UITP ADVANCING PUBLIC TRANSPORT

STATISTICS BRIEF

WORLD METRO FIGURES 2021

MAY | 2022

INTRODUCTION

Metros are crucial assets for efficient, sustainable mobility in cities worldwide. From 2018 to 2020, during the three-year period following the last UITP World Metro Figures, 14 new cities opened a metro system, taking the total number to 193 cities. During this time, infrastructure grew globally by almost 25%, with the Asia-Pacific region accounting for 21% and mainland China for 17% alone.

In 2020, COVID-19 shook the world and public transport with it. Global metro ridership fell by 40% in 2020 compared to 2019. No region was spared, with average drops rates ranging from 32% in Asia-Pacific to 63% in North America.

For this new metro Statistics Brief, UITP has collected exhaustive data on a series of key indicators for global urban rail systems running on an exclusive right-of-way, including ridership, number of lines, network length, number of stations and fleet size.

	NUMBER OF CITIES	LENGTH OF INFRASTRUCTURE (KM)	NUMBER OF STATIONS	NUMBER OF CARRIAGES	ANNUAL RIDERSHIP 2019* (MILLION)
Asia-Pacific	84	10,118	6,824	75,600	30,537
Eurasia	16	909	593	10,250	5,029
Europe	46	3,028	3,032	25,850	11,021
Latin America	19	1,027	842	9,900	6,245
MENA	10	566	404	3,700	1,721
North America	18	1,573	1,269	13,900	3,704
TOTAL	**193**	**17,221**	**12,964**	**139,200**	**58,257**

Figure 1. Key indicators per region, 2020
** Ridership data provided is for 2019 instead of 2020, as the latter was heavily impacted by COVID-19 and so provides a distorted picture. The 2020 ridership data is available in this Brief.*

INFRASTRUCTURE

As of 31 December 2020, the 193 metro systems together made up an installed asset base of 731 lines for a total length of over 17,000km and close to 13,000 stations (see distribution per region in table above). Approximately 3,300km of new infrastructure was put in revenue service between the start of 2018 and the end of 2020. This includes the lines that opened in new metro cities in China, India, Australia, Indonesia, Pakistan and Qatar, but also new lines or extensions in already established metro cities.

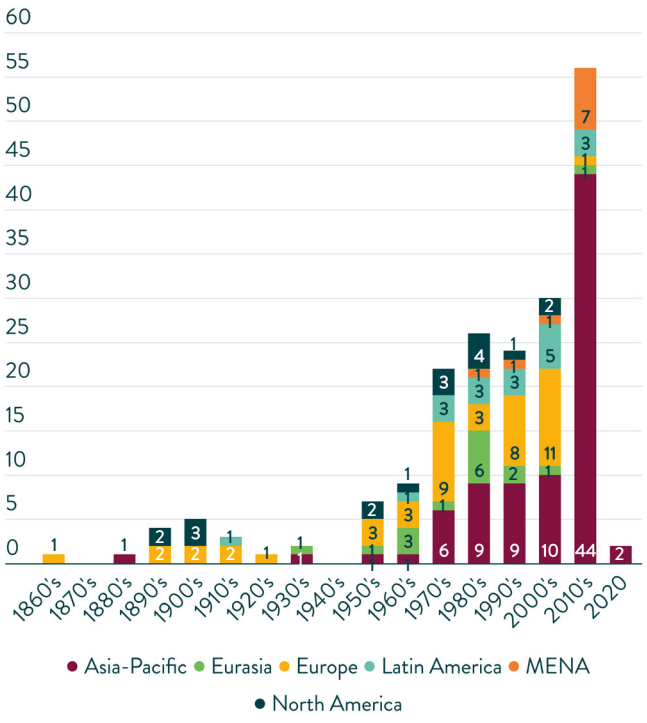

Figure 2. Metro system openings per decade, 1860-2020

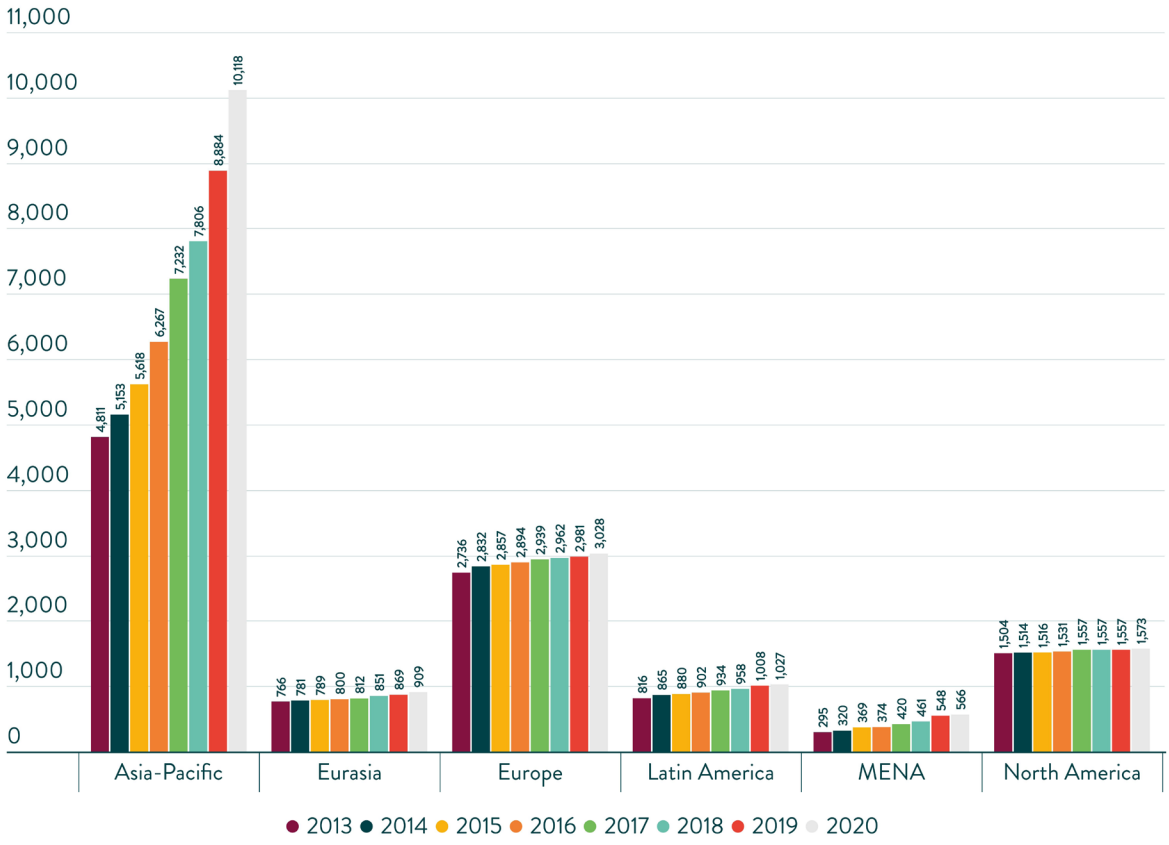

Figure 3. Total line evolution per region (km), 2013-2020

Based on individual metros (see below), compared to the situation at the end of 2017, Chengdu joined the top 10 longest metros and jumped straight to fourth place. Guangzhou climbed two positions to number 5 while Shenzhen went up three positions to number 7. London is the longest network outside Asia-Pacific, ranking number 6.

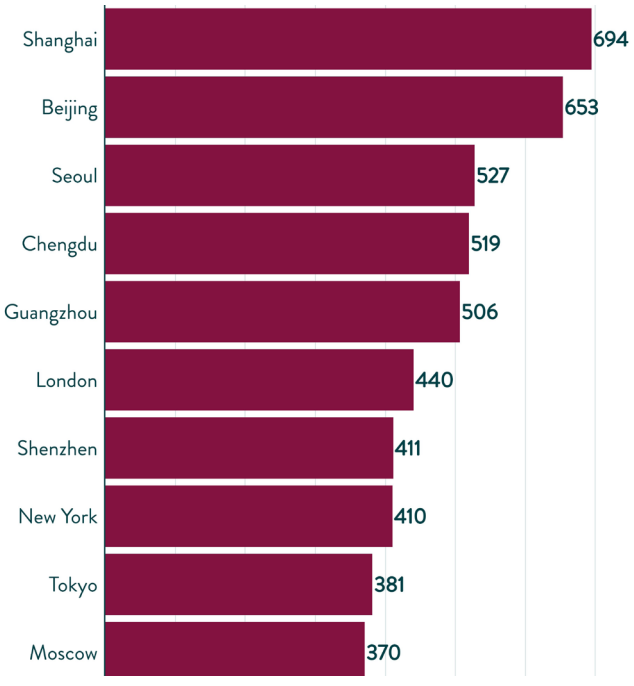

Figure 4. Top 10 longest metro networks

In addition to the cities in the top 10, five more metros had a length exceeding 250km: Delhi (345km), Chongqing (343km), Wuhan (338km), Hangzhou (301km) and Madrid (294km). The number of metros longer than 250km increased from 11 in 2017 to 15 in 2020. There is a remarkable presence of eight Chinese cities in this group, representing more than 50%.

ROLLING STOCK

As for the previous edition of this Statistics Brief, UITP collected rolling stock data for all metros in the world. The chosen unit is the metro carriage (or car), as this allows for better comparison than train (or vehicle), as a train can be composed of two to 12 carriages. For 2020, the total operational fleet worldwide consisted of almost 140,000 carriages (see table on page two for figures per region); that is, 28,000 more than three years earlier.

On average, fleets comprised of eight cars per kilometre of metro line. Eurasia had the largest number (11.3), followed by Latin America (9.6). Other continents lied close to the global average (8.1), while MENA counted 6.6 cars per km of line.

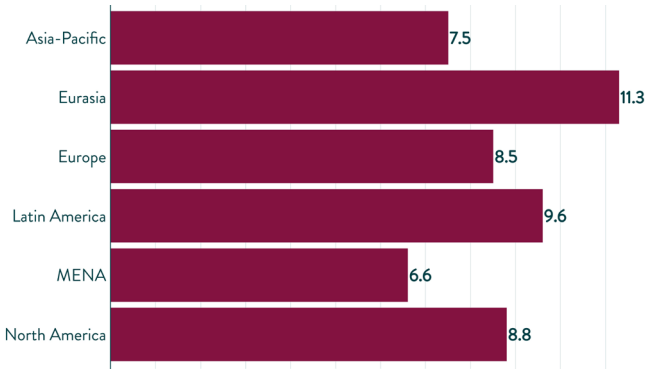

Figure 5: Number of carriages per km of line

RIDERSHIP

For a picture of passenger volumes in normal times, before the start of the Covid-19 pandemic, one needs to look at the figures from 2019. That year, the world's metros carried close to 190 million passengers per day, a 20% increase compared to five years earlier[1].

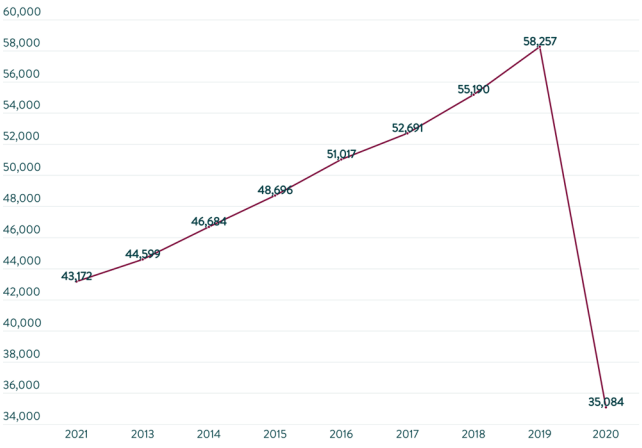

Figure 6: Global ridership evolution (million), 2012-2020

1 Ridership data are trips, as opposed to boardings. To calculate daily ridership, annual ridership is divided by 312, effectively counting a weekend as being equivalent to one weekday.

At regional level, the ridership growth rate between 2014 and 2019 was the highest in Asia-Pacific (+44%), followed by MENA (+21%) and Latin America (+16%). Europe and Eurasia recorded a 9% and 3% increase respectively. Growth during the same period in North America was below 2%, which is a reversal of the decrease in ridership observed for three consecutive years before 2018. In Europe, ridership actually grew faster than infrastructure during the period 2014-2019.

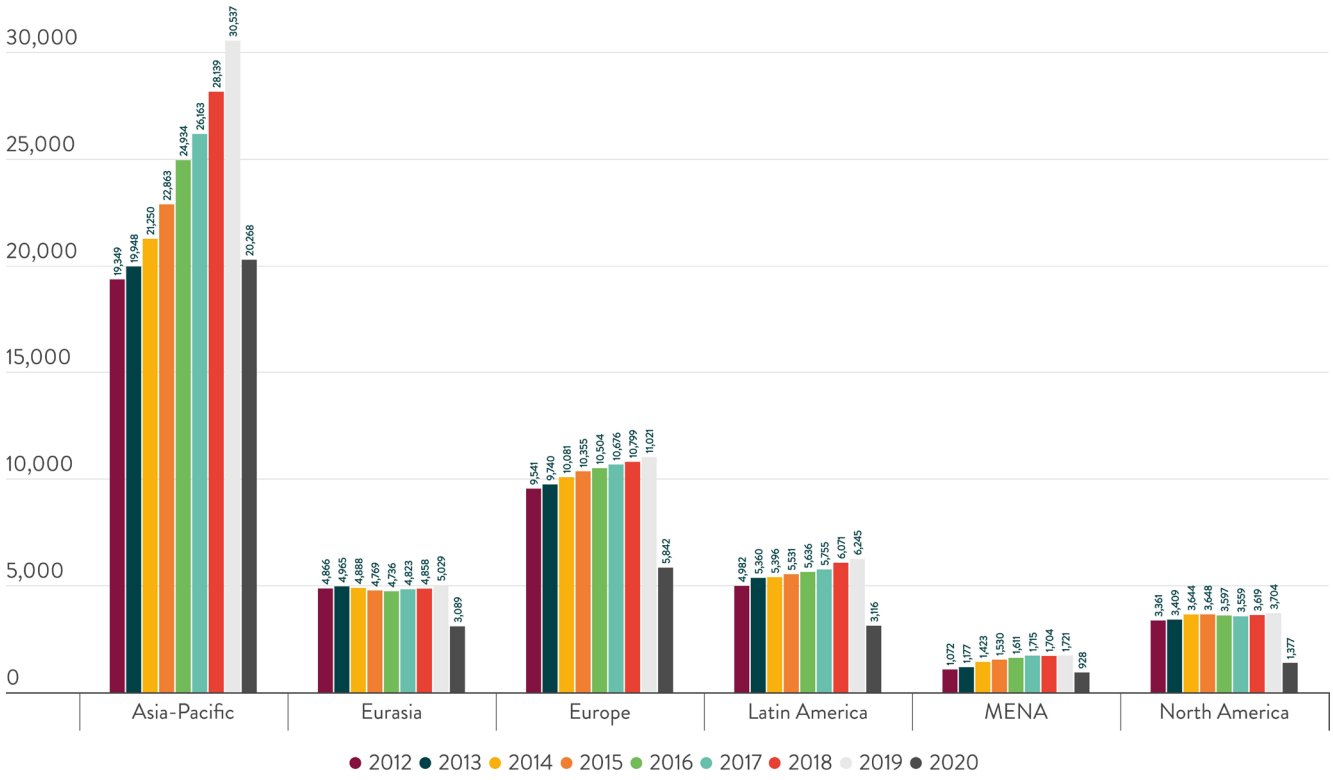

Figure 7: Passengers per year per region, 2012-2020

In terms of individual cities, Tokyo remained the most frequented metro network in the world in 2019 and 2020, followed by Moscow and Shanghai (see table below). In 2019, before the COVID-19 pandemic, there were seven cities from Asia-Pacific in the top 10. Cities in Latin America, Eurasia and North America complete the table.

Outside the top 10, five other cities had a ridership of one billion or more passengers in 2019: London and Paris (1.5bn), São Paulo and Shenzhen (1.2bn) and Singapore (1.bn).

	City	2019	2020	% decrease
1	Tokyo*	3,921	2,586	-34%
2	Moscow	2.,561	1,618	-37%
3	Shanghai	2,209	1,597	-28%
4	Beijing	2,088	1,206	-42%
5	Seoul	1,913	1,393	-27%
6	Guangzhou	1,854	1,335	-28%
7	Delhi**	1,778	182	-90%
8	New York City	1,706	642	-62%
9	Mexico City	1,595	894	-44%
10	Hong Kong	1,568	1,145	-27%

Figure 8: Top 10 metro networks for ridership (millions)

** The ridership figures for Tokyo are the aggregation of the networks of different operators, including the largest ones, Tokyo Metro and TOEI. This means that an unknown number of trips using lines of multiple operators are counted twice.*
*** Delhi data is for the financial year (April to March); 2020 data is an estimation, as official data was not available.*

IMPACT OF COVID-19 ON RIDERSHIP

Metro ridership across the world was heavily affected by COVID-19 (see figure 4 above). Of the top 10 busiest metros in 2019, New York lost close to two thirds of passenger volume in 2020. This was the biggest drop excluding Delhi, which was closed for over five months in 2020[2]. In other cities of the top 10, the drop in ridership was at least 27%, except in Shenzhen (-13%). The particularly high increase of the size of Shenzhen's network (by one third) that year may partially explain the relatively small drop.

Annual ridership went down globally by 40% between 2019 and 2020. The region most impacted was North America (-63%). The decrease was somewhere between 45% and 50% in Europe, Latin America and MENA[3]. The least affected regions were Asia-Pacific (-32%) and Eurasia (-39%).

NETWORK CHARACTERISTICS

It is possible to calculate the average interstation distance by dividing infrastructure length by the number of stations. Similarly, dividing infrastructure length by the number of lines provides average line length. The regional averages can be found in the chart below[4].

It can be noted that longest lines on average are in the Asia-Pacific region (29km) and MENA (27km) while the shortest are in Europe and Latin America (approximately 17km). The average distance between stations is the longest in Eurasia and Asia-Pacific (approximately 1.5km) and the shortest is in Europe (1km). Eurasian network characteristics stand out in that the region has the highest interstation distance while it has the third lowest average line length (20km).

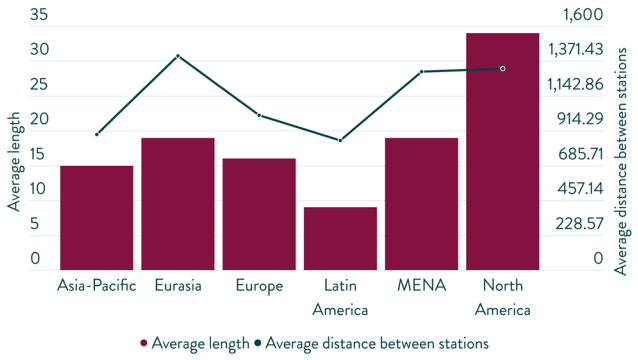

Figure 9: Metro network characteristics per region, 2020

FULLY AUTOMATED METROS

By the end of 2020, there were fully automated metro (Grade of Automation 4; GoA4) lines in 48 cities, meaning that more than one in every four metro systems has at least one driverless line. The total number of GoA4 lines grew from 62 to 80 between 2017 to 2020. There were 1,007km of fully automated metro at the end of 2017. Three years later, the figure was above 1350km. (See graph below). Fully automated metros accounted for 10% of the new metro infrastructure in this period and 8% of total metro infrastructure by end 2020.

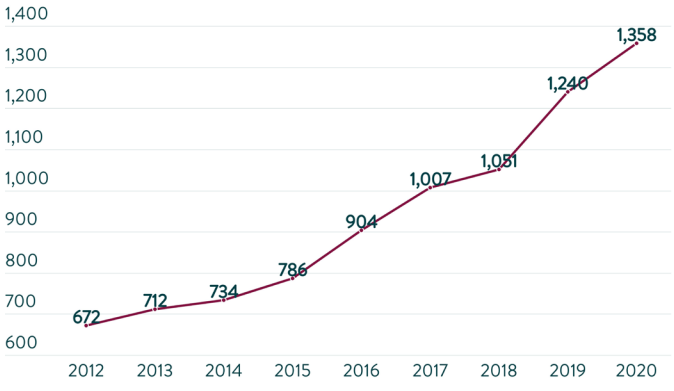

Figure 10: Evolution of GoA4 infrastructure (km)

2 Official ridership data for Delhi was not available for 2020 • 3 Due to limited availability of ridership data for metros in the MENA region, 2020 figures are based on estimations. • 4 It should be noted that the data is somewhat distorted because the interchange stations were only counted once, bringing the average interchange distance up. Similarly, average line length is in reality slightly longer than in the calculation because infrastructure shared by different lines was counted only once.

CONCLUSION

Metro construction has continued in recent years as a response to increasing urbanisation, environmental challenges and aspirations to a better quality of life, with most growth concentrated in the Asia-Pacific region. MENA and Latin America also saw strong growth rates, albeit smaller than Asia-Pacific, while all regions saw at least expansion in metro infrastructure in certain cities.

Infrastructure owners and operators across the world have also been investing to refurbish and modernise existing assets, as well as implement new maintenance tools and techniques destined to increase safety, performance, comfort and bring down the costs of running systems. This work by the sector was not the subject of this Statistics Brief, but it is crucial nonetheless.

After a steady increase of passenger numbers, the COVID-19 pandemic has seen ridership drop significantly. At the time of writing this Statistics Brief, many networks had recovered a substantial part of the drop in passenger numbers, although very few networks, if not any at all had reached 2019 levels. Despite the challenges this entails for finances, metros keep playing a crucial role to make cities livable and sustainable[5].

5 UITP members can benefit from ridership figures for several operators since the beginning of the pandemic. Data is available on MyLibrary.

DEFINITION AND METHODOLOGY

The data for this document was extracted from a database compiled by UITP containing official data from operators or transport authorities or other authoritative sources (national statistics office, national associations, etc.) for the vast majority of cities. Other sources like trade press and generalist press were used when data was not available from official sources.

Metros are high capacity urban rail systems, running on an exclusive right-of-way. Metro lines included in the above statistics run with trains composed of a minimum of two cars and with a total capacity of at least 100 passengers per train. Suburban railways are not included and are available in a separate dataset. Systems that are based on light rail vehicles, monorail or magnetic levitation technology are included if they meet all other criteria above. Suspended systems are not included.

The dataset including the data per city for all the main indicators mentioned in this report is available for free for Premium members on MyLibrary, for a discounted fee for other UITP members and for a full fee for non UITP members. If you are interested in the dataset, please contact publications@uitp.org.

ACKNOWLEDGEMENTS

The comprehensive public reports from different national and regional associations have been invaluable for the data collection: APTA, CAMET and the International Metro Association. UITP would also like to thank JR East for support to collect data from Japan and ANPTrilhos for the support with data from Brazil and ASSTRA with data from Italy, as well as all the operators and transport authorities that helped by answering specific questions.

This is an official Statistics Brief of UITP, the International Association of Public Transport. UITP has more than 1,900 member companies in 100 countries throughout the world and represents the interests of key players in this sector. Its membership includes transport authorities, operators, both private and public, in all modes of collective passenger transport, and the industry. UITP addresses the economic, technical, organisation and management aspects of passenger transport, as well as the development of policy for mobility and public transport worldwide.

This Statistics Brief was prepared by the UITP Secretariat.

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