the issue of MaaS is further elaborated on in Topic 3).

Data issues come along with the digitalisation of transport systems; a key consideration is how to establish true reciprocity and a fair level-playing field. The new role that data plays within organisations enhances the necessity for public operators and authorities to develop a data strategy focusing on sustainability and value creation. This trend encourages the integration of data into the decision-making process to improve business performance.

Data has value and the public transport sector should foster its process of digital transition with a clear strategy on data, mindful of its costs and benefits. Opening data without proper delimitations can lead to strategic and commercial competitive disadvantage, on the other hand, cooperation and the sharing of data can stimulate innovation.

Data sharing may bring many uncertainties but only a collaboration between the different stakeholders and sectors will provide strong, consistent and sustainable mobility services to citizens. As such, public transport authorities and operators should understand the unique properties of data as an asset and find the right approach to value data. Above all, data sharing as a factor should be geared towards enhancing sustainable urban mobility and defining parameters and conditions to ensure that the outcomes achieve this goal. This requires a collective effort to align all stakeholders' objectives.

H. Public Transport Oriented Urban Planning

Priority: high
Levels of Action: National, Regional and local authorites, Public Transport Authorities/PTA

When planning for public transport, it is important to analyse the major problems and opportunities related to mobility in the entire functional urban area, by using an appropriate set of reliable and representative data sources. The first step is to identify what data is needed, what information is available, and what is still lacking. This analysis should help to understand the current service quality, what new public transport routes are needed, or how many public transport vehicles and drivers are needed to operate on them at different times of day. This assessment can help to identify investment needs, focused on improving the satisfaction of

public transport and the indicators have been developed within SUMI and are relevant for assessing the quality of services for public transport.

Development of adequate public transport networks through an integrated approach to land-use and transport planning. This can be done through building a planning approach based on sustainable urban management and development, using integrated mobility plans or transit-oriented plans to deliver the vision.

Having an integrated planning process and a reinforced cooperation between the public and private bodies, having coherence between land-use plans and transport plans as well as good integrated processes, and having structures at the planning and execution levels are efficient mechanisms that can be put in place to achieve sustainable mobility goals. It is recommended that a whole-city approach is taken to public transport planning through public transport-oriented urban development. Contributions to the establishment and ongoing operation of public transport services should be secured from developers through legal planning agreements, and parking supply at new developments should be restricted in line with mobility goals (on a consistent basis to avoid intended or accidental bias).

Better integration of public transport and land use planning will improve the accessibility of urban areas and enable people to travel more by alternative modes, and increase the demand for public transport But without consistent land use planning policies, viable public transport services for new developments can be difficult to sustain – passenger churn, ease of physical access and constrained car parking will all help to engender success.

Access to effective public transport services increases the value of land. An integrated urban planning approach that orients itself at public transport would allow to fund the development of public transport infrastructure by capturing the increased land value produced by the very infrastructure. This concept shall be elaborated further in the report of Topic 1 (Funding of Public Transport) of the EGUM Subgroup on Public Transport.

I. Better orchestration and management of mobility demand

Priority: medium
Levels of Action: National, Regional and local authorites, Public Transport Authorities/PTA

Almost one in three European cities will see its population increase by more than 10% in the next 30 years. This will result in more traffic and greater use of public transport services, the capacity of which often already reaches its limit today. A common approach to solving transport problems involves managing the supply side: this means developing new infrastructure, better managing existing facilities or implementing new offerings in transport services (shared bikes, cars…). There is a pressing need to enhance investment strategies and develop new infrastructures or widen transport services. These should be complemented and supported with policies targeting transport demand and supply imbalances.

This approach consists of focusing on managing our demand for mobility better. This will require measures capable of influencing peoples' travel behaviours, habits and mobility patterns in a way that balances what is socially acceptable and positively received against high-level policy goals (such as sustainable development and robust funding models). The goal is to better align them with a certain level or type of transport offering, to implement measures to change travel practices (shifts in mode, time, geography…) or to mitigate the need to travel. In this respect, demand management measures should complement the supply side development and management approach of transport planning (new services, new infrastructures).

Explaining to people the true internal and external costs of their journeys, and how these vary by mode, can help to influence travel behaviour through a process of education and information.

J. Decarbonising public transport

Priority: medium
Levels of Action: All levels (EU, National, Regional and local authorites, Public Transport Authorities/PTA, Public Transport Operators/PTO, PT Supply Industry)

There is a growing demand and need for zero emissions solutions at all levels: from national to local governments, as well as to citizens. Decision makers should prioritise policies that interact with and multiply the benefits of measures to manage transport demand and encourage shifts to cleaner transport modes, as this is the most cost-effective way to reduce urban emissions at scale in the shortest timescale. To deliver 100 climate-neutral and smart cities by 2030 and ensure that these cities act as experimentation and innovation hubs to enable all European cities to follow suit by 2050, major investments will be needed to transition to zero emissions public transport.

Technology enhancements means that clean and zero emissions energy and vehicles are available for public transport. Setting ambitious goals and targets for reducing emissions or procuring vehicles can be beneficial but it will be necessary to drive investments in urban and local public transport organisations, assets, infrastructure, and services if we are to see them delivered both at the local level and at scale across Europe. This includes investment in the infrastructure to power clean buses and training and upskilling for workers negotiated between management and trade unions to ensure a just transition for public transport workers.

Transport authorities can incorporate more stringent emission standards and sustainability and emission-related criteria in procuring and tendering public transport services. Access restriction zones (for instance using Urban Vehicle Access Regulations or UVARs), for example, can achieve dual benefits: reducing congestion that may result in a more efficient transport system as well as lowering the costs associated with operating and prioritising public transport. It can also help to raise revenue to further invest in clean public transport vehicles. The Alternative Fuels Infrastructure Regulations can also be used to help deliver fuelling/charging facilities for public transport, particularly on the TEN-T network and urban nodes.

7. Conclusion

The public transport sector is based on long-term heavy investments, not just in the form of capital expenditure in infrastructure and rolling stock but concerning the continued funding of the production of services (e.g. fuel, personnel, planning and procurement overhead costs) and maintenance as well. These lengthy economic cycles require long-term political commitment, legal certainty and regulatory stability.

It is important to understand that not the mere physical elements of public transport (stations and stops, rails and vehicles) but the interplay of these physical elements with the characteristics of the service produced using them, make public transport a useful infrastructure: A railroad without train service is merely a stranded asset. A railroad with consistent train service is useful infrastructure.

The analysis of the Subgroup on public transport shows, that we generally are aware of what is required to prioritize public transport and make it a true choice for citizens and visitors for a majority of their journeys, and with this make it the backbone of urban mobility. The subgroup recognises that well designed public transport systems that do offer a high level of service

along all four dimensions (accessibility, connectivity, reliability and the services cape) do attract satisfied customers naturally.

It is important to understand how the current public transportation systems have formed (e.g. with a focus on commuting) and the great potential this leaves for decarbonisation and sustainable development if these former planning and development paradigms are updated and streamlined in way that establishes public transport as a service for most journeys and embraces the opportunities of Shared Mobility to deliver a mobility system that provides everyone at any time with a sustainable freedom to move without the burden of having to own a transport asset.

8. Annexes

a. Illustrative Case Studies

1. Tvärbanan - Orbital light rail in Stockholm's metropolitan area

Tvärbanan (transverse line) receives its name from the fact that it operates crosswise to the otherwise radial metro and commuter rail lines of Stockholm. It links together several transit lines through its connections with the southern, western and northern subway branches of the Stockholm Metro as well as three branches of the Stockholm commuter rail (*Pendeltåg*). [6]

This light-rail line enabled travel between southern, western and northern parts of greater Stockholm without having to enter the city centre. This significantly relieved capacity from inner-city bottlenecks, that became available for new customers, while also reducing travel times for transit passengers. The choice for standard tram technology that operates on a dedicated infrastructure body (hence light-rail) allowed for high commercial speed while also enabling some level-crossings with other surface transport where full separation would have become unnecessarily challenging and expensive.
Operation commenced in 2000, with extensions to the line that now spans across the entire western flank of Stockholm added in 2002 and 2013. In 2021, a branch was added to connect Bromma airport. Further extensions to this branch are currently planned and under construction.

By offering an orbital, rapid transport connection linking Stockholm's metropolitan area radial commuter train and underground lines, the line significantly increased public transport capacity and competitiveness, which increased the attractiveness of the overall public transport system and contributed to a modal shift away from private transport.

More information at: https://sl.se/reseplanering/var-trafik/tvarbanan

2. Hovedstadens Letbane and BRT Ring 4 – Two orbital public transport corridors in Greater Copenhagen

Hovedstadens Letbane (Capital Region Light-Rail) is an electric light-rail line that operates outside of but in parallel to Copenhagen's city boarder, creating an orbital route that crosses the various branches of the Copenhagen S-train sub-urban rail service and enabling journeys between southern, western and northern parts of Denmark's capital region without the need to travel through the centre of Copenhagen. [7]

[6] https://en.wikipedia.org/wiki/Tv%C3%A4rbanan
[7] https://en.wikipedia.org/wiki/Greater_Copenhagen_Light_Rail

The light-rail line is also described as Ring-3, as it runs along the third ring road around Copenhagen but also as it forms a third public transport ring around Copenhagen, in addition to the recently opened Metro City Ring and the Ring formed by an S-train Line. The line is currently under construction and said to open in 2025, when it will run with a five minute frequency.
In addition to the light-rail, the metropolitan transport authority Movia is planning a fourth public transport ring even further out, connecting the commuter belt towns of Copenhagen. This fourth ring is to be serviced by a high-frequency and high quality bus rapid transit line that would make use of significant sections of dedicated infrastructure and allow for pleasant interchanges at train- and bus stations through appealing station designs.

The light-rail line and BRT line are set to transform the high-quality public transport lines in Copenhagen's suburbs from the current radial system that orients at commuting into the city, into a true network of high quality lines that serve a large variety of different journeys and journey motives in the suburbs, while making capacity on the S-train network available for new customers.

More information at: https://www.dinletbane.dk/en/ and https://www.moviatrafik.dk/om-os/ny-teknologi/brt/brt-og-klima/

3. **Munich region orbital express bus ring**

Since the end of 2021, an Express Bus ring, consisting of 7 partly interlining bus lines, enable connections between the outer branches of the Munich metro and S-Bahn suburban train system. Passengers now have the possibility to travel on the orbital routes across the different suburbs and rural towns and have fast access to different metro and S-Train corridors, without having to travel through the congested trunk lines in the core of the city.

The ExpressBus lines run in a coordinated and consistent timetable, every twenty minutes and have fewer stops than regular bus lines as the services orient themselves at useful and effective interchanges and access to major educational and commercial facilities. Through these clearer and faster routes, some journey times are reduced massively.

More information at: http://www.mvv-muenchen.de/express

4. **Vienna night public transport expanding beyond city limits**

Since 2010, the service level of nightly public transport network that was operated by buses in the city of Vienna has been advanced significantly with all metro lines running all nights before Saturdays, Sundays and public holidays in addition to some of the night buses that further link into local neighbourhoods.

This nightline service by metro and bus has been further advanced in 2019 with S-train suburban railway trains operating a half-hourly service all nights before Saturdays, Sundays and public holidays on the orbital line S45 and the system's trunk-line that crosses through the city, extending into the agglomeration of suburban towns to the south of Vienna. Since its introduction, the night S-Train service that not only services the city but also the immediate suburbs, is continuously enlarged to additional towns. Also the Baden light-rail service, that connects the city centre of Vienna with southern suburban towns, runs a quarter-hourly night service.

The night public transport services are offered at the general integrated public transport fare of the region's transport authority VOR, with all tickets and passes valid without any form of night-service supplement.

More information at: https://www.vor.at/fahrplan-mobilitaet/fahrrad-sammeltaxi-co/nachtverkehre

5. **Ile-de-France metro development scheme «Grand Paris Express» for a fully integrated region**

The development program Grand Paris Express consists of a group of new metro lines currently being built in the Île-de-France region in France. While the Paris metro has traditionally served the city of Paris and cities in its direct surrounding, the Grand Paris express project brings four new lines of metro and two metro lines extensions into the wider greater Paris region.

With a total of 200 kilometers of new track and 68 stations currently being built, the project provides faster connections throughout the entire region: The circular and orbital network design of the new lines particularly enables fast connections between the suburban cities, towns and commercial centres in the Ile-de-France region. As these lines will take over journeys from the busy RER suburban- and regional train network, capacity on the existing lines in Ile-de-France will be available for new customers.

More information at: https://www.grandparisexpress.fr/benefit-metro-ile-de-france

6. **Second trunk-line to remove capacity bottleneck in Munich S-Train network**

Munich's S-Train suburban railways system transport some 840.000 Passengers each day. Most lines of the system's radial network converge onto systems trunk line that travels through the city in East-West direction. Opened in 1972 and designed for a fracture of the current passenger levels, the trunkline has become a proper bottleneck in the region's transportation system, that becomes a victim of its own success. The congested trunk line limits the possibility to further increase the level of service on outer branches and failures – technical or otherwise – on this stretch of railways have a rippling effect for train service in the entire regions as there is no possibility to bypass.

To enable the suburban train system to grow throughout the region and to increase the operational stability of the system, a second trunk line, in parallel to the existing line, is currently being built. Centre piece of this new railway line is a seven kilometre long tunnel under the city centre of Munich. The second trunk line will have 5 stations, three of which underground and two of which at the city major railway hubs (central station and station Munich East), compared to 11 stations on the existing trunk line.

Next to the additional infrastructure capacity and necessary redundancy to increase operational stability of the system, the fewer stations on the second trunk line will allow for the creation of express-S-train services that provide faster connections across the region. Despite current construction difficulties, the project will have a transformative effect on Munich's congested transport system.

More information at: https://www.2.stammstrecke-muenchen.de/

7. **Strasbourg Tram as role model for the new European Tramway**

Link many European cities, Strasbourg was home to an extensive network of tramways up until the 1940s when the system started to decline due to destruction and financial difficulties. The growth in car-use in the post-war era led the city to close its by then 80-year old system in a funeral procession in May 1960. After 34 years, Strasbourg opened its first newly established tram service in 1994.

Nowadays, Strasbourg once again hosts a vast and successful tram network, that even connects across the Rhine into the city of Kehl in Germany. The network, currently about 50 kilometres of track on which nearly half a million passengers are transported each day, was developed as part of an integrated project for street scape redesign and urban regeneration that proved very successful and cost-effective. While not the first new tram system in France, the Strasbourg tram certainly provides a perfect example of the new European tramway and is a perfect showcase of the fact that streets, cities and regions can change for the better with proper development of public transport.

More information at: https://d-nb.info/984849262/34

8. **Leveraging the power of data for better Public Transport – the Case of #Ruter in Oslo**

Since 2016, Ruter, the public transport authority of Norway's capital region, is transforming the way it generates, analyses and uses data in all of its and its transport operators processes. The PTA recognised that public transport vehicles themselves can become the perfect IoT-data collection devices to generate data that can be useful for planning, operational excellence, and customer information services – as well as new services that currently are not obvious.

Before 2016, public transport vehicles in Oslo utilized a variety of separate, often privately-owned on-board systems to support data functions, often generating data in proprietary data-formats. These different ticketing, customer information, location and technical data systems were incompatible with one-another and required different communication tools. By embracing open- and standardized IT-specifications developed with sector association ITxPT, public transport data collection devices became interoperable, standardized and less complex, meaning a variety of suppliers were enabled to deliver the tools required.

Embracing the central coordination and orchestration for not just the transport system but also the date related to that very system allowed Ruter to have easier data management, more meaningful data and improved access to data insights as well as shorter development and implementation times for new operational and customer facing data services.

More information at: https://itxpt.org/2017/03/24/ruter-will-request-all-it-vendors-to-comply-with-itxpt/

9. **Digital transformation of information and sales go hand-in-hand: The case of BKK's BudapestGO**

The transport authority of Hungary's capital Budapest, BKK, like many public transport organisations throughout Europe, was operating several digital interfaces for route planning and live traffic information and faced significant obstacles in the creation of a system for digital or smartcard ticketing.

Addressing this fragmentation of its digital services, BKK developed an integrated mobile app as a one-stop-shop for mobility in Budapest in an agile approach, that leverages cloud

services and enables shorter times-to-market than in off-the-shelf-solution procurement procedures.
The clear long-term vision but step-by-step development approach enabled the BudapestGo app to exceed all expectations: In its first year the service attracted more than 900.000 active monthly users, more than doubled the share of digital sales in BKK's revenue structure and enabled three times more journey-searches than the former systems.

More information at: https://bkk.hu/en/tickets-and-passes/budapestgo/

10. The value of setting up a metropolitan transport authority – the case of Lisbon's TML

In an effort to advance public transport in Portugal's capital region, the 18 cities and municipalities of the area established the metropolitan public transport authority TML - Transportes Metropolitanos de Lisboa in 2020, following the example of integrated metropolitan transport authorities seen in many of Europe's city-regions.
Despite its short history, TML has been able to bring about considerable advancements to the public transport system in the region.

The public transport fare and ticketing system branded "Navegante" was introduced in 2021 and fully integrates all mores of transport and allowed the introduction of a monthly subscription for all urban bus, regional bus, tram, ferry, metro and suburban train services, facilitating multimodal public transport journeys and truly connecting the region.
In an effort to integrate and re-organise all bus services in the region outside of the City of Lisbon, TML contracted several bus operators after a competitive tendering process. For customers, the various contract areas all utilize the same, recognisable information infrastructure in vehicles and at bus stops and operate a regionally consistent network under the brand name "Carris Metropolitanos", in accordance with the "Carris" brand used for urban buses in Lisbon.
TML is developing integrated ITS and Data services for the entire region and supports overall mobility and infrastructure planning processes for the municipalities that put public transport at the centre of the region's mobility system.

More information at: https://www.tmlmobilidade.pt/

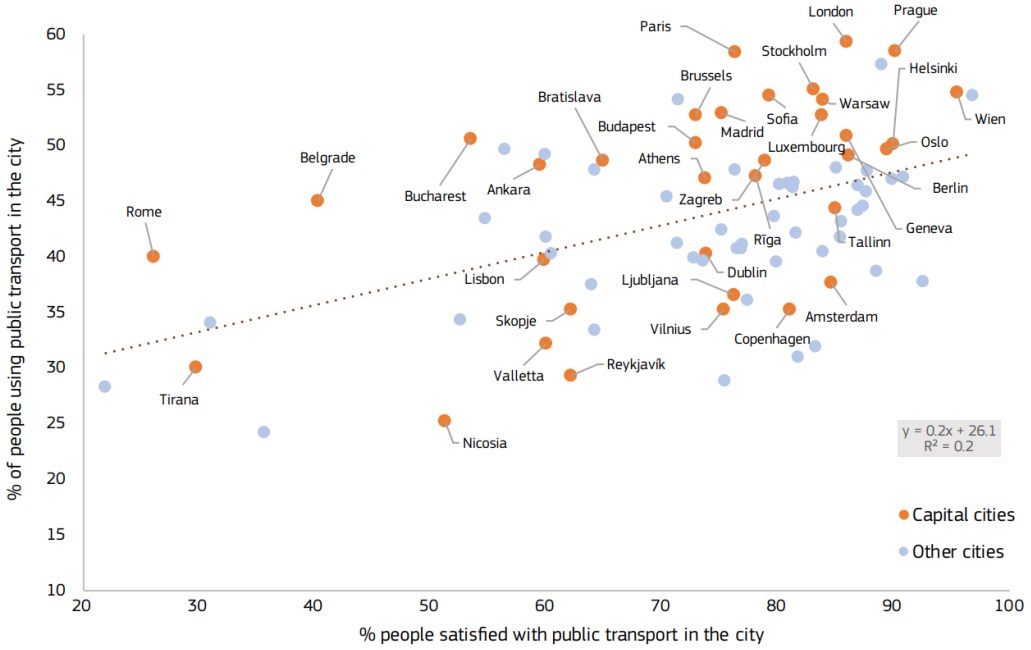
11. European Cities Report: High use and satisfaction with public transport go hand in hand

According to the EC's Report on the Quality of Life in European Cities 2020, a strong correlation exists between the quality of public transport and its usage amongst citizens. Also, a strong correlation exists between satisfaction with public transport and satisfaction with the citizen's quality of life:

In cities where more people are satisfied with public transport, more people use it (Figure 23). The variation in satisfaction with public transport explains a quarter of the variation in its use. This could mean that if people are satisfied with public transport, they are more likely to use it. Another explanation could be that if public transport services have a high frequency more people will use them and more people will be satisfied with them.

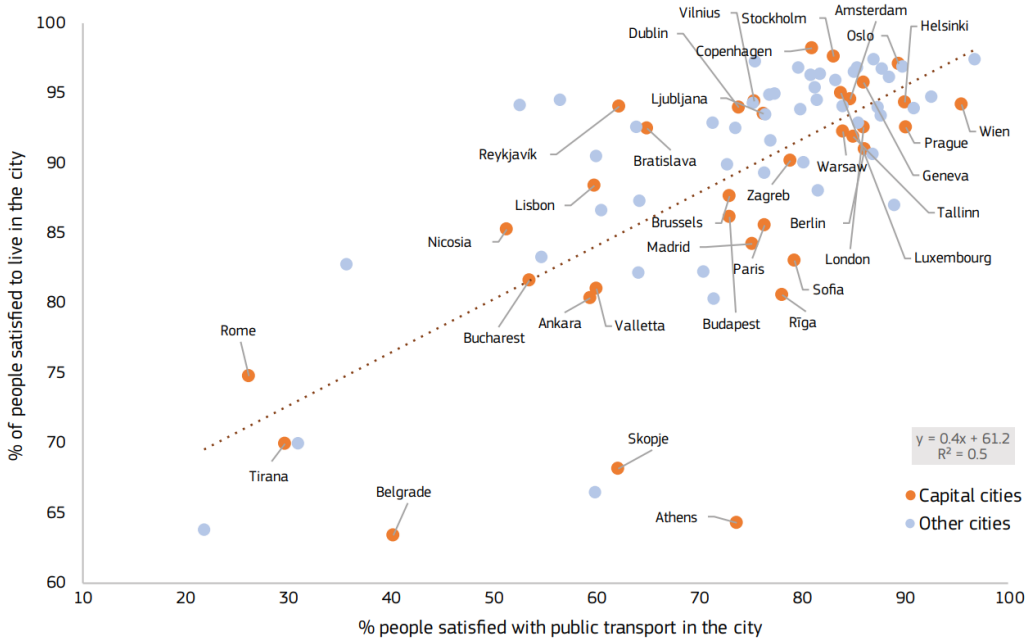
Satisfaction with public transport has an even stronger link to people's general satisfaction with a city and explains half the variation in general satisfaction (Figure 24). This suggests that people's judgement of public transport services has a big impact on their overall satisfaction with the city they live in.

FIGURE 23: People satisfied with public transport in the city *as against* people using public transport in the city



Source: EC/DG REGIO Quality of life in European cities survey, 2019.
Note: Percentages are based on all respondents (excluding don't know/not answered).

FIGURE 24: Percentage of people satisfied with public transport in the city *as against* people satisfied with living in the city



Source: EC/DG REGIO Quality of life in European cities survey, 2019.
Note: Percentages are based on all respondents (excluding don't know/not answered).

More information:
https://ec.europa.eu/regional_policy/sources/work/qol2020/quality_life_european_cities_en.pdf

b. List of organisations participating to the subgroup

Subgroup leaders
Ile-de-France Region
UITP - International Association of Public Transport
Cities and Regions
Barcelona Metropolitan Area
Braga Municipality
Budapest
Central Slovenia Statistical Region (w. Ljubljana)
Oradea
Toulouse Métropole
Member States
Belgium
Czechia
Finland
France
Italy
Latvia
Lithuania
Luxembourg
The Netherlands
Poland
Portugal
Organisations
ACEA – European Automobile Manufacturers Association
AVERE - The European Association For Electromobility
Community of European Railway and Infrastructure Companies - CER aisbl
Council of European Municipalities and Regions - CEMR
Cycling industries Europe aisbl (CIE)
EIT Urban Mobility
ERTICO
European Cyclist Federation asbl (ECF)
European Passenger Transport Operators - EPTO
European Transport Workers Federation - ETF-Europe

Eurocities

International Road Transport Union - IRU

LEVA-EU

MaaS Alliance

Micro-Mobility for Europe

MOVE EU - The European Association of On-Demand Mobility

POLIS

Taxis 4 Smart Mobility - T4SM

Observers

CoR – Committee of the Regions

JRC – Joint Research Centre of the European Commission

Ad-hoc expertise

EMTA – European Metropolitan Transport Authorities