

Data Governance and Data for Governance

- A circular and regulatory perspective on data



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This report is part of the Smart Urban Traffic Zones project, which aims to develop intelligent urban solutions to increase flexibility in the use of urban space, optimize transport efficiency, and improve traffic safety. This involves testing and evaluating digital tools such as geofencing, sensors, and digital signage within the city. The project is carried out in three phases, with the ongoing third phase having started in February 2023. A total of 24 project partners are involved, including public entities such as cities, technology providers, OEM companies, transport companies, businesses, and the academic sector. The project is partially funded by Sweden's Innovation Agency, Vinnova.

Abstract

Data Governance and Data for Governance – a circular and regulatory perspective on data

The Smart Urban Traffic Zones¹ Project aims to create smart solutions in cities that contribute to increased flexibility in the use of urban space, more efficient transportation, and improved traffic safety. This report is a partial deliverable within the project, where we have explored how a municipality can collect and work with data to achieve better and more efficient solutions, based on policies and regulations.

During this work, we have identified four possible approaches to data sharing. In the first approach, the city handles all data-related tasks itself, from start to finish. In the second approach, the city allows private actors to collect data in the city infrastructure. These companies then aggregate and analyse the data, and the municipality procures the results through a public procurement process. The third approach is based on voluntary data sharing. The municipality procures a data-sharing platform, which both public and private entities can use to exchange data. In the fourth and final approach, the municipality makes its data publicly available, for example, via the National Access Point. The expectation is that the market will identify possible use cases for the municipal data, combine it with their own data, and develop services for citizens.

We have conducted literature reviews, interviews, and workshops where we discussed the different approaches. After analysing the results, we have concluded that there is no single best solution for data sharing that works for all municipalities in all situations. Instead, the approaches may work differently depending on the context, and they can also be combined.

The approach where the city handles everything itself has several advantages, such as maintaining full control and oversight, but it is also highly resource intensive. It is unlikely that any municipality has the capacity to manage such a large-scale effort, meaning that this approach is best suited for a limited scope. The approach where the municipality procures analysed data from private entities appears relatively straightforward from a municipal perspective, but the question remains whether the market is ready to provide such a service at a scale that meets municipal needs. The third approach—the platform model—is well-tested and currently works well in cases such as data sharing between municipalities and e-scooter operators. In that case, there is a clear use case. If a municipality wishes to adopt this approach, we recommend starting with a clearly defined target group, such as businesses engaged in public procurement. Over time, the municipality could extend the platform to include additional stakeholders. We do not believe the last approach, where the municipality makes its data publicly available, is suitable for smart urban traffic zones, as the municipality would not have control or oversight over the outcomes.

¹ The project's website can be found <https://closer.lindholmen.se/en/project/smart-urban-traffic-zones>

Key Takeaways from the Interviews:

- A clear understanding of the needs is crucial when procuring data-sharing services, as it guides requirements and ensures fit-for-purpose solutions.
- Data quality is crucial for successful innovation and requires clear specifications, well-defined requirements, quality controls, and incentives.
- Public procurement processes should include dialogue with suppliers, emphasize quality, and enable innovation.
- Well-balanced incentives are important to promote data sharing.
- Municipalities play a key role as coordinators, data consumers, and guarantors of public value.
- Small municipalities can often benefit from regional collaboration.

Key words: smart urban traffic zones, loading zones, data sharing agreement, better regulation, public procurement of data

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Preface

This report has been prepared as part of the Smart Urban Traffic Zones project. It has been developed with financial support from Vinnova. The project has been ongoing from February 2023 to January 2025.

We would like to extend our sincere gratitude to everyone who has participated in the project and contributed their time, expertise, and experience.

The views and conclusions presented in this report are those of the authors and do not necessarily reflect those of other participating parties in the project.

If you would like to learn more about the project and this report, please feel free to contact kristina.andersson@ri.se or emmie.nordell@ri.se.

Gothenburg, January 2025

The Authors

1. Introduction

1.1 Background

The Smart Urban Traffic Zones project² aims to develop smart solutions in cities that enhance flexibility in the use of urban space, improve transport efficiency, and increase traffic safety. The project is now in its third phase, with the goal of addressing gaps identified in previous phases and deepening the analysis of factors that enable the implementation of such traffic zones.

With urbanization and growing cities, competition for urban space is increasing, leading to more complex traffic systems where vehicles and city inhabitants must interact safely and efficiently. Smart urban traffic zones are data-driven, cost-effective solutions designed to tackle specific traffic and logistics challenges within defined geographic areas. These zones can be static or dynamic, permanent or temporary, and they all utilize data and technology to generate insights that guide both public sector urban planners and road users toward sustainable urban mobility solutions.

The project aims to enhance cities' ability to leverage smart digital solutions in traffic and urban planning, as well as to promote collaboration between transport buyers, operators, and municipalities to utilize enabling technologies such as geofencing and dynamic speed regulation. This allows for adaptive speed and driving behaviours in urban areas, which can lead to improved traffic safety, reduced noise pollution and emissions, and increased transport efficiency.

Data sharing is a central component of smart urban traffic zones, as it enables data-driven planning and collaboration among different stakeholders, such as municipalities, transport companies, and technology providers. By sharing data, these actors can better understand traffic patterns, identify challenges, and develop solutions that improve infrastructure and mobility efficiency. Furthermore, data sharing facilitates the introduction of innovative solutions and services that contribute to a more sustainable urban environment, while also supporting policy-making and decision-making processes for future urban planning.

This sub-report examines and maps out relevant policies, procurement opportunities, and purchasing procedures for data sharing, with the aim of identifying challenges and opportunities within the current regulatory framework and providing recommendations for solutions and future directions. The analysis is conducted in relation to the Smart Urban Traffic Zones project as a whole, with a particular focus on the pilot case: Efficient Loading Zones in Gothenburg.

1.2 Pilot Case: Efficient Loading Zones

The City of Gothenburg has identified challenges related to the placement of loading zones in central Gothenburg. These challenges may include an insufficient number of loading zones in certain areas, a complete lack of them in some locations, or zones being placed in areas where they are no longer in use.

² The project's website can be found <https://closer.lindholmen.se/en/project/smart-urban-traffic-zones>

Poorly placed loading zones create difficulties for logistics companies and drivers in their daily operations. For logistics companies, efficient transport planning is crucial, customers need to know when deliveries will arrive, and drivers require a safe working environment. When loading and unloading processes do not function optimally, it often leads to traffic congestion, delays, and inefficiencies in urban logistics, congestion and difficulties in urban accessibility. Drivers may need to transport goods over longer distances, and customers struggle to plan for deliveries and keep staff available. However, multiple factors come into play. In some cases, alternative parking options exist for temporary vehicle stops during deliveries, such as short-term parking spaces and shared urban environments like pedestrian-priority streets. Additionally, the demand for loading zones depends on the type of goods being delivered, as different logistics requirements influence the optimal placement and usage of loading areas.

To effectively plan for a more efficient use of loading zones, data is essential. Previously, data has been collected through consultation meetings with various stakeholders in the logistics sector. However, in many cases, municipalities require more comprehensive data. One key question in this project is whether the municipality can leverage digitalization to collect real-time data on how loading zones are used in practice. With better access to data, the city believes it could improve physical planning for logistics purposes. More data could also benefit logistics companies in their planning and operations, provided they have access to relevant information. Therefore, the city aims to develop and implement a data-sharing ecosystem that generates insights and services for optimized planning and use of loading zones.

The municipality wants to understand the next steps, such as what can be done in the coming year and how to start by addressing “low-hanging fruit”. They seek to explore the potential of data, especially as more vehicles become connected, and AI-powered data analysis expands, enabling solutions to more challenges than today.

In summary, the city's goals are to:

1. Gain insight into the city's specific needs, such as:
 - I. Utilization of loading zones (to inventory their use and optimize infrastructure),
 - II. Space efficiency (as urban space is limited),
 - III. Traffic flow and accessibility,
 - IV. Traffic safety.
2. Plan and manage urban access using system-level data.
3. Reduce environmental impact, e.g., by minimizing unnecessary freight vehicle circulation in search of parking.

To achieve these objectives, the city needs data. The assumption is that various stakeholders hold large amounts of data that could be collected and utilized. However, different actors have different interests. The municipality aims to optimize overall traffic flow, whereas logistics companies prioritize their own transport efficiency. A crucial question, therefore, is how to design a data-sharing solution that ensures a win-win scenario for all participants.

1.3 Purpose

Building on the pilot case: Efficient Loading Zones, this report aims, first and foremost, to explore current and, in particular, upcoming regulations affecting data sharing in a city with smart urban traffic zones. What new opportunities for data sharing emerge with these regulations, and how do they impact different possible solutions? Secondly, the report seeks to examine, from a regulatory perspective, how a municipality can share data within the context of smart urban traffic zones. This includes exploring how municipalities can utilize public procurement and contractual agreements to enable more efficient and effective data sharing. During the study, four different alternative approaches to data sharing—four governance structures—were identified. These structures are examined and analysed in this report, highlighting their advantages and disadvantages.

1.4 Method

The work has been based on a case study—the pilot project: Efficient Loading Zones. The study was conducted through literature reviews focusing on legal texts. Additionally, around twenty individuals were interviewed, all of whom were involved in some capacity in the pilot project or the broader initiative. The interview questions focused on needs and capabilities. Throughout the project, design-oriented workshops were regularly conducted, where various proposals were presented and discussed with all project participants to validate the results.

1.4.1 Analysis Tools

We will compare the four different data-sharing alternatives using the following analysis tool. For each attribute in the left-hand column, the most dominant characteristic(s) for each alternative are identified in the remaining four columns. In Section 4 – Data Governance Structures for Data Sharing in Smart Urban Traffic Zones, we use this analysis tool to assess the four governance models identified in the project. Attributes distinctive for the analysed model are marked in green. Attributes that apply to some extents are marked in yellow. Attributes that do not apply are marked in red. The attributes have been designed based on insights from interviews conducted during the project.

Need/Data Volume	Individual dataset	Smaller quantity but specific need	Large quantity with specific need	Big data
Control and Authority over Data	Full control, own governance	Restricted by contracts and law	Shared control, joint governance	Minimal control, market-driven
Need for Standardization/Interoperability	High	Medium	Low	None

Responsibility	Sole responsibility	Shared responsibility	No responsibility	
Risk	High	Medium	Low	None
Role Related to Data Quality	Strategic role	Tactical role	Operational role	No role
Flexibility	High	Medium	Low	None
Competence	Requirement for technical expertise and competence	Requirement for coordination competence	Requirement for analytical data competence	No requirements
Possible Governance Mechanisms/Incentives for Data Sharing	Information/Access to high-quality data	Economic	Recognition/Quality seal	Compulsion
Possibility for Transparency/Public Insight and Citizen Dialogue	High	Medium	Low	None
Burden/Impact on Businesses and Citizens	High	Medium	Low	None
Costs	High	Medium	Low	Minimal

Explanation of Attributes in the Analysis Tool:

Need/Data Volume: Refers to the model's suitability in meeting different needs regarding the amount and type of data. A single dataset may be sufficient for smaller needs, while Big Data may be required to generate more complex insights and support decision-making.

Control and Authority over Data: Describes the extent to which the municipality has control and authority over data, including the ability to collect, store, manage, use, and share data. Full control means the municipality has total authority and governance, while minimal control means that other actors are in charge.

Need for Standardization/Interoperability: Refers to the importance of standardization and interoperability for effective data sharing. High standardization is required in contexts where data must be compatible across different systems and stakeholders, while low standardization is acceptable in less complex systems.

Responsibility: Responsibility is a broad concept that includes the overall accountability for data sharing. It also refers to which entity is responsible for ensuring compliance with regulations such as GDPR and other data protection laws. Sole responsibility means that the municipality has full accountability for data sharing, including regulatory compliance. Shared responsibility means that accountability is distributed among multiple parties.

Risk: Describes the level of risk associated with the collection, storage, and sharing of data. High risk indicates that the alternative involves significant risks. Low risk suggests a cautious strategy with a stronger focus on security.

Role Related to Data Quality: Describes the municipality's role in ensuring data quality. Strategic role: The municipality sets guidelines and objectives for data quality. Tactical role: The municipality translates strategic goals into operational actions and processes. Operational role: The municipality directly manages and ensures data quality. No role: Data quality is entirely managed by external actors.

Flexibility: Describes how well a model can adapt to changing conditions or requirements. A model with very high flexibility can be adjusted quickly and easily, allowing it to respond efficiently to new circumstances. In contrast, a model with no flexibility is rigid and difficult to adapt, making it less suitable for dynamic environments.

Competence: Refers to the level of technical or coordination expertise required to implement and manage the model. A requirement for technical expertise involves the need for IT and data skills, while coordination competence emphasizes the ability to manage multiple stakeholders effectively. Additionally, analytical data competence includes skills and knowledge in handling, analysing, and interpreting data to generate insights, support decision-making, and assess and define requirements for data quality.

Possible Governance Mechanisms/Incentives for Data Sharing: Describes the mechanisms or incentives that can be used to enable or encourage data sharing. These may include access to high-quality data, economic incentives and compensation, recognition through quality seals, or mandatory mechanisms such as legislation or regulations.

Possibility for Transparency/Public Insight and Citizen Dialogue: Describes the extent to which the city allows transparency and openness regarding data and systems, enabling citizen engagement and public dialogue.

Burden/Impact on Businesses and Citizens: Describes the extent to which the model imposes burdens or obligations on businesses and citizens. This can include privacy concerns or workload-related demands, such as requirements for additional effort or compliance.

Costs: Describe the extent to which the alternative involves expenses and investment requirements for the municipality in both the short and long term.

1.5 Delimitation

This report focuses on analysing and evaluating different data-sharing models in urban environments, with a particular emphasis on the four identified alternatives. The analysis is conducted from the municipality's perspective, aiming to identify solutions that best support the municipality's needs, capacity, and long-term goals. The report is limited to policy-related aspects and does not cover detailed technical implementations, specific business models, or legal assessments of individual cases. The purpose is to provide municipal decision-makers and stakeholders with guidance in the process of enabling efficient and sustainable data sharing.

2. Upcoming Legislation Affecting Smart Urban Traffic Zones

This mapping outlines a number of upcoming new laws and legislative changes that may impact data sharing and the planning of future smart urban traffic zones. This mapping has also served as a foundation for parts of the analysis (see Chapter 4) of alternative data-sharing models.

2.1 The EU Data Strategy

One of the goals of the European Data Strategy³ is for the EU to lead the way in building a data-driven society. The aim is to create a single market for data, where rules and guidelines for data sharing are harmonized. By increasing interoperability and establishing clearer regulations for data access between public and private actors, the EU seeks to strengthen its global position and reduce dependence on major tech companies outside Europe. The strategy also places great emphasis on data sovereignty, ensuring that European companies and citizens have control over their data. Additionally, it aims to consolidate European data within key sectors through common, interoperable, and sector-specific data spaces, such as in mobility (European Mobility Data Space).

2.1.1 Analysis of How the Strategy Affects Smart Urban Traffic Zones

The European Data Strategy is likely to improve the ease and efficiency of data sharing and usage among various stakeholders. By creating a common data space for mobility data, actors such as municipalities, the Swedish Transport Administration, and private companies will be able to share traffic and mobility data more easily. This could help optimize traffic flows and reduce CO₂ emissions. At the same time, increased requirements for data security and interoperability may mean that businesses and public authorities need to adapt to new regulations and standards. Investments may be required in technical solutions to ensure that data sharing happens securely and in compliance with regulations, which in turn could enable more integrated and efficient urban mobility solutions.

³ COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS A European strategy for data COM/2020/66 final

From a broader perspective, the European Data Strategy is intended as a step towards a more sustainable and competitive data economy, which could contribute to the development of smart urban traffic zones and loading zones.

2.2 Data Act

The Data Act (EU) 2023/2854⁴ aims to create a fairer and more innovative digital environment by regulating access to and sharing of data among individuals, businesses, and public actors within the EU. The law seeks to reduce power imbalances between data holders and users and promote innovation by facilitating data access. The Data Act complements previous legislation, such as the Data Governance Act, which focuses on establishing processes to facilitate data sharing. While the Data Governance Act relies on voluntary data sharing, the Data Act provides clearer rules on access and usage of data. For example, the Data Act grants users of connected devices greater control over the data generated by their devices. The regulation ensures that users (both legal and natural persons who own or lease a connected product and its related services) can access the data generated through the use of the connected product or an associated service.

Examples of connected products: Connected vehicles, connected sensors.

Example of a related service: Anything that enables a connected product to function in a certain way (such as an app for interacting with your connected vehicle).

Data generated by connected products and related services can, for example, be used to enhance aftermarket services and complementary services, as well as to develop entirely new services (as long as these do not involve a competing connected product). This applies to data generated through the use of a connected product or an associated service. The regulation covers both personal and non-personal data, including relevant metadata. However, when it comes to personal data, it is important to note that GDPR compliance is required. As a general rule, data should be made available free of charge.

Another key aspect of the law is the promotion of interoperability.

2.2.1 Analysis of How the Law Affects Smart Urban Traffic Zones

The Data Act is likely to have a significant impact on future smart urban traffic zones. It will likely change how data flows to and from stakeholders providing smart urban traffic zone services.

The law could facilitate collaboration and increase data sharing among different actors involved in smart urban traffic zones, such as transport operators and technology providers. Additionally, it could lead to the development of new services offered by third parties, introducing new ways to utilize data. In the long term, the Data Act may pave the

⁴ Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act)

way for a more robust and integrated system, where data plays a central role in enhancing urban transport solutions.

2.3 Camera Surveillance in Public Administration

According to the Swedish Camera Surveillance Act (2018:1200), an entity requires a permit to install a surveillance camera if it can be directed toward a location accessible to the public. The government commissioned a state inquiry to propose simplifications for camera surveillance in public administration. The inquiry has suggested removing the permit requirement for public actors (SOU 2024:27). If implemented, this change would allow municipalities and other public entities to install surveillance cameras without applying for a permit, provided they still comply with data protection and privacy regulations under the General Data Protection Regulation (GDPR). Even if the permit requirement is removed, strict rules on personal data protection and data storage will still apply. The removal of the permit requirement could reduce administrative burdens, but it is important to note that this does not expand the situations in which surveillance is allowed (except for law enforcement activities). Entities would still need to conduct a balancing test, weighing the purpose and benefits of surveillance against individuals' right to privacy. A key aspect of the proposal is ensuring that the change does not lead to a general expansion of surveillance possibilities but rather aims to reduce bureaucratic complexity.

At the time of writing, these proposals are under review by the government offices.

2.3.1 Analysis of How the Law Affects Smart Urban Traffic Zones

For smart urban traffic zones, an administrative simplification of camera surveillance regulations could mean that more surveillance cameras can be installed in a shorter time without extensive administrative procedures, provided the permit requirement is removed. This could increase access to high-quality data, improving the efficiency and effectiveness of smart urban traffic zones, while also enabling faster deployment of surveillance cameras based on need.

However, it is important to note that while camera surveillance can be effective for managing traffic, sustainability, and safety, GDPR requires that individuals' rights are protected. For actors involved in smart urban traffic zones, this means that camera surveillance must be implemented in a way that balances the need for surveillance with strict data protection requirements. This balance may impact how quickly and efficiently camera infrastructure can be developed in urban environments. Consequently, actors working with smart urban traffic zones must invest time and resources to ensure regulatory compliance and implement adequate security solutions for safe data handling and storage.

2.4 Regulation of Intelligent Transport Systems (ITS)

The EU Directive on Intelligent Transport Systems (ITS)⁵ aims to integrate advanced information and communication technologies into the road transport sector to enhance traffic safety and efficiency. The ITS Directive is based on making data available through a

⁵ Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport

National Access Point (NAP). This allows companies developing traveller and traffic information services to easily access both static and dynamic data. Two key components of the ITS Directive are the delegated acts: Real-Time Traffic Information (RTTI)⁶ and Safety-Related Traffic Information (SRTI)⁷.

Real-Time Traffic Information (RTTI): Road authorities, such as the Swedish Transport Administration (Trafikverket), have access to large volumes of traffic data. RTTI focuses on making both static and dynamic data available. An expansion of data types and geographical coverage is expected in the future.

Safety-Related Traffic Information (SRTI): SRTI focuses on providing road safety-related traffic information to help reduce traffic accidents. Data can be collected both privately and publicly and then made available via the National Access Point (NAP).

Revisions in the Regulation of Intelligent Transport Systems (ITS): A revised directive, adopted on November 22, 2023, has been introduced to accelerate digital transformation and enable smarter mobility. In the new directive, goals are set for the digitization of essential information, such as speed limits, roadworks, and multimodal hubs, as well as for the provision of critical public services, such as traffic safety information. The revisions also introduce new obligations to ensure access to data. Previously, the requirements focused on data already available in machine-readable formats. However, the new requirements state that certain critical data must be generated if it does not already exist.

2.4.1 Analysis of How the Law and Potential Revisions Affect Smart Urban Traffic Zones

The ITS Directive could create significant opportunities for smart urban traffic zones. Through RTTI, access to data is enhanced. Using the National Access Point (NAP), municipalities can easily share data with other stakeholders, and other actors can also contribute data via the NAP. This increases access to both static and dynamic data, fostering the development of new services.

The new regulations will likely drive a more coordinated and standardized approach to data sharing, which, in the long run, will facilitate collaboration between different stakeholders in smart urban traffic zones. This, in turn, will help reduce technical barriers and promote the development of smart urban traffic zones.

3. Regulatory Design and Data for Governance

Data for Governance is about being able to control regulatory design and operations better with more and better data. Smart urban traffic zones, as a project, are about being able to make more efficient and better decisions for road users and citizens with the help of digitalization and access to more data, and the concept is therefore very relevant to the project. The goal of the project is to gain new insights that can guide decision-makers in a

⁶ Commission Delegated Regulation (EU) 2022/670 of 2 February 2022 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services

⁷ Commission Delegated Regulation (EU) No 886/2013 of 15 May 2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users

world that is changing at an ever-faster pace, with the help of data. The challenges lie, among other things, in combining the old way of working with a new way of working.

Better and smarter regulation is a concept that is about moving away from the traditional way of implementing legislation (a linear sequence of independent steps one after the other) to a more modern way of working with new regulations (a cycle of interconnected, mutually reinforcing steps). The hope with the concept is that technological development and changes in regulations will go hand in hand in a better way. Another way to describe the more modern way of working is to think of regulations and rule design as a wheel with the parts create-implement-evaluate. In the "create" part, the rule-maker works to identify needs, develop solution proposals and translate into rules. In "implement", the regulator works to inform, educate and monitor regulatory compliance. In "evaluate", the rule-maker then works to evaluate whether the rules fulfil their purpose or if they need to be changed, and then land in the "create" part again.

The purpose of better and smarter regulations is to make them more effective, for citizens to gain a better understanding of the rules and to be more involved in the development of new rules. We live in an ever-changing world, and with better and smarter regulation, our society can more easily adapt to new technologies that bring new risks and opportunities. The rules must also be future-proof and resilient, so that our society can adapt to new and changing needs. Better and smarter regulation is also about making rules easier to understand, cutting red tape for citizens and businesses, and being fit for purpose in the sense that they should not impose unnecessary burdens on citizens and businesses (proportionality).

In 2012, the Organization for Economic Co-operation and Development (OECD) published the Council's Recommendations on Regulatory Governance, which provide guidance on how to achieve better regulation.⁸ The OECD has also published a number of practical advice on how an agency can work with better regulations.

The OECD recommendations are based on a number of principles to improve the quality and effectiveness of the regulatory framework. Here is a summary of a number of these principles:

- Regulatory quality is important to ensure that regulation is effective, effective and serves the public interest.
- Decision-making should be based on evidence. Rulemaking should be based on evidence and analysis, including impact assessment, to evaluate the potential impact of proposed regulations.
- Regulatory making must be based on open administration and transparency. Regulatory processes should be transparent, so that the public can be consulted and participated. Stakeholders should have access to information and be able to contribute to regulatory decision-making.
- It should be possible for citizens to demand accountability. This requires clear roles and responsibilities, as well as mechanisms for reviewing and evaluating the performance of legislation.

⁸ OECD (2012), *Recommendation of the Council on Regulatory Policy and Governance*, OECD/LEGAL/0390

- Coherence and coordination – Regulation should be coherent across sectors and levels of government. Coordination between different authorities is essential to avoid conflicting rules and ensure a coherent approach.
- Regulations should be proportionate to the issues they raise and be flexible enough to adapt to changing circumstances. Overly burdensome or rigid regulations can hamper innovation and economic growth.
- Continuous monitoring (performance measurement) and evaluation of regulatory performance is essential. Frameworks should be established to measure the results of regulations and make the necessary adjustments.
- Risk-based regulation – Regulatory action should be based on a risk assessment and focus resources on the most important issues while avoiding unnecessary regulation of low-risk activities.
- Capacity building – Authorities should invest in building the capacity of regulatory bodies and officials to develop and implement high-quality regulations effectively.
- International cooperation – Regulatory policies should take into account international standards and practices and promote cross-border cooperation and harmonization to address global challenges and facilitate trade.
- Simplification of legislation and reduction of burdens – Efforts should be made to simplify the regulatory framework and reduce administrative burdens for businesses and citizens, without compromising regulatory objectives.
- Dynamic adaptation – Regulatory policies should be dynamic, allowing for regular reviews and updates to ensure they remain relevant and effective in changing environments.

Together, these principles aim to create regulatory frameworks that promote innovation, economic growth, and public trust, while ensuring that regulations achieve their intended social, economic, and environmental goals. These principles are relevant in the analysis of models for data governance and data sharing in smart urban traffic zones because the models form the basis for how data is managed, shared, and used to achieve a more sustainable and efficient urban mobility. Each model entails different types of legal conditions, challenges, and opportunities, and the choice of governance structure affects factors such as data quality, control, and division of responsibility. Different governance structures also provide different opportunities to create incentives for private actors to share data and develop new services. Choosing the right governance structure therefore requires a careful policy analysis based on the specific needs of the smart urban traffic zone, as well as an understanding of what resources are available, both in terms of skills and technical solutions. By analysing the models in the light of the above-mentioned principles, one can work towards creating a governance structure that promotes innovation, economic growth and public trust, while ensuring that it achieves its intended social, economic and environmental objectives. Through such an analysis of the different governance structures, we can better understand how policy tools can be used to support data sharing and what challenges and opportunities may exist, for example linked to incentives or internal policies that govern work across administrative boundaries.

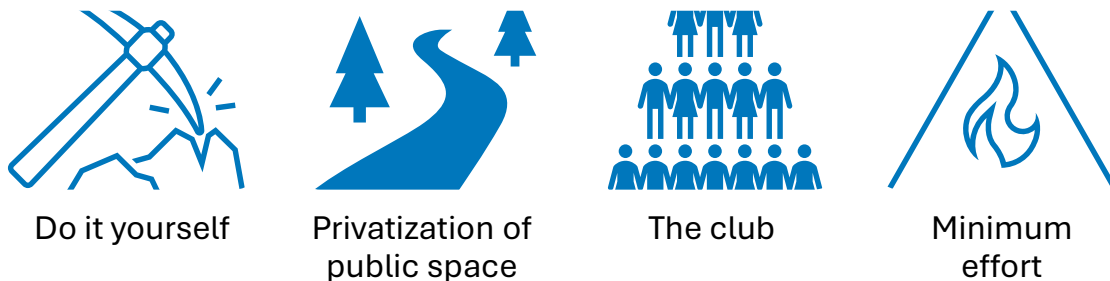
By clearly defining how different actors can interact, what roles and responsibilities they have, and what tools are available, it creates a framework for trust, transparency and security in the handling of data, which is necessary to address the complex issues that arise in relation to data sharing, including issues of accountability, data protection and interoperability. It is also important to consider how each model can create incentives for data sharing and how the city can ensure communication and cooperation with suppliers and other actors.

The following part presents the four alternative models for governance structures for data sharing in smart urban traffic zones, where each model has its own strengths and weaknesses. Thoughts on regulatory design, data for governance and OECD principles have served as a background for this analysis.

1. Data Governance Structures for Data Sharing for Smart Urban Traffic Zones

In this section, four different alternative ways to achieve data sharing identified during the project will be analysed.

As an initial overview, the four different models can be illustrated with the following image:



4.1 Option 1 – "Do it yourself"

4.1.1 Governance description

In the Smart Urban Traffic Zones project, as previously mentioned, the municipality wants to understand how the infrastructure is used. In order to understand how the infrastructure is used, data on this is needed. Option 1 means that the municipality takes overall responsibility for data collection, storage, analysis and implementation of data solutions, even though the municipality can choose to procure certain parts, such as technology. Traditionally, the municipality has collected data from, for example, hose measurements or through human observation and dialogue. In a smart urban traffic zone, the municipality can also or instead choose to set up different types of smart sensors, such as cameras in the infrastructure that measure how the infrastructure is used. This means that the municipality needs to assess how many sensors are needed, what type is

suitable, where they should be installed and how the sensors should be powered. Then the sensors need to be purchased and installed. In the next stage, the municipality needs to keep the operation of the sensors going and collect data from them for analysis. There are also other solutions where the municipality could, for example, use its own vehicles to collect data.

The municipality can then choose to keep the aggregated and analysed data for its own use or choose to make it available as open data.

In this alternative, the municipality becomes both a data producer and a data manager, which means that clear internal roles and responsibilities must be established. For example, the IT department can be responsible for operations and security, while those responsible for urban planning can analyse data and integrate it into development projects. It is therefore important that the governance structure ensures that all parts of the city work efficiently and in line with common goals. It is also important to encourage cooperation between different parts and to promote an iterative development process that can be quickly adapted to local needs.

4.1.2 Summarized results of the interviews

In this part, a comprehensive story follows from those we interviewed in the project about their views on option 1:

In this alternative, the municipality is responsible for doing the work itself. In the interviews, it was pointed out that the model is preferable if it is linked to some form of exercise of authority where control is important or if the access to data is business-critical. There is concern among private actors that in this alternative, the municipality becomes too closed and loses contact with the challenges and needs of the business community and thus does not understand what data needs to be collected and worked with. The public actors argued that there is no risk of this.

Another aspect that was highlighted in the interviews was that this model requires a high level of IT competence over time within the municipality, and that it is likely that only a few large municipalities can meet this. For example, officials need to understand what data quality a sensor delivers and what happens if data from sensors with different data quality is mixed. It was also highlighted that small and medium-sized municipalities may find it difficult to implement this alternative as they lack resources. Even a large municipality may also need to procure parts of the solution. Here, the risk that the various procurements will become islands that do not work together was pointed out. It was also highlighted that the municipality therefore also needs to have a high level of expertise in procurement and that it is not certain that a municipality has the competence to set requirements clearly enough or understand the consequences of different choices.

During the interviews, it was also highlighted that the model is associated with high costs, which in turn requires that the municipality has good finances and is willing to invest. A sensor can cost from SEK 10 to several million SEK. The risk that the municipality makes large investments that after a short time is no longer needed because the need for data changes over time was therefore pointed out.

In this context, the urban and rural perspective was also highlighted. The perception was that a small rural municipality could not cope with digitalization at the pace required, and

that it would be desirable to have some form of central support. According to the interview responses, for example, small rural municipalities in Norway can get help with digitalization from a central function and can thus more easily keep up with technological developments.

4.1.3 Legal prerequisites and disposal

In this alternative, the municipality has full control over the data that is collected, but this also means that it is solely responsible for complying with legal requirements such as GDPR and other data protection legislation.

Legal challenges:

There are no direct legal obstacles to a municipality handling all data collection and management internally, but it requires that the municipality has the necessary expertise and ensures compliance with laws such as GDPR and the Public Access to Information and Secrecy Act. For example, the handling of personal data must be done with great care to avoid invasions of privacy. The municipality must also ensure that procurement legislation is followed when purchasing equipment such as sensors or software.

Currently, a permit is required for a municipality to set up a camera in public spaces. One conclusion from the interviews we conducted is that permits are almost always granted in today's system, but that it takes time to get a permit and that it is resource-intensive. The challenge is that the traffic environment is dynamic and that a need to measure a new phenomenon may arise at short notice. The current system of permits is therefore perceived as too slow to suit the dynamic traffic environment. Within the Government Offices, work is underway to change the legislation to facilitate administration with permission. If the change goes through, it could mean that it will be easier for a municipality to follow and measure changes in a dynamic traffic environment with cameras.

Favourable legal conditions:

Full control over data allows for better control over compliance with regulations such as GDPR and makes it easier to ensure data quality and security.

Availability:

In this alternative, the municipality has full control over data and technical solutions. It enables local adaptation and control but also requires large resources and high capacity.

4.1.4 Challenges

Resource and competence needs

Managing the entire process in-house requires extensive resources and specialist expertise in, for example, data management and data quality. Small and medium-sized municipalities may lack the capacity and expertise required to maintain quality and develop solutions iteratively.

Time-consuming implementation

Building and managing internal systems for data collection, sensors, and analytics takes time, which can delay the ability to meet urgent and dynamic needs.

Legal and quality requirements

The municipality must have procedures in place to handle GDPR and ensure that the data used is of sufficient quality. Deficiencies in quality can lead to ineffective solutions and a loss of trust.

Isolation from external actors

By working entirely under its own auspices, the municipality risks missing out on opportunities for collaboration and innovation from the business community and other municipalities. This can also create challenges in terms of interoperability and national coordination.

Cost of sensor technology and systems

Initial investments in sensors and computer systems are high, although costs are expected to decrease in the long term.

4.1.5. Possible policy solutions

Capacity building and collaboration

The municipality can implement long-term strategies to build internal competence through training programs and recruitment. To overcome resource constraints, smaller municipalities can join forces in municipal associations to share resources and expertise.

Innovation procurement

The municipality can use innovation procurement of, for example, technical solutions to ensure that the latest technology for sensors and data platforms is used. This can also open up opportunities for collaboration with the business community.

Procedures for ensuring legal compliance and data quality

Ensuring legal compliance requires clear policies and procedures for data storage, handling of personal data and cybersecurity, for example. It is important to identify and specify who is responsible for data quality, storage, and sharing. This includes how the city handles tasks as a data producer, data consumer, and data distributor.

Procedures to ensure that the collected data is correct and usable are also of great importance. Here, processes are needed for quality assurance and compatibility when mixing different data sources. The municipality can define procedures for quality assurance, including tests and random checks. The procedures can also address how different types of data are used and integrated, such as historical data and trend data.

National coordination

To ensure interoperability and enable cooperation across municipal boundaries, the city can participate in national or regional initiatives for data sharing or standardization. This would also help to address problems with data sharing related to, for example, transport that crosses municipal borders.

While the

city handles everything in-house, internal guidelines may include mechanisms for collaborating with external actors. This can be done by creating incentives, such as providing access to anonymized data that is valuable for research or business development.

4.1.6 Analysis

Need/Data Volume	Individual dataset	Smaller quantity but specific need	Large quantity with specific need	Big data
Control and Authority over Data	Full control, own governance	Restricted by contracts and law	Shared control, joint governance	Minimal control, market-driven
Need for Standardization/Interoperability	High	Medium	Low	None
Responsibility	Sole responsibility	Shared responsibility	No responsibility	
Risk	High	Medium	Low	None
Role Related to Data Quality	Strategic role	Tactical role	Operational role	No role
Flexibility	High	Medium	Low	None
Competence	Requirement for technical expertise and competence	Requirement for coordination competence	Requirement for analytical data competence	No requirements
Possible Governance Mechanisms/Incentives for Data Sharing	Information/Access to high-quality data	Economic	Recognition/Quality seal	Compulsion
Possibility for Transparency/Public Insight and Citizen Dialogue	High	Medium	Low	None
Burden/Impact on Businesses and Citizens	High	Medium	Low	None
Costs	High	Medium	Low	Minimal

In summary, option 1 is most suitable when the city wants full control and disposal over

data and solutions, as well as wants to build long-term capacity. It is important to manage internal capacity building, quality assurance and innovative use of resources. To succeed, the city must address challenges such as resource scarcity, high initial costs and the need for coordination, while at the same time taking advantage of opportunities for local innovation and critical control of society.

4.2 Option 2 – "Privatization of public space"

4.2.1 Governance description

Option 2 means that the municipality purchases aggregated and analysed data from external suppliers through public procurement, either with the supplier's already existing vehicle data or after suppliers have been granted permission to set up sensors and collected data in the city's infrastructure. There are thus two different subsets, namely data from infrastructure and data from connected vehicles.

Data from infrastructure: Private actors can collect data from the infrastructure by obtaining permission to set up various sensors in the municipality's infrastructure. The idea is that the actor collects data from the sensors, aggregates and analyses the data. The analysed data is then sold to other companies or public actors. The underlying business idea is based on the fact that data can be reused. An example of what a process, where data can be reused, could look like is for the actor to set up sensors in a first city. They can then train algorithms that can be used in other cities as well. In subsequent cities, the operator may set up a fewer number of sensors. The idea is then that the reduced actual data collection will be compensated with algorithms that fill in where actual data is missing.

Data from connected vehicles: When connected vehicles drive around, they collect large amounts of data, both about themselves and their surroundings. The data is held by the vehicle manufacturer in the Fleet Management System or collected by third parties through agreements with the vehicle owner. For example, the City of Gothenburg already buys friction data through public procurement from vehicle manufacturers to evaluate how snow removal is managed. In such a case, the vehicle manufacturer has an agreement with the vehicle owner that states that the vehicle manufacturer may share data with the municipality. In the future, the Data Protection Regulation may make it easier for a vehicle owner to export data to a third party, such as a municipality.

In this alternative, the municipality becomes a data consumer and relies on the supplier's data quality, while the supplier acts as a data producer and is responsible for delivering data according to contractual terms

We have chosen to call this model "Privatization of the public space". The choice of name refers to a process where private actors to a greater extent can control and create value from spaces that are traditionally publicly accessible to everyone, such as roads, streets and squares. Basically, privatization of public space is about a meeting and in some cases conflict between the public interest and private profit interests. The privatization of public space may ultimately lead to this space being reshaped to benefit commercial interests and not to the same extent the interests of the collective. Surveillance through, for example, cameras and data collection can also control human behaviour.

4.2.2 Summary results of the interviews

In this part, a comprehensive story follows from those we interviewed in the project about their views on option 2:

In the interviews, it was pointed out that in this model, it is important that the city works strategically. You need to identify who stands for the whole over time. The municipality also needs to think long-term and understand how data should be shared over time. It was also highlighted that the municipality needs to think about not making itself dependent on a single data provider.

It was also pointed out that this alternative means that the municipality needs to be good at procuring with clear functional requirements. And that it is not certain that a municipality has the energy to set requirements clearly enough or understand the consequences of different choices. Questions that were highlighted as important are: The data that the municipality buys – should it become open data and be able to be reused by third parties? If a municipality changes supplier – what should apply to data already collected? How does the municipality get access to older data streams and how can these be used? Another aspect that was highlighted is that it is often good to have access to data from many years to understand trends over time. One challenge identified with this model is that it risks becoming unclear. For example, regarding questions about: Who is responsible for data quality? Whose responsibility is it to correct inaccuracies? It was therefore highlighted that there is a risk that the municipality does not understand the data quality that is being delivered.

One advantage that was highlighted with the model is that it allows a municipality to build services together with others and thus can create a learning organization and work with innovation. In the interviews, it was also highlighted that private actors and municipalities can also learn from and about each other and understand each other's needs. It was also pointed out that it is good if the city is involved in the work of developing a new product, as such a product will be better adapted to the city's needs. There were divided opinions on whether smaller municipalities have the capacity to implement this solution.

Interview results regarding data from infrastructure: It was stated that municipalities need to understand what data they already have and the time/cost to obtain new data in order to evaluate this alternative. There were divided opinions on the question of whether it is easy to reuse solutions and move a solution from one municipality to another. The environment is dynamic and the adaptations to a new environment will probably be costly. It was claimed to be unrealistic to believe that it is possible to create a model that measures nothing at all in reality in the new environment. At the same time, it was pointed out that sensors are not needed everywhere, and that the difficult thing is to find the balance. It was also highlighted that if the municipality first makes a careful assessment of where the sensors should be located, it can be of great benefit. Another issue that emerged was that if earthworks or electrical wiring are needed in the infrastructure, it also needs to be clarified who will be responsible for this. Another challenge that was highlighted with the model is that municipalities in some cases may find it difficult to understand and interpret raw data/analysed data. If, for example, you have developed a solution for a large city with many sensors and then move the same solution to a medium-sized city with a smaller number of sensors, the city needs to understand what raw data comes from its own city's sensors and where in the analysis an algorithm has filled in with

answers. The interviewees highlighted that there is a risk that the analysis will be incorrect, and that the municipality does not understand this. The importance of the municipality working with validated data was therefore highlighted as important.

Interview results regarding data from connected vehicles: The interviewees highlighted that, by the public sector buying vehicle data, a market is created which in turn can result in new services. One aspect that was pointed out was that in this model, data quality is based on the fact that there are large amounts of data that are collected and that this means that it is not viable for each city to develop unique solutions. This is because in a situation where data is not collected from many vehicles, there is a risk that the data quality will be low. It was also highlighted that the business between hauliers and vehicle manufacturers needs to be fair and sustainable over time. On the private side, there is also concern that the collection of truck data will result in trade secrets, personal data or data linked to security issues being leaked. It is pointed out that it is important to be able to choose which data you want to share, and that this solution is based on trust that the city does not misuse data or use it in ways that have not been agreed upon. There were also different opinions about how many vehicles are actually connected today. Some said that there are many older vehicles in the city that are not connected, while others said that the vast majority of vehicles are connected today.

Despite some challenges, the interview responses indicate that it may be convenient for a municipality to let private actors be responsible for data collection and aggregation. Private actors often have access to a high level of IT expertise with domain knowledge and can more easily work with data quality from different sensors.

4.2.3 Legal prerequisites and disposal

In this alternative, it is the supplier who collects the data and the municipality that will use it. This entails a need for policy frameworks that set the framework for cooperation. Clear agreements and procedures are necessary to manage the relationship between the municipality and the supplier and to ensure that purchased data meets both legal and functional requirements.

In order for a company to be able to set up its own sensors in the municipality's infrastructure, it may require agreements where conditions need to be stated. The company and the municipality also need to agree on, for example, how the sensors will have access to electricity. This interim report is about data sharing, so we will not go further into what is required from a legal point of view to be allowed to physically set up sensors in the infrastructure.

Legal challenges:

Purchased data is often covered by agreements between the municipality and private suppliers, where conditions for the use, sharing and resale of data can limit the municipality's disposal.

GDPR and other data protection legislation mean that the municipality needs to set clear requirements for data protection and security in agreements with suppliers.

Favourable legal conditions:

Standardisation and interoperability benefit from EU regulations aimed at creating a common data management structure within the Union.

The procurement rules give the city the opportunity to put suppliers out to tender and choose the most cost-effective solutions.

Availability:

The municipality's control over data is limited in this alternative. However, the municipality can set requirements in procurements and negotiate contractual terms that ensure necessary and sufficient access to and disposal of data.

4.2.4. Challenges

Clear requirements and responsibilities

Without or with inadequately defined requirements and responsibilities, the collaboration between the city and the supplier can become ineffective. The city must be able to set requirements for data quality and responsibility for any shortcomings, which requires technical and legal expertise.

Costs and sustainability Data

purchases can be costly, especially if the municipality needs to purchase data from several different suppliers. The challenge lies in ensuring an economically sustainable pricing model that does not overload the municipality's budget while providing sufficient incentives for suppliers to provide high-quality data.

Limited control and flexibility

Since the city does not have full control over data, it can be difficult to make changes in usage or adapt data to other and new needs. The supplier's limitations may inhibit the municipality's ability to innovate or develop tailor-made solutions.

Lack of expertise

Smaller municipalities often lack sufficient expertise to evaluate and validate data, which can lead to them accepting low-quality data or missing important details, for example in the design of data procurement.

Interoperability

Integrating data from different suppliers into the municipality's existing systems can be technically complex, especially if standards and formats are not compatible.

4.2.5. Possible policy solutions

Innovation procurement

can be used to get to know the market and identify solutions that best meet the city's needs. This can also promote the development of new technologies and data services that are better adapted to the municipality's context and needs.

Clear requirements for data quality and use

Procurements and agreements can include detailed and/or standardized requirements for data quality and describe responsibilities and roles, as well as how data is to be delivered, used and validated. Routines for random sampling and follow-up can also strengthen quality assurance.

Collaboration between municipalities

To reduce costs and streamline procurement processes, several municipalities can

collaborate through, for example, joint procurements to purchase data, which promotes scalability and improves bargaining power with suppliers.

Flexible agreements and long-term sustainability

Flexible agreements can enable the adaptation of data deliveries to the municipality's changing needs. It is also important to ensure that pricing models are sustainable over time.

Skills development and support

The municipality can invest in skills development to better understand data quality and market dynamics. National or regional actors can also offer support for building capacity in smaller municipalities.

4.2.6 Analysis

Need/Data Volume	Individual dataset	Smaller quantity but specific need	Large quantity with specific need	Big data
Control and Authority over Data	Full control, own governance	Restricted by contracts and law	Shared control, joint governance	Minimal control, market-driven
Need for Standardization/Interoperability	High	Medium	Low	None
Responsibility	Sole responsibility	Shared responsibility	No responsibility	
Risk	High	Medium	Low	None
Role Related to Data Quality	Strategic role	Tactical role	Operational role	No role
Flexibility	High	Medium	Low	None
Competence	Requirement for technical expertise and competence	Requirement for coordination competence	Requirement for analytical data competence	No requirements

Possible Governance Mechanisms/Incentives for Data Sharing	Information/Acc ess to high- quality data	Economic al	Recognition/Qu ality seal	Compulsio n
Possibility for Transparency/Public Insight and Citizen Dialogue	High	Medium	Low	None
Burden/Impact on Businesses and Citizens	High	Medium	Low	None
Costs	High	Medium	Low	Minimal

In summary, option 2 is most suitable when the municipality has specific data needs but lacks the resources to collect data itself. Governance and policy frameworks can ensure clear division of responsibilities, flexible agreements and high data quality. Collaborations between municipalities, investments in skills development and the use of innovation procurement can reduce costs and promote data sharing. The alternative is probably, in most cases, not suitable for activities that involve the exercise of public authority.

4.3 Option 3 – "The club"

4.3.1 Governance description

Option 3 is a collective solution based on collaboration between several actors – municipalities, private companies and other stakeholders – where data is shared and used on a voluntary basis via a central platform procured by the municipality. Data sharing is based on voluntariness and equal opportunities, rights and obligations.

This option has taken inspiration from how municipalities today share data with e-scooter operators. The solution is based on the municipality procuring a platform for data sharing, which the e-scooter operators then join voluntarily via data sharing agreements. Through the platform, it is possible to communicate and exchange data in real time. In the platform, the municipality can, for example, publish data on infrastructure and rules for how the infrastructure may be used (machine-readable traffic rules). Different users of the infrastructure can in turn share data from vehicles over where they are in real time in the city. The city can then analyse the data and based on this, decide on, for example, where parking should best take place in the future.

The challenge with this alternative lies primarily in the fact that it requires a high level of connection of private actors who share their data with the platform for the solution to work satisfactorily.

The Data Protection Regulation may mean that in the future it will be easier for a vehicle owner to export data to a platform.

4.3.2 Summary of the results of the interviews

In this part, a summary of the stories from those we interviewed in the project about their views on option 3:

One aspect that emerged during the interviews was that the model is fundamentally based on a systems perspective – sharing data for the benefit of all. This means that there is value if everyone shares data, but if only one actor shares data with the platform, there is no value. During the interviews, it was pointed out that the municipality needs to clearly explain the purpose of the data sharing to the private business community. It was also pointed out that the important thing for the business community is to understand the business model behind the platform. To understand: What does it cost, who pays and what is the benefit? Why should someone from the private sector be in the club (incentives and driving forces)? Should it be a requirement in future procurements? One incentive that was raised was linked to the fact that vehicles that are stationary in congestion cost a lot of money for a haulage company. And that if the platform means that congestion is reduced and vehicles arrive faster, the profit can finance digitalization.

One challenge with the model that was highlighted is that it can be difficult to collect enough data for it to be interesting to be part of the solution. It is not enough for the platform to share data on 50% of the traffic, but the interviewees considered that it should be at least 90% of the relevant data must be included. Another challenge that was raised was that traffic in a city is both local, regional, national and international, which makes it difficult to get enough vehicles on board. There are also different types of vehicles in a city, such as trucks and crane trucks.

One solution that was pointed out during the interviews was that municipalities can join forces with neighboring municipalities and have a common platform to increase the amount of data and thus make it more interesting for traffic across municipal borders. In this way, large and small municipalities can work together. It was also pointed out that goods owners also need to be part of the platform.

Another idea that was raised is that you can work with modules and start on a smaller scale. Gradually, the platform can be expanded with new services. In these contexts, it was also pointed out that it is important that the municipality, when procuring the platform, needs to understand how it is possible to develop the platform over time. And that it is also important to work with interoperability and standardization for data sharing and that it is not viable for each city to develop unique solutions.

During the interviews, hauliers highlighted that it is important to be able to choose what data the companies want to share with the platform because this solution is based on the trust that the city does not misuse data. There was also uncertainty as to whether it is possible to connect to a platform with today's equipment in the vehicles or whether data sharing with the platform requires that extra equipment is installed in the vehicles. It was also pointed out that it needs to be clarified who is responsible for ensuring that personal data is not shared in the platform.

4.3.3 Legal prerequisites and disposal

Legal challenges:

A collective approach often requires agreements between many different actors, which can be complex to manage legally.

Privacy issues related to GDPR are also particularly important, as data is often collected and shared between multiple parties. Compliance with competition law also needs to be ensured. This means that data such as volume or price should not be shared. Information security is also important to manage in the platform.

A big challenge is the question – how can you make the club attractive to be a part of? In the project, a desire to offer some form of benefit to get actors to join has been expressed. The question of possible incentives is discussed further in section 6.5 below.

Favourable legal conditions:

Standardisation and interoperability benefit from EU regulations aimed at creating a common data management structure within the Union.

Availability:

Control over data is shared between several actors, which can weaken the municipality's control. A clear governance structure and agreements can be used to ensure that data can be used in a way that meets the needs that exist.

4.3.4 Challenges

Commitment from many actors

In order for this solution to work well, broad participation from many different actors is required. This is particularly challenging in cities with many small and large players with different interests and priorities. Developing fair and sustainable incentives that work for all actors can be difficult. The model must balance costs, revenues, and incentives to create long-term commitment.

High data quality and compatibility

Data quality and technical compatibility between different actors' data is crucial but can be challenging to ensure, especially when data comes from many different sources with varying standards.

Competition law and trade secrets may limit certain actors' willingness and ability to share data, which reduces the functionality of the solution.

4.3.5. Possible policy solutions

Create incentives for participation

Economic incentives, or non-financial incentives such as quality stamps and brand benefits for participation, can be used to get actors to voluntarily share data. The municipality can provide benefits of some kind to those who share data via the platform if it is done on objective grounds. It is important that incentives are handled fairly. Further discussion of possible incentives can be found in section 6.5 below.

Support collaboration within and between municipalities

Municipalities and different parts of a municipality can collaborate and make joint investments, which enables the sharing of resources and technical solutions. Regional

collaboration platforms can be a solution to reduce costs and facilitate wider participation.

Standards

To minimize uncertainties around data sharing, standardization of technical solutions and legal agreements can be promoted. This can make it easier for actors to share data without compromising security, data protection or competition law.

4.3.6 Analysis

Need/Data Volume	Individual dataset	Smaller quantity but specific need	Large quantity with specific need	Big data
Control and Authority over Data	Full control, own governance	Restricted by contracts and law	Shared control, joint governance	Minimal control, market-driven
Need for Standardization/Interoperability	High	Medium	Low	None
Responsibility	Sole responsibility	Shared responsibility	No responsibility	
Risk	High	Medium	Low	None
Role Related to Data Quality	Strategic role	Tactical role	Operational role	No role
Flexibility	High	Medium	Low	None
Competence	Requirement for technical expertise and competence	Requirement for coordination competence	Requirement for analytical data competence	No requirements
Possible Governance Mechanisms/Incentives for Data Sharing	Information/Access to high-quality data	Economic	Recognition/Quality seal	Compulsion
Possibility for Transparency/Public	High	Medium	Low	None

Insight and Citizen Dialogue				
Burden/Impact on Businesses and Citizens	High	Medium	Low	None
Costs	High	Medium	Low	Minimal

In conclusion, option 3 is a model that requires strong collaboration and well-designed policies and incentives to ensure broad stakeholder participation, high data quality and compatibility. By building incentives, supporting collaboration and developing a flexible platform, the model can encourage data sharing and potentially create added value for all participating actors. At the same time, legal and technical challenges must be proactively addressed in order to create an effective and attractive collective solution.

4.4 Option 4 – "Minimal effort"

4.4.1 Governance description

Option 4 is a completely private market solution, which means that private actors are responsible for data collection, management and provision of services. The municipality's role will be limited to being a regulatory party, and by, for example, providing high-quality data on the city's infrastructure providing incentives for private actors to innovate.

This option is in line with the EU's ideas about creating a common single market for data. An important part of this solution is that the public sector provides data via, for example, the national access point or a local access point. For the municipality, this means that the data that the municipality has about, for example, its infrastructure is made available as open data. Other actors can also share data via the national access point, such as vehicle data. The EU then hopes that a third party will develop and offer services where different data sources are pooled and used. At first, the effort is low on the part of the municipality, hence the name "minimum possible effort", but one challenge is that if no third party steps forward and creates services that meet the needs of the municipality and its residents, dissatisfaction may arise. The risk is then that the municipality needs to act at a later stage, which risks being costly, hence the addition "with risk of fire" in the name of this alternative.

4.4.2 Summary of the results of the interviews

In this part, a summary of the stories from those we interviewed in the project about their views on option 4 follows:

All the people we interviewed were negative about this option and highlighted various reasons why this option is a bad solution. Firstly, it was highlighted that in this alternative there is no one who takes responsibility for data quality and for the whole. It was pointed out that there will be different sources with varying data quality, which means that the whole will have low data quality and thus be unattractive to the user. It was also highlighted that it may be the case that a third party actually has an idea for a service, but that data is missing. If data does not exist, there is little incentive for someone to create data and make it available. The interviewees therefore believed that it will be random

which services are possible for third parties to create. Another scenario that was highlighted was that data is available in year 1, a service is created in year 2, but in year 3, the data is deleted and the service can no longer be provided. The interview results therefore indicate that this alternative is also associated with high risks for third parties. It appeared unclear whether the market is interested in and able to develop new services in this alternative. However, it was argued that if there is a willingness to pay, the market will innovate. If there is no willingness to pay, however, nothing will happen.

In conclusion, this model does not solve the needs of the city and only in the best case the needs of the market.

4.4.3 Legal prerequisites and disposal

Favourable legal conditions:

The EU regulatory framework for the data economy encourages public and private actors to share data within certain frameworks.

Availability:

The municipality has minimal control over data and solutions in this alternative, as private actors own and operate the systems. This means that the municipality is dependent on the market's willingness to innovate and share data.

4.4.4. Challenges

Limited control and transparency

The municipality has little control over strategic decisions, data quality and long-term development. This can lead to solutions that prioritize commercial interests over societal benefits.

Lack of coordination between actors

Private actors may have different objectives and standards, which can lead to fragmented solutions that are difficult to coordinate across municipal boundaries or sectors.

4.4.5 Possible policy solutions

Provision of high-quality and interoperable data

The municipality can provide high-quality data on the city's infrastructure, thus creating incentives for private actors to share data and develop services that ensure that the needs of the municipality are met.

4.4.6 Analysis

Need/Data Volume	Individual dataset	Smaller quantity but specific need	Large quantity with specific need	Big data
Control and Authority over Data	Full control, own governance	Restricted by	Shared control, joint governance	Minimal control,

		contracts and law		market-driven
Need for Standardization/Interoperability	High	Medium	Low	None
Responsibility	Sole responsibility	Shared responsibility	No responsibility	
Risk	High	Medium	Low	None
Role Related to Data Quality	Strategic role	Tactical role	Operational role	No role
Flexibility	High	Medium	Low	None
Competence	Requirement for technical expertise and competence	Requirement for coordination competence	Requirement for analytical data competence	No requirements
Possible Governance Mechanisms/Incentives for Data Sharing	Information/Access to high-quality data	Economic	Recognition/Quality seal	Compulsion
Possibility for Transparency/Public Insight and Citizen Dialogue	High	Medium	Low	None
Burden/Impact on Businesses and Citizens	High	Medium	Low	None
Costs	High	Medium	Low	Minimal

In conclusion, Option 4 offers opportunities for private innovation and efficiency, but also involves limited municipal control and potentially unequal access to data.

2. Discussion

5.1 Which of the four alternatives should a municipality choose?

This report delves into the topics of data for governance and data governance. In the sections below you will find a discussion of the question – which alternative should a

municipality choose in a context of smart urban traffic zones? – based on these two aspects.

5.1.2 Option 1 – “Do it yourself”

In this work, the municipality does all the work itself and has total control over the entire process, from start to finish. However, if the municipality wishes, it can choose to procure certain parts. The people we have interviewed were positive to the idea as such but believed that the alternative would not work in practice as municipalities usually do not have enough resources either in the form of staff or money.

From a "better regulatory perspective", there are many advantages to this option. Since the municipality is responsible for everything, it can, for example, set quality requirements itself, collect data and analyse it over time to evaluate different effects and work with coordination between different parts internally. The municipality can also easily work with citizen dialogue and transparency. For a citizen, it is also possible to demand responsibility if the result is not good. The disadvantages of the alternative are that it consumes a lot of resources. Another question to consider is whether the alternative costs more than what they taste like (if it's proportionate). For example, the municipality invests large resources in technology that can quickly become outdated and outdated. There may therefore be other options to achieve a similar result.

From a data governance perspective, the municipality has full control and control. The municipality is also not dependent on any other party in the form of a party.

Our conclusion is that the alternative itself has many advantages, but practically difficult to implement for a municipality. Our recommendation is that the alternative can work for a small, well-defined subset in the concept of smart urban traffic zones, especially when it comes to issues that the municipality is obliged to implement by law and that involve the exercise of public authority. In the Smart Urban Traffic Zones project, another pilot was carried out that dealt with the digitalisation of exemption decisions. This is an example of when this option could be suitable for a municipality. However, one of the best things to do is to try to avoid developing unique solutions that only work in one municipality.

5.1.4 Option 2 – “Privatization of public space”

In this option, private actors are responsible for the collection and aggregation of data, but the "mine" where data is mined is the public space. The municipality buys analysed data from private actors. From the interviews, we take with us that this alternative received the most appreciation because the alternative opens up for many different types of collaborations and that it is a model that can suit both large and small municipalities.

From a "better regulatory perspective", it is a good alternative as long as there is transparency towards citizens. In the same way that a municipality needs to understand raw data and how algorithms work, citizens also need to be able to understand this. Only then can citizens demand responsibility from politics. The option provides access to data that can be used to improve regulations. In this part, the municipality needs to understand what data is needed to achieve this and how purchases should be coordinated between different parts of the municipality. Better regulations require that rules can be evaluated over time. In relation to this, a weakness of the alternative is that there is a risk that the supply of data may change so that it is no longer possible to purchase follow-up data over

time, since there is no longer any actor offering requested data. This can lead to the fact that evaluation is difficult. The alternative can be a good start for a municipality to build up competence and then move more towards alternative 1 "yourself is the best farmhand".

From a data governance perspective, the municipality needs to work with solutions that are general and not unique to the specific municipality in order for it to work effectively. It is also important to keep in mind that interoperability is important.

Our assessment is that this alternative is relatively straightforward for a municipality to implement. A market for vehicle data is starting to emerge, so that part of the alternative is possible to implement. The question is how realistic the alternative is when it comes to sensors in the infrastructure. If private actors do not get a deal where it is possible to reuse sensor data between municipalities, private actors end up in the same position as the municipality in alternative 1: "yourself is the best farmhand", i.e. a very expensive and resource-intensive solution. This means that there are probably no or very few companies that can do this in practice. From a municipal perspective, a situation where there are different companies to buy data from is preferable, so that the municipality does not end up in a position of dependence on a single company.

5.1.3 Option 3 – “The club”

This option originated from a model that several municipalities use to work together with e-scooter operators. The municipality procures a platform for data communication and data sharing is then regulated through a voluntary agreement with those who join the platform.

From the interviews, we take with us that it can be unclear who will be in the club. For example, is it transports that only run in Gothenburg or should transports across municipal borders be included? Unlike e-scooter operators, there is no clearly designated group that should be part of the club, but it is more fluid. We also found that public and private actors often talked about different things when it came to the purpose of the platform. For private actors, the deal was absolutely crucial. A membership in a platform must be able to translate into monetary benefits. The business model for data sharing is therefore very important here (business models for data sharing have been addressed in another work package in the project.) The public sector spoke more about the platform as a tool for management and governance. Our conclusion is that it needs to be clear who should be in the club and why.

From a "better regulatory perspective", the alternative has many advantages. A key advantage is that the option allows communication in both directions in real time. Citizen dialogue, transparency, transparency and the opportunity to influence are great in this alternative.

From a governance perspective, it is crucial to establish a standard for data sharing. In the e-scooter context, an American standard (MDS) is used, which means that the same standard can be used in many different cities. In this way, the platform solution will not be unique to a particular city. The challenge for the city will be to find a suitable standard for communication that can work for many cities.

Our assessment is that this alternative has many possibilities but needs to be developed further. Our conclusion is that the question of whether the club is a viable path or not has

entirely to do with how many people join it and how much data is made available. If there is a broad and large connection to the platform with a lot of data, it will be successful. Traffic itself also floats around, which makes the target group for the club unclear. One suggestion to the municipality, to work on, is to target those who do business with the municipality, for example through public procurement. In this way, the municipality and private actors speak the same language and the club's boundaries become clearer. You should also consider what data is desirable, what data and amount can be collected, and what services are desirable. Those we have interviewed also highlighted that it is important to have a platform that is modular and expandable as new needs arise.

What the municipality needs to think about especially for this alternative is the question of what type of data is shared on the platform. For example, in most cases, data on cargo should not be shared because it reveals something about the carrier's business and can also be dangerous from a security point of view (risk of theft).

The wishes presented by the municipality in our project are that no transactions should occur on the platform, i.e. that the platform should not be a data exchange where data is bought or sold. That data shared via the platform should be free of charge and based on everyone sharing data voluntarily. We make the assessment that the platform belongs under public administration as it is intended to be used, for example, as a tool for the municipality to inform, measure, control and follow up. It can be part of the municipality's work with business development. The platform also has a clear connection to traffic. A municipality may only carry out an activity that is related to the municipal purpose and is of public interest. Our assessment is that the platform has a clear connection to the municipality's mission. As far as is known, there is also no private operator that offers a similar service. The platform should therefore not compete with private actors.

5.1.4 Option 4 – “Minimum Effort”

This alternative can be compared to a bulletin board where the municipality puts up notices, i.e. a catalogue of the data the municipality can offer to interested parties. The idea comes from the EU's ideas about creating a single market for data and that data can be made available through, for example, the National Access Point (bulletin board). For a municipality, it is a relatively simple job to publish its open data via the NAP, hence the name Minimum possible effort.

None of the interviewees saw any advantages of this alternative in the context of smart urban traffic zones. What was highlighted was, for example, that it is difficult to coordinate and combine different data from different data sources with different data quality, and that there were no guarantees that data will be available over time.

From a "better regulatory perspective", there are many disadvantages to the alternative. In this alternative, it is the market that governs and there is no coordination. There is no room for citizen dialogue and democratic influence. The municipality also has no control over the result and cannot answer the question of whether the development is going in a certain desirable direction. This, in turn, can lead to challenges in accountability. If the market fails to deliver a good service, there is a risk that citizens will demand that the municipality act in a certain direction.

From a data governance perspective, there is also not much room for a municipality. In this option, the market controls the outcome. It will probably take many years before a larger number of actors have made data available via the NAP.

Our conclusion is that this alternative is not suitable for a context with smart urban traffic zones and that the municipality should not invest in this alternative in most cases. A municipality can work to make open data available, but such work should have a different purpose.

5.2 General reflections based on the interviews

In the following part, we discuss a number of issues that have arisen during the interview studies that have been conducted during the project and that are considered to be particularly important to take into account when deciding on procurement and purchasing procedures for data sharing.

5.2.1 The Importance of a Well-Defined Needs Assessment

A clear picture of needs is crucial to ensure that the choice of model and solution meets the goals and challenges of the specific municipality or organization. Municipalities must first identify what the need is, what they want to do, what data is needed, who will use the data and for what purpose. This analysis should include a mapping of both technical and organizational requirements and how these fit into the municipality's long-term plan.

A well-defined needs picture is particularly important in procurements, as it governs the requirements placed on suppliers and ensures that the delivered solutions are useful and appropriate.

5.2.2 Data quality

Data quality is one of the most important aspects to ensure successful innovation. Low-quality data can lead to wrong decisions, decreased trust among stakeholders, and inefficient services. Municipalities must clearly define what quality requirements are necessary for data to be useful for the specific purpose and need. It is also important to identify effective control and verification processes.

To ensure high data quality, it is important to:

- Create clear requirements specifications for data quality in procurement, including standards for data collection, processing, and storage.
- Identify and establish effective quality control processes such as random checks and validation.
- Identify and use incentives for actors who deliver high-quality data.
- Invest in internal skills development to better understand and manage data quality issues.
- Ensure a clear division of responsibilities for data quality.

5.2.3 More on procurement and innovation procurement

Procurement is a central process in municipalities' work to gain access to the data and solutions that best meet their needs. In the context of procurement, it is important to prepare requirement specifications that include relevant aspects such as data quality, interoperability, security and flexibility.

To maximize the benefits of procurements, municipalities can work to involve relevant stakeholders and integrate processes for evaluation and learning for future procurements. It can be effective to work with transparency in procurement processes and include early and ongoing dialogue with potential suppliers to understand the market and its opportunities. It can also be effective to ensure that the evaluation focuses not only on cost but also on quality, long-term sustainability and potential for innovation.

By using so-called innovation procurement, the municipality can promote the development of new technology and new services. It can be used to identify and develop new solutions that can better meet specific needs. Innovation procurement is not a separate procedure, but it is a way to promote innovation in the context of public procurement and follows the same process as traditional public procurement.

Innovation procurement can be used when the market cannot directly solve the municipality's needs, i.e. in cases where development and perhaps even research is required for the suppliers to develop a service. Sometimes this type of procurement can also be used in cases where the need can be met by the market, but where the municipality and suppliers together have ideas for improvements to the solutions.

The National Agency for Public Procurement points to the following two situations as examples of when it may be appropriate to use innovation procurement:

- it is an industry with a high rate of development, such as medical technology or IT
- The procurement has great potential to increase the result in the organisation's core business, for example in terms of technology, work environment, work processes, finances and to increase the benefit for citizens⁹

The services and products discussed in this report may be suitable for innovation procurement, as there is often a high rate of development and the procurement can have great potential to increase the results of the business.

Innovation procurement can thus be an effective tool. However, it is important to be aware that this form often takes more time and requires more expertise and resources than a traditional procurement. Solid preparatory work is often needed before the procurement.

5.2.4 The role of the municipality

The role of the municipality is central to decisions on how it can drive the development of data sharing and smart solutions for sustainable urban development. The municipality has a dual role as an exercise of power and a provider of social services.

Municipal competence, its powers and tasks are regulated in the Local Government Act. Municipal competence sets the external framework for the municipality's freedom of action. In addition to the Local Government Act, there is special legislation that specifies

⁹ <https://www.upphandlingsmyndigheten.se/innovation-i-upphandling/> 2024-01-09

what the municipality must do, but the municipality can also act on the basis of general principles.

The Local Government Act states that:

*'Municipalities and regions may themselves manage matters of general interest which are connected with the territory of the municipality or region or their members.'*¹⁰

*The Local Government Act also contains the principle of equality, which states that municipalities must treat their members equally, unless there are objective reasons for otherwise.*¹¹

*The Local Government Act also states that municipalities may implement measures to generally promote the business community in the municipality or region. However, that individually targeted support to sole proprietors may only be provided if there are special reasons for it.*¹²

In the current context, the municipality can act as a coordinator, stipulator and sometimes also a data producer in different situations. The municipality can function as:

1. **Catalyst for innovation:** By promoting dialogue and collaboration, as well as through innovation procurement, the municipality can drive new solutions.
2. **Data consumer and producer:** In some models, the municipality generates data via its own sensors and systems, while in other cases it consumes data from suppliers.
3. **Guarantor of societal benefit:** The municipality should work to ensure that their data-driven solutions benefit residents and support long-term goals such as sustainability, safety, and efficiency.
4. **Responsible for permits, etc.**

In addition to these various functions, the municipality can also exercise coercion in certain contexts. However, our assessment is that the opportunities for this are currently relatively limited.

The municipality's role varies partly based on needs and conditions, and partly on the model used. Agreements, procurement and internal policies should therefore clearly define the municipality's role in relation to other actors to avoid ambiguity and inefficiency.

Different municipalities' conditions, challenges and potential:

Different municipalities have different conditions, and small and medium-sized municipalities often face specific challenges, such as limited resources, skills and technical capacity. Limited financial and technical resources can make it difficult for smaller municipalities to invest in advanced systems and data. Many smaller municipalities also lack the technical expertise required to evaluate and manage complex

¹⁰ Local Government Act (2017:725), chap. 2 § 1

¹¹ Local Government Act (2017:725), chap. 2 § 3

¹² Local Government Act (2017:725), chap. 2 § 8

data solutions. At the same time, they have great potential to implement changes that can create added value for residents. By collaborating with other municipalities or participating in regional or national initiatives, small municipalities can share costs and expertise.

In relation to the alternative models for data sharing proposed above, it may be more appropriate for smaller municipalities to choose a model where data is purchased from private actors or where a collective solution is used than where the municipality manages and is responsible for the entire process.

5.2.5. Incentives for data sharing and making data available

Option 3, the club, is an option that assumes that many people want to share data via one platform. To promote data sharing and increase access to high-quality data, clear incentives are needed for all actors involved. Incentives can be both financial and organisational, but they must also be adapted to the needs and conditions of the actors.

For a municipality, there are two general principles to take into account. The first – the principle of objectivity – means that the municipality must take into account everyone's equality before the law and observe objectivity and impartiality in its activities (Chapter 1, Section 9 of the Instrument of Government). The principle of objectivity applies to all relationships, regardless of whether it is a member of the municipality or not. A municipality must also comply with the principle of equality (Chapter 2, Section 3 of the Local Government Act (2017:725)). This means that the municipality must treat its members equally unless there are objective reasons for otherwise. The principle of equality applies in relation to the municipality's members. Members in the same situation must be treated equally, for example, the same fee for the same service. The principle does not apply when the municipality acts in commercial relationships. However, a municipality may treat members differently if it is done on objective grounds and that municipalities may implement measures to generally promote the business community in the municipality or region (Chapter 2, Section 8 of the Local Government Act). However, that individually targeted support to sole proprietors may only be provided if there are special reasons for it.

When designing incentives, it is important to take both principles into account. The platform that has been discussed in the project should be open to who can join. The idea is that the more data there is, the more attractive the platform becomes. What has not been discussed in the project is how much data the individual actors are expected to share and how much data the individual actors should be allowed to access. Should everyone have access to all data, regardless of how much or how little data they have shared with the platform?

Promoting data sharing also requires addressing technical barriers, such as interoperability issues, by implementing standards and interoperable systems.

5.2.6 Future prospects

The future of data sharing is influenced by policy initiatives and legislation at both national and European level. Initiatives such as the European Mobility Data Space (EMDS) and the ITS Directive are examples that aim to create a more integrated and data-driven society.

Future trends and impacts:

- **Standardization and interoperability:** New and upcoming regulation has a focus on standardizing data formats and creating interoperable systems, facilitating data sharing between actors and sectors.
- **Greater focus on security and privacy:** New and upcoming regulations place high demands on security and privacy, which can present both challenges and opportunities for municipalities and companies.
- **Increased use of AI and automation:** Regulations that promote access to data may facilitate the development of AI and automated solutions.
- **National and regional initiatives:** Sweden and other EU countries may develop national policies that complement EU legislation and focus on local needs.

Policy recommendations for the future:

- **Proactive adaptation:** Municipalities should actively monitor and adapt to changes in legislation.
- **Investing in skills and technology:** To meet future demands, municipalities should invest in skills, training, and new technologies that support data sharing and interoperability.
- **Regional collaboration:** In order to benefit from future initiatives such as EMDS and the national access point, municipalities and different parts of a municipality can work together to share resources and knowledge.

5.2.7. International relevance

The Smart Urban Traffic Zones project has great international relevance, as cities all over the world face similar challenges in optimising urban space, improving transport efficiency and increasing road safety. Many municipalities, regardless of country, are exploring how they can use data-driven solutions to support policy goals, regulate mobility services, and foster innovation. The models for data sharing identified in this project can be adapted to different legal and urban contexts.

The project's insights are also in line with the EU's initiatives aimed at increasing data sharing.