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LONG ABSTRACT

The Role of local authorities in urban freight innovation: two case studies

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Climate change is affecting life in cities and regions. Warming temperatures, sea level rise, and extreme weather events are impacting even the most advanced cities in the world. These changes will also bring challenges in health and broader inequalities as "any increase in global warming is projected to affect human health" (IPCC, 2018). Continuous urban development is another factor of concern as urban heat islands often amplify the impacts of heat waves in cities.

However, the transport sector is hard to decarbonise. As seen in Figure 1, road transport emissions have only decreased when Covid lockdowns were implemented, but have rapidly gone to an upward trend when business as usual. At the same time, congestion is affecting health, well-being, and efficiency, costing the UK nearly £8 billion annually [1]. The 2019 Urban Mobility in the EU Audit estimates €110 billion the cost of congestion in the EU, around 1% of GDP (Europe Court of Auditors, 2019).

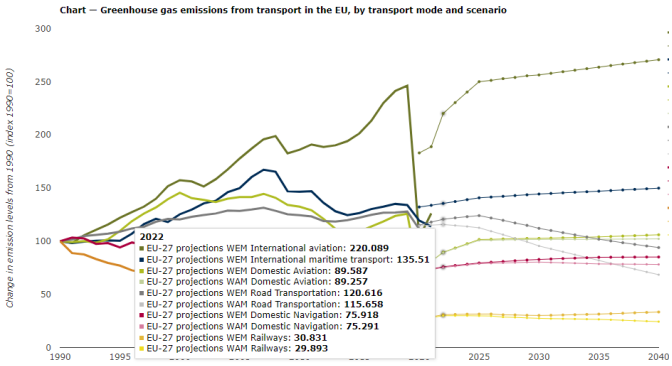

Figure 1 Road transport emissions projected for 2022 are between 15% and 20% depending on the scenario (source: (European Environment Agency, 2022)

Going deeper into the problem and considering freight as a major player in the way cities are planned and operated, we can see the national Lights Goods Vehicles (those used in cities) fleet growing at around 1.7% annually (ACEA, 2023) and e-commerce growing at +10% (Ecommerce Europe, 2022). There are no substantial statistics on active modes for freight in cities and with the continuous growth in emissions from transport, is not very clear how the transport planning sector aims

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[1] https://inrix.com/press-releases/scorecard-2018-uk/

at transitioning to sustainable transport (Transmodal, 2019). Moreover, only a few cities are thinking of freight and logistics planning as part of their local transport plans. While some guidance was issued by the EU in 2019 (Aifandopoulou et al., 2019), it is too early to understand whether the recommendations are been considered by local policymakers.

The question of how the transition to more sustainable mobility paradigms can be leapfrogged or accelerated is aligned with the calls from the socio-technical systems approach, which "suggests that answers to the challenges that ensure transitions to sustainable urban mobility systems require more than changes from the point of view of technological development" (de Souza et al., 2019). A systems approach is needed to make a change in scale and depth that considers user preferences, rules and regulations, and the involvement of different stakeholders.

Coenen et al (2012) discuss the concept of sustainable transitions, as those "complex and multi-dimensional shifts considered necessary to adapt societies and economies to sustainable modes of production and consumption in areas such as transport, energy, housing,...". This transition is seen as a system innovation with changes in "markets, user practices, policy and cultural discourses as well as governing institutions...". The notion of relational space mentioned in Coenen et al (2012) is defined as the distance between actors that affect the way they interact. This geographical analysis of space and transitions considers that interactions between actors regularly lead to more solid networks and institutions, which at the same time support more interaction. In the urban freight sphere, the notion of relational space can be exemplified by the inclusion of a company in public procurement frameworks, sustainable labelling trademarks, or transport associations. The networks created "define and create spaces with their own institutional arrangements, power relations, governance institutions and dynamics, which offer proximity between actors". The authors emphasize that while the approach can look at institutional arrangements at the city level, the geographic economic environmental agenda is still in its "infancy". Whereas economic geography hasn't focused on sustainability, economic development has captured more attention. Sengers et al (2016) also warns us, that while the topics of innovation and how it helps transitions have been, somehow explored for the national level, "less attention has been paid to transforming highly interconnected and materially obdurate city-level socio-technical systems".

How cities plan for urban freight innovation can be regarded as the main research question of this paper. While current literature focuses on describing pilots, case studies, and experiences in cities. This research aims at comparing case studies to analyse the structure in which the experiments are designed to capture the variables that had more influence on the success of innovation management. In this particular paper, it can also be seen the transfer of an idea from city to city and how it is adapted to its particularities.

This paper is organised as follows, the next section provides an overview of the main challenges of logistics and freight in the city context. It follows by unpicking different planning approaches for innovation from the literature. In the third section, I present two case studies in Antwerp and Lucca. Finally, a short discussion and conclusion.

1 Planning for Sustainability and freight transport in cities

It is estimated that urban demand for goods mobility will increase threefold by 2050 with an expected volume of 28.5 trillion tons/km (Arthur D Little, 2015). Cities face a dilemma between the economic growth that increased sales and activity represent in terms of job creation and business taxes with the social-environmental externalities that arise from increased transport-related trips.

Increasingly, businesses look into streamlining and optimising their processes to increase the revenue margin and adapt to environmental regulations. However, the institutional setting in which urban freight stakeholders move is disjointed in terms of objectives and sometimes lacks vision as it is mostly based on specific public policies and not in frameworks such as Sustainable Urban Logistics Plans (SULP).

SULPs are the logistics-specific version of the more developed Sustainable Urban Mobility Plans launched in 2011. Still, SULPS follows similar steps and stages to the former. These go from preparation and analysis, moving on to strategy development and measure planning (Aifandopoulou & Xenou, 2019).

A fact-finding study conducted by DGMOVE in 2021 on SULPs, showed that only 20% of cities had a planning approach that considered urban logistics, only 13% of the cities surveyed had a SULP, and awareness of this planning tool is higher in bigger cities than smaller ones (DGMOVE EU, 2021). The report highlights that the urban logistics situation in European cities is not in line with EU-level objectives.

However, the lack of a planning framework to improve freight transport in cities does not imply that cities are condescending in the fight against climate change. Due to various factors, such as lack of resources, lack of administrative and planning capacities, etc, cities may opt for a more targeted or incremental approach by funding trials, projects, or regulations.

2 Planning approaches to innovation in the freight sector

We have seen so far that cities face certain dilemmas. First, the economic-environmental dilemma between their objectives of economic growth and sustainability. Second, two planning dilemmas: transition and urban freight planning. The transition part refers to the concept of socio-technical agendas presented in the introduction and specifically to the institutional arrangements (frameworks, organisations in which urban freight stakeholders can collaborate or receive help.) that are needed for innovation to happen and (maybe) change a system towards a more sustainable one. The urban freight planning dilemma focuses on how to plan, whether to have a general framework (Sustainable Urban Logistic plan or Local Innovation Strategies for example) and more robust process to engage with freight stakeholders or opt for a more targeted approach (a specific project like the implementation of a Low Emission Zone).

Traditionally, urban freight has been considered a private-sector matter. However, due to its increased externalities, the public sector has been increasingly interested in managing and collaborating with logistics stakeholders. This special characterisation (in comparison to the role and power a local authority has to plan for public transport for example) requires other types of planning frameworks that are better aligned to the role of local authorities in shaping such an ecosystem. In this line, a concept that has gained traction is the one of Living Labs or Urban/City Labs, which originally comes from the private sector innovation management sector. These are placed-based interventions with a heavy component of interaction between stakeholders and focusing on innovation and sustainability (Schliwa, Evans, McCormick, & Voytenko, 2015).

The idea of living labs is to produce innovation by experimenting in real-life settings. Schuurman et al (2013) provide a good paper including the main characteristics, goals, and categories of living labs. Eschenbacher, Thoben, and Turkuma (2010) look into living lab service offerings and promote thinking on what the best choice of a living lab, managers or designers should go for, however, it lacks a clear answer. The matter of funding of living labs is less developed in the llitarature, although this is considered a shortcoming in planning studies. Therefore, trying to capture the value in which innovation can be enhanced may represent a way forward for cities to allocate (or get) funding for this.

Living labs can be single-project endeavours or living lab platforms(Alexnadrakis, Hein, & Kratzer, 2022). A similar distinction can be found between product-oriented living labs (Neef, Verweij, Gugerell, & Moen, 2017) and transition living labs. In the first type (product oriented) a fixed group of actors determines the physical environment in which the experiments will happen, it includes a strong lead that decided and organises the innovation process. We can draw comparisons between product-oriented living lab approaches to single projects or targeted innovation public policy. On the other hand, transition-oriented living labs are set by multiple actors with the city as a whole lab and with longer goals, where strategic learning and feedback are seen as crucial components.

To summarise, in the innovation and transport (freight in this case) for sustainable transitions we find three planning levels:

- Planning frameworks: SULP, Innovation Strategies, Climate Action Plans, SUMPs
- Planning vehicles: City Labs, Living Labs, Urban Living Labs[2], Innovation Districts, etc
- Individual actions: projects, public policy

[2] Different denominations but overall refer to the same approach as described in the text.

3 Case studies: Lucca and Antwerp

The organisation of the logistics and innovation ecosystems in these cities was promoted, among others, by the SUMP-PLUS (H2020) project. This section presents the main characteristics of such efforts in two European cities, participants of the project: Antwerp in Belgium and Lucca in Italy.

The cities organised their activities in City Labs, whose objectives were to:

- Forge cross-sector links between transport, public services, and commercial activity
- Implement and monitor cutting-edge mobility solutions
- Create new forms of public-private partnerships and business models

3.1 Antwerp

The City of Antwerp has a population of 530,504 and it's the biggest city in the Flemish region. The city has seen a big change in transport governance. The Flemish government created the transport regions that in this case included Antwerp with other 32 smaller municipalities. In this redrawing of competencies, big and small-sized cities need to find a way to collaborate. The different scale of planning governance was considered as barriers to the upscaling of innovation to the metropolitan level due to a lack of expertise, different administration practices, and organisations (Halpern C., 2022).

In 2016, the City of Antwerp launched the Marketplace for Mobility in the context of the PORTIS project. The Marketplace is a platform for partnerships with providers to offer solutions for mobility, including passengers and freight (Kishchenko, Roeck, Salens, & Maroey, 2019). The mobility solutions would have to aim at modal shift, time shift, location shift, and technology shift. The partnership options were defined as (in increased order of support: time and resource investment):

- Promotional support: for optimising their product, companies are offered professional support from the Smart Ways to Antwerp agency.
- Financial support through project call: the City launches an open call once or twice a year for companies to submit project ideas to reduce congestion and are offered financial and non-financial support (similar to promotional support).
- Long-term partnership through tender: having the city as the contract owner for the development of two mobility apps (long term) looking at reducing traffic. This app is called “Smart Ways to Antwerp” and consists of a route planner with active travel and MaaS options (Berreta, 2022).

3.2 Lucca

The City of Lucca in Italy has a population of about 89,000 inhabitants in the Italian region of Tuscany (Adminstat, 2023). The City has been experimenting with sustainable logistics innovations for years, in the context of continuos engagement with stakeholders, although not under a “living lab” brand. In the last 8 years they have trialled infrastructure for automated access control in the restricted city centre area, The Lucca Port Urban Distribution Center (now suspended), loading and unloading bay ITS, a public cargo bike sharing service and a monitoring RFID system that has been integrated into the innovation call explained next (Salvatore, Della Lena, & Guerra, 2022). It is interesting to highlight that even when experiments or innovations are regarded beneficial and have a positive impact on the environment like the case of the Urban Distribution Center with expected benefits such as reduction of air pollutants between 35% and 80%, might not be wholly economically sustainable. The experience has led the city to look for alternatives to keep engaging with the private sector to come up with other innovative policies.

In essence, the administration pledges to cooperate with selected operators to perform more sustainable transport in the city centre by involving them in specific sustainability projects or supporting them in developing their specific projects. In a certain way, such an approach is close to the one adopted by the city of Antwerp with its mobility marketplace. However, an interesting difference is the fact that the operators are identified by exploiting the sustainability ranking of the transport operators authorized to circulate in the RTZ. The innovation call foresees that certain operators, selected among

those with an appropriate level of ranking, are invited to discuss with the city administration city logistics sustainability projects.

Freight operators were classified into three groups: those who lean on fossil fuels for deliveries, those in transition, and inspirers who got more than 50 ecopoints (representing only 3% of the total). Fossil fuels group 0-20 ecopoints (44%), transition 21-49 ecopoints (53%) (Salvatore, Della Lena, & Guerra, 2022). The innovation call was focused on this last group. The awards ceremony is considered an intangible aspect positively considered by the private sector. Sustainable awareness is increasingly important for Social Corporate Responsibility.

4 Discussion

The two case studies presented show how two local governments approached freight innovation by using a City Lab backed by the research and innovation EU programme Horizon (SUMP-PLUS project).

As regards planning frameworks, both cities have Sustainable Urban Mobility Plans, however, they don't have SULPs. They are in the process of developing one. Previous experience in organising experiments (whether successful or not) and engaging with the freight sector are considered assets by both municipalities in their endeavour to establish a more structured freight and logistics planning document.

Focusing on the particular projects or programmes for innovation calls we see that the main functions that the city administration considers of value for the private sector to ramp up their innovation capacity regarding sustainability are:

- Funding is a constant variable in the Antwerp case. This can be project-based or long-term funding. Funding refers not only to investment in the development of tools or technology but also for the human resources (city officers' time) that enable for this innovation calls to have continuity. In the case of Lucca, for instance, funding was allocated to officers' time and the collection of smart data for the dynamic parameters that were later considered for the sustainability ranking.
- Technical assistance: optimisation of products, business/value models, networking. This is partially linked to funding capabilities as designing and coordinating the projects as well as offering assistance to the private sector requires human resources. In both local authorities, skills were present and the participation in European Innovation and Research projects helped with funding officers' time.
- Marketing and visibility: in the case of Antwerp, companies are offered support to market their products or solutions, and in Lucca, they receive an award that certifies their commitment to improving sustainability.
- Operations/regulations incentives: the possibility of data and testing in a real-world environment like in Antwerp or allowance to enter the city centre at certain (better) times in Lucca.
- Reverse feedback: the possibility of the private sector influencing the next steps of innovation. In both cases, companies that have increased sustainability rankings have more influence in the discussions and can help develop the agenda for future collaboration.

While planning frameworks for innovation, urban freight, and sustainability are not widespread (Bjorgen & Ryghaug, 2022) there is an increased interest in city administrations in orchestrating or enabling the ecosystem. Increasing knowledge transfer, stable funding options, marketing, and engagement seem to be key considerations that local governments need to think of when designing public policies or planning tools in this sector.

The case studies in this paper show two examples of local authority-led and research-led urban freight innovations. In both cases, the public sector has taken the lead to define the sustainability goals of “innovation calls”, which were also in line with supra-state funding available (EU funding based on SUMPs and the Mobility White Paper (EC, 2011). Private sector participation could be defined as active and interested. In some cases as it represented a business opportunity and in others due to marketing and Corporate Social Responsibility. The role of citizens and research institutions has not been greatly explored in this paper and represents a topic that should also be deepened as they are

both key actors in the quadruple helix approach on which living labs in particular are based. However, universities have supported both cities, and citizens were consulted in mobility forums within the time scope of the projects.

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Keywords: Urban freight; innovation ecosystems; planning approaches, transition management

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