

Smart City Data Governance Policies



Creating a Foundation
for Data Sharing
with City Partners

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FOREWORD

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's business priorities. ATIS' 150 member companies are currently working to address 5G, cybersecurity, robocall mitigation, IoT, artificial intelligence-enabled networks, the all-IP transition, network functions virtualization, smart cities, emergency services, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle – from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

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US Ignite is a non-profit organization accelerating the smart community movement by guiding communities into the connected future, creating a path for private sector growth, and advancing technology research that is at the heart of smarter development. For more information, visit www.us-ignite.org.

INTRODUCTION

SMART CITY DATA POLICIES

138.7 USD Billion 2020



236.0 USD Billion 2025



CAGR of 11.2%

The global smart city platforms market is expected to reach USD 236.0 billion by 2025, growing at a CAGR of 11.2% during 2020-2025

Source - MarketsandMarkets

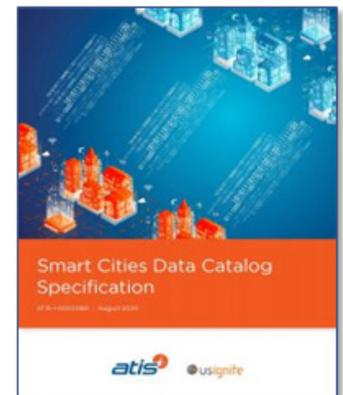
Smart city data policies represent the rules, guidelines and procedures that drive effective data management and data sharing. These policies are developed within the scope of local, state and federal laws, regulations and organizational structures, so there is no single approach that can be applied across all jurisdictions. However, the evolution of new data sharing models and data enrichment capabilities does offer the opportunity to build data policies that are fully aligned with the future digital economy.

At a foundational layer, data policies form the basis of good data governance and optimize the curation and sharing of a city's data assets. They encompass areas such as data integrity, transparency, privacy and consent. One of the guiding forces for future data sharing is the

ability to integrate third-party partner data with city-owned data. This combination will provide a more robust data ecosystem to the data consumers who derive value from participating in this ecosystem. The application of emerging technologies and techniques for enriching the data is central to the success of data sharing.

The ATIS/US Ignite Smart Cities Data Catalog Specification was developed through the collaboration of solution providers from industry and leading North American cities. It is based on an architecture that connects data producers, data enrichers and data consumers, leveraging a consistent framework, approach and interoperable specifications.

The remainder of this paper builds on the concepts described in the Data Catalog Specification. It also provides cities with recommendations for leveraging forward-looking data policies to take advantage of new opportunities to engage citizens, businesses and data partners.



CURRENT DATA POLICY MODELS



Smart city data governance models continue to evolve as data volume and velocity are increasing coincident with the need to move data to open data portals. The majority of existing data policies have been designed to meet the growing demand for open data from city-owned data assets.

Existing sources of municipal data policies include US Ignite (<https://www.us-ignite.org/tools/data-standards-and-policies>) and the Sunlight Foundation (<https://opendatapolicyhub.sunlightfoundation.com/collection>).

The following are key learnings from existing smart city data policies that are applied to North American municipalities:

- Publish city data, making it freely available via open data portals and maintain updated metadata. Open data portals may be managed by a third party, in some cases.
- Utilize open and widely used data formats, including ones that are machine readable and downloadable through an API or bulk download function for automated processing.
- Open data should be connected to a city's strategic priorities. Metrics should be established to measure its effectiveness. Work with internal and external stakeholders to identify datasets with the highest benefits.
- Establish processes to ensure that datasets exclude restricted, sensitive or confidential information. Cities define what they consider protected information.
- Cities are exploring partnerships to promote new software applications and tools to collect, organize and share open data.
- Data catalogs are being explored to provide a comprehensive inventory of city datasets. These could be potentially published on open data portal.
- Open data portals may also contain public feedback mechanisms about the usefulness of datasets, as well as system tracking and analytics for ongoing process improvement.
- Governance consists of oversight by a city chief information officer, a chief data officer, the mayor's office or a city manager. It generally includes an open data governance committee or management team across city agencies.

TOP DATA POLICY CHALLENGES FOR CITIES



Cities participating in the ATIS/US Ignite Smart City Data Exchange program were surveyed to identify the key challenges they face in advancing their data policies to meet future demands and partner relationship models.

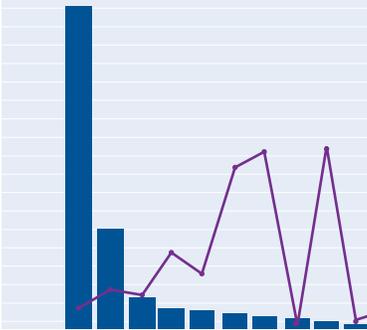
Cities have diverse geographies, demographics, population and citizen needs, but they share a set of common challenges that relate to forward-looking data policies:

- Cohesive leadership and accountability structure for executing data policies
- Cross-agency/jurisdictional data sharing agreements.
- Moving data sharing policies from agreement to implementation.
- Ability to collect and collate data from multiple sources for publication.
- Acquisition of data stewards, data scientists and other staff necessary to develop and apply data policies to future needs.
- Prioritizing data initiatives in light of COVID-19 response efforts and budget needs.

As cities consider future data management solutions and opportunities for data sharing and data partner relationships, their emerging data policy needs can be potentially addressed by new data analytics approaches. These include machine learning (ML) and artificial intelligence (AI), combined with data enrichment capabilities offered by solution providers. Some examples:

- Optimizing data classification of data for publication and data sharing consistent with local government policies.
- Implementing data protection practices that can be applied across all city assets and understood by all city employees and partners.
- Privacy and protection policies that also mitigate re-identification and unauthorized access.
- Data policies that can be applied to real-time data acquisition (e.g., video in public spaces) using capabilities such as AI to manage how data is interpreted fairly.
- GIS-formatted data solutions that often require coordination with other municipalities, county governments, etc.
- Creating end-to-end data governance and stewardship processes with accountable organizations. These teams can work with data partners to curate and enrich data assets.

IMPACT OF COVID 19 ON HANDLING OF CITY DATA



COVID-19 has certainly impacted local government resources and budgets. However, cities' rapid response to pandemic-related challenges have also highlighted new requirements related to data governance and municipal relationships with external agencies and other data partners.

One of the highest priorities for cities is coordinating and publishing public health information for their citizens. This data is acquired from a large number of federal, state and local data sources, including the private health care industry. From a data policy perspective, the critical need for data sharing during the pandemic highlighted the technology

gaps that exist in how this data is collected, collated and then made available to the public in a timely manner from a variety of sources, such as health, human services and transportation.

Cities are rapidly assessing the lessons learned from the COVID-19 response over the past year to better position municipalities for future challenges. One lesson is that data sharing policies for inter-agency and third-party sources of data must be available, applicable and flexible to meet future, unanticipated needs. This includes policies that can be rapidly applied to nontraditional sources of city data, beyond the typical interdepartmental relationships. New technological solutions will need to be accessed and made operational to meet these future challenges.

Another key lesson is that data policies cannot totally rely on historical needs or a specific application sector. Cities were suddenly thrust into being the responsible party for data dissemination related to schools, health tracking, citizen movement, business continuity and more. This reality has demonstrated the need for cities to adopt data policies that can be applied in almost real-time to the next uncharted crisis and across a new set of undetermined data partners.

Data policies that are developed in a "sunny day" environment and rely on traditional types of data sources and partners will struggle to meet the next crisis facing local government. Take the example of traditional data sharing applications for tourism, large public events and pedestrian movement through crowded spaces. During the pandemic, these were almost instantaneously replaced with new citizen needs, such as finding less-crowded spaces and navigating walkways and biking trails that were well outside of typical destinations. Data policies must be nimble enough to quickly and gracefully accommodate the changing needs of citizens and events rather than hardwired to a smart city's core application environment. In other words, data governance policies must be adaptable to meet ever-changing conditions on the ground because these unplanned events are ultimately one of the most important drivers for responsible data sharing.

Definitions, Acronyms, and Abbreviations

For a list of common communications terms and definitions, please visit the ATIS Telecom Glossary at <https://glossary.atis.org>.

EVOLUTION OF DATA POLICIES FOR THE FUTURE

As advanced data analytics and new data management solutions come to market, smart cities can benefit from many of the same capabilities as large enterprises. These data policies can take advantage of new data handling approaches, as well as mutually beneficial relationships with data enrichers.

Data policies can track new developments in data management and value creation, such as:

- Using advanced techniques such as ML and AI to identify datasets (especially in real time) that are optimized for publishing to a data catalog or portal.
- Developing data policies that allow automated population of data catalogs to reduce the manual review of datasets against established data policies.
- Applying solutions that give cities better insight from data consumers (via reviews and feedback) about the usability of available datasets and sources.
- Integrating partner data and crowdsourced information with city data assets.
- Meeting the challenge of data collected in public spaces by applying AI to achieve appropriate privacy filtering and remove any bias prior to publishing.

In assessing the evolution of data sharing over the next decade, one of the most significant challenges related to data policies will be calibrating the societal needs and ethical treatment of data privacy. At a global level, citizen and device tracking have evolved with significantly different policies across regions, societies and governments. The COVID-19 response has highlighted these differences in areas such as health tracking. But even in normal times, there will always be a necessary set of ethical standards for privacy and trust. This requirement implies that local data policies must reflect each municipality's unique obligations, regulations and ethical needs in coordination with appropriate state and federal obligations.



One of the greatest privacy challenges is data acquired in public spaces and public rights-of-way, particularly in connection with real-time data. Likewise, new data sharing arrangements may need to be rapidly implemented with new types of data partners during a significant event. These arrangements will need to be implemented within a city's existing data policy structure to meet urgent requirements. Data policies and technology solutions can complement one another to help solve the needs of data privacy. To do that, they must have an adaptable and

extensible framework that does not require re-engineering during a crisis.

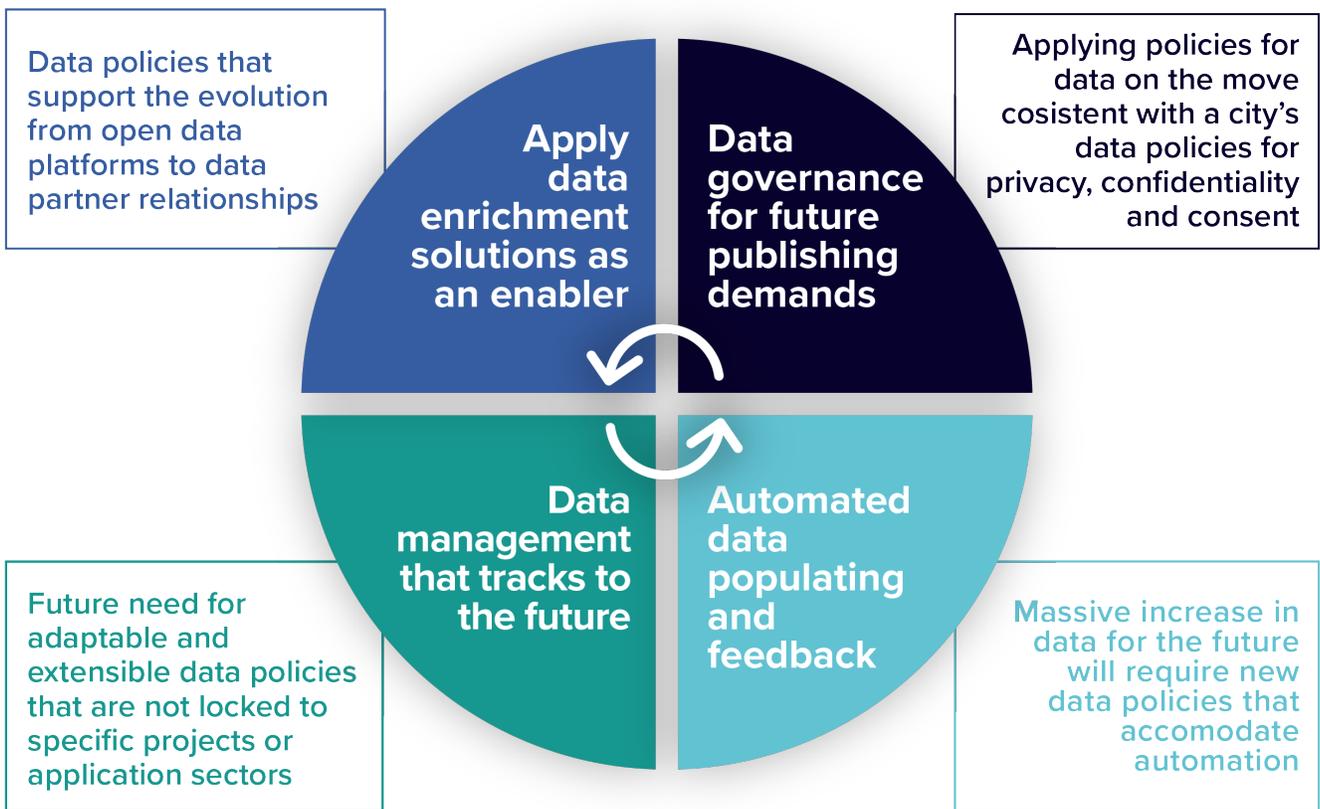
DATA POLICY RECOMMENDATIONS

This paper provides an assessment of current smart city data policies along the evolutionary path that leads to a set of more extensible approaches to data governance. Data policies typically act as the intersection of technological opportunities and general policy guidelines. Like large enterprises, smart cities will need to manage the complex flow of data from myriad sources to the data consumer domain, where usability and applicability are the gating factors. As this paper describes, data enhancement can work in conjunction with data policies to optimize the connection from producers to consumers. It also can enable the automation and analytics to support the more rapid movement of data across the ecosystem.

The following is a summary of data policy recommendations that will support smart cities' digital transformation and data sharing needs for the future:

1. Data policies must evolve from data sharing across open portals to more complex arrangements with third-party partners. Data enrichment techniques can provide an effective platform, but they must be coordinated with new data policies that operate outside of traditional interagency sharing.
2. Rapid growth of data, including real-time data assets, will require a new approach for data governance. Advanced data analytics and learning techniques should be applied using a city's data policies for privacy, confidentiality, consent and other obligations. These techniques should be applied in a manner that builds trust between cities and communities, ensuring that needs such as privacy are enforced with respect to singular datasets and data aggregated from multiple sources.
3. Automated population of data-to-data sharing platforms and data catalogs will become increasingly important. Data governance must evolve to safeguard the use of this data within cities and by data partners.
4. Cities can gain valuable insight and value from feedback from data consumers, who are the ultimate users of such data. Data catalogs facilitate rating and review capabilities, including assessing the value and usability of city data assets.
5. Data policies must support cities' current data and application needs but also be extensible to meet future needs, where the data sources and/or partners may be new, completely unexpected types. This future-proofing requires adaptable data policies that are not locked to specific projects or application sectors.
6. Data enrichment represents a new evolution path for cities, where value-added capabilities can be built on top of data catalogs and joined to data policies. These capabilities offer cities an investment path that is both extensible to the future and adaptable to meet new applications or unplanned events.

To further illustrate the key findings, the following diagram applies these recommendations to a data centric model for data governance. It reflects the key trends that are shaping cities' management of their data assets and partner data:



It is hoped that this document can provide cities with valuable insights into the evolution of data policies to meet future needs. While each municipality must shape its policies to meet local government obligations and priorities, data policies represent a common challenge to all cities that must be continually re-assessed to keep pace with new opportunities and technological developments. This paper was developed as a foundation for further dialog and action by city leaders on the pathway to full digital transformation.

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