ACTION INSIGHTS

Connecting the Dots

Using Big Data to Understand Mobility Gaps in American Cities

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RESEARCH FINDINGS FOR CITY LEADERS

How long, how widely, and to which types of destinations do your city's residents travel? Mobility can have a far-ranging impact on quality of life. A study supported by the Bloomberg Harvard City Leadership Initiative explores how socioeconomic status and where people live impact mobility and shows how city leaders can use big data to better understand inequality in their cities.

Socioeconomic inequality is a key issue in cities across the globe. While many studies focus on income, education, healthcare, and housing affordability, research on the so-called mobility gap—how different socioeconomic groups move about the same city—has been limited in scope. One reason for this is that traditional datasets (e.g., the Census, built environment data, economic data, health outcomes) are relatively static: they are too small and evolve too slowly to properly capture mobility trends or allow policymakers to address inequalities in real-time.

Traditional datasets are too small, slow, and static to capture mobility trends.

A study by the Bloomberg Harvard City Leadership Initiative used smartphone location data to examine the mobility patterns of nearly 13 million individuals living in nine cities across the United States before and during COVID-19. Unlike other recent studies using smartphone GPS data, which have focused on one destination at a time, we were able to paint a more complex picture of urban travel by considering several destinations at once. This approach allowed us to better understand how mobility trends vary depending on residents' socioeconomic status (which we measured through a multi-dimensional socioeconomic index, or "SEI"), and how different factors—such as walkability of neighborhoods, proximity to public transportation, and the disruptive effect of the COVID-19 pandemic—can impact mobility gaps.

The study is an example of an emerging field driven by newly accessible, high-volume, high-velocity data that can provide a much more granular, timely understanding of human behavior than traditional datasets. For city leaders interested in improving the quality of life for their residents, this kind of analysis can help shine a light on the blind spots that may arise when we look only at built environments and traditional social policies.

Mobility Gaps in American Cities before and during COVID-19

We examined how mobility differed between the lowest- and highest-SEI groups in Atlanta, Boston, Chicago, Denver, Houston, Los Angeles, Philadelphia, Seattle, and St. Louis in 2019 and 2020. Specifically, we studied differences in mean trip distances, the proportion of trips made to three types of destinations (parks, healthcare, and retail), and whether home location—walkability and proximity to public transit—affected mobility outcomes. We used data provided by SafeGraph, a company that captured the mobility patterns of smartphone users and made this information freely available for public interest purposes during the pandemic. (SafeGraph no longer provides mobility data, but other companies offer it for a fee.)

We found striking differences in the mobility trends of the least- and most-advantaged residents.

We found striking differences in the mobility trends of the least- and most-advantaged residents. Among other things, low-SEI residents made fewer trips to parks and more retail trips in 2019, and these differences grew in 2020. While disadvantaged residents made more trips to healthcare facilities before COVID-19, this difference flipped in 2020, with low-SEI groups reducing their healthcare visits while high-SEI groups increased them.

Home location affected each group differently. Neighborhood walkability allowed better-off city dwellers to make fewer and shorter trips during COVID-19 but conferred no such benefit on low-SEI residents. High-SEI residents were more likely to travel by car even when public transit was easily accessible.

Mobility patterns also differed across cities. While the pandemic widened mobility gaps significantly in seven of the nine cities studied, Seattle and Atlanta experienced much smaller pandemic-induced changes in their mobility gaps. This disparity raises interesting questions about how the particular spatial, social, and economic aspects of cities affect mobility.

Takeaways

Big data, like the cellphone location data highlighted in our study, offer city leaders insights into closing mobility gaps that can inform policies beyond transportation, such as investing in access to childcare, schools, and medical facilities; creating equitable opportunities to use amenities, services, and public spaces across neighborhoods; and extending affordable housing programs to commercial spaces so that low-SEI residents living in walkable neighborhoods can afford nearby goods and services.

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More broadly, however, big data can help city leaders better understand their particular city's mobility patterns to help devise solutions that can best address the specific challenges they face. To boost your city's data-analytic capacity, consider the following:

Take advantage of big datasets, such as smartphone location data.
The magnitude, granularity, and timeliness of this data can help cities uncover inequities more quickly, better understand its dimensions, and develop more effective policies to improve the quality of life for everyone.

Partner with a university.
While the terms for accessing smartphone mobility data have changed since it was made freely available during the height of the pandemic, partnering with educational institutions may facilitate access for city leaders. These types of collaborations are win-win, providing academic teams with insight into relevant government challenges while allowing city governments to tap into and learn from universities' expertise and research capacity.

Conduct a local study.

Don't rely on findings from other cities that appear similar to yours in size, location, or demographics. Although the relationship between mobility and SEI may be similar across cities in some ways, the specifics vary depending on the city. For example, Seattle and Atlanta are very different in terms of geography, size, and racial/ethnic makeup, but they both stood out from the others we examined for having the least inequitable pandemic-induced changes among their high- and low-SEI residents.

Look beyond big data.

Big data can offer insight into the "what, where, and who" of mobility patterns, but it usually can't tell you the "why." This study showed a variety of patterns across cities, within cities, and over time, but understanding why patterns and gaps occur, change, or remain the same under different circumstances requires additional (likely qualitative) research and direct engagement with residents. Big data can, however, generate important questions and provide a factual basis for analysis and discussion.

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Further Reading

"A tale of two Americas: Socio-economic mobility gaps within and across American cities before and during the pandemic"
Cities: The International Journal of Urban Policy and Planning

"Hidden Barriers to Open Venues: What Big Data Can Tell You about Access to Public Spaces"
Bloomberg Harvard City Leadership Initiative

"Using Big Data for Local Decisions: Which Demolitions Reduce Gun Violence Most?"
Bloomberg Harvard City Leadership Initiative

"Are Your City's Policies as Dynamic as Your Residents' Preferences?"
Bloomberg Harvard City Leadership Initiative

Action Insights summarize findings from academic research for city leaders and other public officials. They offer management and leadership guidance you can put to use in your work, and they link to the underlying studies.

The Bloomberg Harvard City Leadership Initiative, located at the Bloomberg Center for Cities at Harvard University, is a collaboration between Harvard Kennedy School, Harvard Business School, and Bloomberg Philanthropies to equip mayors and senior city officials to tackle complex challenges in their cities and improve the quality of life of their residents.

Launched in 2017, the Initiative has worked with 465 mayors and 2271 senior city officials in 524 cities worldwide. The Initiative advances research and develops new curriculum and teaching tools to help city leaders solve real-world problems. By engaging Harvard graduate students in research and field work, the Initiative supports current city leaders while investing in future generations. The Initiative also advances the field of city leadership through teaching, research, and new curricular materials that help city leaders drive government performance and address pressing social problems.

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