# DISC

Data-driven and Dynamic Space Assets for physical internet led Urban Logistics and Planning



## DISCO Policy Lessons

# DISCOPROXI

# DISCOLLECTION

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101103954

# Contents


**Acronyms and abbreviations** ..... 3

**1. What is DISCOPROXI?** ..... 5

What it could look like in practice ..... 5

Paired with DISCOLLECTION ..... 6

**2. Where DISCOPROXI was demonstrated** ..... 6

What each Living Lab tried ..... 6

What made the implementations successful ..... 8

Challenges faced by DISCO living labs ..... 9

Standardization lessons ..... 9

**3. Results and policy fit** ..... 10

Best-suited policy and regulatory targets ..... 10

**4. Recommended first steps** ..... 12

**5. Policy recommendations** ..... 13

A. European Union level ..... 13

B. National level ..... 13

C. City level ..... 14

**6. Where can cities start? The Meta-Model Suite** ..... 15

# Acronyms and abbreviations

A quick reference for the terms used throughout this brief.

| Term | What it means |
|---|---|
| **DISCO** | Data-driven and Dynamic Space and Assets for Physical Internet-led Urban Logistics and Planning, the Horizon Europe project behind this brief (Grant Agreement No. 101103954) |
| **DISCOPROXI** | The DISCO innovation covered in this brief, for proximity-based last-mile delivery through microhubs, lockers and shared facilities |
| **DISCOLLECTION** | The companion DISCO data layer that publishes standardised hub, locker and access-rule data from DISCOPROXI deployments |
| **Living Lab** | A real-world city site where a DISCO innovation was piloted (Starring) or adapted and tested (Twinning) |
| **PI** | Physical Internet, the interoperable-logistics principle underpinning DISCO: shared infrastructure, resource pooling and modal shift |
| **Microhub** | A small, often temporary consolidation point close to the delivery area where goods switch from vans to low-emission transport |
| **PUDO** | Pick-up and drop-off point, such as a parcel locker, where goods are collected by or handed to the end customer |
| **UAC** | Urban Access Control, the DISCOPROXI system that turns digitised access rules into automated routing instructions |
| **UVAR** | Urban Vehicle Access Regulation, the city rules (time windows, emission classes, permits) that govern who may enter an area and when |
| **WaaS** | Warehouse-as-a-Service, a platform that lets several operators book shared storage and handling capacity instead of each holding their own |
| **LSP** | Logistics Service Provider, a company that moves or delivers goods on behalf of others |
| **SULP** | Sustainable Urban Logistics Plan |
| **SUMP** | Sustainable Urban Mobility Plan |
| **UFDS** | Urban Freight Data Space, the DISCO platform for sharing standardised freight and access data |
| **API** | Application programming interface, a standard way for two computer systems to exchange data automatically |
| **GDPR** | General Data Protection Regulation, the EU's data-privacy law |
| **DATEX II / NAPCORE** | European data-exchange standards and the National Access Point Coordination Organisation for Europe, used to publish traffic and access data consistently |
| **AFIR** | Alternative Fuels Infrastructure Regulation, the EU rules on charging and refuelling infrastructure |

## What is DISCOPROXI?

> ***Consolidating goods close to their destination, then finishing the journey on foot, bike or electric van.***

DISCOPROXI tackles the last-mile problem through proximity logistics: microhubs, parcel lockers, consolidation centres and shared facilities placed close to the final destination. Goods are consolidated at these points and the final leg is completed by low or zero-emission modes such as cargo bikes, electric vans, walking couriers and delivery robots.

The aim is to reduce the number of conventional delivery vans entering city centres, and to better integrate logistics activity into the neighbourhoods it serves rather than leaving it to spread unplanned across the edge of the city. This supports the Physical Internet principles of shared infrastructure, resource pooling and modal shift, in line with the European Green Deal and the EU Urban Mobility Framework.

DISCOPROXI works through two complementary tools: shared microhubs and lockers that act as physical consolidation points, and an Urban Access Control (UAC) system that turns a city's digitised access rules into automated routing instructions. Both can be set up by a public authority, a private operator, or a partnership between the two; neither requires operators to restructure their core business.




*Figure 1: A CityLogin consolidation delivery van operating in a Spanish city centre.*

### What it could look like in practice

- Several operators share a single microhub close to the delivery area, cutting duplicated facilities and the number of separate vans entering the same streets.
- Mobile microhubs let electric vans meet cargo bikes at flexible points, so bikes need not return to a fixed depot between drops.
- Smart locker networks and Warehouse-as-a-Service platforms pool storage and collection capacity across several operators at once.
- An Urban Access Control system feeds digitised access rules into routing software, so drivers automatically respect emission zones, time windows and school streets.
- Final delivery shifts from large vans to cargo bikes, electric vehicles and assisted carts, cutting local emissions and freeing up curb space.

### Paired with DISCOLLECTION

DISCOLLECTION covers the data side of proximity logistics: hub and locker telemetry, delivery metrics and digitised access rules, all shared through the Urban Freight Data Space (UFDS).

This data underpins demand modelling, Digital Twin simulation and the matching of supply and demand in a hub marketplace, while letting cities monitor performance against their own logistics plan objectives. As with other DISCO-X innovations, a city can choose to keep its own data private within a local Smart Data Platform, sharing openly only what it decides to publish.

## Where DISCOPROXI was demonstrated

DISCOPROXI was the most widely tested DISCO innovation, demonstrated in seven Living Labs, including a crisis adaptation in Valencia. Together they cover shared hubs, access control, lockers and warehouse marketplaces, each following the DISCOPROXI transition path introduced in Section 4. Helsinki and Copenhagen led as Starring Living Labs, piloting the original innovations, soon joined by Ghent and Thessaloniki; Padua, Zaragoza and Valencia then adapted the approach as Twinning Living Labs, each to their own local constraint, whether space, legal clarity or crisis response.

### What each Living Lab tried

Each profile below brings together, for one Living Lab at a time, the approach it took, the data it fed back into DISCOLLECTION, and its headline result. The next two sections then draw out what made these demonstrations succeed, and where standardisation is still needed.

## Helsinki *Starring*

**Approach** Tested shared and mobile microhubs serving cargo bikes and delivery robots, positioned so bikes could meet vans at flexible points rather than returning to a fixed depot.

**Data shared** Hub booking and delivery telemetry shared for performance monitoring.

**Key result** Zero tailpipe emissions across more than 1,500 deliveries, but each delivery took nearly five times longer than a conventional van run, showing clearly where further optimisation is needed.

## Copenhagen *Starring*

**Approach** Focused on the business model and legal groundwork for fair-market space provision, producing the partnership agreements a shared microhub needs to operate legitimately.

**Data shared** Partnership and agreement data feeding the local Sustainable Urban Logistics Plan.

**Key result** Legal clarity on fair-market space provision, backed by thirteen partnership agreements feeding directly into the city's Sustainable Urban Logistics Plan.

## Ghent *Starring*

**Approach** Built an Urban Access Control system that turns the city's digitised access rules into automated routing instructions for logistics software.

**Data shared** Access-rule and trip data shared through a city-wide consortium.

**Key result** Automated access checks flagged eleven compliance risks per route. Moving to a shared data standard also meant Ghent needed far fewer custom system-to-system links to its partners, cutting bespoke integrations from six down to two.

## Thessaloniki *Starring*

**Approach** Combined a shared locker network with a Warehouse-as-a-Service platform, letting several operators book storage and collection capacity on the same infrastructure.

**Data shared** Locker and warehouse telemetry published to the Urban Freight Data Space.

**Key result** An evidence-based approval process for new parcel lockers, leading to a new loading-and-unloading regulation for the city.

## Padua *Twinning*

**Approach** Twinned Copenhagen's approach, dynamically reallocating space for a shared microhub network through a modular booking API.

**Data shared** Booking and occupancy data shared via open APIs.

**Key result** A simple siting algorithm for new hub locations reached an 84 percent successful-delivery rate.

## Zaragoza *Twinning*

**Approach** Ran a municipal-market microhub through a city logistics cooperative, creating local jobs alongside the delivery consolidation.

**Data shared** Delivery and employment data supporting the public-private agreement.

**Key result** 7,058 packages delivered through the municipal-market hub, delivery distance cut by 59 percent, and two new accessible jobs created.

## Valencia *Twinning (crisis)*

**Approach** Repurposed existing proximity capacity as an emergency consolidation measure during the 2024 flood crisis, rather than as a planned pilot.

**Data shared** Crisis data exposing where flexible capacity was still missing.

**Key result** Crisis logistics through repurposed proximity capacity outperformed conventional emergency logistics by 40 percent, introducing a methodology that decreases crisis response time from 72 hours to 12 hours.




*Figure 2: A mobile parcel locker unit deployed for the Padua Living Lab.*

## What made the implementations successful

Across the seven Living Labs, four conditions repeatedly separated a successful rollout from a stalled one.

- **Helsinki** participatory planning. Two workshops, one-on-one meetings with logistics providers, a resident workshop and two resident surveys helped align the microhub concept with what residents and operators actually needed.
- **Helsinki** investing in service design. A commissioned consultancy produced a concept paper with business and operational model options, shared with the city's Urban Environment Division and the regional transport authority.
- **Ghent** building regional momentum. Selection for a regional project with Leuven and Hasselt let the Urban Access Control system expand to new cities and add features such as a dashboard and a simple registration app for small operators without their own routing software.
- **Zaragoza** working through an existing cluster. Partnership with the Aragón Logistics Cluster (ALIA) gave access to shared performance data and insight from its member companies, rather than building trust from scratch.

## Challenges faced by DISCO living labs

The same Living Labs also surfaced four recurring obstacles that any city planning a similar rollout should expect.

- **Helsinki** permit and regulatory barriers surfaced only once implementation began; the city later concluded that it needed to be engaged in project preparation from the proposal stage onward, not after.
- **Helsinki** stakeholder alignment was harder than expected. A bottom-up approach to choosing a microhub location surfaced genuinely different views among partners, and some testing partners withdrew when other priorities took over.
- **Ghent** technical integration between the Urban Access Control system and a second operator's software ran into data-transfer delays that made real-time demonstration unfeasible within the project's time and budget, though the issue was technically solvable.
- **Across labs** revenue models remain unproven. Private partners generally need to see firm evidence of scale and tangible outcomes before committing, so the value proposition has to be made strongly: this is a potential game-changer, not only a research exercise.
- **Beyond DISCO** two further barriers emerged from wider European policy workshops: tram-assisted delivery is technically feasible but blocked by unresolved safety certification for fast loading at tram stops, and carriers often resist sharing a hub under a competitor's visible brand, a problem best solved by a neutral, white-label platform rather than by cost alone.




*Figure 3: A SCOOBIC e-scooter delivery unit operating in Valencia.*

## Standardisation lessons

No single microhub design repeated across cities: Helsinki used a shopping centre location, Zaragoza a municipal market, Ghent a software only system with no physical hub at all. That diversity points to a clear conclusion for standardisation: focus on functional requirements, not a prescriptive design.

- **Data standards for access rules** Ghent's experience, built on extensive work with the Flemish digital government agency, shows that machine-readable access-rule data only becomes useful once a common regional standard is in place, an ongoing process rather than a one-off task.
- **API integration standards** aligning the Urban Access Control system with different operators' own route-planning software highlighted the need for common input and output formats, so each new integration does not start from zero.
- **Microhub operational standards** Zaragoza's experience shows that hub agreements must clearly define the subject of the contract, the scope of activity and how risk is shared between the public and private partner.

# Results and policy fit

Taken together, the seven Living Labs show that shifting last-mile delivery to proximity hubs is achievable and delivers real environmental gains, but it carries trade-offs in cost and delivery speed that need to be managed openly rather than designed away.

Helsinki reached zero local emissions while accepting a significant drop in delivery speed, whereas Zaragoza combined emission cuts with genuine social benefits such as accessible local jobs. Ghent's Urban Access Control work showed that digitising access rules is a powerful enabler of compliant routing, while Copenhagen and Thessaloniki confirmed that critical mass, legal clarity and a credible business case remain the binding constraints

on scaling up. Valencia added a further dimension: proximity capacity is also a resilience asset when conventional logistics is disrupted. The key result for each Living Lab is set out in its profile in Section 2.

## Best-suited policy and regulatory targets

DISCOPROXI speaks most directly to policy and regulatory targets concerning last-mile decarbonisation, access regulation, charging infrastructure and the integration of resilience into urban planning.

| Framework or instrument | How DISCOPROXI contributes |
|---|---|
| **Sustainable Urban Logistics and Mobility Plans** | Provides evidence for microhub siting, access regulation and Low and Zero-Emission Zone integration. |
| **EU Urban Mobility Framework** | Advances the shift to low and zero-emission urban delivery and shared infrastructure. |
| **Alternative Fuels Infrastructure Regulation** | Justifies charging provision for electric last-mile fleets at and around hubs. |
| **UVAR digitisation (DATEX II, NAPCORE)** | Supplies machine-readable access rules for automated, compliant routing. |
| **Climate-Neutral and Smart Cities Mission / resilience planning** | Contributes measurable emission and space-efficiency gains toward city climate contracts, and positions proximity hubs as dual-use assets for emergency logistics. |

## Recommended first steps

Planning and implementation go hand in hand at every step of a DISCOPROXI rollout. The DISCOPROXI Generalised Transition Path, shown below, sets out a recommended route for a city to follow, from defining the proximity area to agreeing a generalised business model.

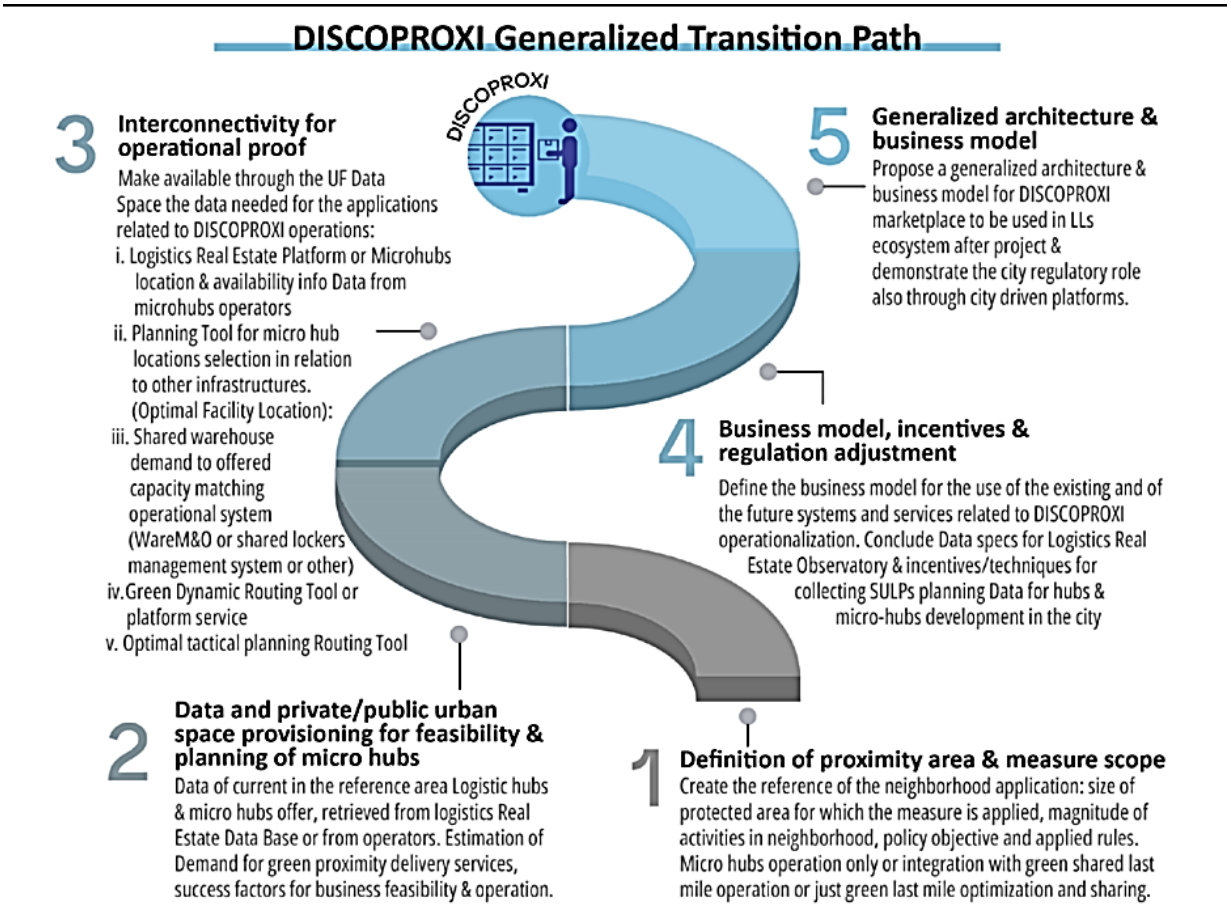


*Figure 4: Generalised transition path for proximity-based last-mile delivery see DISCO deliverable D2.1 for full detail.*

The path moves through five stages: defining the proximity area and what the measure should achieve; gathering the data and space needed to plan feasibility; making that data available through the Urban Freight Data Space so operators can act on it; agreeing the business model, incentives and regulation; and finally proposing a generalised architecture that can run as a marketplace beyond the pilot, with the city holding a clear regulatory role throughout.

### Practical tips for getting started

- Engage the city in project preparation from the proposal stage, not after a site has already been chosen; permit and regulatory barriers are far cheaper to resolve early.

- Collect only the data a use case genuinely needs. The better question is not what data could be collected, but what the data will actually be used for, which also keeps the project aligned with data-protection rules.
- Treat revenue and business-model clarity as a first-order task, not an afterthought: private partners commit once they see credible scale and a real value proposition, not before.
- Where a hub must serve several competing operators, plan for a neutral, white-label platform from the outset rather than retrofitting one once carriers resist sharing a branded facility.

## Policy recommendations

Consolidation hub models of this kind are already active in more than fifty cities across the European Union, they may not necessarily be shared but it points to a greater possibility on the horizon: this is no longer an experimental idea but an emerging mainstream. The recommendations below draw on the DISCOPROXI Living Labs themselves, together with parallel policy discussions held across DISCO, GreenLog, DECARBOMILE and UNCHAIN project cities, from Belgium's multioperator platforms to Spain's cooperative run hubs.

No single level of government can make proximity logistics stick on its own. European action is needed to tighten the regulatory driver and standardise data; national governments must resolve the funding and planning questions that sit outside city competence; and city-level action remains essential for site-specific permitting, space agreements and day-to-day orchestration.

### A. European Union level

#### Mandate UVAR digitisation as a baseline requirement

Urban Access Control depends entirely on machine readable access rules. Cities without a digitised access rule dataset cannot benefit from DISCOPROXI's routing optimisation. Policy frameworks should mandate UVAR digitisation and open publication, in line with the revised TEN-T guidelines that already ask cities to collect freight-relevant data.

#### Create a universal standard for urban access rule data

DISCOPROXI's Urban Access Control currently relies on a draft DATEX II standard, which underlines the gap between how complex urban access regulation has become and how far data standards have kept up. A universal standard would let the model be replicated without bespoke data engineering in every new city.

#### Tighten EU-wide low-emission zone stringency

Current low-emission zone rules across member states are often not strict enough to compel a switch from vans to bikes or robots. Proximity logistics only becomes the rational commercial choice once access restrictions genuinely compel modal shift rather than merely encourage it.

### B. National level

#### Embed proximity-logistics targets in statutory long-term plans

Political continuity is the most fragile point in proximity-logistics governance everywhere it was tested. The cooperative and city-orchestrator models that work operationally are also the most exposed to a change of

administration. Embedding targets in statutory long-term plans, rather than voluntary SULP documents, is the single highest-leverage action a national government can take.

### Use pricing policy to nudge consolidation, not subsidy

Where consumers can choose a delivery slot and pricing nudges them toward consolidated options, the model becomes financially self-sustaining once volume is sufficient. National pricing instruments, such as parking charges linked to a green fleet share, work on the same principle and do not depend on continued subsidy.

### Clarify the business case for shared hubs

Longer delivery times and higher per parcel costs were identified consistently as the obstacle to commercial scaling. National level cost-per-emission-saved benchmarks, green procurement incentives for city contracts, and reform of service-level agreements for zero-emission deliveries would all improve the business case operators are asked to accept.

## C. City level

### Create fast track permitting for time-limited logistics pilots

Restrictive public-space permitting prevented multi-hub demonstrations even in cities with established innovation programmes. A dedicated, fast-track permitting pathway, with pre-designated logistics zones inside the SULP, lets a city gather evidence before committing to a permanent policy.

### Formalise public-private space transfer agreements

Zaragoza's model, a formal public-private contract for logistics use of municipal space, is a replicable instrument once it is written into SULP and SUMP templates, including clear terms on the subject matter, scope and shared risk of the agreement.

### Establish the city as a neutral orchestrator, not an operator

The most transferable lesson from across DISCO and comparable European projects is not the hub itself but the role of a neutral intermediary between space owners and logistics operators. A city that convenes rather than operates, with dedicated staff for the role, is the precondition for genuine multi-operator consolidation.

### Secure cross-party commitment and keep funding small pilots

Targets survive a change of administration only when they sit inside long-term city masterplans or coalition agreements rather than single-term programmes. Continued local funding for small demonstration projects also remains essential: it is the only way to build the safety and performance evidence that later unlocks regulatory approval.

> ***DISCOPROXI is therefore most effective where access regulation, charging policy and logistics space provision are aligned, so that the environmental gains of proximity delivery are matched by a viable, replicable operating model.***

## Where can cities start? The Meta-Model Suite

DISCO has created a Meta-Model Suite: a set of interoperable decision-support tools developed across the DISCO project to let planners test urban logistics interventions before committing to physical investment or regulatory change.

For planners, this means the ability to run scenario comparisons that guide a city toward the DISCO innovation that suits its local context, together with a step-by-step transition guideline and advisory.

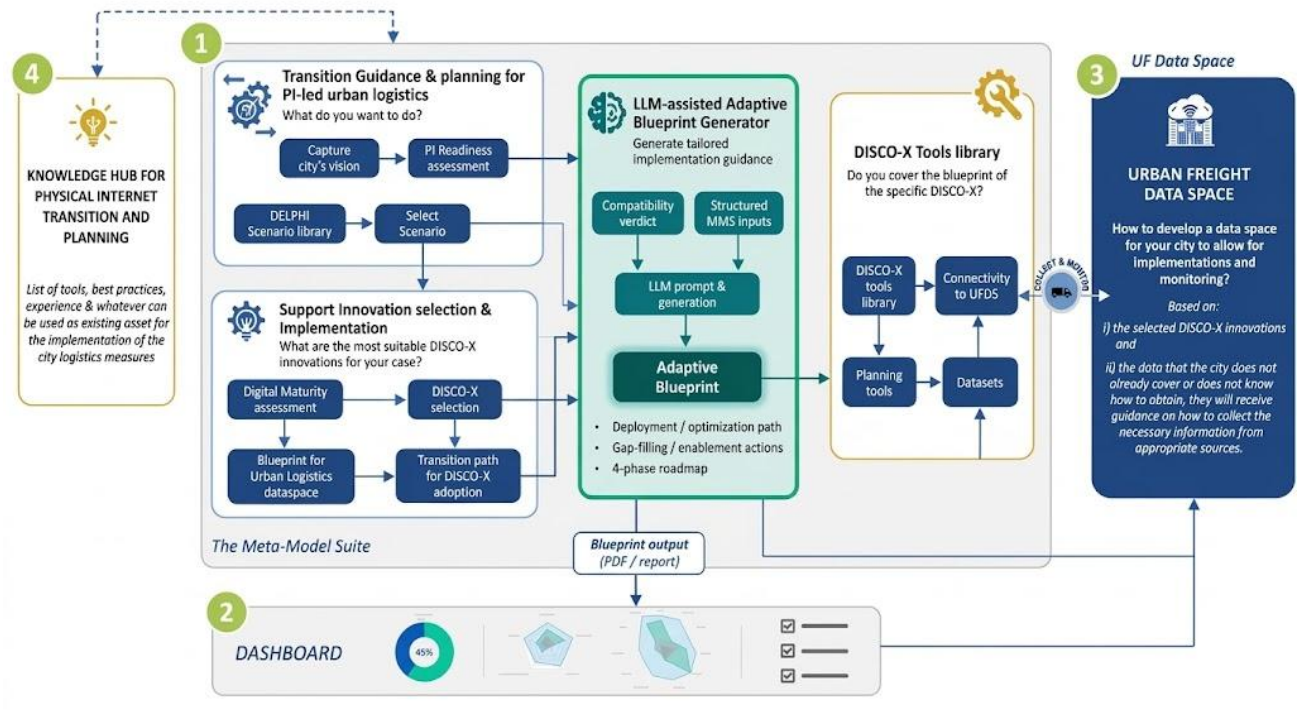


*Figure 5: The Meta-Model Suite: from capturing a city's vision and readiness, through assisted blueprint generation, to output connected to the Urban Freight Data Space.*

The suite works in four linked parts:

- **Transition guidance and planning** captures a city's vision and Physical Internet readiness, then helps select the most suitable scenario.
- **Adaptive blueprint generator** an assisted tool that turns a city's inputs into a tailored implementation blueprint, complete with a deployment path, gap-filling actions and a four-phase roadmap.
- **DISCO-X tools library** connects the blueprint to the specific planning tools, datasets and Urban Freight Data Space connectivity a city will need.
- **Knowledge hub** a running list of tools, best practices and experience that cities can draw on when implementing any DISCO-X measure, including DISCOPROXI.

Because the underlying models share a common structure across partner cities, a planner in a new context can adapt parameters from a comparable DISCO deployment rather than starting from first principles, shortening the path from policy intent to a testable local plan.

Explore the step-by-step analysis and guided feedback at [metamodelsuite.imet.gr/meta-model-suite](metamodelsuite.imet.gr/meta-model-suite)

# DISC

# Data-driven and Dynamic Space Assets for physical internet led Urban Logistics and Planning





Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101103954