United Nations ECE/TRANS/WP.6/2020/5

Economic and Social Council

Distr.: General
30 March 2020

Original: English

Economic Commission for Europe

Inland Transport Committee

Working Party on Transport Statistics

Seventy-first session
Geneva, 17-19 June 2020
Item 5(a) of the provisional agenda
Urban transport statistics: pilot questionnaire on tram and metro statistics

Results of Pilot Questionnaire on Tram and Metro Statistics

Note by the secretariat

I. Background

1. Trams and metro systems exist in most large cities in the Economic Commission for Europe (ECE) region, with some systems existing in smaller cities and as specific tourist attractions as well. While the use of and interest in trams waned towards the middle of the last century, they have increased again in popularity and were reintroduced in some cities from the 1990s onwards, often just decades after older systems had been removed. Metro systems are typically in only the largest cities (many countries have a metro only in their capital for example, although exceptions to this exist), and have broadly remained popular over the twentieth century and twenty-first century, with an overall trend towards expanding systems with new lines.

2. This has meant that metros and trams often either rival or surpass bus travel as the principal mode of public transport in many cities. In many of these cases they are the dominant mode of any type of transport in their city. For example, in 2018 over 1800 million metro and tram journeys were made in Paris (as defined by the Régie Autonome des Transports Parisiens (RATP)) compared to slightly over 1000 million bus journeys.[1]

3. Despite this, no regular statistics collection exists for trams and metros at the international level. The International Association of Public Transport (UITP) produces some statistics from its members which come from public transport operators directly, rather than through Ministries of Transport or National Statistics Offices. As these data are only shared in detailed form with UITP members (namely, the public transport operators themselves), there is a large scope to improve international data availability.

4. These data would provide value in the context of monitoring the Sustainable Development Goal framework. Specifically, target 11.2 monitors public transport access in cities. Measuring access to public transport relates to more than passenger measurement, as an understanding of cost, distances to the transport stop and frequency of service are required. Yet knowing passenger numbers and distances travelled does give an indication as to whether a good level of public transport service is provided for the public to use. The custodian of

[1] https://ratpgroup.com/ratpgroupe-content/uploads/2019/06/ratp_radd18_gb2.pdf

this target, the United Nations Human Settlements Programme (UN-HABITAT) has recognized as much, by including public transport use in the set of indicators needed to fully understand public transport access.[2]

II. Background and Process

5. During the 2019 Working Party workshop on urban public transport statistics, it was noted that data on trams and metros are indeed quite widely available, and yet had not been collated at the international level with input from national statistics offices. After the meeting, the Secretariat conducted a survey to see what data were available in statistics offices on both passenger numbers and passenger-km; on what basis the data were collected (surveys, ticket sales or sensors); and what kind of role the NSO played in collecting, adjusting or verifying the data. Given the largely encouraging results of the survey, in November 2019 the secretariat sent out a pilot questionnaire, so that data availability could be assessed at the next meeting. The questionnaire was kept as simple as possible, with individual sheets devoted to both of passenger numbers and passenger-km.

6. Both the survey results and the questionnaire results were shared with interested countries and are available online via the UNECE statistics wiki.[3] This allowed all countries and stakeholders to see how their peers were collecting and producing data.

III. Definitions and Challenges

7. The Glossary for Transport Statistics defines a metro line as an electric rail line mainly for urban transport with the capacity for heavy volumes of traffic involving very frequent train movements. Metro lines are also often characterized by closely spaced stations. The concept of a metro system can be considered one or more of these lines (with the possibility for changing between lines in an integrated manner) with metro trains running on them in a single city or urban area. A tram system meanwhile, is defined as a railway line mainly installed on, and well-integrated into, the urban road system. While in some countries the concept of tram and metro may be blurred, the key distinction is typically the separation from traffic enjoyed by metro systems, which are often underground. Trams may run in tunnels and be separated for some of their length from traffic, yet they will typically mix with roads at least in a few places. As an example, the Lausanne Metro system in Switzerland is classified as a tram system as one line is integrated into the road system.

8. The Glossary also includes a Light Rail line definition as well, which is typically still separated from traffic like a heavy rail line but has a lower travel speed and more frequent stops than heavy rail lines. As this definition is somewhat arbitrary, for the purposes of this questionnaire these systems needed only be considered if they are not already included in a country's existing rail statistics.

9. For a meaningful understanding of metro and tram usage, statistics on both passenger-km (for comparisons with other modes) and number of passengers (to understand total numbers of journeys) have their uses. Statistics on employment, timeliness/punctuality, train-km, line-km or capacity of trains were not requested, as most interest was on comparing transport measurement figures with other modes to enable modal split analysis.

10. With regards to passenger numbers, an important caveat is that transport companies (or statistical offices) may be collecting data on trams and metros in different ways. The traditional basis for data on trams and metros (and indeed buses too) would be ticketing information, and this remains the case for many systems. This has the advantage of being based on financial transactions where there is a record of a purchase, thus no surveying is required. But there are certain drawbacks to this method. Firstly, it will not include

[2] https://www.unece.org/fileadmin/DAM/trans/doc/2019/wp6/Presentations/UN_HABITATtransport_11.2.1_Monitoring_SDG_UNCE_workshop_V2.pdf (see slide 9).
[3] https://statswiki.unece.org/display/UPTS/National+Data+Collation+for+Trams+and+Metros

passengers that do not buy tickets (either illegally or because they do not require tickets e.g. pensioners or young children). It is also possible that some tickets are bought but not used.

11. Further than this, many systems have moved away from individual tickets and towards either weekly, monthly or annual passes that cover an entire zone, or towards travel cards that allow calculation of tariffs based on trip distance. Increasing complexity further, there are many cases of cities (or sometimes entire countries) with integrated public transport systems where a single ticket may allow passage on a bus, metro or tram (and in some cases, cable cars, funiculars and ferries) within a certain amount of time. Assigning tickets bought for these systems between the different transport modes will not be straightforward.

12. The other principal source of passenger number data is on-board sensors. While a relatively new technology, on-board sensors are now used in many cities and provide near-instantaneous data on boardings and alightings, for every vehicle and line (they can be used on buses, trams, metros and ferries).

13. Depending on adjustments made by any statistics office, these different data collection methods may lead to different interpretations of passenger numbers across cities and countries. If ticket information is taken unmodified, then these data will count the numbers of complete journeys by passengers, that may involve two or more different vehicles due to transfers. Conversely, unmodified data based on sensors may count all boardings and thus count each leg of a journey separately.

14. It is hard to quantify what kind of difference these alternate concepts of passenger measurement may have across different cities and networks, as each network is used in a different way. It is likely that the average number of trip legs varies significantly across different systems (depending on geography and other factors). Luckily, many cities and countries produce both passenger numbers and passenger-km.

15. The Passenger-km indicator adds value to the tram and metro data by allowing comparisons with other transport modes on the basis of distances travelled. Thus, this indicator allows modal split comparisons to be made. As a result of the complications about standardized passenger numbers mentioned above, passenger-km may be the best way to compare system performance across cities and countries.

16. How passenger-kms are calculated again varies by system and country, but if the passenger-km indicator is being calculated accurately then the issue of trip legs versus total journeys would not apply. In the survey, countries indicated a mix of passenger-km methods. Some with full data sources on start and end points of journeys (either from tickets or “tap in” and “tap out” information) will have accurate transferring information, whereas other systems use an assumed (or surveyed) kilometre rate per passenger that may be fixed over multiple years, until the survey is repeated.

IV. Data availability

17. A total of 36 countries responded to the questionnaire. Of these, 23, including the United States of America, reported having data available by city and transport system. Canada could provide data by city, but not by system. Fourteen out of the sixteen countries that reported having a metro, could provide both passenger numbers and passenger-km data. Similarly, fourteen out of the eighteen countries reporting having a tram system, could provide both passenger numbers and passenger-km data. (Of the countries not responding, it is known that metro and tram systems exist in many of them).

18. Of the 23 countries providing data by city and system, five countries rely only on ticket sales for data collection. Eight countries make use of sensors, but often supplement the data with information from either surveys, ticket sales or gateway counters. Of the eight, Estonia and, since 2018, Norway use only sensors for data collection. Four countries use only surveys for data collection, while five countries use a combination of surveys and ticket sales. Serbia did not provide information on data collection. It is worth noting that each country and city has different circumstances which vary over time, and comparisons and summary data are thus difficult to interpret.

19. Maintaining the city-by-city split was considered crucial in this pilot exercise. The vast majority of countries could do this; due to confidentiality or other reasons Germany and the Russian Federation could only provide country-level information. These data are still useful, in that they can show the contribution to the systems to the overall national modal split, but do not allow city-specific insights.

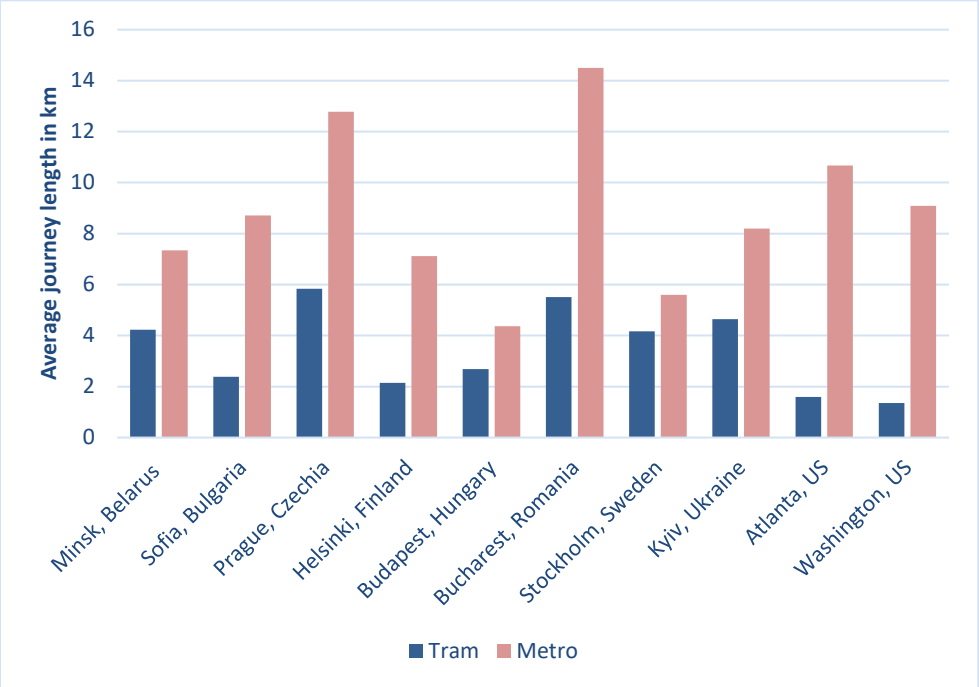
20. Despite indicating that data were available, Slovakia in a follow-up message said that data for their only tram system was considered confidential. Data from Israel are also not publicly available. As public transport is publicly subsidised and managed in most countries, countries are encouraged to reflect on whether these data need to be protected as confidential.

V. Data validation

21. In order to validate the data, the secretariat conducted some basic validation checks. When both indicators were available, the passenger-km per passenger ratio was calculated to be used as an order of magnitude check. For trams this ranged from around 0.2km in Edinburgh, United Kingdom, to around 11km in Riga, Latvia. For metros, average journey lengths ranged from 2.6km in Sul do Tejo, Portugal, to 11-15km in Prague, Czechia. Comparing average journey lengths between metros and trams, there was a consistent pattern of metro journeys being longer than tram journeys (see the figure below).

Figure

Average journey lengths for tram and metro, selected cities, average of available years between 2010 and 2018



Note: Data on tram journeys for Atlanta, US, from 2015 to 2018 and Washington, US, from 2016 to 2018.

VI. Usefulness of the data

22. With data for 23 countries already available, and the possibility of more to come in the future, the data are a welcome addition to existing passenger data for passenger cars, rail and buses (where available). A better modal split analysis at the national level is possible as a result. Even more than this, the dataset gives insights into transport patterns at the city level. Combining this with city-level data on e.g. population, may allow cities to be compared in a meaningful way to a certain extent.

VII. Considerations and next steps

23. Given the relatively good availability of these data and the lack of a huge reporting burden (just two indicators for each system are requested), it would seem a good dataset to continue for the time being. Members of the Working Party are requested to provide their feedback on whether they think this data collection should continue; whether any additional indicators may be useful, considering the reporting burden; and to provide comments on the easiest way to collect these data (excel questionnaire, flat file, another method) for their statistics offices.