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D7.7 Policy, market recommendations and standardisation v2

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Acronyms

Acronym	Meaning
AI	Artificial Intelligence
API / APIs	Application Programming Interface(s)
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CINEA	European Climate, Infrastructure and Environment Executive Agency
DPA	Data Processing Agreement
DPO	Data Protection Officer
EU	European Union
FAIR	Findable, Accessible, Interoperable, and Reusable
FTP	File Transfer Protocol
GDPR	General Data Protection Regulation
GeoJSON	Geographic JavaScript Object Notation
GRI	Global Reporting Initiative (global standards for sustainability reporting)
ICT	Information and Communication Technology
IDS	International Data Spaces
IDSA	International Data Spaces Association
IoT	Internet of Things
ISO	International Organization for Standardization
IT	Information Technology
ITS	Intelligent Transport Systems
KER / KERs	Key Exploitable Result(s)
KPI / KPIs	Key Performance Indicator(s)
LEZ / LEZs	Low Emission Zone(s)
LO (e.g. LO-1)	Logistics Operators (prefix of recommendations addressed to logistics operators)
LoRaWAN	Long Range Wide Area Network
MQTT	Message Queuing Telemetry Transport
NB-IoT	Narrowband Internet of Things
PESTEL	Political, Economic, Social, Technological, Environmental, Legal
REST / RESTful	Representational State Transfer

SAS	Servizi Alla Strada (Florence's road services portal)
SECAP	Sustainable Energy and Climate Action Plan
SME / SMEs	Small and Medium-sized Enterprise(s)
SULP / SULPs	Sustainable Urban Logistics Plan(s)
SUMP / SUMPs	Sustainable Urban Mobility Plan(s)
SWOT	Strengths, Weaknesses, Opportunities and Threats
TEN-T	Trans-European Transport Network
UCC	Urban Consolidation Centre
ULaaDS	Urban Logistics as an on-Demand Service (EU project)
UNESCO	United Nations Educational, Scientific and Cultural Organization
UVAR / UVARs	Urban Vehicle Access Regulation(s)
WFS	Web Feature Service
WP	Work Package
ZEZ	Zero-Emission Zone
ZTL	Zona a Traffico Limitato (Limited Traffic Zone)

List of Key Exploitable Results

Acronym	Meaning
KER1	Data standardisation IDS connectors and microservices for ICT mobility platforms
KER2	SUMPs and SULPs guidance tool
KER3	Guidebook for freight-efficient land use strategy
KER4	UCC location and integrated planning KIT
KER5	On-street loading zones planning tool
KER6	Active UVARs and city regulations tools
KER7	Knowledge powerhouse for urban logistics
KER8	Dynamic curb side management tool IT
KER9	Dynamic management tool of pick-up/drop-off points
KER10	Pop-Up delivery points management tool
KER11	Logistics operator monitoring system and incentives tool
KER12	Congestion forecasting and safe route planning tool
KER13	Advanced Management IT Cockpit of Shared Facilities

Executive Summary

The UNCHAIN project has developed a standardised, interoperable data-exchange ecosystem and thirteen Key Exploitable Results ("KERs") to make urban freight logistics more sustainable, efficient and collaborative. Between mid-2025 and early 2026, these services were deployed and tested under real-life conditions in three Living Labs (Berlin, Florence, Madrid) and four Follower Cities (Mechelen, Prague, Riga, Funchal), engaging city administrators, logistics operators and technology providers.

Deliverable D6.3 documents the first phase of this large-scale demonstration. While it confirms the clear added value of the UNCHAIN services for public-private cooperation in urban logistics, it also surfaces a consistent set of structural obstacles that slowed deployment across almost every pilot site: lengthy or unpredictable municipal approval processes, data-protection and GDPR-related delays, hardware production and connectivity bottlenecks (notably NB-IoT and LoRaWAN coverage gaps), friction between new digital tools and legacy municipal IT systems, and the difficulty of securing sustained engagement and data-sharing from private logistics operators without adequate incentives.

This report translates those findings into targeted, actionable policy recommendations for three audiences that jointly determine whether solutions like UNCHAIN's can move from pilot to permanent practice:

- Local authorities, who control permitting, data governance, procurement and on-the-ground implementation;
- Logistics providers, whose operational participation, data-sharing and behavioural adaptation ultimately determine real-world impact.
- EU Services (the European Commission, CINEA and the Horizon Europe programme architecture), who shape funding rules, timelines and cross-city knowledge transfer.

Across the three audiences, four themes occur: (1) regulatory and administrative processes need to be simplified and made predictable, ideally through pre-agreed "sandbox" exemptions; (2) data protection compliance should be designed in from project inception through standard templates and data-minimisation defaults, not negotiated pilot-by-pilot; (3) technical deployment (hardware, connectivity, integration with legacy systems) needs realistic timelines, shared infrastructure assessments and fallback options; and (4) sustainable participation by private operators requires structured incentives and reciprocal value, not one-off data requests. The recommendations that follow are organised by audience, cross-referenced with the specific evidence from the demonstration, and closed with a consolidated implementation roadmap.

1 Introduction and context

This is the second and final version (v2) of the deliverable for Task T7.4 on Policy and Market Recommendations, delivered in October 2026 (M42). It builds on the preliminary framework established in version 1 (D7.3 v1), which set out the methodology, the policy and standardisation landscape and a first set of provisional market recommendations.

Version 2 focuses on policy recommendations grounded in the results achieved and the evidence matured in the project living labs. The pilots carried out by the participating cities and operators provide first-hand experience of what it takes to prepare, run and scale urban logistics solutions in real conditions, including the structural and practical barriers encountered along the way. This evidence, together with the feedback gathered from stakeholders, has been used to test, refine and consolidate the provisional recommendations of v1 into a final set of proposals.

The recommendations are addressed to three audiences: local authorities, logistics operators and EU services. They are meant to be practical, with concrete suggestions that each audience can take up within its own competences, resources and planning cycles. They are organised in an indicative sequence over short, medium and longer-term horizons, and are complemented by a set of cross-cutting recommendations on structured multi-stakeholder exchange, aggregated procurement, a common data-sharing and incentive framework, the value case for market uptake, gender and the social dimension, and neutral data governance.

The report takes stock of the structure and methodology of v1 and updates the analysis of the policy ecosystem surrounding urban freight and logistics, including guidance on Sustainable Urban Logistics Plans (SULPs) and Sustainable Urban Mobility Plans (SUMPs). It draws on the SUMP and SULP review and implementation work (D8.5), the updated market analysis and monitoring (D7.2) and the assessment of the UNCHAIN Key Exploitable Results (KERs) in light of existing standardisation frameworks and activities.

By translating project evidence into actionable guidance, the report aims to support policymakers, city planners, logistics operators and other stakeholders in adopting and scaling innovative urban logistics solutions beyond the lifetime of the project.

1.1 About UNCHAIN

UNCHAIN aims to leverage digitalisation to enhance urban logistics and strengthen collaboration between public authorities and logistics stakeholders. The project is developing a standardised, IDSA-compliant data-exchange ecosystem (KER1) alongside twelve urban

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logistics services covering strategic planning (e.g. SUMP/SULP monitoring, urban consolidation centre siting, freight-efficient land use), regulatory management (Urban Vehicle Access Regulations and permitting), and operational space management (curb-side management, loading/unloading bay booking, shared-facility management, safety-aware routing, and operator incentive schemes).

WP 6 is responsible for deploying, testing and evaluating these services under real-life conditions across three Living Labs — Berlin, Florence and Madrid — and four Follower Cities — Mechelen, Prague, Riga and Funchal. Deliverable D6.3 ("Large-scale demonstration in the Living Labs", v1.0, April 2026) reports on the first phase of this demonstration: the refined implementation plans developed with each city, the initial friendly-user testing and service refinement, the deployment activities and early results, and a cross-pilot synthesis of experiences and lessons learned.

1.2 Purpose of this Report

This report is a policy-oriented companion to D6.3. Its purpose is not to restate the technical description of each service, but to distil the operational lessons learned during deployment into concrete recommendations for the actors who can act on them: EU-level programme and policy bodies, the local authorities hosting and scaling these solutions, and the logistics operators expected to adopt and sustain them.

Each recommendation is grounded in a specific piece of evidence from the demonstration — a named challenge, city or service — so that it can be traced back to the underlying experience rather than treated as generic advice.

1.3 Basis for the Recommendations

The recommendations draw on three categories of evidence documented in D6.3:

- Cross-cutting challenges identified in the project's synthesis of experiences across all seven pilot cities (Section 6 of D6.3), including approval-process unpredictability, hardware and data-protection delays, and the difficulty of incentivising external-company participation.
- City- and service-specific implementation evidence, including regulatory exemptions secured in Madrid, cultural-heritage permitting constraints in Florence and Prague, data-processing-agreement delays in Mechelen, connectivity failures in Funchal and Prague, and legacy-system integration in Mechelen.
- Ethics- and data-related issues reported project-wide, including GDPR-driven redesign of demonstration plans and the consistent commitment across partners to GDPR

compliance even where it constrained functionality (e.g. license-plate recognition limited to a single pilot site).

2 Key Findings from the Large-Scale Demonstration

Before turning to recommendations, this section summarises the cross-cutting evidence base. D6.3 is explicit that, notwithstanding delays, "*the interaction with cities and the implementation of demonstrations have already made the added value of the developed services clearly visible*" — the challenges below are implementation friction, not a verdict on the underlying solutions.

2.1 Regulatory and administrative friction

Nearly every pilot site experienced delays tied to municipal approval processes rather than to the technology itself. In Florence, installing camera-based equipment (KER13) in a UNESCO-protected historical setting required additional administrative steps and adjusted the demonstration timeline. In Prague, cultural-heritage protection considerations led the city to mount KER8 sensors on existing poles rather than anchor new devices to the ground, in contrast to Florence and Madrid. In Berlin, the requirement to avoid grid-connection permitting delays for the KER8 device shaped its technical design toward a standalone, battery-powered solution. More generally, D6.3's synthesis identifies "finding suitable companies or city departments … negotiating the terms of the demonstration process and approving them as eligible partners" and "*the unpredictability of approval processes*" as recurring, first-order obstacles.

Conversely, Madrid demonstrated that regulatory friction can be substantially reduced through deliberate process design: combining KER8 and KER13 into a single executive macro-project allowed for one municipal board approval instead of two, and an ordinance provision enabling regulatory exemptions for testing innovative projects was identified as a key enabler for on-street deployment.

2.2 Data protection and GDPR compliance

Data protection considerations materially shaped what could be demonstrated and how. D6.3 states plainly that "*multiple cities experienced delays related to discussing data processing agreements to protect personal data and some demonstration plans were thus altered to adhere to local regulations and guidelines*." In Mechelen, finalising the data-processing agreement for KER13 remained an open issue as of April 2026, due to strict internal procedures governing any personal-data capture, however brief. In Madrid, GDPR considerations meant that a department managing the city's Smart Urban Logistics app was not permitted to share vehicle license-plate data with the project, constraining KER13's ability to cross-check against authorised-vehicle lists. In Florence, KER13 was deliberately limited to a "*whitelist*" approach without plate analysis, and physical signage was installed near monitored parking spaces to inform the public about the EU-funded camera system and their GDPR rights.

2.3 Hardware production and connectivity constraints

Physical-device services (KER8, KER9, KER13) encountered the most significant technical delays. KER8 hardware production was delayed relative to the project's original plan, first due to the consultation process to finalise device design with participating cities, and subsequently due to component procurement time. Connectivity design also had to be adapted mid-project: Madrid and Florence lacked the LoRaWAN infrastructure originally planned, requiring development of an alternative gateway-based communication solution, while Prague used LoRaWAN as originally intended. Most acutely, KER9 sensor deployment in Funchal and Prague was undermined by unreliable or unavailable NB-IoT network coverage; in Funchal, despite firmware updates, recalibration and carrier troubleshooting, sensors were ultimately unable to transmit data, requiring a mitigation plan based on an existing local NB-IoT deployment combined with simulated data.

2.4 Interoperability with legacy municipal systems

Several cities already operate their own permit, parking or logistics-management systems, and integration — not replacement — proved to be the practical path. In Mechelen, new permits for length and heavy-traffic restrictions were integrated into the city's existing Spotbooking system so the two could be compared directly during the demonstration.

In Florence, the KER6.2 mobile front-end connects to the city's existing SAS (Servizi Alla Strada) portal for permit issuance and payment. Where such integration was not designed for from the outset, D6.3 notes interoperability with existing municipal systems as a standing challenge to decision-tool adoption (e.g. for KER9).

2.5 Incentivising private-sector participation

Several services depend on active cooperation from logistics operators — providing real operational data, completing evaluation questionnaires, or changing delivery behaviour. D6.3's synthesis is explicit that this participation "*requires additional effort on their side*" and that "*offering appropriate incentives can significantly improve participation, data availability, and the overall quality of the evaluation*." This was evident where external operators (e.g. DHL in Madrid, the Latvian national postal operator in Riga) were engaged directly in pilot design, and in the reward-based incentive mechanism piloted in Florence (KER11.1) to encourage sustainable operator behaviour.

2.6 Evidence relevant to SULP integration, standardisation and market uptake

D7.3 v1 reviewed how the KERs relate to standards and to the SULP process. Read alongside the demonstration evidence, three points matter for policy. First, standardisation is already

happening in practice: KER1 rests on an IDSA-certified connector using the IDS Information Model and Messaging Service; KER4 harmonises Berlin, Florence and Madrid datasets (WFS, GeoJSON, shapefiles) into a common H3 hexagonal grid; KER8 and KER10 exchange data via MQTT; KER6, KER9 and KER11 use RESTful APIs; and KER12 builds its routing on OpenStreetMap and GeoJSON. Formal certification or alignment with standardisation bodies has, however, mostly not been pursued (KER5, KER12), and v1 identifies the KER12 routing profiles, which reflect safety and access restrictions such as UVARs, as the clearest candidate for harmonisation across cities.

Second, the SULP table of contents co-developed with the cities in v1 asks each measure to document pilot results, lessons learnt, responsible body, stakeholders, monitoring method and funding. The demonstration is the natural source of those inputs, but only if results are captured in a form that cities can reuse. Third, the v1 market analysis concluded that uptake depends on political alignment with local and national objectives, quantified benefits, accessible commercial terms and user training, and on strong bridges between public and private actors; the participation barrier for operators documented in Section 2.5 confirms this.

2.7 Market conditions: what enables and what limits uptake

D7.2 judges the market for integrated urban-logistics tools promising, driven by supportive policy and growing demand. Climate and air-quality objectives, low-emission and zero-emission regimes and SUMP/SULP requirements create direct demand, and the TEN-T Regulation requires urban nodes to adopt SUMPs by 2027. Its central conclusion, however, is that uptake hinges on factors that are largely policy- and governance-dependent rather than technological. Six findings matter most.

Data sharing, not technology, is the bottleneck: in all three living-lab countries data availability and privacy are rated mixed with high intensity, because open data exists but logistics companies hesitate to disclose operational data, and the SWOTs repeatedly cite data quality, missing standard formats and security concerns. Enforcement decides whether regulation-based tools work: permit and curb-side tools (KER6, 8, 9) are only as effective as enforcement, which D7.2 flags as insufficient in Prague, Riga and Funchal. Governance is fragmented where competences are decentralised (Spain, Italy, Germany, Belgium), producing uncoordinated rules. City budgets and skills are limited, and high upfront investment is a recognised threat for the planning and management toolset, although funding is a strong enabler where available.

On the demand side, the operator base is small-scale: about 85% of European short-distance truck firms have fewer than five employees and white vans account for roughly 25 to 30% of urban deliveries, so tools must suit micro and small enterprises, which need a visible short-term benefit before sharing data or changing routines. Finally, integrated freight tools fill a market gap: commercial urban-mobility suites are proprietary and scarcely interoperable, with freight handled as an add-on, and no off-the-shelf solution exists for dynamic

consolidation-centre location, shared-facility management or urban-logistics data-space connectors. Tables 3 and 4 summarise the national and product-level picture.

Country (city)	Supports adoption	Hinders adoption or is mixed
Spain (Madrid)	Strong energy and climate policy and funding; LEZ duty for cities above 50,000 inhabitants (Law 7/2021)	No national SUMP/SULP framework beyond a few regional laws; most LEZs still not enforced although due in 2023; operators reluctant to share data
Italy (Florence)	SUMP mandatory above 100,000 inhabitants; over 300 cities with a ZTL; Freight Quality Partnerships forming (Florence, Bologna, Rome)	Tight municipal finances, slow permits, heritage rules; no central body to manage and standardise mobility data
Germany (Berlin)	Long-term climate commitment; largest EU logistics market (about 20%); strong digital landscape and open-data portals	Strict privacy rules (cameras contested); uneven enforcement across municipalities; public–private data sharing still hard
Belgium (Mechelen)	Flemish ZEZ framework for urban logistics (2024); regional Green Deals; high SME digital intensity	Federal structure with inconsistent rules; no uniform city-access regulation and no central database of loading zones
Czechia, Portugal, Latvia (Prague, Funchal, Riga)	National SUMP guidelines; Prague SUMP and parking strategy; Funchal plans aligned with UNCHAIN	Weak commitment of decision makers to freight; only one LEZ in Portugal and none in Latvia; Riga has no SUMP or SULP; no legal duty to prepare SULPs in Portugal; enforcement gaps

Table 3 – National context in the living-lab and follower-city countries (D7.2)

Product (KERs)	Market position	Main barriers
P1 Knowledge hub (KER7)	No tool strictly on urban logistics; neighbours are SUMP-oriented	Value depends on stakeholder contributions; content upkeep
P2 Policymaking toolkit (KER2, 3, 6.3, 11.2)	Impact assessment and monitoring usually separate; integrated view is the gap	Needs city data and expertise; staff and funding; no standard data formats
P3 Planning and management (KER4, 5, 6, 8, 9, 10, 11.1)	Competes with proprietary mobility suites; no off-the-shelf tool for consolidation-centre siting	High upfront cost; many data inputs; integration with city systems; weak enforcement; sensors in heritage areas
P4 AI and big-data services (KER12, 13)	Niche routing and fleet tools; no shared-facility solution	Depends on data quality; operators may resist routing apps or facility sharing
P5 Data-space connectors (KER1)	No commercial off-the-shelf offer	Willingness to share data; a security breach could destroy trust

Table 4 – Market position and main barriers by product (D7.2)

Two further observations come from the pilot-level annex of D7.2. Permit cycles can be too slow for operators who only know their schedule the day before, against annual permits in parts of Florence's traffic-restricted zones; and occupancy sensors can be unreliable for perpendicular bays. Both are consistent with the demonstration evidence in Sections 2.1 to 2.5. D7.2 also finds that replication depends on a clear value proposition for every actor in

each result's value ecosystem, and on a "future state" of that ecosystem after the project (funding, organisational capacity, regulatory support, infrastructure and new actors).

3 Recommendations for EU Services

EU Services (the European Commission's relevant Directorates-General, CINEA as implementing agency, and the Horizon Europe programme architecture more broadly) set the funding rules, timelines and cross-project infrastructure within which local demonstrations like UNCHAIN's operate. They shape what pilots can test, how quickly they can start, what data and evaluation requirements they must meet, and whether their results can be carried forward once a project ends.

The recommendations below therefore target the structural conditions that lie outside the control of any single city or project, and where experience from the UNCHAIN pilots points to recurring barriers. They are framed as options for consideration, to be taken up within the existing competences and procedures of the EU institutions and funding bodies.

EU-1 Fund and codify regulatory sandboxes for urban logistics pilots

Recommendation: Support the development of a standard EU-level "regulatory sandbox" clause or model ordinance that co-funded cities can adopt to grant time-boxed exemptions for testing innovative urban logistics measures, and require Horizon Europe proposals in this domain to identify at proposal stage which local regulatory exemptions will be needed.

Evidence base: Madrid's ordinance provision allowing regulatory exemptions for testing innovative projects was identified in D6.3 as a key enabler of on-street KER8 deployment, while other cities without an equivalent mechanism experienced longer, less predictable approval processes.

Suggested action: EU services should work draft a model sandbox ordinance and make its adoption an eligibility or scoring criterion for future urban-logistics demonstration calls.

EU-2 Issue a standard GDPR/data-protection compliance toolkit for co-funded urban mobility pilots

Recommendation: Develop and require use of standardised data-processing-agreement templates, data-minimisation patterns (e.g. plate-check "whitelisting" instead of full recognition), and model public-notice signage for EU-funded projects deploying sensors, cameras or other personal-data-adjacent technology in public space.

Evidence base: *GDPR-related delays affected data-processing-agreement finalisation in Mechelen, constrained data-sharing between municipal departments in Madrid, and led Florence to adopt a whitelist rather than full plate-recognition approach; all reflect pilot-by-pilot negotiation of the same underlying compliance questions.*

Suggested action: A reusable GDPR compliance toolkit (data-minimisation design patterns, public-notice templates) as a shared resource across all urban mobility and logistics Horizon Europe portfolios, reducing duplicated legal effort in every city.

EU-4 Mandate and fund permanent, interoperable data-space infrastructure beyond the project lifetime

Recommendation: Condition urban logistics digitalisation funding on IDSA-compliant (or equivalent open-standard) data-exchange participation, following the KER1 model, and commit to funding the operational continuation of such data spaces after individual project grants end.

Evidence base: *KER1 is described in D6.3 as a horizontal service that broke down data silos and created a "win-win scenario where all partners benefit from shared insights," with user feedback reported as positive; its value is structural rather than project-specific.*

Suggested action: Future urban mobility and logistics calls should require applicants to connect to (or contribute to) an existing IDSA-compliant data space rather than build bespoke, project-limited data exchanges.

EU-6 Provide EU-level guidance and funding for private-operator incentive mechanisms

Recommendation: Publish guidance — and consider co-funding — for reward-based or reciprocal incentive schemes that compensate logistics operators for the additional effort of sharing operational data and completing evaluation activities in publicly funded pilots.

Evidence base: *D6.3's synthesis states directly that operator data and evaluation participation "requires additional effort on their side" and that "offering appropriate incentives can significantly improve participation, data availability, and the overall quality of the evaluation," a pattern echoed in the KER11.1 gamified incentive pilot in Florence.*

Suggested action: EU Services might identify incentive-scheme design (e.g. reward credits, preferential access, streamlined permitting) as an eligible cost item in future calls targeting logistics-operator participation.

EU-7 Anchor pilot-validated interfaces and data conventions in formal standardisation

Recommendation: Use EU research and innovation programmes to bring interfaces proven in pilots to CEN/CENELEC and ISO work: IDSA-based data-space connectors, open geospatial formats and common indicator grids, MQTT and REST interfaces for curb-side devices, and city-specific routing profiles for safety and access restrictions. Projects should state a standardisation pathway for each exploitable result.

Evidence base: *D7.3 v1 found that KER1 uses an IDSA-certified connector and KER4 a harmonised H3 grid built on open formats, while the KER12 routing profiles were identified as having standardisation potential but without any formal alignment with standardisation bodies so far. Other KERs, such as KER5, have not pursued formal certification at this stage.*

Suggested action: The Commission and CINEA should fund standardisation follow-up as an explicit task in urban mobility projects (liaison with CEN/CENELEC committees and contributions to ISO work on digital governance and data sharing for sustainable urban

mobility, such as ISO/DIS 16483 and 23098-1 cited in v1), and encourage consortia to reuse IDSA-certified components rather than build bespoke ones.

EU-8 Position the SULP as the integration vehicle for urban freight, aligned with SUMPs and TEN-T

Recommendation: Update EU SULP/SUMP guidance and programme requirements so that urban nodes preparing SUMPs under the TEN-T Regulation treat urban logistics through a linked SULP (or dedicated freight chapter), with pilot results from EU-funded demonstrations feeding its measures, KPIs and monitoring cycle.

Evidence base: *D7.3 v1 notes that TEN-T requires each urban node to adopt and monitor a SUMP covering its Functional Urban Area, that Madrid flagged the effort of involving several municipalities, and that Florence, Funchal, Prague and Riga asked for the SULP to be bridged with the SUMP and other planning tools at several levels. D7.2 adds that the 2027 TEN-T deadline raises demand for planning support, while Portugal has no legal duty for cities to pursue a SULP and Riga has neither a SUMP nor a SULP.*

Suggested action: EU Services should (i) add to its guidance a short "measures from pilots" template (results, lessons learnt, monitoring) based on the structure agreed with the UNCHAIN cities, (ii) clarify the expected geographic scope for freight, between the Functional Urban Area and the area where logistics impacts concentrate, and (iii) consider support for coordination at Functional Urban Area level.

EU-9 Fund capacity, not only software: staff, skills and procurement support for cities and micro-operators

Recommendation: Complement technology funding with dedicated support for municipal staff, skills and procurement capacity, and with low-threshold access for micro and small operators, and support the transposition and harmonisation of UVAR and loading-zone data across Member States.

Evidence base: *D7.2 identifies limited municipal budgets and skills (Spain, Italy, parts of Germany) and high upfront investment as threats to the planning and management tools, notes that no central body manages or standardises mobility data in Italy and that Belgium has no central database of loading zones, and stresses that about 85% of short-distance truck firms have fewer than five employees.*

Suggested action: The Commission and CINEA should make capacity building (training, secondments, shared expert pools, procurement guidance) an eligible and visible budget line in urban-logistics calls, back common data standards and data spaces such as the Mobility Data Space under programmes like Digital Europe, and fund simple entry routes for small operators, for example through operator associations.

4 Recommendations for Local Authorities

Local authorities are the actors closest to implementation. They control permitting, own or commission the public space and infrastructure involved, negotiate data-protection terms, and ultimately decide whether a piloted solution is adopted permanently. They are also the first to see how a pilot interacts with everyday realities such as heritage constraints, connectivity gaps, existing IT systems, enforcement capacity and the expectations of residents, businesses and logistics operators. Their choices at the design stage therefore largely determine whether a pilot can start on time, run smoothly and generate results that can be scaled or transferred.

The recommendations below are designed to be actionable at municipal level, independent of EU programme timing. They concern, in particular, the early involvement of data protection officers and other internal services, the integration of pilots with existing systems and approval procedures, the use of local sandbox provisions where the legal framework allows, the embedding of validated solutions in the SULP with clear KPIs, and the alignment of enforcement, procurement and open data practices with new measures. They are framed as options for consideration, to be adapted to each city's size, competences, resources and political context, and can be taken up step by step rather than all at once.

LA-1 Consolidate related technology deployments into a single internal approval track

Recommendation: Where multiple related digital tools or devices are being deployed together (e.g. a sensor plus a monitoring camera at the same site), route them through a single combined internal approval process rather than parallel, separately timed approvals.

Evidence base: *Madrid incorporated the technical implementation of KER8 and KER13 into a single executive macro-project, enabling one approval process by the Municipal Board instead of two separate ones, streamlining administrative procedures.*

Suggested action: Municipal digital/mobility departments should establish an internal protocol for bundling technically-related pilot approvals and identify, in advance, which board or committee has authority to approve combined multi-technology deployments.

LA-2 Pre-negotiate data-processing agreement templates with the Data Protection Officer before pilot launch

Recommendation: Engage the municipal Data Protection Officer at the design stage of any pilot involving sensors, cameras or personal data, using a standard data-processing-agreement template (ideally the EU-level toolkit recommended in EU-2) rather than negotiating terms after device selection.

Evidence base: *In Mechelen, finalising the data-processing agreement for KER13 remained unresolved as of April 2026 because of strict internal procedures for personal-data capture, even though captured images were deleted after processing; this delayed the pilot independent of the technology's readiness.*

Suggested action: Local authorities should require a completed data-protection impact assessment and draft DPA as a precondition for scheduling any device installation date, not a parallel or subsequent step.

LA-3 Map cultural-heritage and public-space constraints before finalising device design

Recommendation: For any deployment in heritage-protected or visually sensitive areas, engage the relevant heritage/conservation authority at the concept stage to agree an installation method (e.g. ground-anchored vs. pole-mounted) before manufacturing or procurement is finalised.

Evidence base: *Florence evaluated ground-anchoring for KER8 against cultural-heritage regulations in a UNESCO-protected setting before selecting it, while Prague — also prioritising heritage protection — instead mounted devices on existing poles; both approaches worked, but only because heritage constraints were identified early rather than retrofitted.*

Suggested action: Municipalities should add a mandatory heritage/urban-design consultation step to their internal digital-infrastructure deployment checklist, sequenced before hardware finalisation.

LA-4 Verify local IoT connectivity coverage before committing to sensor-based designs

Recommendation: Commission an NB-IoT/LoRaWAN (or applicable network) coverage assessment for the specific deployment site before selecting a connectivity technology, and identify a fallback approach (alternative carrier, alternative protocol, or simulated data collection) in advance.

Evidence base: *Funchal's KER9 pilot could not achieve reliable NB-IoT connectivity for its sensors despite extensive troubleshooting including firmware updates and carrier coordination, ultimately requiring a mitigation plan based on an existing local sensor network and simulated data; Madrid and Florence similarly lacked the LoRaWAN infrastructure originally planned for KER8 and required a gateway-based workaround.*

Suggested action: Local authorities should require a documented connectivity feasibility check, ideally in cooperation with local telecom/ITS providers already operating IoT infrastructure in the area, before committing capital to a specific sensor technology.

LA-5 Design new digital tools to integrate with, not replace, existing municipal systems

Recommendation: Where a municipality already operates a permit, parking or logistics-management system, prioritise integration (shared data feeds, parallel operation for comparison) over wholesale replacement during the pilot phase.

Evidence base: *Mechelen integrated new UNCHAIN permits for length and weight restrictions into its existing Spotbooking system, allowing a direct operational comparison; Florence's KER6.2 connects to the city's existing SAS portal for permit issuance and payment rather than duplicating that function.*

Suggested action: IT and mobility departments should map existing systems and required integration points as a first step in any digital-tool pilot scoping exercise, and budget integration effort explicitly rather than treating it as incidental.

LA-6 Adopt local regulatory sandbox provisions for innovative logistics measures

Recommendation: Introduce a municipal ordinance provision, mirroring Madrid's approach, that allows defined, time-limited regulatory exemptions for testing innovative urban logistics measures in public space.

Evidence base: *This ordinance-based exemption was explicitly identified in D6.3 as "one of the key enablers" for testing KER8/KER10 on-street in Madrid.*

Suggested action: Legal and mobility departments should jointly draft a standing sandbox ordinance ahead of, rather than in reaction to, a specific pilot request, so future projects are not delayed while such a provision is drafted from scratch.

LA-7 Build public transparency measures into any monitoring deployment

Recommendation: Install clear, accessible signage or public communication wherever cameras or monitoring sensors are deployed in public space, explaining the purpose, EU funding source, and citizens' data-protection rights.

Evidence base: *Madrid installed an informative panel near monitored parking spaces for KER13 to inform users about the presence of the camera, the EU project, and how to exercise their GDPR rights — addressing public acceptance alongside legal compliance.*

Suggested action: Municipalities should adopt a standard public-notice template (see EU-2) as a default requirement for any camera- or sensor-based public-space deployment, regardless of project.

LA-8 Co-design operator incentive schemes with logistics operators from the outset

Recommendation: Involve logistics operators directly in designing reward or incentive mechanisms tied to compliance and sustainable behaviour, rather than presenting a finished scheme for adoption.

Evidence base: *In Florence, the KER11.1 reward strategy for the pilot phase was defined in coordination with local partners; D6.3 also notes that user acceptance among drivers is an important factor requiring well-designed incentive schemes.*

Suggested action: Mobility departments should convene logistics operators (including major carriers active locally) during incentive-scheme design, not only during roll-out, and pilot reward structures at small scale before city-wide launch.

LA-9 Carry validated services into the SULP as measures with monitored KPIs

Recommendation: Once a pilot is validated, write it into the SULP (or the SUMP freight chapter) as a measure with a responsible body, timescale, stakeholders, expected impact, lessons learnt and monitoring method, and define KPIs that are essential, clear and reusable across the SUMP, SECAP or other city plans.

Evidence base: *D7.3 v1 reports that cities asked for measures to include pilot lessons learnt, for KPIs aligned with other plans (Florence) and grouped by the Key Performance Areas of UNCHAIN D2.3 (Funchal), for action indicators assessed every one to five years and strategic indicators every two to three years, and for a short-term implementation horizon of three to five years (Berlin, Riga).*

Suggested action: Mobility departments should schedule SULP drafting so that pilot evaluation results are available as input, use the v1 table of contents as a checklist (scope, legal framework, working group, baseline, scenarios, measures, monitoring, funding), and attach a funding line to each pilot-derived measure so that there is no gap between the end of the pilot and permanent operation.

LA-10 Use the SULP process as the platform for Freight Quality partnerships and stakeholder dialogue

Recommendation: Build Freight Quality Partnership scoping, a standing stakeholder forum and a short data roadmap into the SULP process, and ask urban freight partnership proposals to show their contribution to SULP KPIs such as emissions reduction, curbside efficiency and noise reduction.

Evidence base: *D7.3 v1 recommends using the SUMP/SULP as the platform for urban freight partnerships, creating a SULP data roadmap and piloting a neutral data node, and institutionalising dialogue. Mechelen's logistics working group has met twice a year since 2020 and its covenant is endorsed by 37 parties; Florence's participatory SUMP/SULP process fed its UNCHAIN measures; Funchal and Prague asked that the SULP taskforce include operators and local traders.*

Suggested action: Cities should formalise the forum before their pilots end so that operators engaged in demonstrations stay involved in plan implementation, include worker representatives, and define priority datasets, anonymisation rules, governance and access tiers in the data roadmap.

LA-11 Pair access regulations with credible enforcement and digital permitting

Recommendation: Treat enforcement capacity as part of the design of any access regulation (LEZ, ZTL, ZEZ, time windows, loading zones) and align digital permit cycles with the way operators plan, so that tools such as KER6, KER8 and KER9 are not undermined by weak enforcement or slow processes.

Evidence base: *D7.2 flags insufficient enforcement in Prague, Riga and Funchal, notes that Spanish LEZs due in 2023 are mostly not yet enforced, and observes that regulation which is not strict enough makes the tools hard to apply. Its pilot annex adds that permit cycles can be too slow for operators who only know next-day schedules, with annual permits in parts of Florence.*

Suggested action: Mobility departments should budget enforcement (cameras, staff, back-office) together with each new regulation, offer short-notice or time-limited permit types through the digital tool, and use the data from KER8, KER9 and KER13 to target enforcement where loading-zone misuse is greatest.

LA-12 Harmonise rules across municipalities and publish regulation and loading-zone data in open formats

Recommendation: Coordinate access, loading and delivery rules with neighbouring municipalities and the region, publish regulations and loading-zone data in open, standard formats, and designate a body responsible for mobility data.

Evidence base: *D7.2 reports decentralised competences leading to uncoordinated or inconsistent rules in Spain, Italy, Germany and Belgium, no uniform city-access regulation and no central loading-zone database in Belgium, uneven enforcement across German municipalities, and unclear signage in Belgian cities.*

Suggested action: City networks and regional authorities should agree a minimum common set of attributes for access rules and loading zones, build on the open formats already used in the pilots (see EU-7), and use Freight Quality Partnerships or equivalent forums, as in Florence, Bologna and Rome, to agree data-sharing terms with operators.

5 Recommendations for Logistics Providers

Logistics providers, from large carriers to local delivery fleets, are both users of and data contributors to the digital planning and regulatory tools tested in the pilots. Their engagement determines whether these tools reflect real operational conditions, such as delivery windows, vehicle types, loading practices and the constraints of working across several cities, and whether monitoring and incentive schemes achieve their sustainability goals. Without the participation of operators, even well-designed tools risk being technically sound but of little practical use, or being adopted too narrowly to produce measurable effects.

The recommendations below therefore focus on what logistics providers can do to take part in pilots, share data and feedback, and prepare their operations for new solutions. They concern, in particular, contributing to pilot testing and evaluation, agreeing clear terms for data sharing, checking the compatibility of fleets with connectivity and routing tools, taking part in local SULP forums and professional associations, and gradually embedding routing, booking and reward tools in daily operations and driver training. They are framed as options for consideration, to be adapted to the size, business model and operating context of each company, with particular attention to the capacity of smaller operators and SMEs.

LO-1 Participate in interoperable data-space ecosystems rather than bilateral data-sharing arrangements

Recommendation: Connect to IDSA-compliant (or equivalent) data spaces such as KER1 as a standard practice for sharing operational data with public authorities, rather than negotiating bespoke bilateral arrangements per city or per project.

Evidence base: *KER1 was designed specifically to break down the data silos that hinder public-private interaction, with partner feedback on the approach reported as positive once connectors were operational.*

Suggested action: Operators should build data-space connectivity (secure connectors, defined data-sharing policies) into their standard IT roadmap so that participation in future public-authority digitalisation initiatives does not require one-off technical integration each time.

LO-2 Engage early in permit and UVAR digitalisation pilots to shape usability

Recommendation: Provide structured feedback during the design and testing phases of digital permit and access-regulation tools (KER6), rather than only at post-deployment stage, particularly on practical operational constraints.

Evidence base: *Feedback from logistics operators on KER6.2 identified specific usability gaps — for example, that the check-in process only permits check-in in chronological order of bookings, which may not suit express couriers — that could only be captured through active operational use.*

Suggested action: Fleet and operations managers should nominate frontline drivers and dispatchers to participate directly in municipal digital-permit pilot testing, since operational edge cases are most visible to those actually executing deliveries.

LO-3 Provide real operational data and evaluation input, and negotiate reciprocal value for doing so

Recommendation: Recognise that sharing real operational data and completing evaluation questionnaires for public pilots carries a genuine cost, and proactively negotiate reciprocal benefits (priority access, incentive credits, preferential permitting) rather than treating participation as a one-sided favour.

Evidence base: *D6.3 explicitly identifies the additional effort required from external companies providing real-life data and completing evaluations as a participation barrier, and recommends appropriate incentives to improve data availability and evaluation quality; engagement with DHL in Madrid and the Latvian national postal operator in Riga illustrates the value of sustained direct operator involvement.*

Suggested action: Operators should treat structured participation in public urban-logistics pilots as a negotiable commercial engagement with defined reciprocal terms, not an unpaid compliance exercise.

LO-4 Adopt safety- and efficiency-oriented routing and space-management tools operationally

Recommendation: Integrate tools such as the safety-aware routing service (KER12, CargoConnect) and curb-side/loading-bay booking tools (KER8, KER9) into standard driver workflows, rather than treating them as pilot-only add-ons.

Evidence base: *KER12 combines static and dynamic data to prioritise safety by accounting for accident hotspots and vulnerable road users while offering routing profiles tailored to operational needs; KER9's booking and check-in functionality is designed to give operators real-time visibility of loading/unloading bay availability.*

Suggested action: Operators should incorporate route- and bay-booking tool adoption into driver training and dispatch procedures for pilot areas, and provide structured feedback on how well these tools fit real delivery schedules.

LO-5 Invest in compatible connectivity and telematics infrastructure

Recommendation: Ensure fleet telematics and any operator-side hardware are compatible with the connectivity standards (e.g. NB-IoT, LoRaWAN) being adopted by partner cities, and flag coverage or compatibility gaps early.

Evidence base: *Connectivity mismatches between planned and available infrastructure (e.g. the shift to gateway-based communication in Madrid and Florence, and NB-IoT coverage failures in Funchal) repeatedly disrupted deployment timelines; operator-side readiness is a precondition for these systems to function end-to-end.*

Suggested action: Operators should audit fleet and depot connectivity compatibility with municipal digital-logistics infrastructure as part of onboarding to any pilot, and report gaps to the responsible technology partner promptly.

LO-7 Join the SULP working group and help build the value case

Recommendation: Participate in local SULP working groups and forums, and contribute operational data and cost figures so that the benefits of digital services, such as fewer empty trips, shorter dwell times and lower emissions, can be quantified credibly.

Evidence base: *D7.3 v1 stresses that uptake depends on quantifying cost savings, efficiency gains and reductions in external costs, and recommends flexible pricing, customisation options and user training; it also recommends that SULP taskforces include freight players such as operators and local traders.*

Suggested action: Operators should appoint a representative for each city where they are active, agree in advance which data they can contribute to impact assessments, and ask tool providers for training and flexible service levels.

LO-8 Use collective channels so that micro and small operators can take part

Recommendation: Take part through associations, Freight Quality Partnerships and shared representatives, and ask for entry-level tools with tiered pricing and an early, visible benefit, so that the many micro and small operators are not left out of data sharing and incentive schemes.

Evidence base: *D7.2 shows that the operator base is fragmented (about 85% of short-distance truck firms with fewer than five employees; white vans roughly 25 to 30% of urban deliveries), that the incentive and reward tools (KER11) depend on operators' willingness to share activity data, and that the main incentives named are lower empty mileage, fewer penalties, faster permits and compliance with LEZ, GDPR and heritage rules.*

Suggested action: Operator associations and larger carriers should pool representation in city forums, share templates for data-sharing agreements, and ask providers for lightweight onboarding. Operators should also engage early in the co-design of regulations and permit processes, since tools aligned with the rules from the outset benefit them most.

6 Cross-cutting and joint recommendations

Several of the most effective mitigations documented in D6.3 required coordinated action across more than one stakeholder group. These joint recommendations complement the audience-specific ones above.

6.1 Institutionalise structured multi-stakeholder exchange

The regular WP6-style meetings that allowed cities to share hardware-related solutions and implementation experience should be replicated as a standing mechanism — jointly convened by EU programme bodies and city networks, with logistics operators included — beyond the lifetime of any single funded project. Such a mechanism would keep practical knowledge available once individual projects close, give newly starting pilots a place to learn from earlier experience before repeating the same trial-and-error, and offer a recurring setting in which cities, operators and EU services can raise shared barriers and agree on common solutions.

6.2 Explore aggregated, cross-city procurement for shared hardware

Since multiple cities independently faced the same hardware production and component-sourcing delays for similar curb-side and sensor devices, EU Services and local authorities should explore aggregated procurement frameworks across participating cities for functionally similar devices, to reduce per-city lead times and unit costs. Common technical specifications and joint purchasing arrangements could also strengthen the cities' negotiating position with suppliers, make it easier to replace or upgrade devices over time, and ensure that equipment bought for one pilot can be reused or scaled up by other cities without starting procurement from scratch.

6.3 Align on a common minimum data-sharing and incentive framework

EU Services, local authorities and logistics providers should jointly define a minimum common framework, covering data formats, minimisation defaults and baseline incentive principles, so that operators engaging across multiple cities or projects face consistent expectations rather than negotiating terms anew in each locality. Such a framework would lower the administrative burden for operators, and SMEs in particular, make data from different pilots easier to compare and reuse, and give cities a tested starting point that they can adapt to

local conditions without having to draft data-sharing agreements and incentive rules from scratch.

6.4 Build the value case and commercial terms for market uptake

Local authorities, operators and technology providers should agree, before pilots close, a common set of quantified indicators covering cost savings, efficiency gains, emissions, noise, congestion and safety, expressed in comparable units and, where possible, monetised with a social cost-benefit approach. Following v1, they should pair this with flexible pricing and customisation options and with user training. Without a shared account of who gains what, promising services risk staying at demonstration stage. A transparent value case would allow each party to see where costs and benefits fall, support fair arrangements for sharing them, and give cities, operators and investors the evidence they need to commit to continued use once public funding for the pilot has ended.

6.5 Mainstream gender and the social dimension

The earlier review of the key exploitable results found no gender-related issues in their design, but advised applying a gender equity lens in marketing and implementation, collecting specific data and involving gender experts in stakeholder groups. EU Services, cities and operators should therefore collect sex-disaggregated and shift-specific data in freight-worker surveys and delivery-timing analyses, include worker representatives and gender and inclusion experts in SULP forums and impact assessments, and ensure that devices and applications are accessible, multilingual and tested with diverse users, including women and other under-represented groups in logistics. Taking these steps from the outset would help identify differences in how drivers, couriers and residents experience new measures, such as working hours, safety at night or ease of use, before they become barriers to adoption, and would make the resulting solutions more inclusive and better suited to the full range of people who work in and are affected by urban logistics.

6.6 Establish neutral data governance

A neutral data node (municipal or consortium-run) with defined anonymisation rules, governance and access tiers should be piloted to demonstrate benefits such as fewer empty trips and improved reliability before scaling. It should build on the IDSA-based infrastructure and the minimum framework in 6.4, and keep personal-data processing within EU data-residency requirements, as already done for the KER13 cloud services. Placing data under neutral stewardship would give operators, cities and technology providers confidence that shared data will be used only for agreed purposes, reduce the risk of dependence on any

single platform or company, and provide a trusted basis on which more partners can join over time.

7 Continuity with previous deliverables

7.1

D7.3 "Policy, market recommendations and standardisation v1" (POLIS, delivered September 2025 under Task T7.4) established the framework for the final version due at month 42. It reviewed the EU urban-logistics policy context and the SULP process, summarised the market analysis of D7.2 (SPES Consulting), mapped the standardisation status of each KER, and stated that its recommendations were provisional and would be reviewed as pilot results became available. This document is the first opportunity to do so. It keeps v1's audiences (policymakers, city planners and stakeholders), its five areas of intervention for SULP measures (technical/operational measures; infrastructure and clean fleet; policy and smart governance; purpose-oriented data acquisition; soft measures and consumer engagement) and its recommendation themes, and tests them against the D6.3 evidence.

Table 1 shows how each v1 recommendation fares. Three patterns emerge: the strategic direction of v1 holds; the pilots shift the emphasis from what should be done to how it can be achieved on a realistic timeline (approvals, data-processing agreements, connectivity); and some obstacles were not visible at v1 stage.

D7.3 v1 main recommendations	Status	What the demonstration adds	Where addressed
Strategic integration of SULPs with SUMPs and other plans (climate, energy, air quality, circular economy)	**Confirmed**	Pilots advanced fastest where new tools plugged into existing municipal procedures and systems (Madrid single approval track; Mechelen Spotbooking; Florence SAS portal).	LA-1, LA-5, EU-8, LA-9
Exchange of best practices between cities	**Confirmed**	Regular WP6 exchange meetings helped cities resolve hardware and engagement problems together; worth institutionalising.	6.1
Facilitate data collection and exchange through a common security and privacy framework and interoperability standards	**Refined**	The interoperable data space (KER1) was valued by partners, but data-processing agreements were the main source of delay: the privacy framework must exist as ready templates before pilots start.	EU-2, EU-4, LA-2, LO-1, 6.4,
Include digital tools and infrastructures in the analysis and in solutions	**Refined**	Infrastructure readiness (NB-IoT/LoRaWAN coverage, hardware lead times) decided deployment; assessments must precede design choices.	LA-4, LO-5, 6.3

Gender issues mitigation: collect specific data and involve experts	**Confirmed, open**	The evidence base of this document (D6.3) reports no gender-disaggregated findings, so the v1 recommendation stays valid and is made operational.	6.5
Market recommendations: bridge public and private actors, tailor to cities, quantify benefits, flexible pricing, training	**Refined**	Operator participation needs reciprocal value (DHL in Madrid, Latvian postal operator in Riga, Florence reward pilot); quantified benefits and accessible terms underpin it.	EU-6, LA-8, LO-3, LO-7, 6.6
Standardisation opportunities for the KERs (IDSA, open formats, REST, MQTT)	**Refined**	v1 mapped the status per KER; the pilots show where harmonisation across cities is most useful (data space, indicator grids, routing profiles).	EU-7
Not in v1: regulatory sandboxes, DPO-first compliance, heritage and connectivity pre-checks, joint procurement	**New**	Emerged from deployment experience in Madrid, Florence, Prague, Mechelen and Funchal.	EU-2, LA-2 to LA-4, LA-6, 6.2, 6.3

Table 1 – Continuity with the D7.3 v1 recommendations

7.1 Market evidence from D7.2

D7.2 (SPES Consulting, Task T7.1, version 1.0 of 27 June 2025, public) assesses the market conditions for the 13 Key Exploitable Results and two sub-results, grouped into five products: a knowledge hub (P1), a policymaking toolkit (P2), a planning and management toolset (P3), AI and big-data services (P4) and data-space connectors (P5).

It combines a PESTEL analysis of the national contexts of Madrid, Florence and Berlin (with shorter versions for Czechia, Portugal, Latvia and Belgium), Porter's Five Forces and SWOT analyses collected from partners, a Value Creation Ecosystem map per result and a simplified external-cost method. It was written before pilot results existed, relies on qualitative ratings rather than quantified uptake, and is to be updated at the end of the project.

D7.2 closes with first recommendations addressed to technology developers and project partners. This document keeps their logic but widens the addressees to the three audiences that decide whether the services move from pilot to permanent practice. Table 2 shows where each cluster is taken up.

D7.2 recommendations cluster	Status	What changes in this document	Where addressed
Legal and institutional: make compliance (GDPR, LEZ rules, heritage) a core value proposition; create standardised data-sharing agreements based	**Taken up and extended**	Demonstration confirms that compliance drives timelines. Standard agreements become public templates and a minimum	EU-2, LA-2, LA-9, 6.4

on KER1; show how the KERs inform policy decisions		framework; policy use is anchored in the SULP.	
Infrastructural: guarantee interoperability with city systems; offer customisable solutions for different infrastructure readiness	**Taken up and extended**	Integration-first design worked (Mechelen, Florence); readiness varied widely (NB-IoT, LoRaWAN), so assessments and fallbacks are needed.	LA-4, LA-5
Data management: prioritise security and privacy built on KER1; promote sharing by demonstrating benefits	**Taken up and extended**	Moved from developer advice to institutional action: neutral data node, data roadmap, EU-level standards and data spaces.	EU-4, EU-7, LA-10, 6.6
Economic and social acceptance: tiered pricing, communicate air-quality, noise and quality-of-life gains, feedback from diverse users	**Taken up and extended**	Added the demand side: capacity funding for cities and micro-operators, collective participation channels, quantified co-benefits and ongoing market monitoring.	EU-9, LO-8, 6.5

Table 2 – Uptake of the D7.2 recommendation clusters

7. Implementation Roadmap

The table below consolidates the recommendations into an indicative sequencing across the three audiences: EU services, local authorities and logistics providers. It is intended to help each audience see which actions can be started early, which build on earlier steps, and which depend on results accumulating from pilots and from the wider policy and funding environment. Actions are grouped into three horizons: short term (0–12 months), medium term (1–2 years) and longer term (2+ years). The grouping reflects a logical progression, from preparing the ground (shared tools, early involvement of key stakeholders, awareness of constraints), through consolidating and scaling approaches (data spaces, sandbox provisions, procurement, standardisation), to embedding practices in routine operations and policy.

Horizons are indicative and should be adapted to local and programme-level planning cycles, including budget cycles, SULP/SUMP revision timelines and the calendar of EU funding calls. Some actions can be moved forward where the conditions are already in place, while others may need more time depending on local capacity and political context.

The actions are deliberately generic and are meant as orientation rather than commitments: each actor will adapt them to its own competences, resources and priorities. They are also interdependent. Progress by one audience often enables or accelerates action by another. For example, shared EU-level templates and guidance reduce the effort required of cities, and a well-structured local SULP process gives logistics providers a clear entry point for engagement. The references in brackets (e.g. EU-2, LA-10, LO-7) point back to the corresponding recommendations in the preceding sections, so that readers can easily find the underlying rationale and detail.

Priority horizon	Local authorities	Logistics providers	EU Services
Short term (0–12 months)	• Involve the data protection officer early in pilot design • Consider heritage and connectivity limits from the start • Start a data roadmap for urban logistics planning Plan enforcement alongside new regulations	• Help test pilots where possible • Check that vehicle fleets are compatible • Name a contact for local logistics forums • Consider joining industry associations	• Share simple tools for pilots, such as data-protection templates • Open discussion on testing-zone (sandbox) rules • Review planning guidance • Consider support for cities and SMEs
Medium term (1–2 years)	• Consider local testing zones (sandboxes) • Combine related approvals and link with existing systems	• Explore joining shared data platforms • Agree fair terms for sharing data	• Encourage use of connected data platforms in funding calls • Provide guidance on incentive schemes

	• Run validated pilots with clear indicators	• Contribute to the value case and share data-sharing templates	• Support standardisation work • Update the market analysis with pilot results
Longer term (2+ years)	• Make transparency and co-designed incentives standard practice • Track indicators regularly • Keep enforcement and permits aligned	• Build routing, booking and reward tools into daily operations and driver training • Keep contributing to forums and monitoring	• Consider longer-term support for knowledge sharing between cities • Explore joint purchasing • Keep guidance up to date • Support the ecosystem after the project ends

8. Conclusion

The large-scale UNCHAIN demonstrations confirm that digital tools for urban logistics cooperation deliver real value to cities and logistics operators alike, while demonstrating that success depends as much on regulatory, administrative, and organisational conditions as on the technology itself. Past implementation hurdles illustrate the critical need for early communication and planning among developers, demonstrators, and evaluators; despite initial resistance and complex challenges, partners consistently forged workable solutions through close collaboration.

These recommendations generalise those proven solutions into standard practice:

- Implementing regulatory sandboxes instead of relying on ad hoc exemptions
- Establishing standard data-protection toolkits rather than negotiating on a pilot-by-pilot basis
- Planning realistic hardware and connectivity buffers instead of relying on optimistic timelines
- Pursuing integration-first system design instead of full system replacement
- Providing structured incentives instead of making one-sided data requests

None of these measures require novel technology. Instead, they require EU bodies, local authorities, and logistics providers to proactively adopt streamlined practices rather than discovering them under tight operational time pressure.

Strategic direction and practical execution work hand in hand. Strategic frameworks establish the broader roadmap: integrating freight into sustainable urban mobility and logistics plans, exchanging best practices, sharing data on interoperable standards, deploying digital tools, and mainstreaming gender considerations. Practical demonstrations show what makes that direction achievable on the ground. Recommendations focused on standardisation, planning integration, market uptake, and the social dimension provide provisional guidance designed to evolve alongside ongoing demonstrations and insights from follower cities.

Technology is rarely the limiting factor for market uptake. Effective enforcement, harmonised rules, trusted data sharing, municipal administrative capacity, and the active participation of small operators dictate long-term success. Addressing capacity, enforcement, rule harmonisation, collective operator participation, and continuous market monitoring directly removes the barriers holding back innovation. Moving forward, the consortium is well-positioned to test these governance and operational models across multiple pilot cities—such as scaling regulatory sandboxes and testing incentive schemes with logistics operators engaged in ongoing urban trials.

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This report is based on: UNCHAIN, "D6.3 – Large-scale demonstration in the living labs", v1.0, 30 April 2026 (Grant Agreement No. 101103812, Horizon Europe). Dissemination level: Public.

Alignment: UNCHAIN, "D7.3 – Policy, market recommendations and standardisation v1", v1.0, 27 September 2025 (POLIS, Task T7.4), including its references to D7.2 (SPES Consulting) and D8.5. Dissemination level: Public.

Market evidence: UNCHAIN, "D7.2 – Market analysis and monitoring report v1", v1.0, 27 June 2025 (SPES Consulting, Task T7.1; dissemination level: Public).

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