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Table of Contents

1. MED COLOURS IN A NUTSHELL.....	6
2. EXECUTIVE SUMMARY.....	7
3. INTRODUCTION.....	9
4. Sulp GUIDELINES.....	11
5. SYSTEM DIAGNOSIS.....	14
5.1. PILLAR 1: THE ECOSYSTEM APPROACH & INNOVATION READINESS.....	14
5.1.1. ECOSYSTEM APPROACH.....	14
5.1.2. INNOVATION READINESS URBAN LOGISTICS SELF-ASSESSMENT TOOL.....	17
5.2. PILLAR 2: THE SUMP/Sulp ASSESSMENT.....	19
5.3. SYNTHESIZING THE PILLARS FOR DIAGNOSIS.....	21
5.4. CITY DIAGNOSTIC PROFILES.....	23
5.4.1. CESENA.....	23
5.4.2. KOPER.....	25
5.4.3. LISBON.....	26
5.4.4. LIVORNO.....	28
5.4.5. LYON.....	29
5.4.6. THESSALONIKI.....	31
5.4.7. AGGREGATED CITY DIAGNOSIS.....	33
5.5. ROLE OF MED COLOURS PILOTS AS FOUNDATIONS FOR Sulp PHASE 3.....	35
6. INTEGRATING RESILIENCE IN THE Sulp GUIDELINES FRAMEWORK.....	37
6.1. OVERALL METHODOLOGY.....	37
6.2. UPDATED Sulp CYCLE.....	37
6.2.1. PHASE 1 - PREPARATION & ANALYSIS.....	38
6.2.2. PHASE 2 - STRATEGY DEVELOPMENT.....	39
6.2.3. PHASE 3 - MEASURE PLANNING.....	39
6.2.4. PHASE 4 - IMPLEMENTATION & MONITORING.....	40
6.3. BEST PRACTICES TO ENHANCE RESILIENCE.....	41
7. CONCLUSIONS.....	44
8. TABLES AND FIGURES.....	46
<i>List of Sources</i>	46
<i>List of Tables</i>	48
<i>List of Figures</i>	48
APPENDIX A: SUMP/Sulp ASSESSMENT TEMPLATE.....	49



List of Abbreviation

Short	Long
ANPR	Automatic Number Plate Recognition
API	Application Programming Interface(s)
C40	C40 Cities Climate Leadership Group
CBA	Cost Benefit Analysis
CDS	Curb Data Specification
CO₂	Carbon dioxide
DER	Distributed Energy Resource
EIA	Environmental Impact Assessment
EU	European Union
EV	Electric Vehicle
FLSF	Floating Logistics Supporting Facilities
FQP	Freight Quality Partnership
FUA	Functional Urban Area
GHG	Greenhouse Gas(es)
HGV	Heavy Goods Vehicle(s)
IoT	Internet of Things
ITF	International Transport Forum
KPI	Key Performance Indicator
LEZ	Low Emission Zone
LPA	Lyon Parc Auto
LPR	Licence Plate Recognition
LSP	Logistics Service Provider
LTA	Low-Traffic Area
LTZ	Limited Traffic Zone
MoU	Memorandum of Understanding
OECD	Organisation for Economic Co-operation and Development
PDCA	Plan Do Check Act Consulted
PI	Physical Internet



Short	Long
RACI	Responsible–Accountable–Consulted–Informed
RCP	Representative Concentration Pathway
ROI	Return on Investment
SME	Small and Medium-sized Enterprise
SuDS	Sustainable Urban Drainage System
SULP	Sustainable Urban Logistics Plan
SUMP	Sustainable Urban Mobility Plan
UFT	Urban Freight Transport
UVAR	Urban Vehicle Access Regulation
V2G	Vehicle-to-Grid
WBGT	Wet Bulb Globe Temperature
ZAAC	Zona de Acceso Automóvil Condicionado (conditional motor access zone)
ZEV	Zero-Emission Vehicle



1. MED COLOURS in a nutshell

Climate change is the foremost worldwide challenge. Among those contributing factors, some of the most pressing include congestion, which costs the European economy €100 billion per year-1% of its GDP, air pollution, affecting people's health, and transport emissions (those from freight count 25% of total urban transport emissions). The EU climate objectives require at least a 55% reduction in net greenhouse gas (GHG) emissions by 2030 and climate neutrality by 2050, cannot be met only by vehicles decarbonisation goals. COLOURS aims at upscaling to a new generation of urban logistics and planning enabling the transition to decarbonised and smart cities. By developing new SULPs, MED Cities will plan resilient, sustainable, integrated, and collaborative innovation-driven solutions for the Functional Urban Area (FUAs). This would help reducing the negative impacts of freight and logistics activities. COLOURS' joint territorial ambition is to enable urban freight distribution in MED-FUAs from a low carbon environmental perspective and, at the same time, give cities a boost in sustainable development and human well-being. COLOURS will jointly validate 1) strategy for continuous cross-monitoring of SULPs ,2) New Resilient SULPs and 3) solutions for innovative and sustainable urban logistics. This would foster the more effective implementation of existing sustainable policies and improve access to funding/investment for climate-resilient living areas. COLOURS supports the digital and environmental transition in six cities and their related FUA in MED area (Livorno, Cesena, Thessaloniki, Koper, Lisbon, and Lyon). Transition is built upon a quadruple helix approach supported by the liaison with other European Projects in the same field. COLOURS will adopt a new approach to urban freight planning introducing new collaborative concepts and disruptive/enabling technologies. The project outcomes will go beyond existing practices through long-term transition scenarios to achieve the targets set in the EU green Deal in MED Area.



2. Executive Summary

MED COLOURS operates in a context where urban logistics systems are increasingly exposed to compounding pressures from climate extremes, rapid digitalisation and demand volatility. In Mediterranean cities, heatwaves, intense rainfall events and flooding can disrupt ports, corridors and last-mile delivery operations, while e-commerce growth intensifies curb competition and variability in delivery patterns. These dynamics create cascading risks across infrastructure, services and governance, implying that conventional "efficiency-first" planning is no longer sufficient. A Sustainable Urban Logistics Plan (SULP) must therefore evolve from a largely static planning document into a resilience-oriented governance instrument that can anticipate, absorb, adapt and recover from disruption, while supporting a credible decarbonisation transition aligned with EU climate objectives.

This deliverable (D1.2.1, "Guidelines for Resilient Urban Logistics Planning") provides a practical framework for strengthening urban freight planning within the MED COLOURS partner cities and their Functional Urban Areas (FUAs): Livorno, Cesena, Thessaloniki, Koper, Lisbon and Lyon. It builds explicitly on established European guidance for SULPs within the Sustainable Urban Mobility Plan (SUMP) framework, retaining the canonical 12-step, iterative and stakeholder-driven planning logic as its backbone. Rather than proposing a prescriptive catalogue of interventions, the deliverable strengthens the planning cycle so cities at different levels of maturity can repeatedly translate resilience goals into implementable measures, monitor performance under stress and institutionalise learning over time.

The report proceeds in three linked steps. First, the baseline is established by presenting the canonical SULP cycle and the implementation logic that connects analysis, strategy development, measure planning and monitoring within a continuous improvement loop. Second, the framework is grounded in evidence through a Two-Pillar Analytical Framework applied across the partner cities. Pillar 1 assesses "innovation readiness" through an ecosystem approach that captures structural capacity for change across governance, infrastructure/resources, actors, networks, greenness/openness and safety/security/quality. Pillar 2 complements this forward-looking view with an implementation-focused SUMP/SULP assessment documenting implemented actions, monitored impacts and the barriers, delays and enabling factors that shaped outcomes. The synthesis of both pillars produces city diagnostic profiles that identify key bottlenecks and the reasons for their persistence, providing a defensible basis for targeted procedural upgrades to the SULP cycle.

The city diagnoses reveal that the most persistent constraints to resilient urban logistics are frequently institutional and relational rather than purely technical. Across the partnership, recurring themes include the difficulty of sustaining collaborative governance and stakeholder engagement, gaps between planning ambition and delivery capacity (resources, procurement and data routines), continuity risks linked to political or administrative cycles and monitoring foundations that remain insufficiently robust to support adaptive management. These patterns imply that resilience cannot be delivered solely through isolated technical measures; it requires planning processes that strengthen governance ownership, accountability, data-driven monitoring and repeatable learning mechanisms.

A practical implication of the MED COLOURS approach is that Phase 3 (Measure Planning) does not start from a blank slate. Feasibility studies and pilot design work have already developed,



planned or operationally defined measures in several partner cities, and these initiatives should be treated as "seed packages" for Phase 3. Positioning pilots in this way ensures continuity between diagnosis and implementation, as the resilient Sulp methodology can formalise these measures into integrated packages with clear responsibilities, timelines, financing logic and KPIs (including resilience-oriented indicators), while expanding them with complementary actions identified through the diagnostic findings. This approach accelerates delivery by focusing Phase 3 on packaging, hardening, sequencing and scaling.

Building on the evidence base and the pilot foundations, the deliverable then explains how resilience is systematically integrated into the Sulp Topic Guide through a small set of targeted enhancements. Resilience is embedded early by strengthening working structures, redefining scope through a functional "risk-shed" perspective and adopting foundational resilience standards at the outset. Strategy development is upgraded by introducing locally relevant climate shock narratives into scenario building and by extending targets and indicators to quantify resilience alongside traditional performance metrics. Measure planning is reinforced through maturity-matched selection logic that prioritises robustness and redundancy, clearer assignment of responsibilities through a structured resilience risk register and investment framing that incorporates the cost of inaction and critical system dependencies. Finally, implementation and monitoring are transformed from passive reporting to active adaptation through predefined triggers, transparent dashboards that support social licence and post-disruption debriefs that institutionalise learning and continuous updating.

Overall, the deliverable equips the partner cities and the wider Euro-MED community of practice with a coherent methodology for evolving SulpS into living governance systems capable of sustaining essential freight functions under climate stress while supporting decarbonisation pathways. By linking structured diagnosis to implementation-ready guidance, and by explicitly leveraging MED COLOURS pilots as the starting portfolio for Phase 3, the framework strengthens the likelihood that measures can be adopted, delivered, monitored and iterated over time.



3. Introduction

Modern cities are complex, interconnected systems whose vitality depends on the reliable flow of goods and services. These urban logistics networks (the very arteries of daily economic and social life) now operate in an environment of unprecedented volatility. The convergence of rapid digitalization, climate-related shocks and geopolitical instability has created a “polycrisis” where disruptions are no longer isolated events but compounding, interconnected threats (Dodman et al., 2022). In urban contexts, hazards interact with exposure and vulnerability to produce cascading and compounding risks that propagate across infrastructure and services, amplifying single events into system-wide failures (Dodman et al., 2022). The Mediterranean basin is a climate hot spot, facing higher-than-average warming, marine and atmospheric heatwaves, drought and coastal flooding (conditions that regularly disrupt port and last-mile operations) (Ali et al., 2022; Zittis et al., 2022). At the same time, the surge in e-commerce has fundamentally altered last-mile delivery dynamics, intensifying curb pressure and adding variability to demand and service levels (World Economic Forum, 2024). As noted by global risk and urban literature, these pressures expose a fundamental vulnerability at the heart of our urban centers, threatening to halt economic activity and jeopardize the well-being of citizens (Dodman et al., 2022; World Economic Forum, 2024).

In this new reality, the strategic priority must shift towards resilience. Rather than a simple ability to “bounce back”, resilience encompasses a dynamic capacity to anticipate, absorb, adapt and recover from shocks and stresses (Linkov et al., 2018). Classic systems work (Holling, 1973) and social-ecological scholarship (Walker et al., 2004) emphasize that resilience is not a single attribute but a constellation of capabilities that shape system behaviour under deep uncertainty; in practice, resilience complements (not replaces) traditional risk management by focusing on maintaining critical functionality and enabling rapid reconfiguration when conditions change (Linkov et al., 2018). Drawing from established resilience theory, this document adopts five mutually reinforcing dimensions that must be woven into the fabric of urban planning:

- Infrastructural resilience concerns robustness and designed redundancy (alternative routes, multimodal options and distributed micro-hubs) to avoid single points of failure (Holling, 1973; Dodman et al., 2022).
- Operational resilience refers to the continuity of logistics processes through flexible re-routing, resource re-allocation and rapid deployment of alternative modes under restrictions or congestion (Walker et al., 2004; Linkov et al., 2018).
- Economic Resilience reflects the ability of local businesses, particularly Small and Medium-sized Enterprises (SMEs), to maintain operations during and after disruptions, stabilizing the supply of essentials and preventing cascading failures (Dodman et al., 2022).
- Social resilience ensures equitable access to essentials, such as food and medicine, for all communities during crises, thereby sustaining public health, trust and social stability (Dodman et al., 2022).
- Institutional Resilience is defined by governance agility (inter-departmental coordination, evidence-based decisions under pressure and continuous learning so policies evolve with emerging risks) (Linkov et al., 2018; Wefering, 2013).

While the primary focus of this deliverable is the systematic integration of resilience within urban logistics planning, it is recommended that these efforts be pursued in parallel with an explicit decarbonisation transition pathway. Although the resilience lens provides the capacity to



anticipate, absorb and withstand disruptive events, it does not, in isolation, guarantee that systems will converge on the climate objectives of the EU. For this reason, a resilience-enhanced Sulp should be coupled with a complementary "vision and transition" perspective. This approach articulates a credible net-zero trajectory for urban freight by 2050 and translates it into interim milestones (2030, 2035 and 2040) to progressively lock in emissions reductions. By aligning the "just-in-case" redundancy of resilience with the "net-zero" requirements of mitigation, such as the deployment of zero-emission fleets and the necessary charging and energy infrastructure, cities can ensure that survivability under shocks reinforces the steady transformation towards climate neutrality. This alignment prevents competition between the objectives of adaptation and mitigation, ensuring that the infrastructure and operational flexibility developed for resilience also support the long-term goals of the EU.

Achieving this holistic resilience requires a fundamental shift in planning (from a singular focus on "just-in-time" efficiency to a balanced, proactive "just-in-case" framework that keeps critical functions available under stress) (Linkov et al., 2018). Although the primary instrument for enacting this shift at the municipal level is the Sustainable Urban Logistics Plan (Sulp), existing Sulp guidelines (e.g., Aifandopoulou, 2019; Wefering, 2013) were primarily designed for conditions of relative stability. The methodology of these guidelines focuses on mitigating negative externalities (emissions, congestion and noise) assuming the transport network remains functional; consequently, they do not currently offer a structured framework for redundancy planning or rapid adaptation to acute shocks. To bridge this gap, this deliverable enhances the Sulp into a dedicated governance tool through which cities can strategically manage the complex world of freight transport by translating abstract resilience goals into concrete, implementable actions.

Deliverable D1.2.1, "Guidelines for Resilient Urban Logistics Planning", provides a clear framework for this evolution. As a key output of the MED COLOURS project, the primary goal of the document is to offer an adapted framework for resilience-enhanced Sulps, positioned as an enhancement to existing European Union (EU) guidance. Consequently, this document targets a multi-layered audience: primarily, it serves the Euro-MED community of practice (specifically city planners and practitioners) and the MED COLOURS partner cities by offering actionable tools to navigate uncertainty, while secondarily addressing the European Commission and the research sector by highlighting critical gaps in current methodologies and demonstrating the specific needs for strengthening the standardized Sulp Guidelines. Methodologically, the deliverable proceeds in three linked steps that mirror the structure of the report. Chapter 4 establishes the baseline by outlining the canonical Sulp cycle and the implementation logic of the process; Chapter 5 grounds the framework in evidence through a two-pillar diagnosis that combines an ecosystem-based innovation readiness assessment with an implementation-focused Sump/Sulp assessment, producing the city diagnostic profiles and the corresponding city-oriented directions for Sulp strengthening. Finally, Chapter 6 translates these findings into a generalised resilience-enhanced Sulp methodology, specifying where and how the standard cycle is extended (through new steps, added activities, tools and best-practice guidance) so that risk-awareness, adaptive monitoring and institutional learning are embedded as repeatable functions of the planning of urban logistics.

4. Sulp Guidelines

The established foundation for this work is the Topic Guide: Sustainable Urban Logistics Planning (Aifandopoulou, 2019), developed under the Sustainable Urban Mobility Plan (SUMP) framework (Wefering, 2013) and building on earlier European Sulp methodology work (Ambrosino, 2015). In this architecture, the Sulp is the freight-specific, implementation-oriented plan that operationalises the goods-related objectives of the SUMP through concrete measures, responsibilities, financing and monitoring. Crucially for resilience, the SUMP/Sulp planning approach is iterative, stakeholder-driven and evidence-based, making it a natural “home” for adaptive mechanisms such as update triggers, redundancy planning and contingency protocols responding to compounding risks (Aifandopoulou, 2019). Recent EU guidance further reinforces this implementation logic by treating innovation uptake as a managed planning function, encouraging cities to combine enabling regulations and incentives with living labs and “regulatory sandboxes” to test, validate and scale sustainable logistics solutions in cooperation with private stakeholders (EGUM, 2024a).

While a SUMP sets the overarching mobility vision for people and goods, urban logistics is often treated as secondary; however, the commercial nature of freight, the diversity of private actors and distinct operational patterns demand a dedicated planning process. The Sulp provides this focus, serving as an essential action plan that translates high-level freight-related SUMP goals into tangible measures (functioning as the implementation engine for the logistics component of the mobility strategy of a city). This role is even more critical in the context of the transition towards zero-emission urban logistics by 2030, which calls for shared frameworks and sustained collaboration between cities/regions and companies to de-risk investments and accelerate deployment (ALICE-ETP & POLIS, 2021). In practice, this means the Sulp should not only define measures (e.g., consolidation/micro-hubs, curb management, Zero-Emission Vehicle (ZEV) deployment) but also embed the data governance required to run and adapt them: EU recommendations emphasise purpose-oriented, fair (and often voluntary) data sharing, leveraging existing data sources and interoperable tools/standards rather than bespoke local platforms (an essential enabler for evidence-based monitoring, continuous improvement and resilient operations) (EGUM, 2024b).

Figure 1 presents the Sulp cycle as an adaptation of the well-established SUMP planning framework, because Sulp is intentionally designed to “plug into” the same 12-step, iterative planning logic (preparation and analysis → strategy development → measure planning → implementation and monitoring). The diagram therefore uses the familiar SUMP circle as its backbone, but it is Sulp-specific in how it is read: the star symbols mark the steps where freight logistics requires additional or different work compared with general mobility planning. These starred points highlight, for example, where the process must explicitly incorporate the commercial nature of freight, the wider set of private stakeholders (carriers, shippers, receivers, logistics service providers), freight-relevant data sources and indicators, and the design of targeted measure packages (e.g., loading/curb management, consolidation solutions, zero-emission delivery plans) and governance arrangements to ensure implementation. In this way, the figure should be interpreted as a Sulp overlay on the SUMP process, making clear that Sulp follows the same planning cycle while systematically flagging where a dedicated freight lens is essential.



Figure 1: Sustainable Urban Logistics guidelines framework.

Specifically, the guide outlines a structured 12-step, 4-phase cycle, designed to ensure planning is comprehensive, stakeholder-driven, and geared towards continuous improvement.

Phase 1: Preparation & Analysis – Laying the Groundwork

This initial phase is the diagnostic heart of the planning process. Its objective is to establish a solid, evidence-based foundation by gathering data, engaging stakeholders, and defining the planning parameters before any strategies are developed. It ensures that the SULP is grounded in a clear understanding of the existing reality.

- Step 1: Set up working structures
- Step 2: Define the development process and scope
- Step 3: Analyze the current Urban Freight Transport (UFT) situation

Phase 2: Strategy Development – Setting the Direction

Moving from analysis to ambition, this phase is about creating a shared, long-term vision with clear, measurable goals. It is a highly collaborative stage where the city and its stakeholders collectively decide on the desired future for urban logistics and define what success will look like.

- Step 4: Build and jointly assess scenarios
- Step 5: Develop vision and objectives
- Step 6: Set targets and indicators



Phase 3: Measure Planning – Designing the Interventions

This is the tactical phase where strategy is translated into concrete action. It focuses on selecting, detailing, and preparing an integrated package of measures for implementation, ensuring that interventions are coordinated, funded, and have clear lines of responsibility.

- Step 7: Select measure packages
- Step 8: Agree on actions and responsibilities
- Step 9: Prepare for adoption and financing

Phase 4: Implementation & Monitoring – Making it Happen and Learning

The final phase brings the plan to life and establishes a cycle of continuous improvement. It is about managing the practical rollout of measures while simultaneously monitoring their impact, allowing the Sulp to be a "living document" that can be adapted over time based on real-world feedback and performance data.

- Step 10: Manage implementation
- Step 11: Monitor, adapt, and communicate
- Step 12: Review and learn lessons

To build true resilience, this established process must be enhanced with new analytical tools and a more adaptive mindset. The following chapter details the diagnostic methodology developed within MED COLOURS to identify the specific gaps and weaknesses that must be addressed to make this framework truly resilience-ready.



5. System Diagnosis

To make the Sulp cycle described in Chapter 4 resilience-ready, it is first necessary to understand the locations and causes of breakdowns within current planning and implementation practices in real urban logistics systems. Resilience upgrades cannot be applied as generic add-ons; they must be targeted to the specific institutional, operational, data and market conditions that determine whether measures can be designed, adopted and delivered under uncertainty. For this reason, Chapter 5 establishes the evidence base for the subsequent guideline updates. The chapter introduces and applies a two-pillar analytical framework to diagnose each MED COLOURS partner city by combining a forward-looking assessment of structural capacity for change (innovation readiness) with a backward-looking assessment of implementation experience (SUMP/Sulp performance). The synthesis of these complementary perspectives produces city diagnostic profiles that identify the key bottlenecks and the reasons for their persistence. This provides a defensible basis for the targeted, procedural enhancements to the Sulp cycle presented in Chapter 6.

5.1. Pillar 1: The Ecosystem Approach & Innovation Readiness

The first pillar of the diagnostic framework provides a forward-looking assessment of the structural capacity of each city for change. To move beyond a simple inventory of assets or policies, this pillar adopts an "ecosystem approach" (a methodology that views urban logistics not as a set of isolated components, but as a complex, interconnected system of governance, infrastructure, technology and actors). The primary objective is to evaluate the "innovation readiness" of a city (its inherent potential to absorb, adapt and implement new solutions). This provides a crucial baseline of the systemic strengths and weaknesses of the city, offering a structured, top-down view of its potential before examining its practical performance in the second pillar.

5.1.1. Ecosystem approach

The ecosystem approach represents a sophisticated evolution in how planners and policymakers conceptualize and address the intricate dynamics of urban transportation. It advocates for a comprehensive examination of urban logistics, viewing it not as a series of independent activities but as a complex network of interconnected elements spanning physical infrastructure, technological advancements, regulatory landscapes and the diverse behaviors of all actors involved. Contrary to traditional methodologies that often focus on singular modes of transport or isolated policy interventions, the ecosystem approach encourages a broad overview, recognizing the symbiotic relationships and feedback loops within the entire system. A central tenet of this approach is the principle of inclusive stakeholder engagement, which is essential for co-developing tailored, innovative solutions that are responsive to the nuanced demands of specific urban settings.

This methodology has an established lineage in European research, building on the pioneering work of projects like SPROUT, which first integrated both passenger and freight mobility into a single analytical framework. This holistic model then evolved and specialized within the URBANE project, which refined the framework to focus exclusively on the deep complexities of urban

freight logistics. It is this freight-specific iteration of the ecosystem framework that the MED-COLOURS project now adopts for its analysis, providing a targeted and robust methodology for diagnosing the unique challenges of urban goods movement.

To provide a structured way for cities to analyze their readiness for innovation, this approach defines a general Innovative Urban Logistics Ecosystem composed of six core, interconnected elements. These provide a framework for assessing the maturity of a city and guiding the development of its SULP.

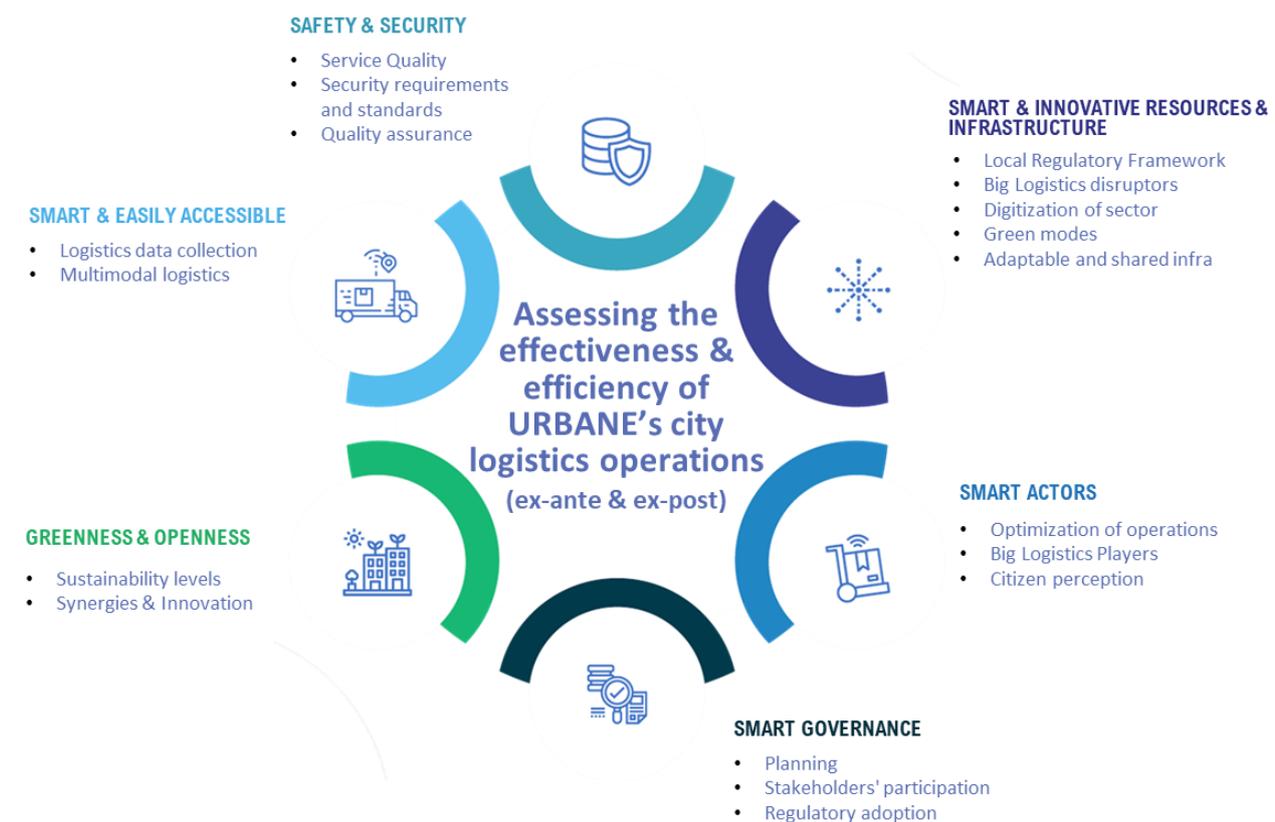


Figure 2: The Urban Logistics ecosystem approach (Aifantopoulou et al., 2025).

The first element, **SMART & INNOVATIVE RESOURCES & INFRASTRUCTURE** represents the physical and digital foundation that enables innovative logistics. It encompasses the deployment of smart infrastructure, a regulatory environment conducive to innovation and the integration of key technologies. This foundation is shaped by the specific Local Regulatory Framework, which includes the rules and ordinances governing traffic, emissions and infrastructure use. The reason this element remains here instead of governance, it is because it is crucial to identify a city's infrastructure capacity. It is influenced by Big Logistics Disruptors, which are the innovative technologies and market trends like e-commerce and autonomous vehicles that are reshaping the sector. A key aspect is the Digitization of Sector, which measures the adoption of digital tools and data analytics to streamline operations. This element also includes the provision of Green Modes, such as electric vehicles (EV) and cargo bikes, supported by the necessary infrastructure and incentives, alongside the availability of Adaptable and Shared Infrastructure, like flexible loading zones and urban logistics hubs that support efficient and decarbonized activities.



The ecosystem is driven by **SMART ACTORS**, who are the key enablers of innovation and collaboration. This group includes logistics service providers, city planners, technology developers and the community, all working together to implement and optimize smart solutions (e.g. on demand delivery). The effectiveness of these actors is seen in their ability to achieve Optimization of Operations by leveraging data and technology for dynamic routing and real-time monitoring. The presence and influence of Big Logistics Players also shape the trajectory of the market, while the ultimate success of new initiatives often depends on Citizen Perception, which encompasses the attitudes, preferences and acceptance of residents towards new logistics solutions.

Next, **SMART GOVERNANCE**, serves as the strategic and operational backbone of the ecosystem. It integrates advanced planning, policy development and stakeholder collaboration to ensure the system is guided by a clear vision and driven by data-informed decisions. This is reflected in the quality of strategic Planning, which assesses organizational agility, political stability and inter-departmental cooperation. It is also defined by the degree of Stakeholders Participation, emphasizing the importance of building strong public-private relationships and utilizing tools like multi-stakeholder platforms. Finally, it relies on the agility of Regulatory Adaptation, meaning the ability to adjust policies and legal frameworks to support new technologies and business models, ensuring that governance can keep pace with innovation.

Central to the purpose of the ecosystem is **GREENNESS & OPENNESS**, which reflects the integration of sustainable environmental management and low-carbon operations. This element is assessed through two interconnected lenses. First is the Sustainability Levels of the City Logistics System, which measures the direct environmental impact of logistics by tracking the adoption of clean vehicles, renewable energy and practices that reduce emissions and waste. Second is the Openness of the City to Synergies & Innovation, which evaluates the willingness of a city to engage in partnerships, support pilot projects and foster a culture that actively seeks out and integrates cutting-edge solutions to enhance both environmental performance and operational efficiency.

The flow of goods and information is managed through **SMART & EASILY ACCESSIBLE CITY LOGISTICS NETWORKS**. This element focuses on the connectivity and accessibility of operations across the urban landscape. Its foundation is robust Logistics Data Collection, which involves the systematic gathering, processing and analysis of information to support planning and decision-making. This data then enables the effective use of Multimodal Logistics, which is the integration and coordination of different transport modes (such as road, rail and water) to optimize freight movements, reduce reliance on trucks and create a more resilient and efficient network.

Finally, the commitment to **SAFETY & SECURITY** is fundamental to the success and sustainability of the ecosystem. This element ensures that the logistics system is reliable, trustworthy and meets the quality expectations of its users. It is upheld through a focus on Service Quality, which measures the satisfaction, reliability and performance of logistics from the perspective of the end-user. It also depends on the establishment of clear Security Requirements and Standards to protect infrastructure and operations from risks like theft and cyber threats. This is all underpinned by a system of Quality Assurance, which involves the continuous monitoring, evaluation and improvement of all logistics initiatives to maintain high standards of excellence and reliability.

5.1.2. Innovation Readiness Urban Logistics Self-Assessment Tool

This detailed ecosystem framework provides a comprehensive lens through which to assess a city's current state and identify strategic priorities. To operationalize this assessment, a dedicated self-assessment instrument, the Innovation Readiness UL Tool, was developed. First created in the URBANE project and now available online (<https://ia-radar.imet.gr/readiness>), this qualitative tool allows city representatives to reflect on and score their own logistics ecosystem. The tool is structured as a survey of 22 questions, each directly linked to the sub-elements (SE) of the six-pillar ecosystem framework. For each question, the user selects from a descriptive scale that represents different levels of maturity, from a low-capability baseline to a highly advanced state, thus providing a tangible way to measure a city's position within the theoretical framework. For example:

- to assess the SMART GOVERNANCE element, the tool asks questions such as "Does the city have strategic, long-term plans for sustainable urban logistics (e.g. SULP)?" with options ranging from "No Planning" to "Developing & Implementing."
- To evaluate SMART & INNOVATIVE RESOURCES & INFRASTRUCTURE, it includes questions like "How widely do companies adopt green transportation modes... and how do city infrastructure and incentives facilitate this?" with a scale from "Lack of adoption" to "High Utilization."

This pattern continues for all six elements, probing topics like the use of digital tools to assess SMART ACTORS, the extent of multimodal operations for SMART & EASILY ACCESSIBLE NETWORKS, and the adoption of live tracking platforms to measure SAFETY & SECURITY. It is important to note that this tool is not an objective, external audit, but a structured self-reflection mechanism. Its purpose is to provide a snapshot of a city's perceived strengths and weaknesses based on the expert judgment of its own representatives, serving as a crucial starting point for deeper analysis rather than a definitive, objective judgment of its capabilities.

Table 1: The Innovation Readiness Urban Logistics Self-Assessment Tool.

Element (E)		Sub-element (SE)		Question (Q)	
E1	Smart Governance	SE1	Planning	Q1	Does the city have a vision for green and sustainable urban logistics plan?
				Q2	Does the city have strategic, long-term plans for sustainable urban logistics (e.g. SULP) to meet the visions involving stakeholder co-creation?
				Q3	How is the interrelation between SUMP and SULP articulated, and how is their alignment with national/local policies?
				Q4	Is there a dedicated team/department/responsible person for orchestrating and planning city logistics (infrastructure, operations)?
				Q5	How data-driven is the current planning process, and to what extent are dedicated tools utilized?

Element (E)		Sub-element (SE)		Question (Q)	
				Q6	How is communication facilitated among municipality departments and region, for coordinating and planning city logistics?
		SE2	Stakeholders' participation	Q7	How engaged were the stakeholders in the development and design of the urban logistics plan, and how is their ongoing involvement ensured?
		SE3	Regulatory Adaptation	Q8	Is the current regulatory framework adaptive to changes to accommodate emerging trends for logistics activities?
E2	Smart & Innovative Resources & Infrastructure	SE4	Local Regulatory Framework	Q9	Which of the following regulatory constraints are actively implemented in the city?
		SE5	Big Logistics disruptors	Q10	How many last-mile delivery companies in the city have established their own innovative logistics infrastructure (e.g. private parcel lockers)?
				Q11	Which of the following smart city logistics initiatives have been implemented by the city's big LSPs?
		SE6	Digitization of sector	Q12	To what extent do last mile companies use digital tools, smart technologies, and platforms for their operations?
		SE7	Green modes	Q13	How widely do companies adopt green transportation modes (EVs, Cargo Bikes, hydrogen), and how do city infrastructure and incentives facilitate this?
		SE8	Adaptable and shared infra	Q14	What is the availability of (public) unutilized spaces that can potentially be used for city logistics operations?
E3	Smart Actors	SE9	Optimization of operations	Q15	To what extent do the last mile companies work with Internet of Things (IoT), AI, and big data technologies to enhance operations or provide cost savings?
		SE10	Big Logistics Players	Q16	What is the presence and market dynamics of major LSP players in the city's last mile delivery ecosystem?
		SE11	Citizen perception	Q17	What was the response of the citizens of your city to the past city logistics solutions that have been implemented?
E4	Smart & Easily Accessible City Logistics Networks	SE12	Logistics data collection	Q18	To what extent do LSPs in the city adopt standardized data storage and participate in secure data exchange with other companies?
		SE13	Multimodal logistics	Q19	What is the extent of public infrastructure utilization for multimodal transportation operations in the urban and peri-urban area of the city?
E5	Safety & Security & Quality	SE14	Service Quality	Q20	To what extent do the last mile companies of your city provide a platform with live tracking of the parcel?

Element (E)		Sub-element (SE)		Question (Q)	
		SE15	Security requirements and standards	Q21	How efficiently does the city's regulatory framework adapt to establish security requirements for new logistics infrastructure?
		SE16	Quality assurance	Q22	Which administrative level assumes primary responsibility for conducting environmental impact assessments related to urban logistics activities?

The tool is structured as a survey of 22 questions, each directly linked to the sub-elements (SE) of the six-pillar ecosystem framework. For each question, respondents select a maturity level on a 1–5 descriptive scale (from low-capability baseline to advanced practice), providing a structured snapshot of the city's perceived strengths and weaknesses. It is important to note that this tool is not an objective external audit, but a guided self-reflection mechanism intended to support discussion and prioritisation rather than produce a definitive assessment.

5.2. Pillar 2: The SUMP/SULP Assessment

While the ecosystem approach provides a crucial framework for understanding the potential of a city for innovation, it is equally important to diagnose the practical reality of implementing urban logistics plans. Strategic documents often fail not due to poor theory, but due to real-world barriers encountered during the complex implementation phase. To bridge this critical gap between planning and execution, the SUMP/SULP Assessment was conducted (find the template at Appendix A). The purpose of this assessment is to move beyond a static snapshot of the capabilities of a city and delve into its dynamic, lived experience. By systematically capturing the lessons learned from past and ongoing efforts, the assessment uncovers the critical factors that determine the success or failure of urban logistics measures on the ground. This qualitative, experience-based diagnosis is essential for creating new guidelines that are not only ambitious but also pragmatic, robust and grounded in the complex reality of municipal governance.



Assessment of SUMP/SULPs state of implementation			
A.	Initial Background Information	Does your city/municipality have an official Planning Document related to city logistics?	Comment
		Example: "Yes - Other - please specify"	Example: "The city has a Sustainable Urban Mobility Planning (SUMP) but the Sustainable Urban Logistics Planning (SULP) is under development. SULP document considers logistics related measures"
	Please select an option from the drop down list of the right cell! and fill the 'Comment' column if needed		Add your comment (Optional)
B.	Level of implementation	What are the Urban Logistics measures your city implements in the context of your planning? Please outline them below.	Level of implementation
		Example: "Creation of low emission zones, climate-neutral districts, and areas with limited access by conventional vehicles"	Example: "Partially implemented"
	Please fill to the right cell all the different Urban Logistics measures that has been implemented at your city and the state of implementation. Measure 1, ...		Add your comment (Optional)
	Feel free to add more Measures or erase if there are extra.		
C.	Monitoring	What is the value at the baseline year?	What is the value at the target year?
	Example: "KPI-1: Average number of cars entering the city center daily"	Example: "500 (2020)"	Example: "100 (2030)"
	Please identify the city logistics related KPIs that your planning document suggest to measure. For each KPI, fill the baseline and the target/year value.		
	Feel free to add or remove KPIs for each measure.		
D.	Evaluation	Please describe the reasons that led to delays in the implementation of the measure	What would you identify as the main factors that enabled the successful implementation of the measure?
	For each measure, identify the delays, enablers and failures during the implementation.	Examples not exhausted, please add your own: Budgetary constraints or financial issues, Changes in political leadership or priorities, Technological challenges or lack of necessary infrastructure, Resistance or opposition from stakeholders or interest groups, Regulatory or bureaucratic hurdles, Inadequate resources (human, technical, etc.), Insufficient data or research to support implementation, External factors (e.g., economic downturn, natural disasters).	Examples: Strong political will and leadership, Adequate funding and resource allocation, Inclusive stakeholder engagement and collaboration, Clear and achievable objectives, Effective public communication and awareness campaigns, Robust technological support and infrastructure, Data-driven decision-making and continuous monitoring, External support from national government or international organizations.
			What would you identify as the main factors that contributed to the failure of the measure's implementation? Examples: Insufficient understanding or knowledge of the local context, Poor project management or oversight, Lack of continuity in leadership or frequent policy changes, Inadequate engagement with key stakeholders, Technical issues or system failures, Ineffective communication or public resistance, Unforeseen challenges or complications during implementation, Inconsistent or lacking financial support.

Figure 3: The SUMP/SULP assessment template (source: own elaboration).

The assessment is structured to capture a holistic view of the implementation process by focusing on several key areas. First, it establishes a baseline of concrete action by cataloging the specific Urban Logistics Measures that cities have attempted to implement, moving the analysis from abstract strategies to tangible interventions. Second, it probes the approach of the city to monitoring by identifying the Key Performance Indicator (KPIs) used to track progress, revealing whether past actions were data-driven and if their impacts were systematically measured. Most critically, the assessment performs a qualitative analysis of the implementation journey for each measure, focusing on three key areas. It seeks to identify the delays and underlying reasons that hindered or slowed down progress, such as budgetary shortfalls or political shifts. It also pinpoints the enablers, which are the positive forces that contributed to successful implementation, such as strong political will, effective stakeholder collaboration or supportive national policies. Finally, it uncovers the specific failures and barriers that caused a measure to fall short of its goals, providing invaluable insight into practical challenges like unexpected public resistance, technological shortcomings or institutional friction. By systematically collecting and analyzing this information, the SUMP/SULP assessment creates a rich, evidence-based narrative of the practical experience of each city. It reveals the real-world complexities and patterns of success and failure that must be understood and addressed in order to develop a truly effective and resilient planning framework.

5.3. Synthesizing the Pillars for Diagnosis

The city-specific diagnoses presented in the following case studies are not the direct output of a single tool, but the result of a deliberate synthesis of the two distinct, yet complementary, assessments described previously. This two-pillar analytical framework was designed to create a holistic, robust, and evidence-based understanding of each city's urban logistics system by combining its theoretical potential with its practical performance.

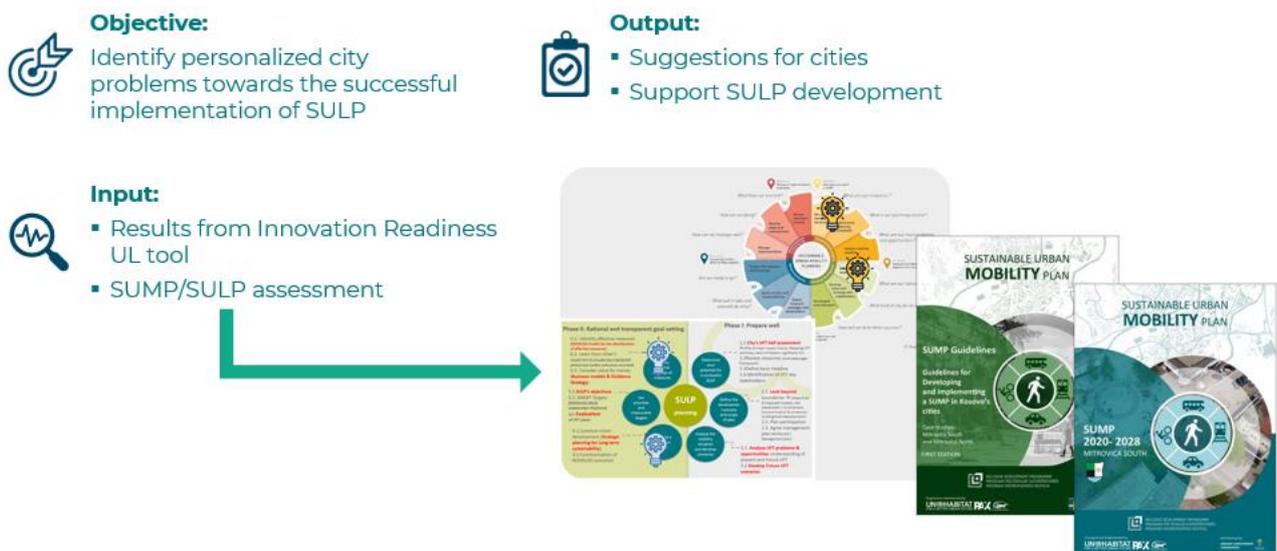


Figure 4: The urban logistics ecosystems diagnosis methodology

The first pillar of the analysis is the Innovation Readiness Assessment. This tool provides a structured, forward-looking evaluation of the city's urban logistics ecosystem. It measures the city's inherent potential and structural capacity for change by scoring its maturity across key elements like governance, infrastructure, and stakeholder networks. This pillar answers the question: "Is the city's system designed for success?"

The second pillar is the SUMP/SULP Assessment. This tool provides a crucial, backward-looking analysis of the city's practical performance. It moves beyond potential to examine the documented history of what actually happened when measures were implemented. By capturing the real-world enablers, barriers, and delays, this pillar answers the question: "How has the city actually performed in practice?"

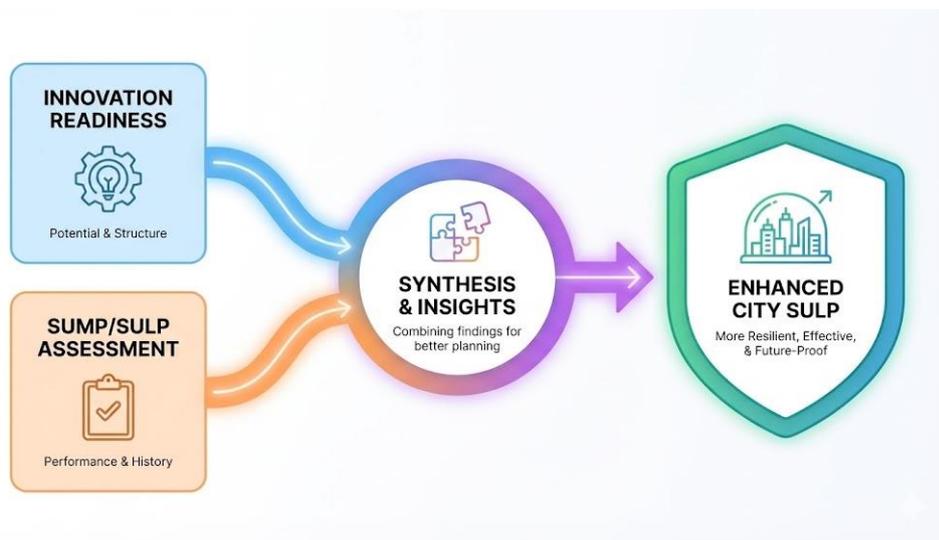


Figure 5: The diagnosis pipeline for evidence driven urban logistics planning

The diagnostic power of this methodology lies in the synthesis of these two pillars. By cross-referencing the findings from both assessments, we can move from simple observation to a deeper diagnosis of systemic issues. This process involves:

- Identifying Correlations: Where a weakness identified in the Innovation Readiness tool (e.g., a low score in 'Smart Governance') is confirmed by the practical experience reported in the SUMP/SULP assessment (e.g., a consistent pattern of project failures attributed to 'changes in political leadership' or 'poor inter-departmental coordination'), we can validate the finding with high confidence.
- Diagnosing Discrepancies: In some cases, a city might appear strong on paper (e.g., having formal stakeholder structures in place) but still report poor engagement as a barrier to implementation. Such discrepancies are highly informative, as they highlight a critical gap between policy and reality, or between formal structures and informal practices.

This two-pillar approach allows for the identification of systemic weaknesses, persistent bottlenecks, and potential leverage points that would be invisible to a single assessment method. The resulting diagnosis for each city, therefore, provides a holistic understanding of not just what the problems are, but why they persist, forming a solid evidence base for the targeted analysis and recommendations that follow in the case studies.



5.4. City Diagnostic Profiles

The Two-Pillar Analytical Framework was applied to generate a detailed diagnostic profile for each MED COLOURS partner city. The following analyses synthesize the potential revealed by the Innovation Readiness Assessment with the practical experience captured in the SUMP/SULP Assessment. This integrated approach provides a nuanced, evidence-based portrait of each city's unique urban logistics ecosystem, identifying critical strengths to build upon, persistent bottlenecks that hinder progress, and the underlying reasons for systemic weaknesses. By cross-referencing a city's potential for innovation with its implementation history, these diagnoses reveal crucial gaps between policy and reality. They form the empirical foundation upon which the targeted, resilience-enhancing recommendations of these guidelines are built.

The evidence base for these diagnostic profiles is drawn primarily from the city self-assessments completed by the partner authorities and their expert teams. The Innovation Readiness results reflect qualitative scoring from the 22-question ecosystem survey, whereas the SUMP/SULP assessment captures reported implementation experience, including measures attempted, monitoring practices and perceived enablers and barriers. These diagnoses function as an evidence-informed snapshot of the baseline context, representing the situation prior to the initiation of MED COLOURS. This reflects the period before project activities, pilots and capacity-building actions could materially influence local practices or outcomes.

5.4.1. Cesena

The innovation-readiness self-assessment suggests that the strongest perceived asset of Cesena lies in governance capacity and collaborative culture, with particularly strong signals around stakeholder participation (SE2 = 5.00), inter-departmental communication (Q6 = 5.00) and the articulation/alignment between SUMP and the forthcoming SULP (Q3 = 5.00). This points to a city that is well-positioned to convene actors, coordinate internally and translate shared priorities into structured planning processes; however, the profile indicates that ecosystem components that typically support rapid scaling of logistics measures are still emerging, especially those related to resources/infrastructure (E2 = 1.85) and logistics networks (E4 = 1.00). Market-led innovation and operational enablers appear less mature, reflected in low signals for major logistics players/disruptors (SE10 = 1.00; SE5 = 1.00) and limited maturity in green modes and multimodal logistics (SE7 = 1.00; SE13 = 1.00). The data backbone also appears to be developing (e.g., SE12 = 1.00; SE16 = 1.00), suggesting that while Cesena is comparatively strong in "how to plan together", the enabling conditions for converting plans into implemented logistics capacity are still maturing.

The SUMP approved in 2022 provides the formal framework for city logistics in Cesena, with the SULP foreseen within the mobility plan and currently under development. Progress to date appears strongest where measures could be delivered through clearly defined regulatory actions and well-scoped objectives, evidenced by the new Limited Traffic Zone (LTZ) access regulation which was approved in January 2025 and is reported as fully implemented. Stakeholders noted that the clarity and achievability of the objectives, together with support from external consultants, helped move this measure from planning to delivery; meanwhile, the city has advanced elements of collaborative governance through the Local Freight Quality Partnership.

This partnership is described as partially implemented and supported by the agreement signed with SME associations in July 2024, providing an initial stakeholder base for the forthcoming Sulp. Broader measures aiming to re-balance freight movements are reported as partially implemented, although continuity has been affected by contextual factors such as changes in political leadership following elections. Several other measures (particularly those requiring new operational models, data-intensive design, additional resources or physical infrastructure such as green last-mile operations in the LTZ, short-haul optimisation, micro-hubs/logistics proximity spaces and consolidation-type facilities) have not yet started. On monitoring, Cesena indicates a set of freight-relevant KPIs and targets (including trends in city-centre access and deliveries), whereas some indicators (e.g., enforcement and loading/unloading occupation metrics) are still under development.

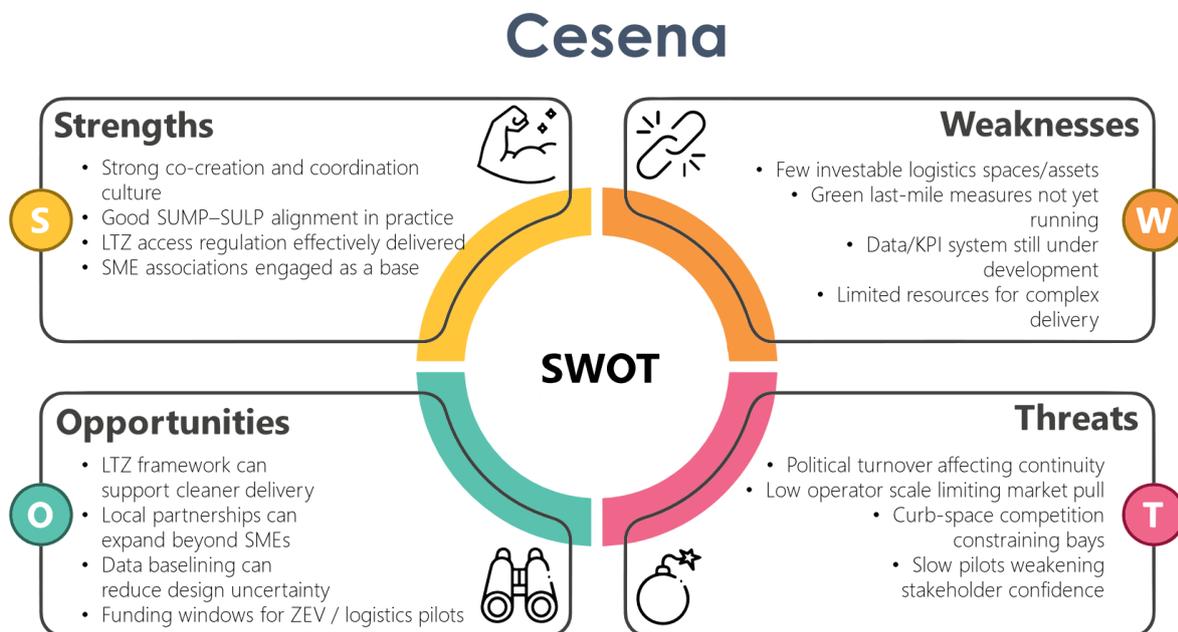


Figure 6: SWOT analysis for the city of Cesena

Taken together, the readiness profile and implementation experience indicate that the main leverage point of Cesena is to translate strong collaborative planning into implementation-ready, resourced packages for measures that require data, infrastructure and investment. In Phase 1 (Preparation & Analysis, Steps 1–3), the Sulp can consolidate the working structures that already function well (inter-departmental core team; Freight Quality Partnership roles) while strengthening the practical evidence base that supports delivery (a light, consistent baseline on delivery patterns, LTZ access/permits, loading–unloading use and enforcement, including items still "under development"). In Phase 2 (Strategy Development, Steps 4–6), it is useful to translate LTZ experience into a small set of shared objectives and indicators that remain realistic for municipal monitoring (e.g., LTZ entries, delivery volumes, compliance and curb occupancy). In Phase 3 (Measure Planning, Steps 7–8), emphasis should be placed on packaging measures that rely on resources, data and infrastructure (green last-mile in the LTZ, micro-hubs/proximity



spaces, short-haul optimisation) with clear responsibilities and feasible financing logic, so that collaborative planning more consistently converts into delivered capacity.

5.4.2. Koper

The innovation-readiness profile of Koper reflects a port-city system with solid service performance and a meaningful multimodal base, alongside areas where collaboration and shared operational optimisation could be strengthened. The self-assessment signals strengths consistent with the logistics role of the city, including multimodal logistics (SE13 = 3.00) and very strong service-quality signals (SE14 = 5.00), supported by advanced customer-facing service features such as live tracking (Q20 = 5.00). While the presence of an internal organisational anchor (Q4 = 3.00) suggests some capacity to steer logistics initiatives, collaborative structures and shared decision-making practices are not yet fully institutionalised (SE2 = 1.00). Furthermore, several operational and digital enablers appear at an early maturity stage (SE9 = 1.00; SE12 = 1.00; Q18 = 1.00; Q15 = 1.00), suggesting that while the system performs well in important respects, the "common operating layer" (data-sharing routines, optimisation practices and joint governance mechanisms) is still developing. The green transition dimension also appears to be an area for development (SE7 = 1.00), alongside constrained availability of adaptable/shared spaces (SE8 = 1.00; Q14 = 1.00).

A practical foundation for urban logistics planning has been established in Koper through an action-oriented Sulp approach developed within the SMILE project, alongside a broader mobility framework with the SUMP reported as in the process of adoption (planned for May 2025, as stated in the assessment). Implementation experience shows a gradual roll-out of core regulatory and space-management measures in the historic centre; specifically, space access limitations, time access limitations, size/weight restrictions and designated loading/unloading parking spaces are all reported as partially implemented. Several enabling conditions support this trajectory, including a compact urban core suitable for bounded pilots and the presence of pedestrian zones that provide a basis for controlled access; in parallel, Koper benefits from multimodal and infrastructure strengths linked to the port-city role, including reported improvements to port access and major rail-related investments. Conversely, implementation challenges appear less related to the absence of measures and more to the coordination and consistency needed to make measures function as a coherent operating model. Stakeholders highlighted fragmented and uncoordinated deliveries in the old town, spatial constraints for infrastructure upgrades and the role of enforcement capacity as a limiting factor. The assessment also identifies clear opportunities and enablers: stronger communication and inclusion of user groups, more targeted data collection for decision support and the uptake of technological enforcement solutions (e.g., bollards/ANPR-style license plate recognition). The strategic direction under discussion, optimising logistics in the city centre and moving toward an Urban Logistics Management Action Plan (ULMAP), is aligned with these findings, with next-step measures including a delivery time restriction decree, dedicated delivery bays, monitoring systems, parcel lockers and a green last-mile pilot (e.g., the electric "Kurjerca" concept).

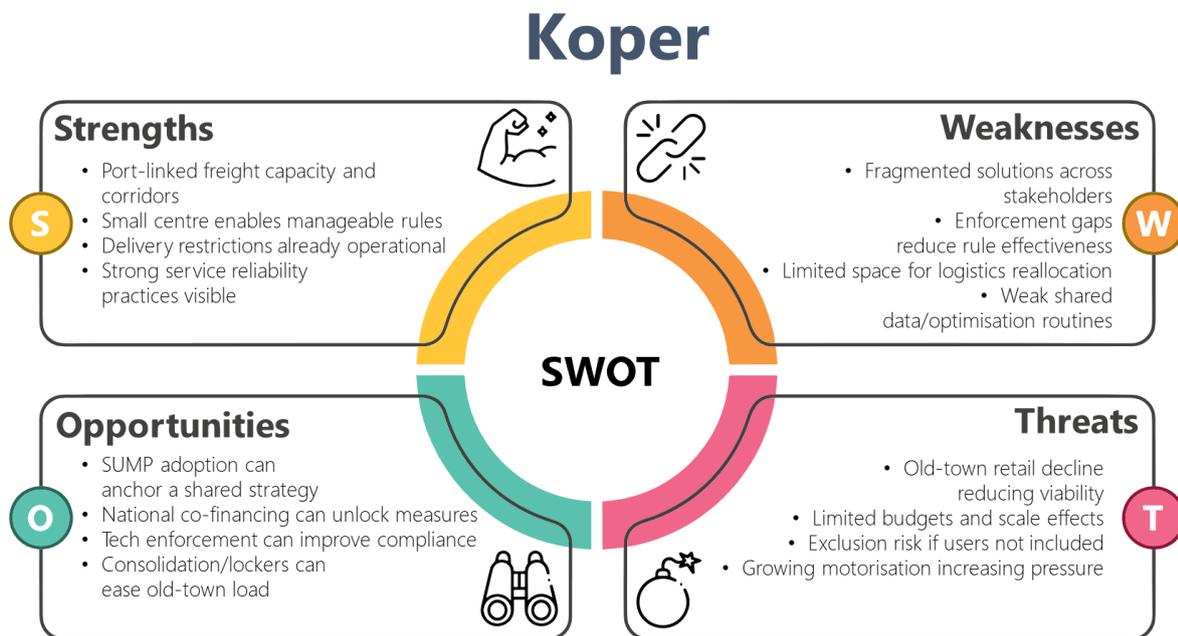


Figure 7: SWOT analysis for the city of Koper

Taken together, the readiness and implementation evidence indicate that the leverage point of Koper is to move from partial, measure-by-measure roll-out to a coordinated old-town operating model backed by institutionalised collaboration and enforceable rules. In Phase 1 (Steps 1–3), the SULP can strengthen the collaborative and operational backbone by convening a dedicated freight platform (municipality, enforcement, businesses, residents and port-related actors) and consolidating a baseline on how current access/time/size rules perform, where enforcement gaps persist and how port-related flows interact with local deliveries. In Phase 2 (Steps 4–6), scenario work can help align the SUMP/SULP direction and define a small set of indicators/milestones (e.g., permits, compliance and delivery pressure in the old town) that can be monitored over time. In Phase 3 (Steps 7–8), planned elements (time-restriction decree, dedicated delivery spaces, enforcement technology, lockers and clean last-mile pilots such as Kurjerca) can be assembled into a single coordinated package with clear roles and financing pathways (including national co-financing), enabling implementation to evolve into a coherent operating model.

5.4.3. Lisbon

The innovation-readiness profile of Lisbon suggests a dynamic, citizen- and market-driven logistics environment characterised by very strong perceived public acceptance and visible private-sector innovation. Citizen perception is rated very positively (SE11 = 5.00) and the ecosystem shows solid signals in resources/infrastructure (E2 = 3.00), supported by a strong presence of private parcel locker infrastructure (Q10 = 5.00) and a generally capable actor base (E3 = 3.57). However, the self-assessment indicates that public governance structures for freight are still consolidating, with comparatively lower maturity in Smart Governance (E1 = 2.03), including stakeholder participation (SE2 = 1.00), inter-departmental communication (Q6 = 1.00)

and the existence of a dedicated team (Q4 = 1.00). The data and assurance scaffolding also appears at an early stage (SE12 = 1.00; SE16 = 1.00; Q18 = 1.00), alongside emerging security/standards clarity (E5 = 1.45; SE15 = 1.00; Q21 = 1.00); overall, the profile depicts a city with strong innovation momentum and openness while the institutional coordination and monitoring foundations remain less mature.

Urban logistics planning in Lisbon is described as being in an inception and consolidation phase, with MED COLOURS acting as an impulse for structuring a dedicated approach and for gathering ground information to move from ad-hoc actions to a coherent strategy. Preparatory efforts are concentrated in a pilot geography (notably the historical centre and the Low Emission Zone (LEZ) context), whereas implementation experience shows that Lisbon has advanced several curb and access management building blocks. The delimitation of loading/unloading areas is reported as fully implemented (and under revision), while both the sensorisation of loading/unloading spaces and the related regulatory framework are described as partially implemented and also under review. In addition, areas with limited access for conventional vehicles (ZAAC-type controls) are reported as fully implemented. The assessment notes that the LEZ affects all vehicles and is not strictly freight-only but creates an important operating context for deliveries. Enablers include clear objectives, political will and leadership, external support (national/EU-level backing) and continuous monitoring of implementation; conversely, where delays are observed, they relate to technological challenges or missing enabling infrastructure, budgetary constraints, administrative/regulatory hurdles and, in some instances, changes in political priorities that affect continuity. The assessment also indicates that dedicated freight KPIs are still emerging.

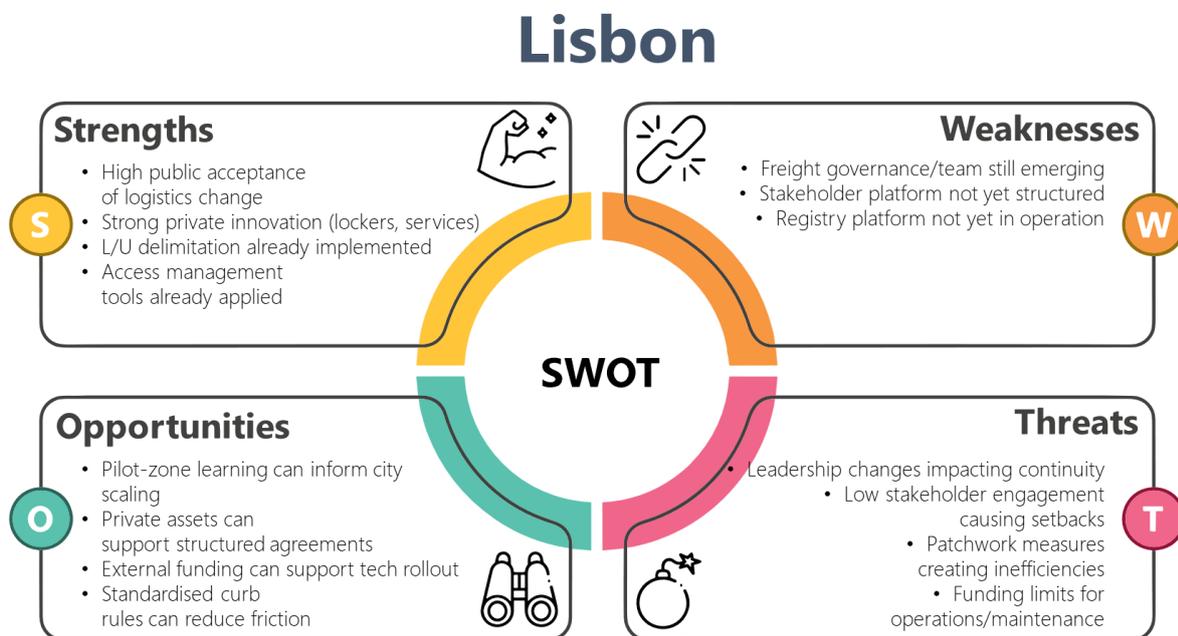


Figure 8: SWOT analysis for the city of Lisbon

Taken together, the evidence regarding Lisbon suggests a need to convert strong on-street operational momentum into a scalable, citywide governance and monitoring spine to avoid



fragmented pilot-led scaling. In Phase 1 (Steps 1–3), the SULP should clarify internal ownership, structure a Freight Quality Partnership and complete a practical baseline on loading/unloading supply, compliance and the performance of the partially sensorised bays and regulations (including what data is realistically collectable early). In Phase 2 (Steps 4–6), it is beneficial to establish a simple, monitorable set of freight objectives and indicators (still emerging in the assessment) and to clarify how access instruments (ZAAC-type restrictions and the LEZ context) contribute to those objectives. In Phase 3 (Steps 7–8), emphasis can prioritise enabling measures that support coordinated implementation: delivering the load/unload registry platform, harmonising regulation, sensorisation and enforcement and sequencing revisions so the pilot functions as a learning-and-scaling mechanism rather than producing street-by-street fragmentation.

5.4.4. Livorno

The innovation-readiness self-assessment of Livorno indicates that several ecosystem elements are still at an early stage of maturity, particularly those related to market dynamism, actor capability and collaborative conditions. The composite readiness signal is low relative to other cities (PI = 1.48); specifically, low scores across Smart Actors (E3 = 1.00), digitisation (SE6 = 1.00) and operational optimisation (SE9 = 1.00) suggest that innovation uptake is not strongly driven by the market. The profile also signals that stakeholder participation and public acceptance are developing, with low signals for participation (SE2 = 1.00) and citizen perception (SE11 = 1.00). Network and service-related elements similarly appear at a developing stage (E4 = 1.00; SE13 = 1.00; SE14 = 1.00; SE15 = 1.00). At the same time, the assessment identifies anchors to build upon, including mid-level scores for regulatory adaptation and the local regulatory framework (SE3 = 3.00; SE4 = 3.00), an existing planning baseline (Q1–Q3 = 3.00; SE1 = 2.67) and a more promising signal for green modes (SE7 = 3.00) supported by EV-charging rollout.

Livorno benefits from a formal basis for action, having adopted a SUMP in 2021 that includes a dedicated chapter on Urban Logistics; furthermore, the municipality has supported the process with a targeted study on last-mile delivery and logistics in the Old Town and City Centre. Implementation experience suggests a city progressing through early capacity-building stages, with measures moving from concept to design and initial rollout. Two initiatives are advancing in practice: the Access Control System is reported as partially implemented (with extensions and enhanced entry/exit control under development) and the electric charging programme is also partially implemented, with the first thirty charging stations deployed in line with the Electric Mobility Plan. Several complementary measures remain at design or pre-implementation stage, including the control system for freight parking lots in the inner centre, the awarding platform (design underway) and the first major revision of the Urban Vehicle Access Regulation (UVAR). Where implementation moves slowly, reasons are described as practical (resource constraints, technological readiness, infrastructure needs and financing continuity). For measures with a stronger regulatory and behavioural dimension (such as the UVAR revision), stakeholders emphasised inclusive engagement and communication to reduce resistance and misalignment. On monitoring, Livorno has outlined relevant indicators, including fleet composition targets, access reduction to the city centre, enforcement-related metrics, safety indicators and process indicators (e.g., stakeholder meetings). A recurring spatial trade-off is highlighted involving

limited loading/unloading bays in the historic centre alongside constraints on expanding them due to competing parking and street-space demands.

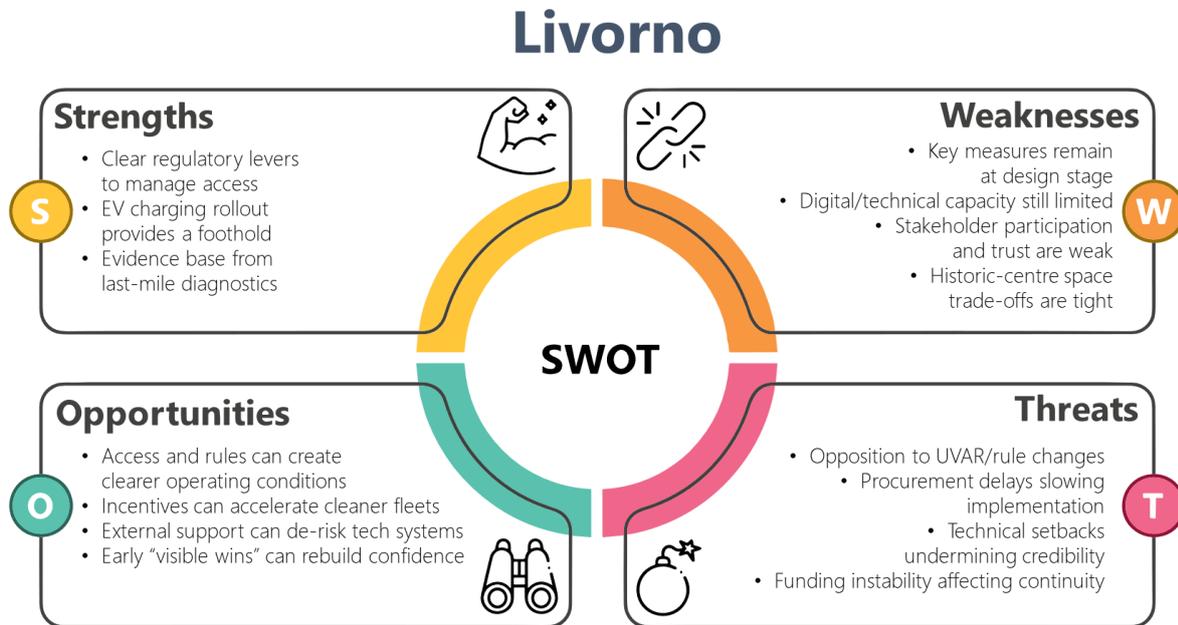


Figure 9: SWOT analysis for the city of Livorno

Taken together, the diagnosis of Livorno indicates that the priority is to build delivery capacity and stakeholder confidence by sequencing a small set of feasible measures around existing regulatory and charging foundations. In Phase 1 (Steps 1–3), the Sulp can consolidate baseline constraints of the historic centre (access patterns, fleet composition, curb-space trade-offs and limits to expanding loading/unloading capacity) while strengthening engagement and confidence-building processes. In Phase 2 (Steps 4–6), it is useful to translate the already stated KPIs (fleet transition, access reduction, enforcement and safety/process indicators) into a small set of agreed targets and a monitoring approach that matches municipal capacity. In Phase 3 (Steps 7–8), emphasis can be placed on sequencing the measures currently in design (freight parking control, awarding platform and UVAR revision) so they complement partially implemented access control and charging rollout, while clarifying responsibilities, funding continuity and stakeholder engagement/communication around rule changes to reduce implementation risk.

5.4.5. Lyon

The innovation-readiness profile of Lyon suggests a high-performing private logistics ecosystem with strong optimisation capacity, alongside governance, data and social-perception dimensions that may require attention to support system-wide resilience. The self-assessment indicates excellent operational optimisation maturity (SE9 = 5.00) supported by advanced technology uptake (Q15 = 5.00) and a strong Smart Actors signal (E3 = 3.57); in parallel, safety/security/quality



is rated at a solid level (E5 = 3.00), with quality assurance showing mid-level maturity (SE16 = 3.00) and regulatory adaptation tools present (SE3 = 3.00). However, the profile indicates that network design and multimodality are perceived as less mature (E4 = 1.00; SE13 = 1.00) and that the public-sector data backbone for shared planning and interoperability is perceived as weak (SE12 = 1.00; Q18 = 1.00). Within governance, the composite score is mid-range (E1 = 2.64) but includes lower-rated elements for strategic articulation and coordination (Q3 = 1.00; Q5 = 1.00; Q6 = 1.00); moreover, a particularly important signal is the low citizen perception score (SE11 = 1.00), suggesting that social licence is a sensitive factor for future scaling.

Lyon stands out in the SUMP/SULP assessment as a city with a clear metropolitan-scale strategic basis and a strong track record of implementation. The Métropole has an established SULP orientation reinforced by the DOLB&S (Document d'Orientations sur la Logistique des Biens et des Services), published in October 2024. This strategic maturity is reflected in the breadth of measures reported as delivered: commercialisation of urban logistics spaces in mobility spaces managed by Lyon Parc Auto (LPA) (three centrally located areas dedicated to decarbonised last-mile logistics, totalling 869 m², with five operators selected), the Espace Logistique de Proximité (ELP) St-Fons functioning as a proximity logistics space/UCC-type asset and a Low Emission Zone (ZFE) in place since 2022 for logistics activities. Lyon is also advancing enabling infrastructure, with multi-energy charging stations partially implemented (one operating in Dardilly; a second planned in the eastern suburbs) and several projects underway or scheduled (underground logistics spaces under developments, a UCC in Villeurbanne for shops reported as planned for commissioning between 2025 and 2028 and a Low Traffic Area in the historic centre reported as planned for June 2025). Monitoring is articulated through measurable KPIs linked to deliverables (logistics space surface area, extent of regulated areas and number of stations). The evaluation reports no major delays for most measures; where risks are noted, they relate to external market conditions (real-estate cycle) and aligning viable business models. Enabling conditions recur as key success factors: political willingness, workable business models and strong connection with users and stakeholders.

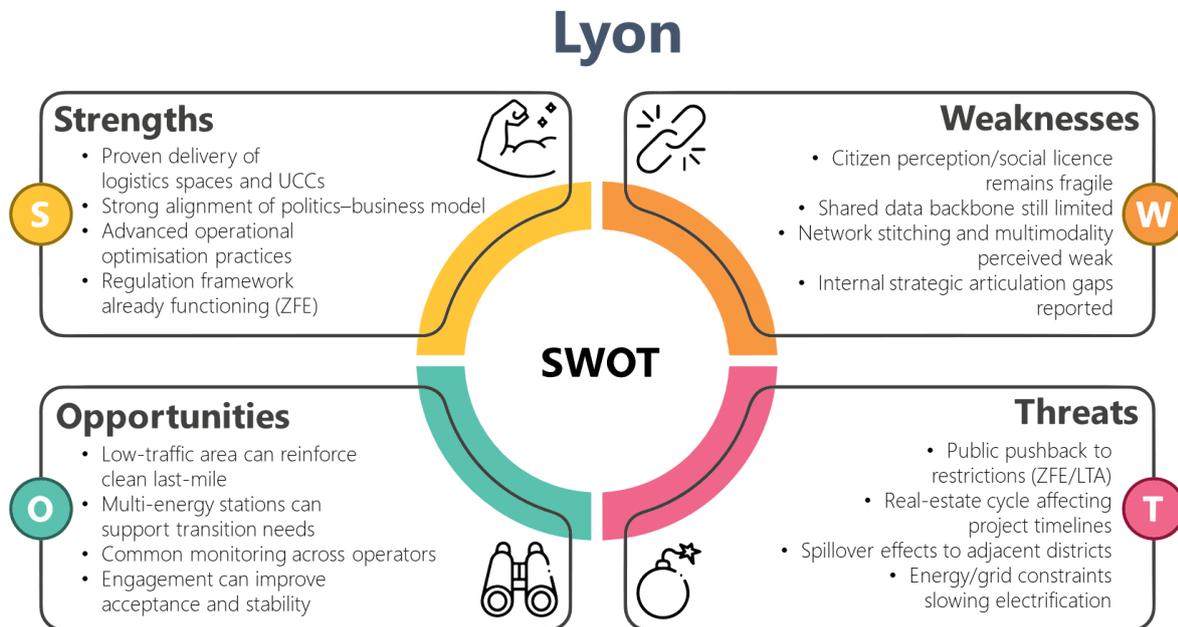


Figure 10: SWOT analysis for the city of Lyon

Taken together, the diagnosis of Lyon indicates that the priority is to complement strong delivery capacity with a stronger shared system layer (data/interoperability and social licence) to support long-term scalability and resilience. In Phase 1 (Steps 1–3), the SULP can strengthen shared monitoring/data routines and partnership arrangements across operators and sites (LPA, St-Fons ELP and upcoming underground volumes) to support system-level learning. In Phase 2 (Steps 4–6), scenario work and targets can help manage uncertainty around longer-term infrastructure projects (timelines, business models and demand) while connecting the Low Traffic Area and charging strategy to coherent freight outcomes and indicators. In Phase 3 (Steps 7–8), measures can continue to be packaged so they reinforce each other (LEZ, logistics spaces, charging and low-traffic access rules), while ensuring evaluation captures not only traffic/emissions impacts but also user value and acceptance, given the sensitivity around citizen perception in the readiness profile.

5.4.6. Thessaloniki

The innovation-readiness profile of Thessaloniki suggests substantial foundational capacity, especially in enabling conditions for evidence-based logistics management, alongside opportunities to strengthen the strategic and regulatory "operating framework" that supports consistent scaling. The self-assessment signals solid maturity in logistics networks (E4 = 3.00), supported by perceived strengths in logistics data collection (SE12 = 3.00) and multimodal logistics (SE13 = 3.00), alongside moderate signals for adaptable/shared infrastructure (SE8 = 3.00). The presence of an organisational anchor is also reflected in the dedicated team indicator (Q4 = 3.00). However, the profile indicates that strategic framing and local regulatory instrumentation are perceived as less mature, evidenced by a low score for a clear logistics vision (Q1 = 1.00) and a



low signal for the local regulatory framework (SE4 = 1.00; Q9 = 1.00). Market leverage appears limited (SE10 = 1.00; Q16 = 1.00) and quality assurance is developing (SE16 = 2.00), suggesting that while several technical and spatial building blocks exist, the shared direction and codified rules or partnerships needed to mobilise implementation consistently can be strengthened.

The planning baseline of Thessaloniki is anchored in an implemented SUMP which explicitly foresees the development of a dedicated Sulp and sets out a coherent package of urban logistics actions across the 2025 and 2030 horizons. In implementation terms, the assessment reflects an active portfolio where many measures are underway but still in a partial-delivery stage. The city has initiated and continues to scale key interventions: development of the Sulp and post-COVID demand estimation, deployment of telematics infrastructure for loading/unloading areas in the historic centre (targets expanding from around 100 locations to 125–150 and higher numbers over time), introduction of night-time delivery hours for specific retail formats outside the core, identification of space for EV charging infrastructure (at least 60 stations) and broader actions related to small consolidation solutions and green-mode deliveries as well as incentives for electric commercial fleets (e.g., access/parking benefits). The monitoring framework outlines relevant mobility-and-environment indicators (car mode share, vehicle-km travelled and PM10 exceedance days) alongside logistics-specific targets (Sulp milestones and number of telematics-enabled loading/unloading areas). The evaluation notes that implementation can be affected by administrative and governmental decision-making, procurement timelines, coordination across departments, public space constraints and day-to-day issues such as illegal parking that reduce the effectiveness of loading/unloading management unless enforcement and allocation rules align. Enabling factors include adequate funding/resource allocation, periods of government willingness, market pull from growing e-commerce activity, investments by major actors in innovative infrastructure and the potential availability of unused public buildings to support proximity logistics when governance arrangements allow. The assessment also notes that behavioural/perception factors can influence uptake, implying the need to pair technical deployment with engagement and incentives.

Thessaloniki

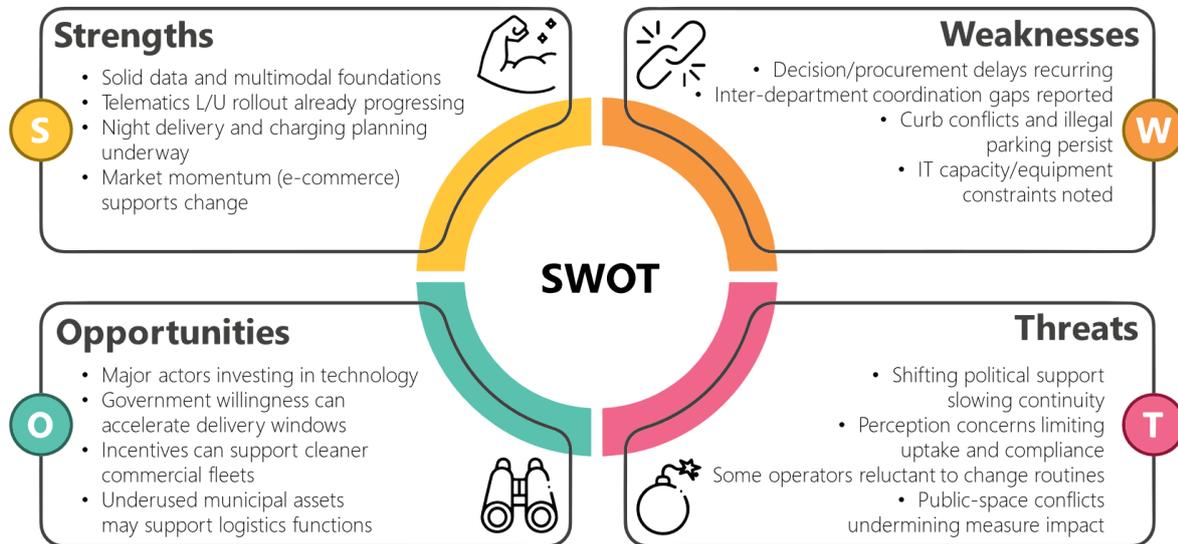


Figure 11: SWOT analysis for the city of Thessaloniki

Taken together, the diagnosis of Thessaloniki indicates that the key leverage point is to convert multiple partially implemented building blocks into full operational maturity through stronger coordination, curb-space governance and implementation-ready packaging. In Phase 1 (Steps 1–3), the Sulp can strengthen coordination structures (inter-department routines and decision pathways) and stakeholder engagement while consolidating a workable evidence base using existing telematics and monitoring structures (including where enforcement and curb allocation constraints reduce effectiveness). In Phase 2 (Steps 4–6), it is beneficial to clarify the freight vision and translate it into a small, feasible set of targets and indicators that link logistics actions to broader mobility and environmental goals. In Phase 3 (Steps 7–8), attention can focus on prioritising a limited number of implementation-ready packages (e.g., scaling telematics-enabled loading/unloading management, operationalising night delivery schemes, supporting clean commercial fleets and advancing consolidation concepts where feasible) with clear responsibilities, timelines and procurement or funding pathways, so that partially implemented measures move toward full operational delivery.

5.4.7. Aggregated City Diagnosis

The individual diagnostic profiles reveal that while each MED COLOURS city faces a unique combination of challenges, a clear set of common patterns and systemic weaknesses emerges from collective analysis. To provide a clear comparative overview, the table below aggregates the core findings for each city by distilling the detailed two-pillar assessment into three key components: the most significant strength of the city, its primary bottleneck or systemic weakness and the resulting strategic recommendation for its Sulp development process. This synthesis provides a high-level snapshot of the urban logistics landscape across the partnership,



forming the evidence base for the targeted, resilience-focused enhancements to the Sulp framework that follow.

Table 2: Aggregated City Diagnosis results

City	Core Strength	Primary Bottleneck / Systemic Weakness	Key Sulp Development Recommendation
Cesena	Strong collaborative governance culture, with effective internal coordination and stakeholder participation.	Delivery conditions for infrastructure- and data-dependent measures are still emerging (resources, baseline data routines, implementation capacity).	It may be helpful to carry collaborative strengths into implementation-ready packaging , using Phase 3 to develop clearer measure “packages” (roles, resourcing logic, sequencing), while keeping Phase 1 evidence-building light but consistent.
Koper	Port-city profile with a meaningful multimodal base and strong service-quality signals.	Collaboration and shared operating routines are not yet fully institutionalised; enforcement and coordination gaps contribute to fragmented old-town deliveries.	It may be useful to shift from partial, measure-by-measure roll-out to a coordinated operating model , starting in Phase 1 by strengthening a practical multi-stakeholder platform/FQP and a small baseline on compliance, enforcement gaps and delivery pressure.
Lisbon	Strong public acceptance and visible market-led innovation momentum in logistics services.	Freight governance ownership and monitoring foundations are still consolidating; risk of scaling through fragmented pilots rather than a citywide logic.	A helpful focus could be to turn operational momentum into a scalable governance and monitoring spine : Phase 1 can clarify internal ownership and baseline routines, while Phase 2 can define a small set of feasible objectives/indicators that allow learning-and-scaling beyond the pilot geography.
Livorno	Regulatory levers and transition signals (e.g., access control evolution, EV charging rollout, initial KPI framing) offer anchors to build on.	Implementation capacity and stakeholder confidence are still developing; several measures remain design-stage and sensitive to space and funding continuity.	It may be beneficial to build credibility through a small, feasible sequence of measures : reinforce Phase 1 engagement and evidence on historic-centre constraints, then use Phase 3 to sequence complementary actions around existing regulatory and charging foundations with clear responsibilities and realistic monitoring.
Lyon	Strong delivery track record (logistics spaces, ZFE-related instruments) and	Shared system-layer issues may affect long-term scalability (data/interoperability routines, cross-operator	A useful direction could be to complement delivery strength with system-level learning mechanisms : Phase 1 can strengthen shared

City	Core Strength	Primary Bottleneck / Systemic Weakness	Key SULP Development Recommendation
	high operational capability.	coordination, and social licence).	monitoring/data routines across operators and sites, while Phase 2 scenario/engagement work can help sustain acceptance and align longer-term infrastructure and access instruments.
Thessaloniki	Solid data and network foundations, with several logistics measures already in motion.	Progress can be slowed by coordination and procurement timelines, curb-space conflicts and day-to-day enforcement realities that reduce effectiveness.	It may help to convert partially implemented building blocks into operational maturity by strengthening Phase 1 coordination routines and stakeholder engagement, and by using Phase 3 to prioritise a limited number of implementation-ready packages with clearer ownership, timelines and procurement pathways.

The aggregated diagnosis indicates that the main obstacles to resilience in Mediterranean urban logistics are often institutional and relational rather than purely technical; recurring themes across the partnership include the difficulty of sustaining collaborative governance (ranging from stakeholder engagement challenges to coordination and continuity constraints) and the presence of disconnects between different parts of the ecosystem (e.g., strong planning capacity not yet matched by delivery conditions, or strong delivery capacity not yet matched by social acceptance and shared data routines). Accordingly, the strategic implications point towards leveraging the SULP not only as a technical planning document but also as a practical instrument for strengthening governance arrangements, monitoring routines and implementation capacity, ensuring that resilience measures can be adopted, delivered and iterated over time.

5.5. Role of MED COLOURS pilots as foundations for SULP Phase 3

While the diagnostic profiles presented below describe the baseline context of each partner city (innovation readiness and past SUMP/SULP implementation experience), MED COLOURS is already advancing a first portfolio of concrete measures. In the five pilot cities (Livorno, Cesena, Koper, Lyon and Lisbon), feasibility studies have defined the scope, enabling requirements, risks, stakeholders and preliminary KPIs for implementation; this establishes a practical foundation for subsequent planning and scale-up.

In methodological terms, these pilots should be treated as "Phase-3 seed packages": they provide the first implementable bundles that the resilient SULP can (i) formalise into measure packages with responsibilities, resourcing and timelines, (ii) connect to targets and indicators (including resilience-oriented metrics) and (iii) expand with complementary actions identified through the diagnosis. This ensures that Phase 3 does not start from a blank slate but builds on measures that are already specified, politically tangible and operationally testable. Concretely, the pilot



measures (already developed, planned or defined) provide the initial "backbone" for Phase-3 measure planning in each pilot city:

- **Livorno** features an integrated package aligned with the SUMP logistics framework of the city, comprising an updated regulatory framework for freight distribution, digital layers for access and parking control, expanded loading and unloading solutions (including smart, monitored bays via a micro-hub approach) and a reward or awarding platform to incentivise compliant and cleaner operations.
- In **Cesena**, a digital decision-support tool (database and dashboard) is utilized to monitor freight traffic, compute indicators and test scenarios; this tool is explicitly used to assess a short-term integrated action combining a Zero-Emission Logistics UVAR scheme in the LTZ, consolidation or micro-hubs and an alternative last-mile fleet (small EVs and cargo bikes), supported by a permanent dialogue forum with stakeholder associations.
- Regarding the remaining pilots, **Koper** focuses on a city-centre logistics service package centred on establishing an e-delivery service for the historic core, supported by procurement of a clean vehicle, operational planning (pick-up stations, ordering method and service design) and structured monitoring or evaluation for real-life roll-out.
- **Lyon** develops a last-mile logistics infrastructure package built around developing a dedicated urban consolidation and logistics hub within existing underground parking assets (notably in the Confluence context); this responds to reduced surface space for delivery areas and enables carbon-free delivery operations through dedicated logistics-space design.
- Finally, **Lisbon** implements a curb and access management package in the Baixa Pombalina / LEZ context combining delimitation of loading and unloading areas, progressive sensorisation and associated regulatory arrangements, alongside the planned development of a load and unload registry platform under a structured municipal working setup with key operational stakeholders (including mobility or parking operator and municipal police).

For all MED COLOURS partner cities, these seed packages (and any additional measures already identified locally outside the five pilots) should be explicitly carried forward into Phase 3 as the starting measure inventory; they must then be refined through the packaging logic of the resilient SULP (prioritisation, governance ownership, financing, implementation sequencing, monitoring and adaptive learning).

6. Integrating Resilience in the Sulp Guidelines framework

This chapter explains the manner in which the established Sulp Topic Guide is systematically updated to incorporate resilience. The starting point is deliberate: the CIVITAS/European Sulp methodology already provides a robust, iterative and stakeholder-driven planning cycle. Rather than replacing that cycle, the Resilient Sulp maintains the canonical Sulp architecture as the backbone and introduces a small number of targeted upgrades that make the guidelines fit for an operating environment defined by climate shocks, market volatility and compounding risks.

6.1. Overall methodology

The approach is procedural rather than prescriptive. It does not mandate a single set of measures; instead, the planning logic is strengthened so that any city, regardless of maturity, can repeatedly translate resilience objectives into implementable actions, monitor performance under stress and learn from disruptions. In practical terms, "integrating resilience" signifies the upgrading of the guidelines so that risk-awareness, redundancy planning, adaptive monitoring and institutional learning become standard functions of the development and implementation of the Sulp. To ensure these upgrades are consistent and easy to apply, the resilient enhancement is expressed through four guideline update mechanisms. These represent the methods through which resilience is embedded into the existing steps, outputs and governance of the Sulp cycle:

- (1) **Adding a new step.** Introduce an additional step (or activity) in the cycle where a resilience function is missing from the original guidelines.
- (2) **Using tools to add new activities within a step.** Insert specific, tool-supported tasks (analysis, documentation, decision support) into selected steps, without changing the step's overall purpose.
- (3) **Providing guidance, paradigms, and best practices in existing steps.** Complement selected steps with concise guidance (templates, decision rules, reference procedures, examples) to standardise how the step is executed and recorded.
- (4) **Enhancing an existing step to cover resilience.** Expand the content of a step to explicitly cover resilience requirements (e.g., uncertainty handling, prioritisation, update mechanisms) while preserving the integrity of the cycle.

The next subsection presents the updated Sulp by mapping these four methodological interventions into the cycle, indicating precisely where the new step is placed, which steps host added activities, where guidance is attached and which steps are enhanced for innovation.

6.2. Updated Sulp Cycle

The resilience-enhanced Sulp retains the canonical twelve-step architecture and introduces targeted adjustments where they matter most. The intent is not to replace the Topic Guide, but to strengthen its capacity to anticipate, absorb and adapt under climate stress and market volatility through simple tools and repeatable practices. The following text explains, step by step,



what is added or modified, which update mechanism it represents (new activity, embedded tool, added guidance/best practice, or step enhancement), and why the change is needed in a resilience-oriented logistics plan.

6.2.1. Phase 1 – Preparation & analysis

Step 1: Set up working structures

[Modification] Sulp activity 1.1: Create inter-departmental core team & consider getting external support

- The composition of the inter-departmental core team is explicitly expanded to embed resilience expertise.
- Alongside logistics, mobility and enforcement leads, the team could now also include a climate scientist (or equivalent risk expert) and a representative for energy grid and infrastructure resilience.

Step 2: Define the development process and scope of the plan

[Modification] Sulp activity 2.1: Assess planning requirements and define geographic scope ("functional urban area")

- The method for defining the geographic scope is changed; it must now be defined by the "functional logistics ecosystem" and its vulnerability to climate and landscape risks (the "risk-shed"), not just administrative boundaries.
- This requires planners to analyze critical assets beyond city limits, such as hubs within a regional hydroshed or along flood-prone rivers. If a critical asset is identified in this risk-shed, the scope of the Sulp must be expanded to include it.

[Modification] Sulp activity 2.4: Agree time plan and work plan

- The work plan is modified to move the Sulp from a static document to a living one.
- It must now encode an explicit cadence for regular review and updates (e.g., biannually) specifically to address climate and market uncertainty.

[Add New Activity] Sulp activity 2.5: Adopt Foundational Resilience Standards

- To ensure resilience is a core principle and not an afterthought, the foundational design standards must be established at the outset.

Step 3: Analyse the current UFT situation

[Modification] Sulp activity 3.1: Identify information sources and cooperate with data owners

- This activity is expanded from just identifying sources to developing a technical solution for ongoing data management.
- This involves creating a standardized repository (a local dataspace tool) to actively collect, manage and analyze both operational and climate data.
- [Introduce Tool]: A local dataspace tool (e.g., the Urban Logistics Data Hub, uldthess.imet.gr) is introduced to operationalize data collection, moving beyond static surveys. This provides the foundation for a dynamic inventory of curb and access points.

[Modification] Sulp activity 3.2: Analyse problems and opportunities

- The analysis method is enhanced; qualitative experience and implementation assessments must be systematically coded into a compact barrier taxonomy (e.g., governance, regulatory, funding, data/tech and social licence).
- [Introduce Tool]: Where available, cities are encouraged to use the planning module of the HE URBANE Impact Assessment Radar to understand the current situation and identify gaps.

6.2.2. Phase 2 – Strategy development

Step 4: Build and jointly assess scenarios

[Modification] Sulp activity 4.1: Develop scenarios with citizens and stakeholders

- In addition to transport scenarios, the city must develop 2-3 locally relevant climate shock narratives (e.g., "flash-flood street closures", "heatwave-induced grid failure") based on evidence like SSP2-4.5 projections and historical data.
- These narratives are then used to stress-test the candidate logistics visions (e.g., "How does the network perform if 20% of the curb inventory is unusable due to flooding?").

Step 6: Set targets and indicators

[Modification] Sulp activity 6.1: Identify indicators for all objectives and agree on measurable targets

- The set of indicators is expanded to make resilience a quantifiable and manageable objective.
- The planning team must supplement traditional operational metrics by defining and adopting a core set of quantitative resilience targets (e.g., "percentage of lockers with backup power", "network redundancy score").

6.2.3. Phase 3 – Measure planning

Step 7: Select measures packages with stakeholders

[Modification] Sulp activity 7.1: Create and assess measures with stakeholders & define integrated measure packages

- The selection logic is modified to follow a "maturity-matched" principle that prioritizes robustness and redundancy.
- [Best Practice]: Network Diversification: Establishing a distributed network of smaller, multi-purpose micro-hubs or parcel lockers on municipal sites (using C40 Cities Climate Leadership Group or Organisation for Economic Co-operation and Development (OECD)/ International Transport Forum (ITF) hub guidance) instead of single, large, vulnerable centers; Asset Hardening: Mandating physical measures like flood-proofing for new depots in identified risk zones or requiring backup power (solar/battery) for lockers and EV charging stations; Modal Redundancy: Pre-authorizing cargo-bike fleets for emergency deliveries in zones where vehicle access may be cut off. These solutions are further introduced and further discussed at Section 6.3.



Step 8: Agree actions and responsibilities

[Modification] Sulp activity 8.2: Identify funding sources and capacities

- The financial planning method is modified; the business case for measures must now quantify the "cost of inaction" (e.g., economic losses from a failed logistics system during a shock) to frame resilience as an investment.
- Financing plans for sustainability measures (like a zero-emission fleet) must now be paired with financing for their resilient energy supply (e.g., depot microgrids) to ensure operation during a climate event.

[Modification] Sulp activity 8.3: Agree priorities, responsibilities and timeline

- A new deliverable is added to this activity: a structured resilience risk register.
- Responsibilities and timelines must now be explicitly tied to concrete mitigations for identified climate risks (e.g., "Partner X is responsible for relocating mobile assets from Zone A if a flood warning is issued").

6.2.4. Phase 4 – Implementation & monitoring

Step 11: Monitor, adapt and communicate

[Add New Activity] Add Activity 11.1: Implement adaptive triggers.

- The monitoring plan is made active, not passive; it must encode explicit adaptive triggers (pre-agreed conditions) that automatically activate a response.
- The primary triggers are climate-based (e.g., "If a National Weather Service heatwave warning Level 3 is issued, non-essential delivery windows are automatically shifted to night-time hours").

[Add New Activity] Add Activity 11.2: Publish resilience dashboard.

- To build social license and communicate adaptations, the city must publish a concise quarterly dashboard for the Freight Quality Partnership (FQP) and the public.

Step 12: Review and learn lessons

[Add New Activity] Add Activity 12.1: Conduct post-disruption debriefs.

- This activity is added to institutionalize learning from shocks; a mandatory "post-disruption debrief" must be conducted with the FQP after any significant climate event to assess what failed, what worked and how the risk models and adaptive triggers of the Sulp must be updated.

The original Topic Guide for Sulp provides a comprehensive and essential framework for cities. It meticulously guides planners through a 12-step process designed to tackle the known complexities of UFT, including stakeholder fragmentation, data scarcity and the negative externalities of congestion and pollution. Its focus on creating multi-stakeholder platforms, analyzing the mobility situation and developing integrated measure packages remains the bedrock of effective logistics planning.

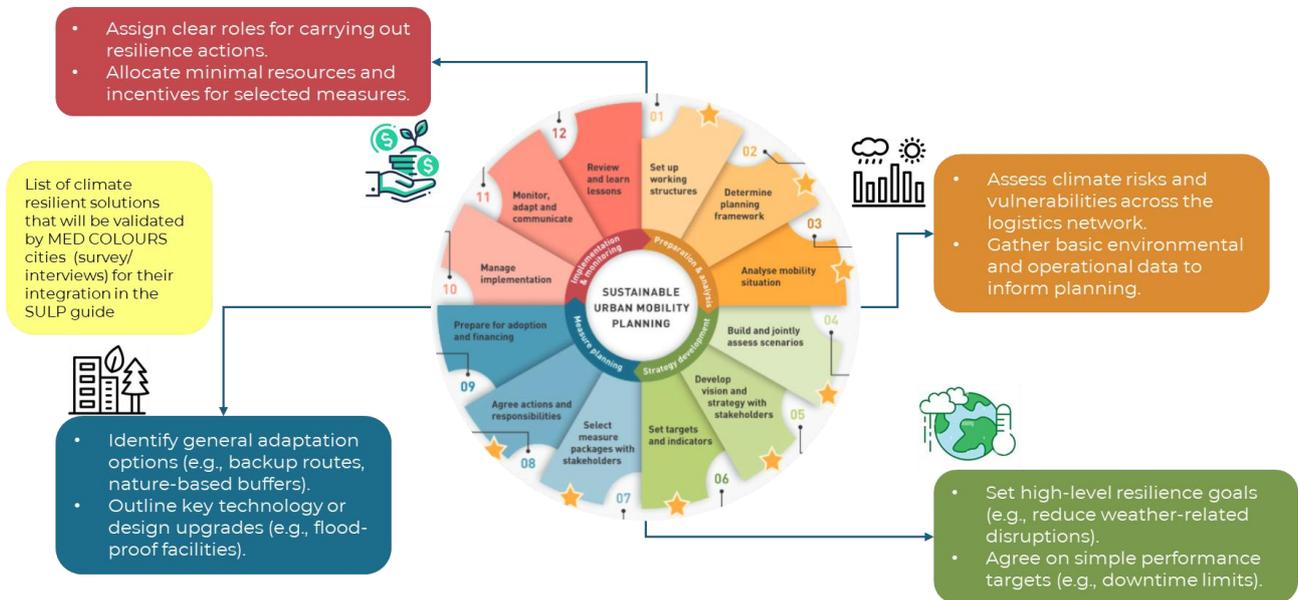


Figure 12: General points for resilient SULP guide

The proposed enhancements fundamentally transform the SULP's objective, evolving it from a static plan focused on efficiency to a dynamic system built for resilience. This is achieved by first embedding risk-awareness directly into the plan's core governance and scope. The strategy development phases are then re-engineered to stress-test the network against climate shocks, prioritizing survivability and measurable robustness over pure optimization. This approach reframes resilience as a quantifiable and bankable investment, not an abstract cost, by focusing on adaptation options and the "cost of inaction". Finally, the implementation and monitoring cycle creates an active, adaptive learning system. It moves beyond passive reporting to institutionalize real-time responses and learn from every shock, ensuring the logistics network is not just sustainable in its operation, but survivable in its design.

6.3. Best Practices to Enhance Resilience

This subsection synthesizes recent European and international evidence into a practical, resilience-oriented literature review. Following the multi-dimensional lens introduced earlier (infrastructure/environment, economy/society, health/well-being, leadership/governance), it distills measures with demonstrated impacts, prioritizing sources that are methodologically robust, policy-relevant and recent. The aim is not to be exhaustive, but to foreground interventions with replicable evidence and clear pathways to embed within a SULP cycle under climate and market uncertainty.

Table 3: Best practices for enhancing resilience in SULPs

Solution	Description	Type
Industrial SuDS & Permeable Aprons	Industrial-grade porous pavement designed for Heavy Goods Vehicles (HGVs) to prevent "ponding" on loading docks. Filters tire particles and oil at the source before runoff enters municipal water.	Nature-based /Infra



Solution	Description	Type
Logistics Microgrids & Islanding	Decentralized power systems (Solar + Battery) capable of "islanding" (disconnecting) from the main grid to keep sorting machinery and EV chargers running during blackouts.	Technology /Infra
Gig-Worker Heat Protocols	Mandatory service suspension thresholds based on Wet Bulb Globe Temperature (WBGT). Includes "Cooling Shelter" networks for riders and vehicle A/C retrofits.	Governance /Social
Multimodal Redundancy Plans	Pre-designated "Blue Highways" (river freight) and cargo-bike lanes to bypass flooded roads or gridlocked streets during infrastructure failure.	Governance /Planning
Supply Chain Interdependency Audit	Mapping the specific reliance of logistics nodes on external critical systems (e.g., telecom for scanners, grid for fuel pumps) to identify failure points before a crisis.	Governance /Planning
Digital Curb Management	API-based regulation allowing instant conversion of parking lanes into "Emergency Freight Corridors" or "Relief Lanes" during shocks, communicating directly to driver apps.	Technology /Governance
Vehicle-to-Grid Resilience	Utilizing the batteries of electric delivery fleets as mobile power plants to support depot operations or community centers during grid failure.	Technology /Energy
Flood-Proof Micro-Hubs	Elevated or floating transshipment nodes designed to remain operational in flood zones, ensuring "last mile" continuity when large depots are cut off.	Infrastructure

The transition from efficiency-centric "Just-in-Time" models to "Just-in-Case" resilience requires a holistic re-engineering of the urban logistics interface, moving beyond simple carbon mitigation to address acute physical and systemic vulnerabilities. Contemporary literature suggests that hydraulic defense must be integrated directly into the logistical node; research by Marchioni and Becciu (2015) and Pagotto et al. (2015) indicates that industrial-grade Sustainable Urban Drainage Systems (SuDS) (specifically permeable concrete capable of supporting heavy goods vehicles (HGVs)) are essential for preventing "surface ponding". This is not merely an environmental measure but an operational one, for by filtering hydrocarbons and attenuating runoff, these surfaces prevent the immobilization of forklifts and trucks during high-intensity pluvial flooding events. For regions facing existential threats from rising sea levels, Dwinanti et al. (2022) argue for a shift toward "amphibious logistics", proposing Floating Logistics Supporting Facilities (FLSF) that decouple transshipment hubs from terrestrial inundation risks, thereby preserving "last-mile" continuity when traditional road networks are submerged.

In parallel, the electrification of fleets introduces new dependencies on grid stability, necessitating energy autonomy; consequently, the deployment of decentralized microgrids with "islanding" capabilities (the ability to disconnect from the main grid and operate independently) is identified as a critical defense against cascading power failures (Hark Systems, 2025). This resilience is further amplified by Vehicle-to-Grid (V2G) integration; as demonstrated in disaster relief scenarios analyzed by Toyota (2021), electric fleets can be repurposed from energy consumers to mobile energy assets, providing emergency power to depots or community



shelters for up to 72 hours. This bi-directional capability transforms the logistics fleet into a Distributed Energy Resource (DER) during crises.

However, physical hardening is insufficient without digital and spatial agility, whereas the rigidity of traditional curb management is viewed as a liability during rapid-onset shocks. Rothbard et al. (2025) highlight the efficacy of the Curb Data Specification (CDS) in enabling "digital curb management", which allows municipal authorities to dynamically reprogram parking lanes into emergency freight corridors via APIs, effectively creating a programmable city that adapts to real-time congestion or closures. To further mitigate the risk of single-point failure in transport networks, planning frameworks are increasingly prioritizing multimodal redundancy, such as the activation of riverine "Blue Highways" and cargo-bike lanes, to bypass gridlocked or damaged arterial roads (New York City DOT, 2024).

Finally, the human element of the supply chain is increasingly recognized as a critical point of failure. With rising thermal extremes, the International Labour Organization (2024) and recent case studies (Mongabay-India, 2025) emphasize that workforce protection must evolve from voluntary guidelines to mandatory suspension protocols based on Wet Bulb Globe Temperature (WBGT) thresholds. This "social resilience" acts as a circuit breaker to prevent mass health casualties among gig workers. To ensure these disparate systems function cohesively, the Business Continuity Institute (2025) advocates for supply chain interdependency audits, which map hidden vulnerabilities (such as reliance on specific telecom providers for scanners or grid sectors for fuel pumps) moving risk management from reactive recovery to proactive structural assurance.



7. Conclusions

This research was predicated on the central problem that the established paradigm of urban logistics planning, namely the Sustainable Urban Logistics Plan (SULP), was conceived for an era of relative stability. Its primary focus on "just-in-time" efficiency and the mitigation of known externalities, such as congestion and emissions, is now fundamentally misaligned with the contemporary urban environment. This new era is defined by a "polycrisis" of compounding, interconnected threats, including acute climate-related shocks, rapid market digitalization and systemic volatility. The primary contribution of this work is the conceptualization, design and articulation of a Resilient SULP framework. This framework provides a clear, procedural and actionable methodology for evolving the SULP from a static planning document into a dynamic, adaptive governance system capable of anticipating, absorbing and recovering from disruption (a strategic and necessary shift from "just-in-time" to "just-in-case" operations). This was achieved through two principal innovations: a novel Two-Pillar Diagnostic Framework to provide a holistic, evidence-based assessment of the starting point of a city, and a set of targeted enhancements to the canonical 12-step SULP cycle.

The application of the Two-Pillar Analytical Framework (synthesizing theoretical potential (Innovation Readiness) with practical performance (SUMP/SULP Assessment)) across the six MED COLOURS partner cities yielded a set of critical, high-level findings. The aggregated city diagnosis revealed that the primary obstacles to resilient urban logistics are overwhelmingly institutional and relational, rather than purely technical. While each city presented a unique profile, common patterns of systemic weakness emerged, including critical failures of collaborative governance (manifesting as "stakeholder gaps," "trust deficits" or "institutional gridlock") and dangerous "ecosystem disconnects" (such as a disconnect between advanced planning and underdeveloped market capacity, or between exceptional implementation capacity and poor social license). These findings lead to a profound conclusion: the SULP must be re-conceived and leveraged as an instrument of institutional reform. Simply providing a technical manual of best practices is insufficient if the underlying collaborative, political and social foundations are not in place.

The enhanced SULP cycle proposed in this document directly addresses these institutional and technical gaps. Its implications are threefold. First, it institutionalizes resilience by embedding it as a foundational requirement at the outset of the planning process, specifically through the adoption of "Foundational Resilience Standards" (Step 2.5) and the expansion of the planning scope to the functional "risk-shed" (Step 2.1). Second, it reframes resilience as an economic imperative by mandating the quantification of the "cost of inaction" (Step 8.2), a business case strongly supported by evidence that 30-50% of EU road maintenance costs are already weather-related and that annual weather-related costs to the EU logistics sector range from EUR 1-6 billion. Third, and most critically, the framework transforms the SULP into a "living document," or an adaptive governance system. This is operationalized through the introduction of pre-agreed "adaptive triggers" (Step 11.1) for automated response and mandatory "post-disruption debriefs" (Step 12.1) to create a formal institutional learning loop, ensuring the plan evolves with emerging risks.

This research must be situated within its limitations, which in turn define a clear agenda for future work. The diagnostic findings are based on six cities within the Mediterranean basin; while this provides a deep and relevant evidence base for climate risks such as heatwaves and floods, the



priorities of the framework would require calibration for other geographic contexts facing different primary risks, such as severe snowfall or permafrost thaw. Furthermore, this document provides a procedural guideline, and the real-world efficacy of this guideline is contingent upon sustained political will and the successful navigation of complex stakeholder interests. The immediate next step is the practical application and longitudinal monitoring of this framework to validate its effectiveness and identify unforeseen implementation barriers. Future research must also focus on developing robust Cost-Benefit Analysis (CBA) and Return on Investment (ROI) models for specific resilience interventions to unlock public and private finance. Concurrently, significant technical research is required to develop the architectures and governance models for the "local data spaces" (Step 3.1) proposed, and further work is needed to deepen the "social resilience" dimension, particularly in codifying "just transition" principles and co-design practices to protect the most vulnerable actors in the logistics chain.

In conclusion, this report provides a necessary and timely evolution of the Sulp framework. It argues that the process of planning is as critical as the plan itself and provides a clear methodology for cities to begin building the institutional, social and physical capacity to thrive in an era of profound and persistent uncertainty.



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List of Tables

Table 1: The Innovation Readiness Urban Logistics Self-Assessment Tool.....	17
Table 2: Aggregated City Diagnosis results.....	34
Table 3: Best practices for enhancing resilience in SULPs.....	41

List of Figures

Figure 1: Sustainable Urban Logistics guidelines framework.....	12
Figure 2: The Urban Logistics ecosystem approach (Aifantopoulou et al., 2025).	15
Figure 3: The SUMP/SULP assessment template (source: own elaboration).....	20
Figure 4: The urban logistics ecosystems diagnosis methodology	21
Figure 5: The diagnosis pipeline for evidence driven urban logistics planning	22
Figure 6: SWOT analysis for the city of Cesena.....	24
Figure 7: SWOT analysis for the city of Koper	26
Figure 8: SWOT analysis for the city of Lisbon.....	27
Figure 9: SWOT analysis for the city of Livorno.....	29
Figure 10: SWOT analysis for the city of Lyon.....	31
Figure 11: SWOT analysis for the city of Thessaloniki	33
Figure 12: General points for resilient Sulp guide.....	41



Appendix A: SUMP/SULP Assessment template

A.	Initial Background Information	Does your city/municipality have an official Planning Document related to city logistics?	Comment
		<i>Example:</i> "Yes - Other - please specify"	<i>Example:</i> "The city has a Sustainable Urban Mobility Planning (SUMP) but the Sustainable Urban Logistics Planning (SULP) is under development. SULP document considers logistics related measures"
	<i>Please select an option from the drop down list of the right cell and fill the "Comment" column if needed</i>		<i>Add your comment [Optional]</i>

B.	Level of implementation	What are the Urban Logistics measures your city implements in the context of your planning? Please outline them below.	Level of implementation	Comment
		<i>Example:</i> "Creation of low emission zones, climate-neutral districts, and areas with limited access by conventional vehicles"	<i>Example:</i> "Partially implemented"	<i>Example:</i> "The LEZ were implemented to a specific area and not to the full planned area."
	<i>Please fill to the right cell all the different Urban Logistics measures that has been implemented at your city and the state of implementation.</i> <i>Feel free to add more Measures or erase if there are extra.</i>	Measure 1: "...."		<i>Add your comment [Optional]</i>
		Measure 2: "...."		<i>Add your comment [Optional]</i>
		Measure 3: "...."		<i>Add your comment [Optional]</i>
		Measure 4: "...."		<i>Add your comment [Optional]</i>
		Measure 5: "...."		<i>Add your comment [Optional]</i>
		Measure 6: "...."		<i>Add your comment [Optional]</i>
		Measure 7: "...."		<i>Add your comment [Optional]</i>
		Measure 8: "...."		<i>Add your comment [Optional]</i>



C.	Monitoring	What is the value at the baseline year?	What is the value at the target year?	With which measure do you believe this KPI related to?
	<i>Example:</i> "KPI-1: Average number of cars entering the city center daily"	<i>Example:</i> "500 (2020)"	<i>Example:</i> "700 (2030)"	<i>Example:</i> "Measure 1, Measure 2, etc."
<p><i>Please identify the city logistics related KPIs that your planning document suggest to measure. For each KPI, fill the baseline and the target year value.</i></p> <p><i>Feel free to add or remove KPIs for each measure.</i></p>	KPI-1: "..."			
	KPI-2 : "... "			
	KPI-3 : "... "			
	KPI-4 : "... "			
	KPI-5 : "... "			
	KPI-6 : "... "			
	KPI-7 : "... "			
	KPI-8 : "... "			
	KPI-9 : "... "			
	KPI-10 : "... "			
	KPI-11 : "... "			
	KPI-12 : "... "			
	KPI-13 : "... "			
	KPI-14 : "... "			
	KPI-15 : "... "			
	KPI-16 : "... "			
	KPI-17 : "... "			
	KPI-18 : "... "			
	KPI-19 : "... "			
	KPI-20 : "... "			

D.	Evaluation	Please describe the reasons that led to delays in the implementation of the measure	What would you identify as the main factors that enabled the successful implementation of the measure?	What would you identify as the main factors that contributed to the failure of the measure's implementation?



<p><i>For each measure, identify the delays, enablers and failures during the implementation.</i></p>		<p><i>Examples not exhausted, please add your own: Budgetary constraints or financial issues, Changes in political leadership or priorities, Technological challenges or lack of necessary infrastructure, Resistance or opposition from stakeholders or interest groups, Regulatory or bureaucratic hurdles, Inadequate resources (human, technical, etc.), Insufficient data or research to support implementation, External factors (e.g., economic downturn, natural disasters).</i></p>	<p><i>Examples: Strong political will and leadership, Adequate funding and resource allocation, Inclusive stakeholder engagement and collaboration, Clear and achievable objectives, Effective public communication and awareness campaigns, Robust technological support and infrastructure, Data-driven decision-making and continuous monitoring, External support from national government or international organizations,</i></p>	<p><i>Examples: Insufficient understanding or knowledge of the local context, Poor project management or oversight, Lack of continuity in leadership or frequent policy changes, Inadequate engagement with key stakeholders, Technical issues or system failures, Ineffective communication or public resistance, Unforeseen challenges or complications during implementation, Inconsistent or lacking financial support,</i></p>
	Measure 1: "...."	1) 2) 3) ...	1) 2) 3) ...	1) 2) 3) ...
	Measure 2: "...."	1) 2) 3) ...	1) 2) 3) ...	1) 2) 3) ...
	Measure 3: "...."	1) 2) 3) ...	1) 2) 3) ...	1) 2) 3) ...



E.	Open Question	Is there any additional information/comment you would like to share regarding the mobility and logistics plans in your city/municipality?