

otonomo



The Promise of Connected Vehicle Data

Vehicle Data is Your Smart City's Ticket to a Better,
Safer, and Cleaner Mobility Experience

INTRODUCTION

To better understand how today's smart city stakeholders are leveraging vehicle data to see measurable results, we conducted a survey of decision makers and data science experts with an interest in mobility.

We asked them:

- How they currently use connected vehicle data to improve the services they offer their citizens?
- What the challenges they face?
- How to create efficient, streamlined data collection?
- How changes in the pace of EV adoption, digital transformation, and connected transportation are affecting their vision for cleaner, more efficient and smarter cities?

Those surveyed include C-suite executives, and senior leaders in finance, compliance and procurement departments, senior transportation directors and many other decision makers from cities in California,

Florida, Illinois, New York, Massachusetts, Wisconsin and a host of other states. The responses were collected by independent survey firm Lead to Market, and took place during July 2021.

The results shine a light on the powerful impact that data is already having on smart city implementation today. 62% of respondents are currently using vehicle data to improve city management and quality of life for their citizens. 70% use it for problem solving, often in real-time.

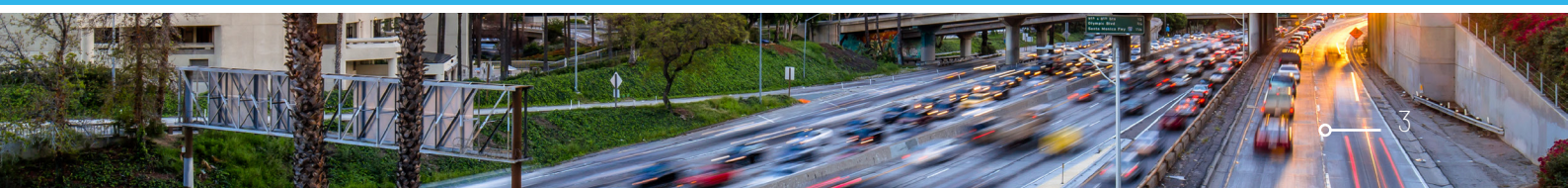
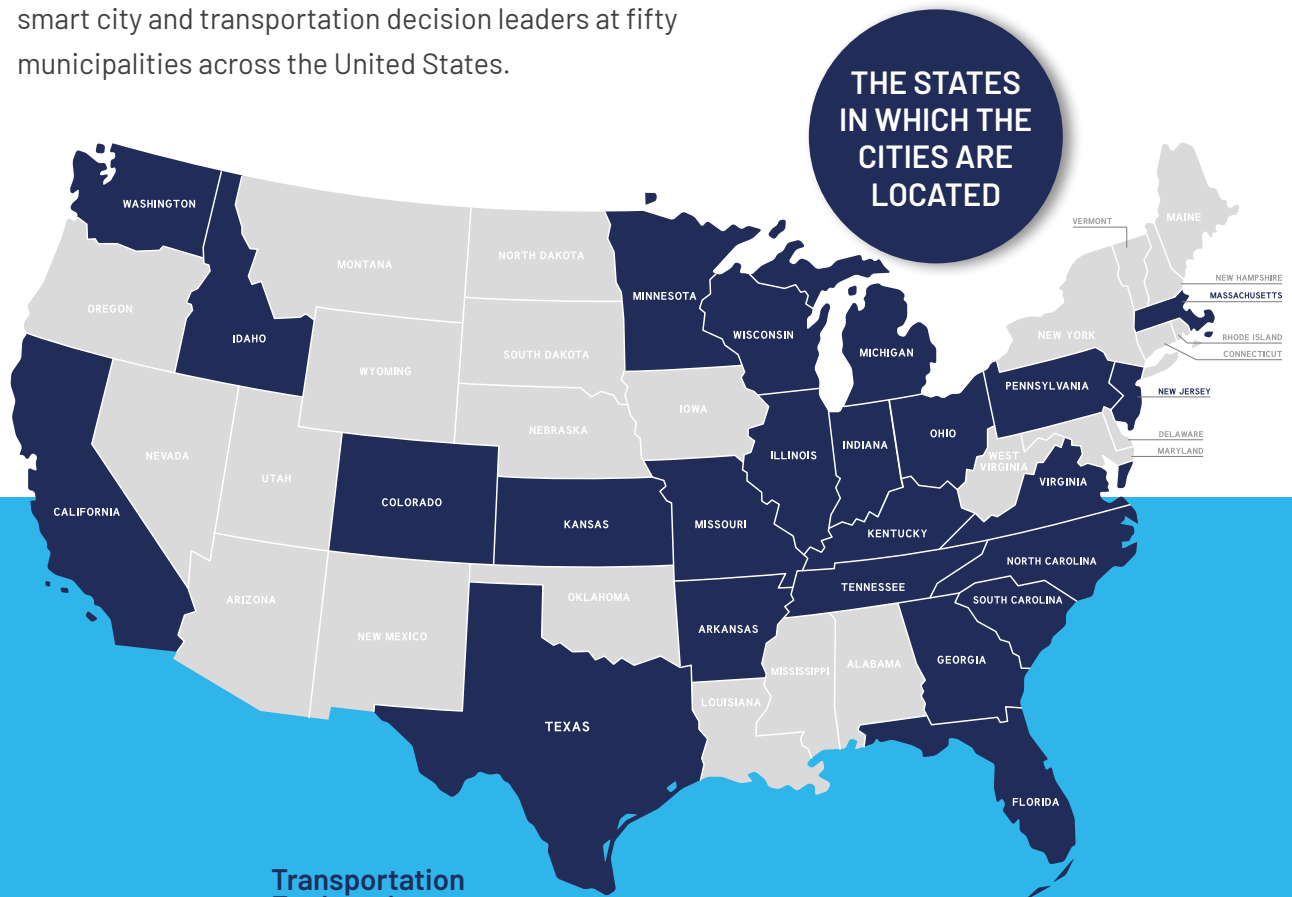
Ready to beat this challenge and learn from the data-driven experiences of those who are already in the trenches?

Let this report be your guide.

One key challenge emerges - creating a single source of accurate, rich, application-ready, multi-layered, vehicle data is the answer

50 Smart Cities Talk About Using Vehicle Data

On behalf of Otonomo, Lead to Market independently collected data through in-depth phone interviews with smart city and transportation decision leaders at fifty municipalities across the United States.



Data Drives Value For Smart Cities

Expected global growth of smart city technology market:

\$101 billion → **\$240 billion**
in 2021 in 2030

- Guidehouse Insights



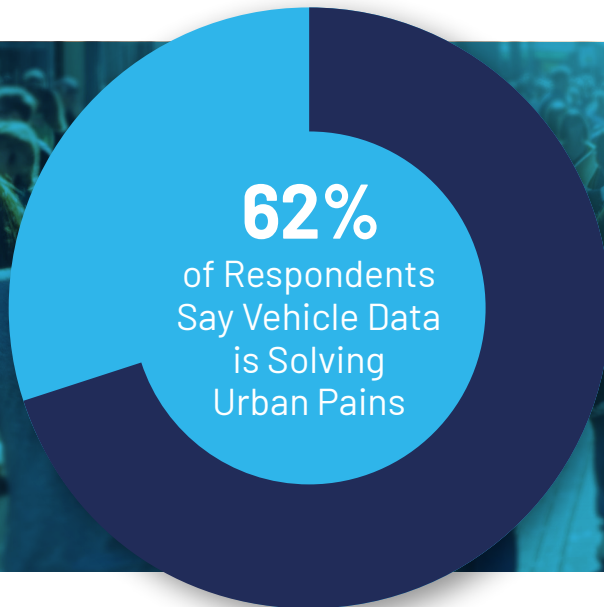
“City governments are looking to rebuild better to ensure resilience to future pandemic events, accelerate the shift to zero carbon, and address the social inequalities in many cities. Smart city solutions that support these ambitions are expected to thrive even during a tough period for local government finances.”

Eric Woods, research director for Guidehouse Insights

At the heart of this growth is connected vehicle data - an area that McKinsey Research comments has been neglected by the market. “To date, most players have overlooked opportunities to monetize data from these vehicles - a significant oversight, considering how companies in other industries are aggressively generating value from data. In fact, seven of the ten most valuable companies in the world already generate billions in profits from data-based services.”



Vehicle Data is Solving Urban Pains



18%
ROADWAY MGMT.
& INFRASTRUCTURE



18%
ROAD USAGE
& CAPACITY DATA



18%
ZONING & URBAN
PLANNING



14%
HIGH ACCIDENT
AREAS

Vehicle data is already in use for solving a wide range of challenges. Information from street and dash cameras, SONAR, LIDAR, RADAR, street sensors, and GPS, is having a significant impact. But, it's not enough.

The number of stakeholders who are solving real-world challenges today is still relatively low. With an estimated 353 million connected vehicles worldwide by 2025, connected vehicle data is the missing ingredient to help solve urban pain points better, faster and more efficiently.



6%
PARKING



2%
ENVIRONMENTAL
IMPACT

What Are Our Respondents Using Vehicle Data For?

Think BIG.

Our respondents show that even with limited data sources, they are changing citizen experiences, expanding infrastructure and planning for the future with the help of vehicle data.



More than two-thirds are event planning

68% of respondents rely on vehicle data in planning for and managing mass events

- Organizing parking ahead of time
- Reducing congestion with smart arrival and departure times
- Suggesting intelligent routing for individual vehicles
- Supporting sustainability through ride-sharing and carpools

Half are designing mobile applications for citizens

50% of cities are designing transportation mobile apps

- Improving transportation access for citizens
- Streamlining access to tourism for guests and visitors
- Adding transparency to public services
- Offering communication tools for municipalities and citizens alike

The majority are improving public facilities

64% are using vehicle data to reduce public congestion

- Offer intelligent parking and services around public facilities such as parks or museums
- Prevent overcrowding during events
- Provide sustainability initiatives such as ride-sharing
- Plan for infrastructure such as new roads or car parks

A third are considering networks for electric vehicles

78% of survey respondents find it challenging to secure reliable data on electric vehicles

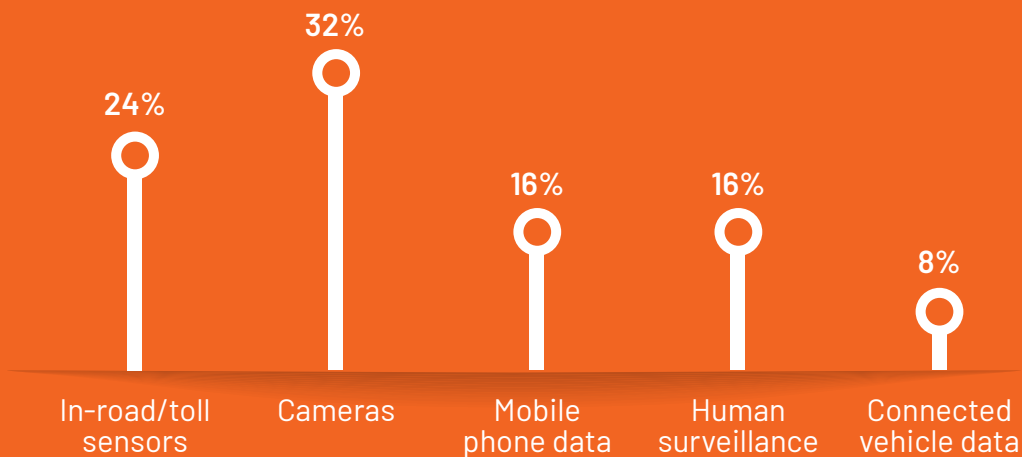
- Accurately ascertain data on EV traffic and usage
- Plan infrastructure such as charging stations
- Provide data to organizations for expenses or insight into sustainability
- Reduce range anxiety for citizens thus increasing adoption rates

Which Data Sources are Most Popular?

32% of our respondents are relying on the data from security cameras to collect vehicle information, while a further 24% are using in-road sensors or toll payment sensors. This is followed by a 16% tie for human surveillance and mobile phone data.

Currently, just 8% of respondents are using connected vehicle data.

As vehicle data becomes easier to access, we expect this number to grow significantly due to its higher quality.



SMART CITY DATA SOURCES



Challenges with Existing Vehicle Data Sources

The problem is that the data collected today is expensive, involves high maintenance, and is limited in terms of the information it can provide.



TRAFFIC SENSORS

These sensors detect vehicles passing over them, and are limited to speed, location and weight. Although they are a choice for privacy requirements, each vehicle information is collected in a silo and that limits insights and prevents any deeper understanding of traffic patterns. Traffic sensors are also expensive to place and maintain over time.



CAMERAS

CCTV systems are great for surveillance, and at no added cost can be used for measuring traffic. However, drivers and passengers have not given consent, and so keeping to privacy laws can be resource-intensive and complex. Coverage is also limited to where cameras are placed, and quality is impacted by weather conditions.



MOBILE DATA

Also known as Floating Cellular Data, is a low-cost solution as many public datasets are available, and phones go everywhere that vehicles do. There can be noises from walking, cycling, public transport and more. Many phone

providers are beginning to offer “opt-in” functionality to address data privacy concerns. Mobile data is also known to be less accurate, and will only provide location and speed information.



HUMAN SURVEILLANCE

This is usually data like profile surveys and directional surveys where humans collect information using paper forms or camera data, such as types of vehicles, and the direction or lane they travel in. More recently, paper-based forms are being replaced with mobile applications, but the chance of human error is still high and resources are limited and expensive.



LIDAR/RADAR/SONAR

These are the available sensing technologies that organizations tend to leverage for data collection and analysis. While LIDAR is most commonly used by law enforcement, all of these technologies can be expensive to deploy and have a limited data range. SONAR is also less accurate than the alternatives, making it difficult to glean information from at scale or speed.

Each of these sources of data collects information in a different format. A great deal of effort is required in order to normalize and harmonise them to get any benefit from combining them together.

The Importance of Near Real-time Data From a Single Source

A key finding of this survey is the importance of **a single stream of data that combines, cleanses and aggregates multiple sources**. Organizations cannot make real-time decisions with disparate data sources.

The trips data of a vehicle needs to be informed by local events or weather data, or changing emergency service routes needs to respond to congestion.

31%

of respondents use real-time vehicle data to know the conditions **vital to decision making**.

USE REAL-TIME DATA TO MONITOR



Traffic Conditions



Weather Conditions



Local Hazards



Construction



City Disasters



What Can Connected Vehicle Data Achieve?

With connected, multi-source, multidimensional, harmonized, granular vehicle data you can:

- **REDUCED COST OF ACQUISITION**
Standardized data pulls in information from various OEMs, harmonized, quality controlled, and compliant with local regulations.
- **LOWERED ONGOING EXPENSES**
Once integrated, you have access to a real-time continuous data feed through a single partner, rather than managing multiple complex needs and integrations.
- **DECREASED LOGISTICS**
Real-time traffic data is available everywhere that cars travel. Analyze any area, street, time of day, vehicle model, or environment.
- **INCREASED DATA UTILITY**
Connected vehicles are inside the flow of the traffic, experiencing motion, speed and idling in real-time, allowing you to get context for what you see.
- **EXPANDED SERVICES**
Data with multiple attributes is key for meaningful traffic analysis, for example spotting trends over time, or comparing two locations.

At Otonomo,
Connected,
Multi-layered
Vehicle Data is...

Gathered from multiple sensor streams representing 150+ data attributes, and merged into one source which can address a variety of smart city challenges.



Will your city LEAD OR FOLLOW?

Additional areas of service improvement made possible
by the use of vehicle data:



Signage and
Traffic Planning



Emergency
Response Services



Physical
Infrastructure
Maintenance



Safety of Parks
and Public Spaces



AI & ML System
Implementations



VMT
Calculation



Revitalize Your Smart City Roadmap with Richer, Expanded, Connected Vehicle Data

One quick integration gives you the key to access a unified set of attributes across multiple OEM brands. The Otonomo cloud-based platform is hardware agnostic and data

can be easily integrated into data analysis tools or proprietary programs through our API. Otonomo's data can also be utilized in a mixed environment with data from other sources.



Otonomo connected vehicle data provides a **rich source of data with multiple data layers.**

Sustainable.
Smart.
Connected.

A single source of data to meet the needs of a municipal government

INCLUDES NEAR REAL-TIME DATA FOR:



Traffic



EVs



Weather



Friction



Hazards



Construction



Signage



Historical

About Otonomo

Otonomo fuels a data ecosystem of OEMs, fleets, and more than 100 service providers spanning the transportation, mobility, and automotive industries. Our platform securely ingests more than 4 billion data points per day globally from over 40 million vehicles licensed on the platform as well as mobility demand data from multimodal sources, then reshapes and enriches it to accelerate time to market for new services that improve the mobility and transportation experience. We provide deeper visibility and actionable insights to empower strategic data-driven decisions – taking the guesswork out of mobility and transportation planning, deployment and operations. Privacy by design and neutrality are at the core of our

platform, which enables GDPR, CCPA, and other privacy-regulation-compliant solutions using both personal and aggregate data. Use cases include emergency services, mapping, traffic management, EV management, subscription-based services, micro-mobility, parking, predictive maintenance, insurance, media, in-vehicle services, and dozens of smart city solutions. Otonomo has an R&D center in Israel, and a presence in the United States and Europe.

More information is available at otonomo.io.





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We hope you found this research helpful and look forward to joining you on connected vehicle data and mobility intelligence. data journey.

Please contact us if Otonomo can be of assistance.

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