The 2019 Deloitte City Mobility Index

Methodology
We chose more than 60 unique data parameters based on a review of existing literature, their correlations with economic growth, and our research team’s analysis. Data was gathered from a variety of sources, including government statistical databases, third-party reports, private vendors, and nongovernmental organizations. We then brought in the qualitative judgments of a variety of experts both inside and outside Deloitte on urban mobility or particular cities.¹

We assigned each metric a score between 1 and 5 based on the data parameters within it. Depending on the metric, score assignment involved converting a qualitative assessment into a number, indexing data to create a relative score, or both. We applied some data parameters and metrics to more than one theme.

To look specifically at a city’s readiness for the future of mobility,² we focused more closely on the parameters that dealt with “smart” or “digital” elements of transportation. In particular, the DCMI looks at integrated and shared mobility, vision and strategy, innovation, regulatory readiness for the future of mobility, and ease of use. The metric scores were then averaged. “Five” indicates being closest to full future of mobility readiness. (Figure 3.)

The data was collected for the years 2016 and 2017 (or earlier where newer data did not exist). Unless specified otherwise, this information is no more than five years old. In some instances, trend data was collected, but predominately the data was cross-sectional for the latest year.

In all, we examined more than 50 cities. (Profiles of 18 cities were published in January 2018 and additional cities were added in the following months.) Cities were selected to achieve geographic distribution, a variety of sizes (population and area), and various levels of economic development.

Of course, any effort to create a composite measure such as this is a product of choices and assumptions made along the way. Ours were guided by a view of how seamless urban mobility that is faster, cheaper, safer, and cleaner than today could look, and the important contribution such a system can make to prosperity and productivity. Places that had multiple modes of easily accessible transportation; that had placed an emphasis on walking, biking, and public transit relative to personally owned automobiles; and that had taken steps toward digitally enabling their mobility network received high marks. Different choices and assumptions, guided by a different vision, would necessarily yield different results. In addition, the DCMI currently presents a snapshot, not a trajectory. It does not capture how cities have trended over time, nor can it evaluate how past investments have affected mobility. As we update the data every year, a more robust picture will emerge.

To read the full report, visit: www.deloitte.com/insights/mobility-index
## Deloitte City Mobility Index themes, metrics, and data sources

<table>
<thead>
<tr>
<th>THEME</th>
<th>METRIC</th>
<th>EXAMPLE DATA</th>
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| Performance and resilience | Congestion | ・Peak hours spent in congestion  
・Congestion level  
Driving time to city center (10 km drive from each cardinal direction, peak hours)  
Dedicated bus lane in km |
| Public transport reliability | ・Percentage of metro/tram delays  
・Percentage of bus delays  
Average waiting time for public transportation (in minutes) |
| Transit safety | ・Road quality  
・Walkability score  
Number of traffic-related fatalities  
Number of traffic-related serious injuries |
| Integration and shared mobility | ・Existence of open data or APIs for transport  
・Existence of integrated ticketing option across transport modes  
Bikesharing system in the city  
Private car dependency |
| Air quality | ・Annual mean of PM2.5 concentration  
・Annual mean of PM10 concentration  
Carbon dioxide per capita emissions  
Air quality index |
| Vision and strategy | ・City innovation and Future of Mobility strategy  
Regulatory collaborations and joint initiatives with the private sector and academia |
| Investment | ・Transport budget as a percentage of the total local authority/city budget  
Investment levels in transport |
| Innovation | ・Electric vehicles (EVs) adoption  
City rank in IESE Smart Cities index  
City innovation and Future of Mobility strategy  
Existence of MaaS-based application |
| Regulatory environment | ・Operation of ridesharing companies  
Regulatory collaborations and joint initiatives with the private sector and academia  
Autonomous vehicles (AVs)-city support |
| Environmental sustainability initiatives | ・Transport sustainability score  
Sustainability plan score  
Length of bicycle lanes (in km)  
EV incentives  
Cars sold/registered in given year that are low carbon dioxide (BEV or PHEV)  
Dedicated bus lane (in km)  “Environmentally friendly” modal share (includes public transport, walking, and cycling) |
| Public transit supply | ・Rail system length (in km)  
Metro/subway average peak frequency (in minutes)  
Dedicated bus lane (in km)  Average waiting time for public transportation (in minutes) |
| Transport affordability | ・Monthly public transport cost (in US$)  
Minimum daily wage (in US$)  
Modal share divided into percentage of trips by cars, public transport, cycling, walking, and other modes such as taxi, ferries, etc. |
| Versatility | ・Presence of tube or commuter rail system  
Presence of tram system  
Operation of ridesharing companies  
Bikesharing system in the city  
Private car dependency |
| Customer satisfaction | ・Customer satisfaction with public transport I  
Congestion level  
Average waiting time for public transportation (in minutes) |
| Accessibility | ・Transport accessibility score  
Accessibility of train or metro fleet (in percentage)  
Walkability score |
Endnotes

1. The sources of data included:
   - 2thinknow data: Data sources purchased from 2thinknow, a research company based in Australia that focuses on analysis of cities. Data points include metro/subway average peak frequency, taxi rate per km, traffic-related injuries and casualties, and others (14 data points in total).
   - Government statistical databases: Including census reports, economic statistics, and geographical information.
   - City and state/province websites: Including US Department of Transportation, city transport authority websites.
   - External reports and indexes: Including Movmi Shared City Mobility Index, INRIX Global Traffic Scorecard, TomTom Traffic Index, Waze Driver Satisfaction Index, IESE Smart Cities Index, Arcadis Sustainability Index, Easy Park Smart Cities Index, Moovit average waiting time for public transportation survey.
   - NGO reports: These include the road quality rating provided by World Economic Forum, Particulate Matter (PM2.5 and PM10) reports by World Health Organization, European Alternative Fuels Observatory, OECD, CDP, and American Public Transportation Association.
   - Qualitative analysis: Done mostly by the Deloitte USI team. For example, evaluation of EV and AV regulation, operation of ridesharing companies.
