



# How Smart Data Management Powers Smart Cities

**MARKET TRENDS REPORT**



**TERADATA**

# Introduction

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City governments are encountering an unprecedented flood of data as they collect it from automated data processing, sensors, internet-connected devices and more. Managing these large and varied datasets can overwhelm government analysts. The sheer volume of siloed data presents a great challenge — but an even greater opportunity.

Within those multiple data sources is the potential to uncover insights that can result in improvements in revenues, safety and public services. That's why more local governments are becoming smart cities that make data-driven decisions.

Smart cities are using the Internet of Things (IoT) to enhance their infrastructure, creating applications and applying analytics to new data to support city services. But the work doesn't stop there.

To fully reap smart city benefits, local governments need smart data management — the process of integrating, storing, analyzing, managing and sharing data through a single solution such as the Teradata Analytics Platform. It is important to start with data collection and acquisition, convert the data to information, obtain the maximum insight and understanding from the information, and then develop appropriate strategies and responses. Some modern cities are missing opportunities to better use their data, and smart data management can change that.

GovLoop partnered with Teradata, a database and analytics provider, on this report exploring cities' data management challenges and how they can address them. The following pages highlight best practices for embracing smart data management to make cities better places to live and work.

## BY THE NUMBERS

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500+

cities worldwide have a population of over one million.

Source: [The World Health Organization \(WHO\)](#)

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5%

more of the world's population will live in cities by 2030 than did in 2015.

Source: [WHO](#)

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\$800 billion

is available in economic opportunities per year for major cities upgrading public transportation.

Source: [The New Jersey Institute of Technology \(NJIT\)](#)

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\$1.2 trillion

in savings is available to the United States if smart energy systems are widely implemented.

Source: [NJIT](#)

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\$342.4 billion

was invested in smart cities in 2016.

Source: [BCC Research](#)

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\$774.8 billion

is expected to be invested in smart cities by 2021, more than double the 2016 total.

Source: [NJIT](#)

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459

U.S. cities were planning smart city projects through 2017, with 97 planning or implementing them in 2018.

Source: [The U.S. Conference of Mayors \(USCM\) 2017 and 2018](#)

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By 2025

at least 88 smart cities will exist worldwide.

Source: [IHS Technology](#)

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# THE CHALLENGE

## Missed Data Opportunities

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Data is the essence of cities, particularly those using it to improve their residents' quality of life. But many cities use only part of their data, missing the full scope of available benefits. **The rise in devices producing data is making it harder for cities to handle the large volume of data, much less act on it to make data-driven decisions that are valuable to their constituents.**

"It's an enormous volume of data to deal with," said Roger May, Partner Manager at Teradata. "It's a daunting task for these cities to figure out."

The use of analytics and data sharing is key to moving forward, May said. "You have such a diverse set of data that is now available to use, and to really drive insights, you need to be able to drive analytics at scale."

Municipal agencies are often isolated from one another, however. As a result, they duplicate efforts and can't uncover cross-agency patterns that could help cities.

Missed opportunities in data integration and analytics force higher costs, lower public safety, diminished public services and less understanding of crime and resource trends.

City governments without smart data management struggle to best serve their citizens, glimpsing a fraction of the wealth of data available to them.

# THE SOLUTION

## A Smart Data Management Approach

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Smart cities connect information and communication technologies to share data. They need an analytics platform in which data gathered from an ever-growing range of sources uncovers trends and makes insights available to city officials and residents. To get there, cities must invest in smart data management.

Smart data management secures data for advanced analytics, which can detect various actionable patterns that can either be automated or monitored to improve processes.

**For city governments, smart data management lights the way to clear, actionable insights.**

IoT plays a key role in this data strategy. IoT describes the huge network of devices and physical objects, or "things," that can connect to the internet, communicate with one another and share valuable data.

Cities will need sufficient data management scale and capacity to capture, analyze and view IoT data in context, or they will be unable to extract insights.

Adopting smart data management helps city officials make data-driven decisions in real time by automating data from various IoT-enabled sources. Data is unified across domains, such as lighting, parking and transportation services. Layering in weather, census, event and other data reveals cities' full operational potential by helping leaders understand the information available to them for next steps.

"The outcomes that matter in a smart city have not fundamentally changed," said Peeter Kivestu, Teradata's Industry Consultant specializing in logistics, transportation and smart cities. "They still are safety, efficiency and the user experience."

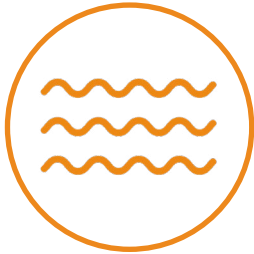
"What's changed is actionability.... When you bring multiple kinds of data together, the new benefits, or the new issues that need to be tackled, become clear patterns," he continued. "We call it discovery analytics. The analytics 'discover the patterns.'... If you don't have integrated data, you will simply miss those connections, and likely miss the opportunity."

Smart cities are ultimately highly integrated, outcomes-driven operations that want to make the most of their data to improve the citizen experience and public services and discover new revenue streams.

# BEST PRACTICES

## Implementing Smart Data Management

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### 1. Create a Data Lake.

Cities are made up of separate systems with myriad data streams available for analysis. Each system comprises multiple data elements. The interplay between traffic lights and parking and transit services within transportation is one example.

Smart cities connect these domains, integrating information into a data lake — a coherent repository of data on a single unified platform. Understanding this data powers informed decision-making that is in the best interest of citizens.



### 2. Bridge Data Silos.

The silos in which city data often exists prevents patterns from emerging and reduces efficiency by duplicating information. Building bridges between agencies' data allows a city's most vital information to be shared and analyzed. Additionally, processed and raw information can be evaluated, helping cities determine the best decision-making insights.



### 3. Apply Advanced Analytics.

Advanced analytics scan the data lake for new discoveries. Valuable insights emerge where seemingly unconnected data aligns with greater context, becoming insightful. Data's value reaches its full potential, bringing to light a city's needs, challenges and opportunities, and how to address them.



### 4. Start Small to Achieve Smart Data Management.

Smart data management takes massive heaps of information and renders them useful.

“With smart city initiatives, it's easy to get lost in some of the technology underpinnings,” May said. Cities should start with smaller, manageable projects to drive early wins, he added. A small, high-value use case can help cities that are considering smart data management see its worth and establish reusable project components for larger tasks down the road.

Easily digestible and actionable data provides clear, immediate value to a city. Smart cities use advanced analytics on such trials to score quick, incremental wins and test their operational processes.



### 5. Use Smart Data Management to Unlock Your City's Potential.

Physical connectivity is the fabric of a city, and in the future, cities will be as digitally connected as they are physically. But they need smart data management to unlock the possibilities.

Smart data management establishes, develops and connects all data capabilities across a smart city, making it more adaptable and capable of solving external and internal challenges.



## CASE STUDY

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The Georgia Department of Transportation (GDOT) and Teradata used [smart data management](#) to better understand how varying the speed limit affects traffic flows.

Variable speed limits (VSLs) are speed limits that change based on road, traffic and weather conditions, potentially reducing crashes and congestion. The benefits, well supported in theory by traffic science, are now practically measurable through data management that integrates the best of internal and external data sources.

By combining internal GDOT data on a 36-mile stretch of a major highway encircling Atlanta with Inrix's minute-by-minute highway speed data, Teradata developed new techniques for understanding traffic flows.

Teradata used advanced analytics to measure persistent slowdowns and how VSL signs helped alleviate those bottlenecks.

By using data science and smart data management analytic capabilities to measure the turbulence traffic holdups cause, Teradata found that it decreased when VSL was active in a bottleneck's critical zone of influence. Subsequent use cases can examine VSL's potential across more complex conditions, such as preventing secondary accidents. Smart data management enables reusable data and analytics, helping grow the use of other internal and external data and extending analytic techniques.

## HOW TERADATA HELPS

Local governments can implement smart data strategies using the Teradata Analytics Platform, which is functional across all possible data verticals.

The platform automatically ingests multiple data sources into a centralized location capable of analysis and sharing. This produces powerful new insights for leaders and citizens alike, allowing advanced analysis on the combined datasets across multiple genres.

Teradata uses its smart data management platform as a focal point for data acquisition and a proven strategy to optimize analytics for a greater understanding.

This strategy helps organizations make smarter, data-driven decisions that achieve sustainable value for their communities.

Observations generated by smart data management help city governments enhance their services, connect citizens and visitors, deliver improved retail experiences, mobilize transportation services, fight crime, and more.

**Learn more here: [Teradata on Smart Cities](#)**

# Conclusion

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City governments can become smart, digitally connected enterprises when they fully deploy smart data management.

“With data, cities can be faster, more targeted in their investments in safety and efficiency, and have better understanding of how the results correlate with measurable user feedback,” Kivestu said. “Without integrated data, you can’t make those connections.”

The resulting advanced analytics ecosystem generates maximum value while granting the intelligence for faster responses to everyday issues and strategies built on sound data.

Smart cities have a tremendous opportunity to harness the value of the data that they collect. Using smart data management techniques, they can optimize investments and decision-making.

## ABOUT GOVLOOP

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GovLoop’s mission is to “connect government to improve government.” We aim to inspire public-sector professionals by serving as the knowledge network for government. GovLoop connects more than 270,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to connect and improve government.

For more information about this report, please reach out to [info@govloop.com](mailto:info@govloop.com).



## ABOUT TERADATA

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Teradata empowers organizations to achieve high-impact business outcomes. Our focus on business solutions for analytics, coupled with our industry leading technology and architecture expertise, can unleash the potential of great governments.

We help agencies evolve from standalone or narrowly-focused smart city projects to highly integrated, business-driven operations. Using a smart data management strategy as a focal point, Teradata drives projects to success through data acquisition and a proven strategy that optimizes analytics.

For more information about Teradata Smart City solutions, visit [www.Teradata.com/smartcities](http://www.Teradata.com/smartcities)





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