CityLab

City logistics living labs

a way forward with city logistics innovation

April 2018

Introduction

In this guide to City Logistics Living Labs, we draw upon the practical experiences of cities in the Citylab project (Amsterdam, Brussels, London, Oslo, Paris, Rome, Rotterdam, Southampton) to explain how they can be effectively used to drive forward innovation.

Who should read this?

Anyone concerned with the environmental impact of 'city logistics' may find this guide useful. With ever-increasing numbers of vans and trucks being used to deliver goods and services, cities are facing growing challenges to improve air quality, noise and congestion levels and liveability, associated with use of urban space. In spite of many trialled 'solutions', scalability and transfer tend to be problematical and few significant efforts towards sustainable city logistics are evident. In this guide, we advocate City Logistics Living Labs as an effective way to identify and implement the best city logistics innovations over a long-term period.

What is a City Logistics Living Lab?

As an introduction to the concept, we suggest you view our animated video at www.citylab-project.eu

Figure 1 — Living lab animation (created for Citylab by www.morph.co.uk)

The term 'living lab' commonly refers to a local experimental project of a participatory nature. Their aim is to actively involve all relevant stakeholder and user groups to encourage participation, hear all views, promote innovation and 'out of box' solutions, set project goals and agree actions. The focus is on practical implementation, learning and improvement. A living lab is usually organised around 4 key principles:

1. Practical, 'real life' setting, with implementation in the field
2. Multiple stakeholders
3. Co-creation of innovative solutions and end-user involvement
4. Iterative learning and development

In the context of city logistics, goals will usually relate to environmental concerns (e.g. improving air quality) or to operating more efficiently and relevant stakeholders may include public authorities, logistics service providers, research institutes and the public. A living lab may be set up to develop a specific product or service and run over a relatively short time period or may be more far reaching and run over a longer period to take advantage of latest technologies and to adapt to changing environments.

Why set up a City Logistics Living Lab?

The main reason is to develop an approach where stakeholders agree common ambitions and work together towards common goals. City logistics are characterised by a large number of freight operators and other stakeholders, often with conflicting interests. Collaboration is needed and may help counter commonly observed negative environmental impacts on emissions, congestion, safety etc., due to factors such as:

- Growth of e-commerce and fast delivery options (e.g. within two hours), and linked to urban population growth
- Inefficiencies within the sector, e.g. partly loaded vehicles
- Logistics sprawl, as freight facilities move further away from city centres

Living labs are most associated with:

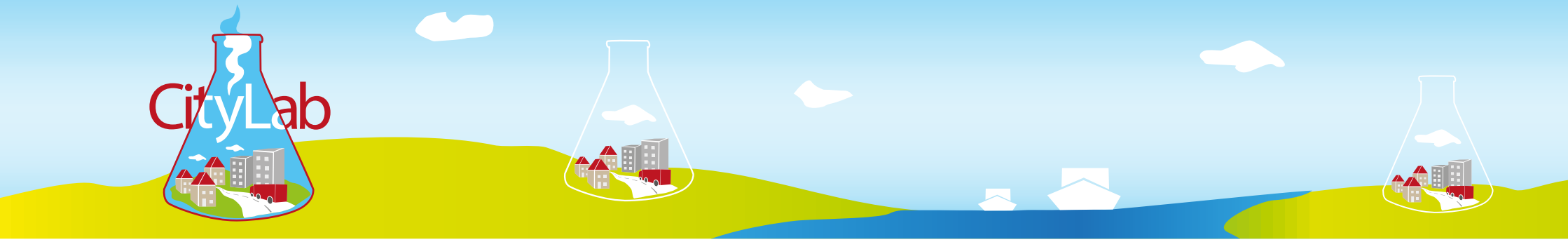
- A complex challenge requiring in-depth analysis and innovative thinking
- Multiple stakeholders with different viewpoints but with a commitment to jointly developing solutions
- A dynamic environment leading to uncertainty in outcomes of proposed solutions and thus requiring flexible, proactive planning, research and development.

As city logistics are complex, involving many stakeholders (e.g. transport and logistics companies, goods senders and receivers, city authorities) and operating in a dynamic urban environment influenced by many changing factors, the living lab approach is highly appropriate.

The application and scope of living labs are wide-ranging: they can be designed to look into a single specific issue in a specific location or have a much broader remit, considering logistics across the whole city. We can also distinguish between:

- an industry-led living lab where, for example, a freight operator wants to develop a logistics innovation with emphasis on improving services they directly control – we refer to this as a *logistics service living lab*
- a city-led living lab where local government want to cooperate with freight industry stakeholders to transition towards more sustainable working methods – we refer to this as a *city logistics transition living lab* (or *transition living lab*, for short).

Figure 2 —
Stakeholder discussions



Supporting city logistics factors

A City Logistics Living Lab can most readily be set up when there are existing supporting factors such as:

1. Clearly stated city logistics policy and plans. Many cities do not yet have dedicated urban freight transport or city logistics plans. Often, at best, urban freight is mentioned within various policy documents such as those relating to urban mobility or air quality.
2. Established communication platforms between city logistics stakeholders.
3. Freight data and information. One of the biggest challenges in city logistics is a lack of detailed knowledge on what is really going on within different city logistics segments. Such information may be essential for good decision-making. Obtaining relevant data on urban freight transport is not an easy task due to predominance of small companies in a landscape of multiple city distribution actors, little interest or unwillingness of operators to provide the data, privacy issues, etc. Several European cities are currently testing and validating different city logistics data collection methods.
4. Financial support, e.g. grant programs for transport innovation

In **Paris**, the Charter for Sustainable Urban Logistics (2013) brought together around 80 organisations (e.g. shippers, carriers, 3PLs, store-owners, public authorities) to establish general goals for city logistics and plans to work towards them. The freight forum was created, which is now a main cooperation platform in urban freight transport.

In **London**, two urban freight stakeholder platforms are well-established:

1. *Central London Freight Quality Partnership*, comprising the freight industry, local government, local businesses, the local community, environmental groups and others with an interest in freight.
2. *London Freight Forum*, co-ordinated by Transport for London, brings together 160 logistics providers.

How to set up a City Logistics Living Lab?

The following steps are usually involved and several iterations may be needed before a living lab takes a distinguished shape:

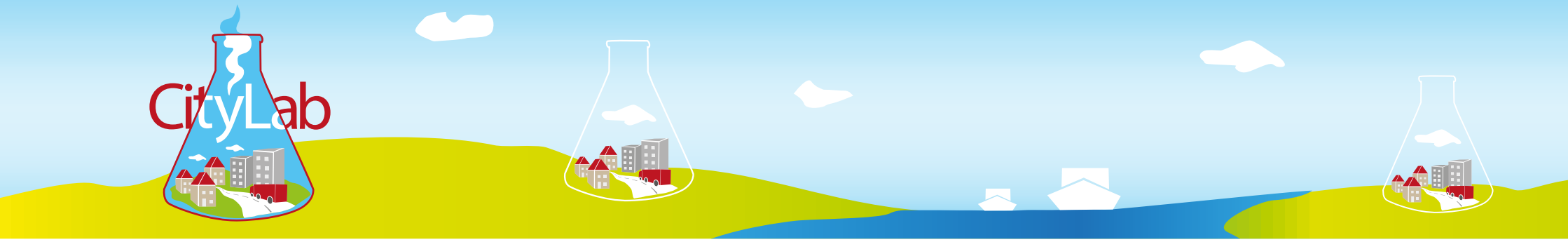
- Define the living lab ambition, objectives and scope
- Create the core living lab team
- Select an appropriate living lab governance model
- Analyse existing city logistics conditions (ecosystem)
- Identify potential ideas and cases to develop within a living lab
- Test and evaluate the measures implemented

From idea or problem to ambition and goals of the living lab in city logistics

The first step is to define clear ambitions and objectives. This will not necessarily be straightforward and may require several iterations with stakeholders. During this process, potential conflicting interests between stakeholders should be considered and agreement and commitment for the common living objectives should be achieved.

In **Brussels** (and other cities) Procter and Gamble (P&G) identified that many small independent stores obtain P&G products by visiting a wholesaler or a retailer. This costs them time and fuel and may not provide the most suitable package sizes. P&G decided to explore if they could directly supply these stores. The ambition of this *logistics service living lab* was to address this specific issue.

The long-term urban freight transport ambition for the city of **Paris** is to reduce overall emissions from freight transport by 75% in 2050 compared to 2004. The city council goal is to have 100% of deliveries to be non-diesel by 2020. The Paris implementation in CITYLAB counters the issue of logistics sprawl by reintroducing logistics terminals in dense urban areas within mixed use developments known as 'logistics hotels'.



Creation of the core living lab team

The core living lab team is a group of people/organisations interested in collaborating in the development of the living lab. To create this team, the living lab initiator (someone championing the cause) has to contact potential partners, keeping in mind the idea of involving all relevant stakeholder and user groups and ideally including innovative thinkers and people with relevant competences as necessary. Different people may be required for different strands of living lab development running in parallel. The aim is to form a partnership with the capacity to set up and deliver projects that support the living lab ambition. Understanding the drivers, interests, culture and way of working of team members can aid continuous involvement and commitment to the living lab over a longer period. Once the core team is created, the roles and responsibilities within the living lab can be identified (e.g. coordinator/manager, service provider, user). The most natural living lab coordinator for a 'logistic service' living lab is the developer of the new service, whereas for a 'transition' living lab, this role will usually be assigned to a public authority or to an unbiased third party (a researcher or consultant, say), reducing the possibility of conflicting interests.

Selecting the appropriate governance model

A written agreement on living lab cooperation is important to make the living lab a priority for participating stakeholders and to secure its continuity. Key is to find a framework that permits all participants to commit to work on the common living lab ambition. The document can be used to define roles and responsibilities and to present plans to the outside world. Various governance models can be used: a memorandum of understanding, informal agreement, working groups, a covenant, etc. The forming of freight partnerships or frontrunner groups could be a good start for a transition living lab. Without good public-private cooperation, transition living labs are doomed to fail.

In **Southampton** a non-binding Memorandum of Understanding (MoU) was co-signed by Southampton City Council and various stakeholders including hospitals, universities and the operator of the Southampton Sustainable Distribution Centre, Meachers Global Logistics. The main objective of this agreement was to reduce overall vehicle emissions and improve air quality standards. It drew attention to freight issues and highlighted possible ways for organisations to reduce carbon footprint associated with purchasing of goods and services.

The **Rotterdam** living lab is set up around the local covenant (a local Green Deal on Zero Emission City Logistics), which was co-signed by the city, research institute TNO and 'frontrunner' freight transport companies.

Next steps

Once the living lab is up and running, next steps include:

- Analysis of the city logistics environment, or ecosystem, to identify associated opportunities and threats, any legal or ethical issues to be considered, and any mitigation measures that may be taken.
- Developing ideas on possible solution methods and making decisions about which to test in the field, bearing in mind: stakeholder and user needs; any risks associated with the implementation; budget and resource constraints; whether proposed solutions are likely to be feasible.
- Producing a clear and regularly updated action plan, documenting agreed ambition, goals, scope, roles and responsibilities, actions, results of analyses etc. Regular updating is important as the lab is living and changes will inevitably occur.

Citylab living lab examples

Here we provide living lab examples from the Citylab cities, organised by the 4 key principles on which living labs are usually based:

Practical, 'real life' setting, with implementation in the field

In Rotterdam, Paris and Southampton the Citylab project assisted citywide transition goals to reduce freight vehicle emissions.

In Amsterdam, Rome, Oslo, London and Brussels specific service improvements were tested in the field.

In **London**, TNT and Gnewt Cargo were looking for a collaborative working arrangement to allow more use of electric freight vehicles for parcel deliveries in central London. The geographical area was defined by the congestion charge area, the main operating area for Gnewt Cargo, taking advantage of the financial incentive to use electric vehicles (exemption from charge). Involvement of the municipality also made it possible to find locations for parcel hubs within the congestion charge area. This is a strategically important issue for major cities, where affordable space is difficult to find.

Figure 3 —
Gnewt Cargo electric vehicle in central London

In **Oslo**, shopping centre developers Steen & Strøm are planning common in-house logistics facilities to optimise internal logistics. Therefore, the test environment was limited to the shopping centre and the neighbouring area.

Figure 4 —
Oslo living lab test environment

Multiple stakeholders

The core idea is that involvement of people from various backgrounds and disciplines aids better understanding and innovation. Stakeholders can form 'frontrunner' groups, leading by example and developing ambitions and objectives. Together they can set up sustainable, user-friendly, financially feasible, scalable and transferable city logistics solutions.

In **Southampton**, the city council, hospitals and universities and Meachers Global Logistics came together with a common ambition to improve local air quality by promoting best practices in sustainable logistics. The University of Southampton acts as the neutral co-ordinator of activities. Existing working relationships between the parties have been key to continue the living lab and develop and explore new ideas related to freight consolidation, joint procurement and electric fleet adoption.

Co-creation and end-user involvement

Direct involvement and input from all relevant stakeholders and user groups are important for two main reasons:

1. to align objectives and identify common ambitions
2. to increase participation of end-users in development of proposed services or products with increased likelihood of uptake.

The **Amsterdam** implementation involved replacing diesel post vehicles with cargo bikes. Postmen were actively involved in the bike design process and operational aspects. They also provided feedback of their experiences to the bike manufacturers to improve design.

Figure 5 —
PostNL cargo bikes

Iterative learning and development

A common living lab idea is that one learns by doing and learning from mistakes. A cyclical approach is used, with plan-do-check-act phases used in sequence until the innovation is considered ready to roll out, or a decision is taken to stop.

Data collection and analysis play an important role to fully understand the consequences of measures taken and to move from one cycle to the next. Too often, in practice, this is ignored and practitioners have little idea how efficiently they are working. It is recognised that there can be 'failures': an experiment does not work well or does not contribute to the overall living lab objective but these can provide opportunities to learn.

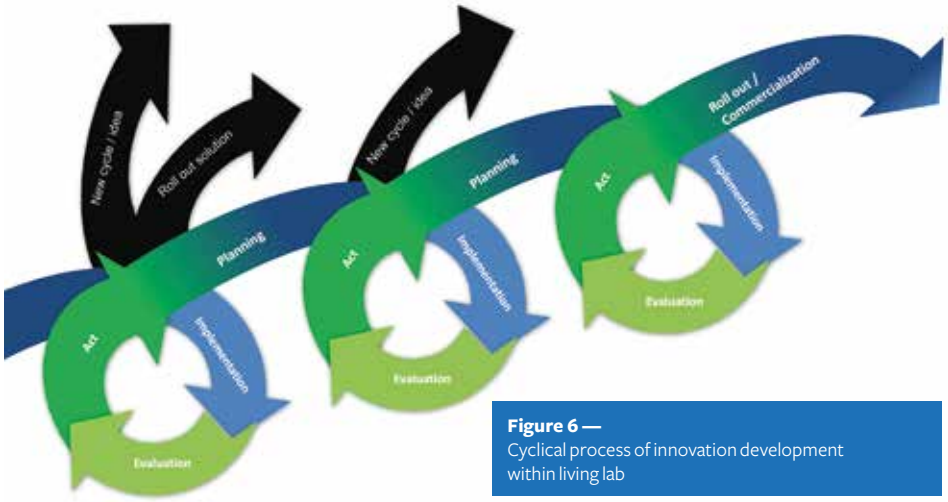


Figure 6 —
Cyclical process of innovation development within living lab

In **Amsterdam** the living lab implementation went through several cycles:

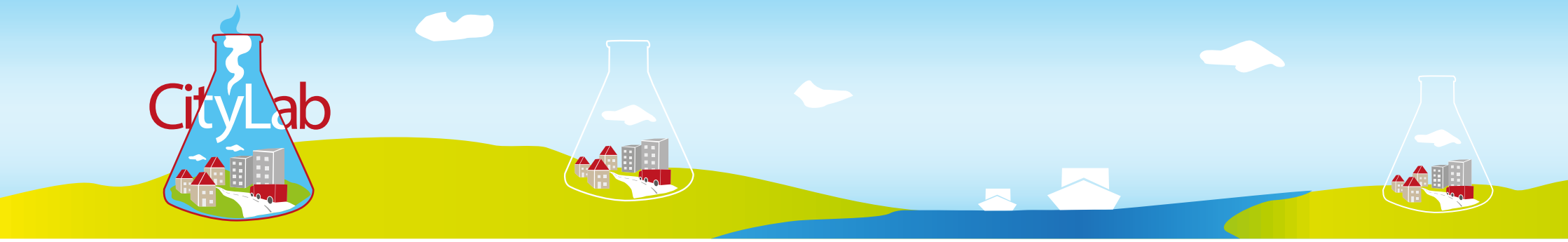
1. The initial idea was to use a floating depot on canals to bring parcels into the city; this proved to be infeasible for various reasons, mainly cost
2. A similar idea was considered to supply pubs, restaurants and hotels with fresh food items but not enough customers were found.
3. The implemented solution saw PostNL replace diesel vans in the city centre with cargo bikes (Figure 5) operating from city centre micro-hubs.

In **Rome** the first living lab cycle looked at combining postal deliveries with collection of recyclable plastic from the University of Roma Tre. The main purpose was to implement this solution in the field to investigate possible issues and market opportunities to upscale the service. Evaluation showed that product flow limited to plastic caps do not offer a positive business case. In the second living lab cycle new categories of waste materials are being considered and new potential clients are being involved in the co-creation of the solution.

Experiences with the living labs in city logistics

The following comments summarise some of the experiences gained by the Citylab partners in setting up and running city logistics living labs:

- Bringing together multiple stakeholders, from the beginning, gives you a better understanding of other stakeholder values, interests and ideas
- All partners need to be convinced there is a benefit from participating
- Persuasion is needed to encourage participants to operate more sustainably when there may be associated costs or impact on service
- The complexity of managing a living lab increases considerably with the number of partners involved. There should be enough but not too many partners. Co-development and stakeholder participation are important; but stakeholders should be active and not just occasional visitors to meetings
- Even if collaborative working arrangements already exist, it takes time to influence and steer towards the principles of working and innovating in a living lab
- The living lab approach requires a certain mentality change to be more flexible to open-ended development of the solutions
- For industry stakeholders, having political support before setting up a living lab is valuable for developing city logistics innovations. Lack of political and institutional support and limited resources are challenging barriers to overcome
- Evaluation should be an ongoing process
- Learning from negative experiences can contribute to subsequent success.
- The living lab cycles for innovations should follow the natural development process and not be forced into fixed timeframes.
- City logistics projects should not only be evaluated on the direct success (or failure) of its implementation, but should be seen in the broader perspective of added value of the stakeholder cooperation and contribution to the long-term goals of public authorities and market players.



Added value of City Logistics Living Labs

City Logistics Living Labs support action-driven cooperation fostering innovation and improving communication and collaboration between stakeholders. They can build on an existing communication platform and add value through specific and targeted project implementations in the field. Development of a shared vision, aligning individual interests to common goals and active involvement of end-users help to develop innovative and practical solutions. This should increase the chances and rate of successful implementations. City Logistics Living Labs raise the profile of urban freight and attract attention of policy-makers, knowledge institutes, researchers and citizens.

From a city authority perspective, added values include:

- Higher policy coherence due to the bottom-up insights
- A common perspective on key issues with key city logistics stakeholders
- Increased knowledge on city logistics and better understanding of practical challenges
- More investments and opportunities for innovation within city logistics
- Support for planning and opportunities for evaluation of the effectiveness of selected policy measures
- An opportunity to exchange practices and collaborate across municipal agencies
- Improved relationships and cooperation with city logistics stakeholders

From an industry perspective, added values include:

- Opportunity to participate and influence policy formulation
- Improved business cases through ideas and opportunities when working closely with other stakeholders
- Learning from experiences of other companies and improved relationships
- Innovation support
- Changed role of private industry where businesses are no longer seen as competitors but as partners working together to achieve a common goal.

For researchers contributing to the living lab, added values include:

- Direct communication with multiple stakeholders and opportunities for access to their data and practical information
- Opportunity to validate research findings
- New directions for research.

Stakeholder collaboration developed within living labs provides an opportunity to build relationships and establish joint initiatives in city logistics that otherwise would not take place.

About the CITYLAB project

www.citylab-project.eu

The CIVITAS CITYLAB (City Logistics in Living Laboratories) project (May 2015 – April 2018) was set up to develop knowledge to move towards the European Union's goal of emission-free city logistics in major urban centres by 2030. The project has explored the living lab approach as a means of bringing multiple stakeholders together in developing and rolling out sustainable and efficient urban freight transport solutions (Table 1).

The City of Rotterdam also developed its City Logistics Living Lab to assist transition to more sustainable logistics practices.

For information about latest trends and developments impacting city logistics, see the Citylab project's 'Observatory of strategic developments impacting urban logistics', available at: http://www.citylab-project.eu/brochure/D2_1_brochure.pdf

Table 1 —
Citylab implementations

Freight challenge	Implementation	City	Industry partner
Highly fragmented last-mile deliveries in city centres	Growth of consolidation and electric vehicle use	London	TNT and Gnewt Cargo
	City centre micro-hubs and cycle freight deliveries	Amsterdam	PostNL
	Increasing vehicle loading by utilising spare capacity	Brussels	Procter & Gamble
Inefficient deliveries to large freight attractors and public administrations	Joint procurement and consolidation for large public institutions	Southampton	Meachers Global Logistics
	Common logistics functions for shopping centres	Oslo	Steen & Strøm
Urban waste, return trips and recycling	Integration of direct and reverse logistics flows	Rome	Poste Italiane, Meware
Logistics sprawl	Logistic hotels to counter logistics sprawl	Paris	SOGARIS

Contact Us

Main authors: Nina Nesterova (TNO),
Fraser McLeod (University of Southampton)
For more information on the project,
please visit www.citylab-project.eu
or contact the project coordinator:
Jardar Andersen, TOI, Oslo
E-mail: Jardar.Andersen@toi.no

The Citylab project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 635898