The Context of Public Transport in Europe

Public Transport EGUM Subgroup – Introductory Report

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INTRODUCTION

The overall definition of public transportation includes any forms of transport, which are available to the public. This includes buses, trains, metros, tramways, cable cars, bike- and car-sharing, micro mobility services, taxis, car-pooling, ride hailing, ride-pooling , etc. This broad definition bases on 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 bike. [1]

This broad definition is widely accepted in the sector and embraced by the EGUM Subgroup on Public Transport. The third report topic that deals with the complementation of traditional public transport services with shared mobility services elaborates on this wider ecosystem of mobility services in particular.

Public transport generally includes long-distance services as well. Such long-distance services (e.g. High-Speed Trains, coach lines, etc.) serve a more occasional, often more exclusive and sometimes seasonal travel market and are out of the scope of the EGUM subgroups elaborations: **The EGUM subgroup on PT focuses on public transport services with significance to daily mobility in functional urban areas and their surrounding regions.**

This report provides a general outline of the overall market context of traditional public transport which is defined as **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.** It introduces a set of concepts and notions particular to public transport. The topical reports 1-4 of the EGUM Subgroup on public transport will refer to these notions without further in-text explanation.

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

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1. Networked Markets

Transportation services operate in a networked market. In networked markets, a customer's ability to consume a specific service is location dependent and no one service provider can serve all customer demand due to location specificities of these various demands.

A bus operator, for example, can only serve those customers whose origin and destination for a specific journey are within its bus network. If the origin is served by the operator but the destination is outside of its network the customer can: a) not consume the service (do not make the journey by bus), or b) create a composite service, combining the service of the operator that serves the origin with the services of an operator that serves the destination, provided these two networks interline at some point, allowing for an interchange.

Networked markets, hence, require a combination of different services (and service providers) to create composite services that are able to serve the majority of customer demand. The more these composite services become a seemingly seamless product, the more viable the market becomes and the more meaningful the service(s) become to a larger extend of customer demand. [2]

Consequently, in public transport, those systems that best integrate all modes of public transport (bus, tram, metro, train, taxis, etc.) into a seamless public transport offer, through integrated fares, integrated information provision and integrated customer service, are the most successful systems with regard to mode share, satisfaction and performance.

2. Public Transport Governance and Market Structure

The understanding that public transport is a vital regional utility, a service of general economic interest, that produces positive outcomes for cities and regions, which go beyond financial output of the services themselves, is undisputed across regions and member states in the EU. Recent EU legislation further strengthens this status, stating that the “availability of resource efficient and environmentally friendly public transport services is key” to achieve the EU’s most strategic objectives, stipulated in the Green Deal.

The positive externalities of public transport cannot currently be internalised in its immediate cost structure, making compensation and subsidies with local taxpayer funds acceptable and worthwhile. This compensation comes with a high degree of public sector involvement and oversight in the production of public transport.

Commercial service markets for metropolitan public transport currently do not exist in the EU. In the recent past, some (former) member states sought to develop metropolitan public transport into a truly commercial service market, allowing direct competition between operators *on the road* and limiting the influence of authorities on transport outcomes. In the

[2] Roson, R., van den Bergh, J. Network markets and the structure of networks. *Ann Reg Sci* **34**, 197–211 (2000).

United Kingdom (outside of London) and Poland, bus services were highly liberalised, with limited influence of authorities and allowing competition between operators on the road. This approach has been a complete failure in terms of public service with reduced and worsening services and increased fares. Both Poland and the UK have recently re-introduced some sort of authority-initiative scheme, moving from *competition in the market* schemes, that suffered from networked market dysfunctions, towards *competition for the market* schemes to control for these inherent market difficulties.

In Sweden, the market for public transport services is open. Transport operators are free to enter the market and compete on any route. However, as transport authorities retain the right to design and procure PT services within their respective areas, such *competition in the market* between the metropolitan public transport services organised and integrated by the PTA and services offered by commercial market entrants is a rare phenomenon. (Note that in the long distance sector, several competing commercial operators provide services between different metropolitan areas in Sweden.)

Nowadays, all member states employ an authority centric governance model for local and metropolitan public transport. Competent local authorities – or the integrating metropolitan PTA, depended on the local distribution of mandates – seek to provide the overarching coordination of services necessary to overcome public transport's networked market dysfunctions.

Authority-centric PT governance can be subdivided into two categories: Authority initiative schemes, where a majority of the network design and planning activity is carried out by a PTA, which then awards the production of these specific services to a transport operator in a service contract. Or authority approval schemes, where transport operators are awarded with an exclusive right to operate in a specific geographic area (this could be a whole region but also just one bus route) and for a specific time period in the form of a concession. In these concessions, the network design and planning activities are taken care of by the transport operator and are then approved by the PTA (this can also take the form of fulfilment of pre-defined minimum standards of service). The entrepreneurial initiative, so the decision where a service will run with what schedule, is to a large extend taken by the transport operator, that might then also bear more risks compared to its counterparts in authority initiative schemes. [3]

Awarding of contracts or concessions is based on a competitive tender process. This tender process establishes a *competition for the market* and determines the best possible market price for a given service or concession. Authorities may award contracts and concessions directly – so without tender procedure – under specific conditions.

Many public passenger transport services of general interest for society cannot be run commercially, so the relevant national, regional or local authorities must be able to make certain they are provided, respecting the EU regulatory framework that provides for public service obligations (PSO) in different modes of transport. The PSO provides local authorities with autonomy on how to plan their services with their own economic, social and environmental goals and ensuring the protection of workers rights when awarding a concession. [4]

3. Public Transport Pricing

The prices for public transport tickets and subscriptions in Europe's regions and metropolitan areas are not based on market outcomes but the outcome of political negotiations. Public transport prices are subject of subsidiarity and thus set at local or regional level.

[3] CIPTEC Project. (2016). (working paper). *D1.3: Report on PT Authorities and Operators' mapping/typology and needs*. Ciptec.eu.

[4] CIPTEC Project. (2016). (working paper). *D1.3: Report on PT Authorities and Operators' mapping/typology and needs*. Ciptec.eu.

Fare revenues cover between 9% and about 50% of the costs involved in the production of services. In some cities and regions, the political ambition is for public transport to cover the direct operational cost or make a slight operational profit, which directly translates into a higher price point of public transport. [5]

Public Transport Fares are used as a policy tool in many cities and regions throughout Europe. Both the pricing of public transport tickets and subscriptions and the underlying structure of the public transport fare are found to help deliver sustainable mobility goals as well as improve equity or solve very specific localized issues. Most schemes include some form of fare rebates for vulnerable user groups. Another common scheme across Europe is free or heavily fare rebated travel for youngsters and the elderly.

In addition to specific products or rebates for certain user groups, the design of the fare structure at large is often used to promote regional cohesion and to mitigate issues identified in other sectors, for example to mitigate the impact of high cost of housing in central areas that usually accommodate most employment and educational activities.

Affordable public transport is currently a high priority throughout Europe and will no doubt gain greater importance due to the financial hardship Europeans are currently confronted with.

Current public transport pricing trends do reflect this political goal of public transport affordability: Several member state governments have introduced cheap national subscription passes for metropolitan public transport (like the German D-Ticket or the Austrian KlimaTicket) or reduced the prices of existing regional subscriptions (e.g. in Spain). All of these measures were taken by national governments, which have traditionally been less involved in fare setting for metropolitan public transport.

Public transport is price inelastic. Academic research suggests a price elasticity of public transport demand of 0.3 to 0.4, meaning that a 10% reduction in the price of public transport only delivers 3% more passengers. Price elasticity of public transport demand is suggested to increase with increasing distance covered by the service in question. Reducing the price of public transport will thus not significantly increase public transport market share in cities, let alone deliver modal shift. On longer distances, for example in commuter and regional rail services, price decreases – and fare simplification in particular - may increase public transport market share. This suggestion by the literature is consistent with the first set of observations made with the introduction of the German Deutschlandticket, which appears to have induced a demand increase on the medium and longer distances. In comparison: Research suggests a supply elasticity of public transport of 0.6 to 0.9 – better public transport supply, hence, attracts twice as many customers as cheaper prices. [6]

4. Public Transport Service Level

The overall quality of a public transport service is composed by its *accessibility, its connectivity, its reliability and the quality of its servicescape*. The observed quality may differ vastly when comparing quality at the transport system level – so the level of service of a metropolitan public transport system at large – with the quality of the offer at the level of a specific set of journeys.

a. Public Transport Accessibility

PT Accessibility is a notion that describes two distinct features of the public transport system: The accessibility that is provided by public transport, so the amount of locations accessible by

[5] EMTA Barometer 2019, available at: https://www.emta.com/publications/article-emta-barometer-of-public-transport/

[6] Kholodov, Y., Jenelius, E., Cats, O., van Oort, N., Mouter, N., Cebecauer, M., & Vermeulen, A. (2021). Public transport fare elasticities from smartcard data: Evidence from a natural experiment. Transport Policy, 105, 35-43.

public transport in an area, also described as the reach of the public transport system. And the accessibility to the public transport system itself.

The latter is subdivided into the physical accessibility of stations, stops and vehicles, which covers aspects like step-free access and other physical measures that define the degree at which mobility- and visually-impaired customers and users of wheelchairs can make use of public transport services independently. And, secondly, cognitive accessibility that describes aspects of information provision (e.g. wayfinding in a station) and transaction design (e.g. the process of purchasing a ticket) and to what extend this is comprehensible and manageable to different groups of customers (and non-customers). The accessibility of the public transport system itself is important as it describes the extent to which the system is inclusive to vulnerable users. This topic is more thoroughly elaborated in Report 4 of the EGUM Subgroup on public transport.

For the discussion of the level of service in a systemic view of the entire transport system, public transport accessibility in the sense of the reach of the public transport system is of particular relevance as it defines the upper border of the systems potential level of service. To illustrate this: At transport system level, the quality of a public transport system with very high connectivity and very high-quality Servicescape will remain poor if it has a low reach, only providing access to a low percentage of locations in an area. This is because the system provides no service – the lowest possible service level - for the transport demand to and from many locations in the area. At the journey level, however, the same PT system provides an excellent level of service for journeys between locations that are within the reach of the system.

In EU cities, around 80 % of the population has easy access to public transport, using the United Nations Sustainable Development Goal indicator. In addition, 56 % of an average city's population has access to at least 10 departures an hour. Access to high-frequency departures is highest in cities with at least 1 million inhabitants and considerably lower in cities with fewer than 250 000 inhabitants, although some cities perform much better or worse than their size implies.

Studies have shown, that the perception of access to public transport is not necessarily down to the physical distance to it, but rather that quality, safety and the frequency of the service had the biggest impact on people's perception. [7] Despite this, substantial efforts are still required to increase satisfaction with public transport across Europe. Many of these networks require investment and need to expand to cater for growing urban populations in some cases.

Eurobarometer survey on the future of transport has shown that a large majority of car users feel that public transport is less convenient than the car and that they do not use public transport because of a lack of connections. Other significant reasons for not using public transport are because of too few services and a lack of reliability.

b. Public Transport Connectivity

PT Connectivity is a notion that describes the ease at which a journey can be made within the public transport system, so from each public transport stop to each other public transport stop or station in an area. This includes the journey time, the amount of interchanges required, wait times at interchanges, walk times at each end of the journey distances to be covered at interchanges and the overall amount of connections during a given time (e.g. journey options per hour).

Connectivity within the public transport system is defined by several dimensions: the design of the networks of each public transport, the amount and quality of interchange stations where these networks interline, the frequency of service on each network (e.g. a metro system in

[7] Lättman, Katrin & Friman, Margareta & Olsson, Lars. (2016). Perceived Accessibility of Public Transport as a Potential Indicator of Social Inclusion. Social Inclusion. 4. 1

which each metro line runs a service every five minutes creates a very high degree of connectivity between any metro station in the network. If a journey includes an interchange to a suburban bus line that runs only once per hour, public transport connectivity for the stops served only by this bus line is significantly lower), the degree of timetable integration (e.g. a bus is scheduled to depart just after the arrival of a train, allowing immediate interchange without wait time), the degree at which transport modes are orchestrated in real time (e.g. a bus delays its departure for a few minutes in response to the late arrival of a train, enabling an interchange that passengers would have missed without this orchestration).

Public transport connectivity is highest where all modes of public transport are integrated into a consistent metropolitan public transport system with integrated timetables and integrated fares (or integrated multi-operator or multi-modal ticketing), that allow customers to make journeys throughout the entire network without a financial disadvantage occurring from a change of operator or mode of transport. In geographical areas with less frequent service, or at times of day where services are generally more infrequent due to less demand, timetable integration and orchestration across modes increases connectivity. The higher the frequency of services within this metropolitan public transport network, the less important becomes timetable integration as waiting times incurred with interchanges are short by default.

The concept of multimodal passenger hubs embraces the amount and quality of interchange stations between different modes of public transport significantly impacts connectivity and expands this thinking to other modes of transport, in particular shared mobility. The report on topic 3 of the EGUM subgroup on public transport will in further detail discuss this concept of concentrating shared mobility and public transport stops into meaningful multimodal hubs. If well designed, these hubs can – in addition to their mobility function – serve as a central anchor point in a neighbourhood, a place one can identify with, that allows a sense of place, a landmark for navigation and that concentrates services (e.g. post office, self-service parcel station, pharmacy, bank/ATM, etc. and commercial activity (e.g. bakeries, supermarkets, restaurants, etc.).

A number of cities and PTAs use assessment methodologies to determine the accessibility of their city and connectivity of their public transport system. Increasingly, the concepts of public transport accessibility and connectivity feed into urban planning purposes, for instance, to identify the most suitable locations for medical and civic services.

c. Public Transport Punctuality and Reliability

Reliability describes the degree of discrepancy between the planned services in timetables or frequency statements and the produced situation in real life. As well as the way in which these discrepancies are resolved for customers when they occur (e.g. will services run a detour, so customers can reach their destination, or will services be cancelled). The lower the discrepancy between planned journeys and executed journeys, the greater the public transport reliability.

There are four causes of discrepancies between the planned and real-life public transport service: congestion, accidents, technical failure and failure of operational processes. Congestion considers both, road congestion, which impact bus and tram services that operate in mixed traffic, and congestion caused by overcrowding of the PT system, which inflates the time required for passenger exchange at stops and stations or otherwise impair operations. Accidents and other incidences, like rescue operations, have an impact on the performance of PT services, particularly when these services operate with level street crossings or in mixed traffic. Technical failures can occur with infrastructure, for example a broken overhead wire or rail switch, and rolling stock, for example a broken door-closing mechanism on a bus or an error with the on-board-computer in a train. Failure in operational processes includes aspects related to staff planning, like a shortage of drivers or dispatchers due to unexpectedly high levels of sick-leave, vehicle, staff and maintenance rostering, like a trainset that is not available at its starting point due to errors in its circulation the day before or longer than scheduled

maintenance requirements. The various causes of discrepancies in public transport performance often interfere with one another when accidents or congestions lead to failures of operational processes because both rolling stock and driving personnel could not make their planned circulations.

Discrepancies that are planned and communicated beforehand, for example in the case of construction works, might make PT services less competitive or convenient during these periods due to longer routes, replacement services or less frequent services, but are not considered discrepancies that influence public transport reliability. Provided these planned replacement services, detours or timetable adjustments are themselves produced without discrepancies.

d. Public Transport Servicescape

The PT servicescape considers the attributes of the physical surroundings – and increasingly also the digital interface - in which the transport service is produced. [i] Comfortable and attractive vehicles, inclusive access and signage, state-of-the-art stations: good design is necessary to make public transport attractive and ensure the efficient functioning of the whole urban mobility system. The public transport servicescape should be an integral part of any public transport project and is fundamental to enhance customer experience/safety and can play an important role in influencing city planning.

Combining physical products, digital tools, and ‘pure’ services provides new opportunities for public transport authorities and operators to capture the entire range of the customer experience. However, planning and designing sustainable and responsible mobility environments and solutions also relies on the quality of the physical spaces. The roles of PTOs and PTAs are therefore becoming more that of an urban lifestyle planner or of an architect of public spaces and infrastructures.

Taking a wider view of 'physical’ environment encapsulates both the physical space in which the service is produced and the interaction among employees, the consumer and other consumers. Customer relationship management is today at the heart of all public transport business strategies. This requires the development of a customer-centric culture and the provision of high-quality services all along the customer’s trip, from the point of origin to the destination. This change of perspective might enable responsiveness to the market, production flexibility, and commitment to serve the customer.

Being customer-oriented is about maximising long-term customer satisfaction for all touch points of the travel experience. It has concrete business impacts, a measurable return on investment, making it possible to quickly and regularly detect expectations. Thus, it allows the sector to run the business of public transport more effectively by improving services.

[i] Booms, BH; Bitner, MJ (1981). "Marketing strategies and organisation structures for service firms". In Donnelly, J; George, WR (eds.). *Marketing of Services*. Chicago, IL: American Marketing Association.