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GLEAM NSR

O1.1 Strategy for Digital Transition Towards Green and Just Urban Logistics

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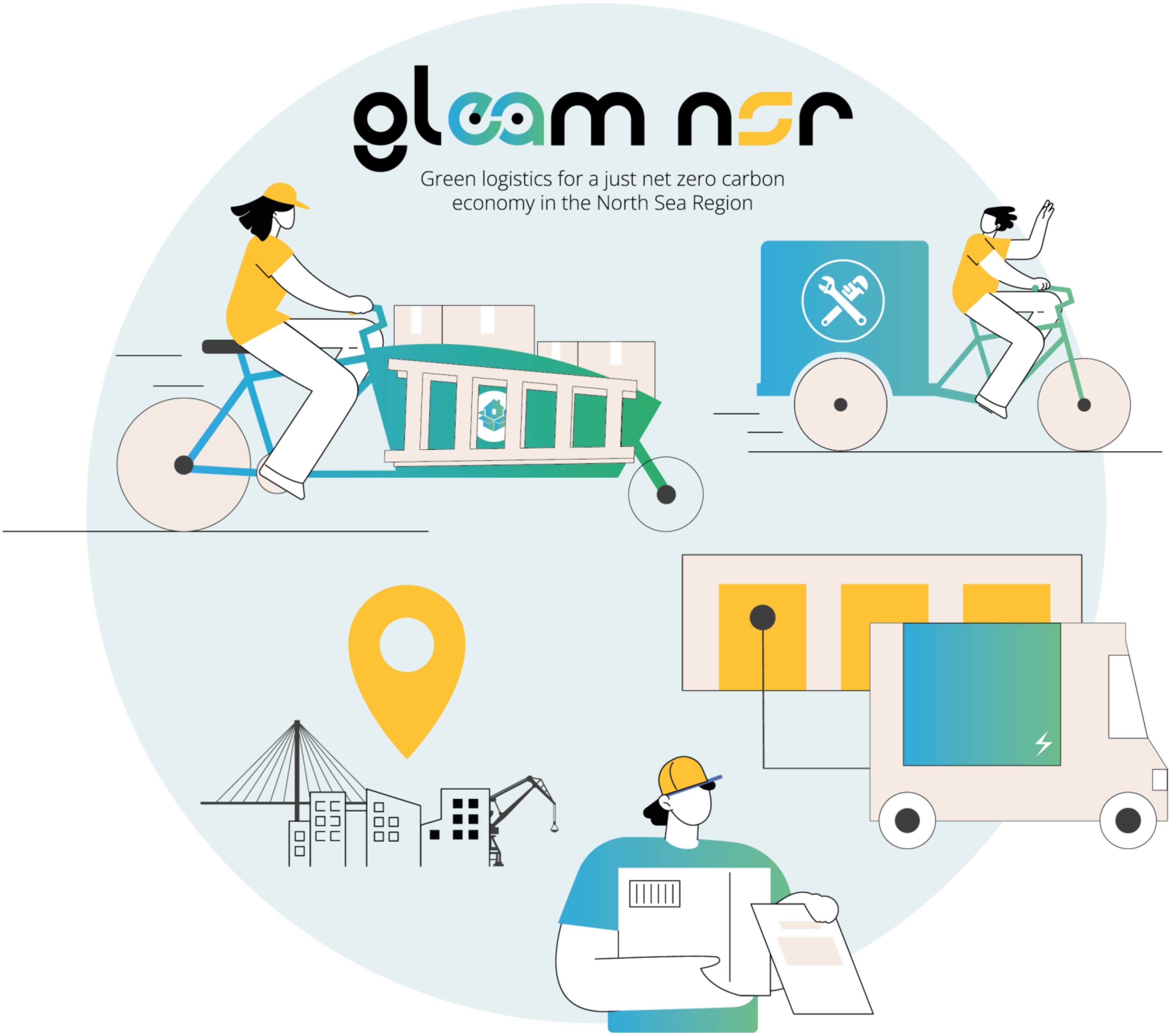

CONTENTS

1 Introduction

This strategy supports local authorities in taking concrete steps toward a green and just urban logistics system by advancing their digital transition as a foundation for evidence-based policymaking. It has been developed jointly by the five public authorities—Aarhus, Rotterdam, Mechelen, Leuven and Le Havre Seine Métropole, with support from two knowledge partners (the University of Gothenburg and the University of Groningen), two policy partners (Logistics Network Consultants and Copenhagenize), and two industry partners (SMEunited and VIL), collectively forming the GLEAM NSR project consortium.

The strategy addresses a shared challenge: without accessible and up-to-date data on logistics activities, designing effective urban logistics policies is difficult. Thus, the strategy identifies relevant data sources, outlines data collection methods and tools, highlights the skills needed for evidence-based decision-making, and offers insights into effective governance. Building on earlier initiatives (e.g., ULaaDS, Harmony, FlexCurb and SURFLOG), it goes further by offering practical guidance for public-private data collaboration and proposing transnationally relevant approaches.

Urban logistics policies risk falling short when they rely on overly narrow definitions or overlook key actors. Before turning to the digital transition in more detail, we therefore begin by reflecting on two foundational aspects: the diverse nature of urban logistics, and the critical role of small and medium-sized enterprises. Urban logistics involves much more than parcel or general cargo delivery. It also includes fresh food distribution, service and facility logistics, waste collection, and construction-related transport[1]. These segments differ in vehicle types, timing, infrastructure needs, and how they interact with regulation. Small and medium-sized enterprises (SMEs) are central to many of these activities—especially in service logistics—and are often among the first to be affected by new policies. For example, service providers mainly use vans, though specialized vehicles are also common in certain sectors—such as water tanks for window cleaning, hoses for plumbing, or elevating platforms for moving services. Similarly, timing requirements vary, from pre-scheduled parcel delivery routes to urgent, on-demand calls for service providers, such as electricians or heating technicians. Yet, despite their key role, SMEs frequently lack the resources or channels to engage meaningfully in the policymaking process.

The remainder of this strategy document follows a stepwise structure. Chapter 2 explores potentially relevant data sources, emphasizing that many types of data are already available to local authorities and can often be repurposed or combined to support urban logistics policymaking. Chapter 3 focuses on the internal capacity cities need to work effectively with existing data, as well as the methods, tools, and skills required to collect and process additional data. Chapter 4 addresses the role of external collaboration, outlining options for public-private data exchange and governance frameworks that balance mutual benefits with legal and practical constraints. Chapter 5 concludes by distilling key insights from the strategy into ten concrete takeaways to guide local authorities in advancing their digital transition toward a green and just urban logistics system.

[1] Quak, H., Kin, B., van Adrichem, M., Meijer, L., Poels, S., & Overwagt, H. (2024). Outlook stadslogistieke 2035.

2 RELEVANT DATA SOURCES

Local authorities already collect and maintain a wide range of data that can be relevant for urban logistics. This data can be classified as **static**–when it provides a snapshot of information from a specific moment in time– and **dynamic**–when the data is a flow of constant real time information. In cities with a longer track record and more dedicated resources, data is often purposefully collected to support logistics-related policymaking. However, even cities that are earlier in their urban logistics journey typically hold potentially relevant data—albeit gathered for other purposes, such as sustainable urban mobility planning, economic development, or spatial planning.

These datasets may not be labeled as "logistics data", but they can offer valuable insights when viewed through a logistics lens. **Traffic counts and flow data**, for example, are typically gathered to manage congestion or inform mobility planning but can also shed light on freight movements and peak delivery times. **Geospatial datasets** (e.g., maps of parking spaces, loading zones, and charging stations) are commonly available static data sources usually developed for urban or environmental planning yet prove equally valuable for logistics analysis. **Administrative records**, including permits, access restrictions and exemptions, and zoning regulations, can help cities understand where and when logistics activities are permitted or concentrated. **National or survey-based datasets** (e.g., vehicle registrations, business registries, or travel behavior studies) further enrich local insights, especially when integrated with local data. An overview of relevant data sources from the GLEAM NSR project is included in table 1 in the Appendix.

While many potentially relevant datasets already exist, a key lesson from the GLEAM NSR project is that data becomes valuable only when connected to a clear policy goal. The relevance of any given dataset depends on the specific question a city is trying to answer—whether it concerns reducing emissions, managing curb space, improving delivery reliability and safety, or supporting zero-emission zones. Without a guiding objective, data collection and use risks becoming ad hoc or resource-intensive without yielding actionable insights. Table 2 in the Appendix shows examples of the connection between data sources and policy goals.

With a policy goal in mind, a good first step is to assess what data is already available. Many datasets (e.g., traffic counts and geospatial infrastructure data) are often underused but can offer significant insights when repurposed for logistics. Effectively using these sources requires internal capacity: the ability to identify relevant data, interpret it in light of urban logistics dynamics, and combine it across domains. While this does not require highly advanced systems, it does call for a focused investment in analytical capacity and cross-departmental coordination. The example of Aarhus illustrates how this kind of capacity can turn existing national datasets into a valuable resource for local policymaking.

Aarhus repurposing national data for local logistics insights

The city of Aarhus illustrates how targeted analytical capacity can unlock value from data sources not originally intended for urban logistics. Using Bilstatistik, a national vehicle registration database, the city's team linked vehicle characteristics (e.g., type, fuel, mileage) with company size and sectoral activity to better understand local logistics patterns. This analysis revealed that 48% of locally registered logistics vehicles are owned by SMEs, with vans dominating among smaller firms—pointing to a strong presence of service logistics in the city. While fossil-fuel vehicles still dominate, the data also showed early signs of a transition toward electrification. By reframing and interpreting national data through a local logistics lens, Aarhus was able to generate actionable insights—without collecting new data, but with a deliberate investment in cross-referencing and analysis.

If a city's policy goal requires data that is not readily available internally, the next step should not automatically be to collect new data. Instead, it may be more effective to first explore opportunities for collaboration with other local agencies, or national authorities. In many cases, relevant data already exists elsewhere (e.g., vehicle registration records, business activity datasets, or mobility survey results held at the national level) and can be accessed through partnerships or data-sharing agreements. This approach can save resources, avoid duplication, and promote alignment between different levels of government working toward similar goals.

When relevant data cannot be sourced through internal or external collaboration, it makes sense to consider new data collection efforts or the development of public-private data exchange. These steps require more substantial investment—both in terms of financial resources and internal capacity—and should be guided by a clear understanding of their added value. They may also involve questions of data governance and privacy. Chapters 3 and 4 explore these issues in more depth, offering practical guidance on how to enhance the use of existing data and, where needed, scale up towards more advanced and collaborative data practices.

3 Data collection methods, tools and skills

This chapter focuses on building the methods, tools and skills needed to advance urban logistics strategies beyond available datasets. It addresses new data sources, building internal capacity, and the use of analysis tools. The emphasis lies not on novelty for novelty's sake, but on strategic, fit-for-purpose enhancements that build on a solid foundation of existing capacities and data sources.

As policy goals evolve, so do data needs, which may result in a point where repurposing existing data no longer suffices. New data needs often arise when existing sources lack coverage or resolution (e.g., vehicle counts without distinguishing freight vs. passenger traffic), when policy moves from planning to enforcement (requiring more up-to-date or traceable data) or when stakeholder engagement deepens (prompting data collection on vehicle types, fleet ownership structures, or operational patterns). The Le Havre Seine Metropole region example provides a good starting point.

Le Havre's field-based exploration of parcel deliveries

Le Havre demonstrates how local authorities can begin collecting new data through modest, focused efforts tied to specific questions. To better understand parcel delivery activity in a dense, mixed-use area, it carried out field observations of delivery practices, focusing on curb use and unloading behavior. These observations were complemented by input from the local post office and insights from national studies, helping to clarify the scale and operational characteristics of parcel logistics in the city.

While still at an exploratory stage, this work gave the municipality an initial base to reflect on delivery patterns and the interaction between freight activity and the urban environment. Rather than starting with a major investment in technology, Le Havre began by aligning small-scale data efforts with a clearly defined question and local stakeholder input.

Within GLEAM NSR cities, common gaps include real-time freight flow data, a clear segmentation of logistics actors, and an understanding of what SMEs do and how they operate within the different urban logistics segments. Closing these gaps involves either targeted new collection or enriching available sources through smart integration. Importantly, local authorities benefit from asking: What policy decision hinges on this data? Who will use it, and how? And is there an existing partner or project already generating something similar?

The collection and use of data tools must align with a local authority's capacity and needs. Tools are not ends in themselves. Static sources of data are often collected manually, or in semi-automated ways and include field observations, license plate spot-checks, and Excel-based registries. More advanced, dynamic data sources include ANPR cameras, GPS and floating car data, real-time traffic counters, and IoT sensors. Data platforms and dashboards support the storage, filtering, and visualization of large and varied datasets. Cities with greater analytical maturity may combine these tools with dashboards or basic data infrastructure. However, advanced tools are only effective when embedded in an ecosystem that can process and interpret their outputs. Some, like ANPR systems, require strict data governance and well-defined data-sharing agreements (see Chapter 4). Others—such as sensor-based parking monitors or geofencing—can be deployed more flexibly.

Data collection alone does not lead to policy insight. Cities must build the capacity to turn raw input into actionable knowledge. This includes:

- Data literacy: staff must understand how to interpret and cross-reference datasets.
- Internal collaboration: urban logistics teams should connect with colleagues in IT, transport, spatial planning, economic development, sustainability, Smart City initiatives, facilities and properties management, procurement, and semi-external actors such as the police.
- Partnerships: external partners such as universities or consultants can support modeling, visualizations, or GDPR-compliant data handling.

Capacity-building is often incremental. Some cities start with spreadsheet-based inventories and evolve toward dashboards. Others bring in research partners to build data bridges between public systems and private datasets (e.g., parcel flows, fleet types, or emissions modeling). Skills are not only technical. Policymakers need interpretive judgment to assess data reliability, connect findings to policy goals, and communicate implications.

As policy ambitions grow, static analysis may no longer suffice. Models are particularly useful for assessing the system-wide impact of targeted measures (e.g., restricting certain vehicle types). However, these models require substantial data, analytical maturity, and governance frameworks, as shown in the example of Rotterdam below.

Rotterdam's logistics data infrastructure

Rotterdam has developed an advanced urban logistics data infrastructure. The municipality maintains a logistics dashboard that integrates data from ANPR systems, vehicle registration databases, and other administrative sources. This dashboard enables continuous monitoring of urban freight activity and supports targeted policy interventions. For example, by linking vehicle registration and ownership data, the city can identify which vehicles are operated by SMEs—information that helps tailor communication and support measures as these operators face access restrictions under the upcoming zero-emission zone.

In parallel, Rotterdam uses the Tactical Freight Simulator (TFS) to model logistics activity across key segments such as construction, service logistics, and general cargo. Drawing on real data, the TFS provides detailed estimates into vehicle kilometers driven and emissions generated per segment. It also supports scenario analysis, allowing the city to explore the likely impact of interventions such as zero-emission zones or the introduction of urban consolidation hubs. Within the GLEAM NSR project, the TFS is being expanded to consider the potential for a modal shift to light electric freight vehicles. Rotterdam is also helping other GLEAM NSR cities explore the potential of simulation models and will host a dedicated workshop to share tools, insights, and use cases.

Together, the dashboard and simulation model illustrate Rotterdam's ability to pair targeted data collection with analytical capacity. This combination allows the city not only to monitor current logistics activity, but also to anticipate future trends and prepare more tailored, evidence-based policies.

4 PUBLIC-PRIVATE GOVERNANCE FRAMEWORKS FOR DATA SHARING

A central aim of this strategy is to support local authorities in advancing their digital transition. The success of this transition depends on their ability to access and exchange relevant data—not only within the public sector, but also across the boundary between cities and logistics actors.

Chapter 2 highlighted two broad categories of data relevant to urban logistics policymaking: static data, such as infrastructure maps, vehicle access regulations, and historical vehicle counts; and dynamic data, such as real-time traffic flows, curb availability, or ANPR detections. Alongside this static–dynamic distinction, it is helpful to clarify the direction of data flows between public and private actors. Cities increasingly seek access to data about the operations of logistics companies, often through public records like vehicle registries or traffic counts. In some cases, they also pursue data from companies directly, such as delivery volumes or GPS traces. At the same time, logistics companies benefit from data provided by cities, especially when it concerns infrastructure, regulatory conditions, or real-time access information. Each of these data flows—static and dynamic; about, from, and for companies—can support operational decision-making and long-term planning. But they also differ in how they are collected, used, and governed.

Cities increasingly rely on data about logistics companies to understand what is happening in the urban logistics landscape. This includes insights into which types of vehicles are active in particular areas, how frequently they appear, what sectors they represent, and how these patterns evolve over time. Often, there is no need to collect this data directly from companies. Rather, cities can draw from public records or collaborate with national authorities, as illustrated below by the initiative in the Netherlands.

Enhancing logistics data through VESDI (Vehicle Emission Shipment Data Interface)
In the Netherlands, recent developments show how ANPR (Automatic Number Plate Recognition) data can be responsibly integrated into broader logistics data infrastructures. Through the VESDI platform, Statistics Netherlands (CBS) has developed a secure and privacy-compliant process to link municipal ANPR data with national datasets on vehicles, trips, and business sectors. This linkage enables cities to better understand the types of vehicles entering zero-emission zones, their frequency, and their associated sectors—information that supports more targeted and effective urban logistics policies.

The process was first piloted with the municipality of Utrecht, which collaborated with CBS, the Ministry of Infrastructure and Water Management, and an independent privacy firm to conduct a full Data Protection Impact Assessment (DPIA). The result is a governance model that restricts data use to business vehicles and ensures that only aggregated insights are shared back with municipalities. This approach is now being adopted by other cities, including Rotterdam, as part of their efforts to monitor and manage logistics activity in the context of the transition to zero-emission zones. The VESDI framework illustrates how municipal data, national registries, and strict governance can come together to deliver meaningful insights without compromising data protection.

Cities can also partner with private companies to enhance their data usage capabilities, as illustrated in Leuven's example below.

Leveraging local data and external collaboration in Leuven's logistics study
To enhance their understanding of urban logistics, the city of Leuven partnered with consultancy firm Rebel Group to generate a logistics profile using local municipal data. Unlike Dutch cities that combine ANPR data with national registries, Belgian municipalities face legal constraints that limit such usage. In response, Leuven pursued an alternative approach by combining its own datasets with Rebel's logistics modeling framework, previously applied in Antwerp.

The municipality provided data on households, population, the commercial landscape, and building functions, which were enriched with delivery profiles and qualitative insights. This enabled an analysis of trip frequency, vehicle types, distances travelled, and emissions across eight logistics segments: retail food, non-food retail, construction, hospitality, e-commerce, waste collection, service services, and facility supplies.

Rather than supporting the direct implementation of a Zero-Emission Zone (ZES), the study aimed to inform future policies by identifying which vehicle types and logistics segments should be prioritized for regulation, and which SMEs are likely to be most affected.

This collaboration illustrates how cities can derive actionable logistics insights without relying on vehicle-level tracking data. By combining structured local datasets with external modeling expertise, Leuven developed a detailed urban logistics portrait—offering a meaningful counterpoint to the data-linkage strategies employed in the Netherlands.

Direct data exchange between logistics operators and cities remains rare in practice. Companies are often reluctant to share data unless there is a clear business case or regulatory requirement. From the GLEAM NSR project, two preconditions stand out. First, cities must clearly communicate the purpose and expected benefits of data sharing—both for urban planning and for the logistics partner. Second, trust is essential, typically built through long-term relationships or collaboration in joint projects. When data is shared, it is usually within the scope of pilot initiatives with well-defined mutual goals, as illustrated below by the example of Mechelen and bpost.

Mechelen's Ecozone and experience-sharing legacy: enabling Leuven's parcel locker network

Launched in 2020 under the EU-funded SURFLOGH project, Mechelen's EcoZone aimed to reduce traffic congestion and environmental impact from parcel and letter deliveries. In partnership with bpost, the city rolled out a dense network of parcel lockers, supported by a microhub for goods consolidation and last-mile deliveries using electric vehicles and cargo bikes—enabling fully emission-free operations within the zone.

Following the pilot's success, Mechelen moved quickly to formalize and expand the initiative. Public tenders were issued in 2018 and 2021 for locker placement in public space, underscoring the integration of logistics infrastructure into urban planning. As part of the agreements, bpost shared anonymized usage data with the city, allowing Mechelen to track use, evaluate effectiveness, and guide future expansion.

This pioneering approach also laid the groundwork for Leuven, which launched its own pilot in November 2021, building on Mechelen's experience. The pilot was extended until October 2025, with usage data available from the start. Leuven directly consulted Mechelen on their collaboration with bpost, and the two cities have maintained monthly exchanges that foster shared learning. Their comparable size and structure have made this collaboration particularly valuable, highlighting the potential for intercity transfer of logistics governance models. Mechelen's leadership not only advanced its own sustainability goals but also helped Leuven implement a more robust initiative.

Cities also hold datasets that can support logistics operators. Sharing information on loading zones, access rules, and charging infrastructure can improve efficiency, reduce friction, and encourage compliance with local policies. Sharing dynamic data has even greater potential but also poses more implementation challenges, as demonstrated by recent experiences in Leuven (see textbox).

Leuven sharing data for companies

As part of the EU-funded FlexCURB project, the city piloted both a digital planning platform and a driver-facing app. The app aimed to guide drivers toward available loading zones, inform them about applicable rules, and collect check-in data. While the tool was technically functional and offered a strong concept for measuring parking demand, its real-world uptake was limited. Most drivers did not use smartphones for route or parking guidance, and the app's added value was not strong enough to prompt behavioral change. Still, FlexCURB helped the city identify where additional unloading space was needed and initiated valuable discussions about dynamic curb use and data exchange.

Through its Smart City Logistics projects, Leuven improved the structure and availability of data about the city for companies. The city digitized its access regulations and linked them to specific zones in a newly developed registration and rule-management platform. Through this platform, policies are translated into enforceable business rules and nudges or discouragements.

Despite growing interest in logistics data, public–private data sharing in this domain remains the exception rather than the rule. Compared to passenger mobility, where cities routinely require data from operators such as e-scooter providers and car-sharing platforms, logistics data exchange is far less institutionalized. This difference is not simply technological, but rooted in how the two domains are governed. Cities exert stronger regulatory control over shared mobility services, often granting access and on-street parking through permits that make data sharing a condition for operation. These services are also consumer-facing, triggering political pressure when poorly managed, and often involve a smaller number of well-organized firms familiar with data standards and public partnerships. Together, these factors have enabled a governance model in which cities exchange infrastructure access for data, supported by standardized APIs and third-party platforms.

In contrast, the logistics sector is fragmented, commercially diverse, and structurally less connected to public regulatory levers. Most logistics operators already have full access to public space. The services they provide are business-to-business, making them less visible in public discourse despite their substantial footprint in cities. Moreover, many cities struggle to clearly articulate what they would do with private logistics data, and what companies might gain in return. Without a credible value proposition or defined use case, trust and transparency are harder to establish. Moving forward, cities may need to take inspiration from mobility governance by tying data exchange to instruments they already control (e.g., exemptions for zero-emission zones or access to shared delivery infrastructure).

5 Key takeaways

This final chapter distills ten practical lessons from across the strategy to help local authorities navigate their digital transition and develop policies for green and just urban logistics.

1) **Start from your policy goals.** Let data follow strategy—not the other way around. A clear policy objective sharpens what data is needed, how it should be used, and why it matters.
2) **Build on what's already available.** Before investing in new tools, repurpose existing datasets. Traffic counts, access rules, and prior project outputs are often underused resources.
3) **Combine sources creatively.** Merge local administrative data with national registries or open data to enrich your understanding of logistics activity and actors.
4) **Grow capacity incrementally.** Begin with what your team can handle: spreadsheets or basic dashboards. Add tools, platforms, and partnerships as capacity and needs evolve.
5) **Use tools strategically.** Advanced systems like ANPR or GPS tracking offer real value—but only when they align with your goals, capacity, and data governance.
6) **Invest in internal collaboration.** Connect logistics teams with colleagues in mobility, planning, IT, and economic affairs to break silos and make better use of cross-domain data.
7) **Share your own data.** Cities hold valuable information—like curb regulations or access rules—that logistics companies can use to operate more efficiently and compliantly.
8) **Collaborate to scale impact.** Work with national agencies, other cities, or knowledge partners to access missing data, align strategies, and avoid duplication of effort.
9) **Clarify governance early.** Legal, technical, and organizational roles must be clear—especially when handling personal or commercial data. GDPR compliance is necessary but manageable.
10) **Tailor the strategy to your city.** This document is a guide, not a blueprint. Adapt its steps and insights to your city's starting point, challenges, and ambitions.

6 Appendix

Exploring and exploiting data: obtaining insights from data combination.
While each of the data sources listed below in tables 1 and 2 can provide valuable insights on its own, they should not be treated as isolated or fixed. Cities increasingly recognize that combining multiple sources of data can yield new and more actionable insights into urban logistics dynamics, as shown in table 3. For example, Mechelen collaborated with a research institution to combine on-board vehicle data with ANPR camera feeds, enabling them to quantify freight vehicle activity, detect peak congestion hours, and segment vehicle behavior within a restricted-access zone by type and time of day. Similarly, Le Havre merged statistical repositories, field observations, and freight modeling tools (Freturb) to map logistics activity at the metropolitan scale and segment trips by sector, revealing that service and craft-related transport made up the largest share of movements. These examples show how data integration enables cities to move beyond descriptive statistics, supporting evidence-based decision-making, targeted interventions, and more nuanced policymaking. Cities looking to better understand and manage urban logistics should view their data ecosystems as adaptable frameworks—ones that evolve through cross-referencing, contextualization, and collaboration.

Table 1: Data sources

Category	Data Source	Description
Administrative records	Permits Access restrictions Exemptions Zoning regulations Stakeholders contact list Company registration	Administrative records are readily available static datasets that can help cities to understand where and when logistics activities take place. These data sources do not require external collaboration nor advanced data skills to be understood. Companies can make use of this data to improve their operations in the city.
Geospatial data	Loading/Unloading zones Parking spaces Charging stations Traffic layout	Geospatial data is a compound of readily available static datasets that help cities in understanding the spatial use of logistics operators. These data sources do not require external collaboration nor advanced data skills to be understood. Companies can make use of this data to improve their operations in the city.
Logistics activity data	Logistic service providers registers and surveys	Cities such as Le Havre or Leuven access LSPs surveys and registers are used to identify the actors of the local logistics ecosystem and their behaviours. These data sources are often gathered by external organizations, such as national-based statistics bureaus. This data can be made actionable with basic data skills.
Previous projects	Previous projects' outputs and learnings	Cities can benefit from collaborative research projects or logistics pilots in which, alongside external partners, different logistics data is gathered. For instance, Le Havre collaboration with bpost or Leuven's participation in GREENLOG assessing last-mile delivery solutions. These projects serve to complement the city's data skills with those of the project partners and create a safe-environment for testing ideas and solutions.
ANPR cameras	ANPR cameras	ANPR cameras gather dynamic data about vehicle flows and access to certain areas of the city. This data source requires advance IT equipment and data skills. It can also raise GDPR concerns. In exchange, it provides real-time data with high data-combination potential.
Modelling tools	Models developed with knowledge/external partners	Traffic models make use of data inputs to simulate logistics flows in the city. This model can be used to estimate the impact of policy actions in a safe environment. The use of modelling tools requires advanced data assets and skills. These models are usually developed alongside specialized external collaborators. This is the case of Rotterdam´s TFS model developed alongside Significance

Table 2: Use Matrix: Urban Logistics Data Sources and Their Policy Relevance

Potential data use / Data/resource	Road Safety	Pollution assessment & emissions modelling	Congestion analysis & mitigation	Public space & livability	Access control (e.g., UVAR, ZEZ enforcement)	Logistics flow coordination & planning	Urban space allocation & curbside planning
Overview of EV charging infrastructure, commissioned by various providers							X
Overview of traffic lights			X				X
Air quality measurements		X					
Pedestrian traffic counts			X				
Traffic counts for cyclists			X		X		X
Floating car data	X	X	X		X	X	X
Traffic counts	X	X	X		X	X	X
Traffic counts with sensors	X	X	X		X	X	X
Traffic Model	X	X	X			X	X
Input data freight generation model		X	X		X	X	X
Freight generation model		X	X		X		X
Data on traffic accidents	X						
Data of vehicles registered	X	X	X	X	X		X
National survey on logistics			X		X		
Ride-along reports				X		X	X
ANPR Cameras						X	X
Parking occupancy data		X		X			X
Parking sensor data			X			X	X
Economic/commercial transactions data						X	
Underlaying business data						X	

Table 3: Hypothetical Examples of Data Source Combinations and Their Strategic Use.

Policy Objective	Example of Data Source Combinations	Potential Insight / Use
Tailor access regulations (e.g., ZEZ/UVAR)	ANPR camera data + Vehicle registration database + Company registry (sector info)	Cities can identify which logistics operators (by vehicle type and sector) access restricted zones and when.
Target emission reductions by sector	Vehicle fleet registry + National logistics surveys + Business license or permit data	Cities can estimate which logistics sectors generate the most urban km or emissions and prioritize action.
Planning curbside space more efficiently	Parking sensor data + Traffic counts + Ride-along reports (delivery behavior)	Combining curbside use patterns with driver-reported needs can guide street design and time window policies.
Understanding delivery frequency and trips	Floating car data + Freight generation model input + Transaction data (commercial density by sector)	Cities can estimate typical delivery patterns per district and sector, supporting consolidation strategies.
Evaluating potential of (micro)hubs	GIS data + Freight model + Company delivery profiles (from surveys or interviews)	Cities can simulate logistics flows with and without hubs to assess traffic, emissions, and viability impacts.
Forecast future congestion pressure from logistics	Traffic model + Logistics activity inputs + Urban growth / construction plans	Urban planners can estimate where freight and service traffic will increase and plan mitigation in advance.
Monitor real-world impact of new logistics policies	ANPR data + Sensor-based traffic counts + Survey feedback from logistics companies	Cities can track vehicle flow changes, detect policy compliance, and evaluate business adaptation.