Evolution of Logistics Services Portfolio offered in Last-Mile Delivery of the Case Study of Urban Logistics Space (ULS) of Cordeliers in Lyon (France): a work in progress

Work in Progress

Kanyarat Nimtrakool[a] and Claire Capo[b]*

[a]Department of Logistic Technology and Transportation System Management, *Rajamangala University of Technology Tawan-Ok, Bangkok, Thailand;*

[b]Université Le Havre Normandie / NIMEC UR 969 – Faculté des Affaires Internationales, claire.capo@univ-lehavre.fr

Abstract

This work in progress investigates the evolution of logistics services in last-mile delivery, specifically in the Urban Logistics Space (ULS) of Cordeliers in Lyon, France. The study explores the current logistics services offered, their advantages and disadvantages, and the needs of existing and potential users. A longitudinal study was conducted using a qualitative method with semi-structured interviews. Key informants included direct stakeholders such as funders, facilitators, operators, existing users, and potential users. Interviews were conducted in 2017 (3 interviews) and 2023 (4 interviews). Data analysis utilized NVivo, employing thematic and content analysis. Key findings reveal a diverse portfolio of logistics services emphasizing operational, technical, relational, included restrictions, and value-added services. Advantages encompass economic, social, environmental, and service aspects.

Keywords: Urban Logistics Space (ULS); Last-mile delivery; Cordeliers (Lyon, France); Logistics services, Urban logistics

Introduction

City logistics aims to enhance efficiency, reduce the negative impact of logistics processes and activities, and reinforce the sustainable development of cities (Reyes-Rubiano et al. 2021). Therefore, various stakeholders involved in urban logistics have been studied, including suppliers, producers, wholesalers, distributors, retailers, and logistics service providers (Munuzuri et al. 2005). Today, one of the most cited definitions of city logistics by academics is as follows: "*the process for totally optimizing the logistics*

and transport activities by private companies in urban areas while considering the traffic environment, traffic congestion, and energy consumption within the framework of a market economy" (Taniguchi et al. 2001). In this context, city logistics primarily focuses on the transport of goods. However, Allen et al. (2000) argued that city logistics studies should also encompass service vehicles and other commercial uses. In fact,

numerous solutions have been implemented to improve urban situations, including those related to public infrastructure, land use management, access conditions, traffic management, enforcement, and promotion (Munuzuri et al. 2005). Urban Logistics Spaces (ULS) is one such solution related to the spatial configuration and objectives for the location of facilities (Sahin and Sural 2007), but also the production of new services offers. Indeed, specialized logistical services are increasingly required in each region (Mirčetić, Nikoličić, and Maslarić 2014). Today, various types of ULS exist. Boudouin, Morel, and Gardrat (2014) considered a ULS as interfaces between supply chains and urban space, articulating urban producers, distributors, consumers, and other stakeholders not directly related to logistics planning. Even if we chose the most generic term of ULS, several terms have been used, including logistics platforms, logistics activities area, urban micro-platform, Urban Distribution Centre (UDC), and Urban Consolidation Centre (UCC) (Meza-Peralta et al., 2020). One of the most studied terms is the Urban Consolidation Centre. Allen, Thorne, and Browne (2007) characterized three types of generic Urban Consolidation Centres (UCC): the public UCCs, the private UCCs and the specialized UCC'ones.. This classification was extended and new dimensions added (Gonzalez-Feliu et al. 2014; Giampoldaki et al. 2023) including the type of user (mono-user or multi-user with mixing or non-mixing flows), the area specificities (urban, city centers…) and coverage area, the temporality of the UCC (permanent, season-based or temporary) and the eventual specialization on a certain type of goods. This study focuses on a specific case study of the ULS of Cordeliers in Lyon, France. The ULS of Cordeliers can be characterized as a private, multi-user with only shared space, area-based, permanent specialized UCC as it is managed by private companies and serves the hyper-center of Lyon. The objectives of this research are:

- To identify the current logistics services offered by the ULS of Cordeliers.
- To analyze the advantages and disadvantages of the logistics services provided by Cordeliers' ULS.
- To examine the existing and potential users of the ULS of Cordeliers and their

needs.

The central research question of our paper is: "*Why do the existing and potential users of the ULS of Cordeliers choose to use or not use this platform? What are their needs"*

Such questions permit to identify the levers that UCC's managers can use to promote the use of UCC and to break down barriers (Nimtrakool et al., 2018) the new users may have. Indeed, many users of logistics services set limits to the use of UCCs, keeping in mind the first forms and experiments of them and preconceived ideas. In addition, their integration into a logistics scheme can lead to resistance to change. It is therefore necessary to identify the changes in service offerings and the interest of their use in a process of building an urban logistics offer within a framework constrained by regulations and decarbonization objectives. To address the research objectives, the current logistics services offered by the ULS of Cordeliers will be identified; then, their advantages and disadvantages; and, eventually, the needs of the existing and potential users.

The subsequent section will offer a comprehensive literature review of urban logistics service offerings and their evolution (Section 1), followed by the research methodology (Section 2), a descriptive analysis of findings (Section 3), and a discussion of the research questions (Section 4). In conclusion, we will identify opportunities for future research.

Literature review

The literature review proposes to identify the categories of urban logistics services offers especially for last miles deliveries. It stresses also the innovation, both technological and managerial, implemented ins such offers that UCCs can propose or support and theirs advantages.

Urban Logistics Service offers and Providers

Urban logistics services can take various forms and must adapt to different needs and contexts. As the stakeholders and expressed needs are highly heterogeneous, a very fine segmentation is often implemented and adapted to the specific logistical profiles of each urban space (Macario et al. 2008). According to Björklund et al. (2017, 38), Urban Logistics Providers create value by incorporating activities throughout the supply chain, including internal and external coordination of goods flows. These services rely on both internal and, more importantly, external coordination with numerous stakeholders. Therefore, relationships with customers, suppliers, partners, public regulators, and others

are essential. Moreover, such activities are highly impacted by city regulations that are not always adapted (Patier and Routhier 2020).

We can classify several categories of urban services linked to urban areas, and more importantly, to consolidation activities at different levels (operational, technical, or relational) and oriented toward upstream or downstream organization (Juga et al. 2010). These services can include classical technical services such as cross-docking, automated storage, and operational services such as shared-user services, multimodal operations… (Fernie et al. 2000); or relational services permitting the creation of collaborative services (information systems, pooling…) (Hingley et al. 2011; Makaci et al. 2017). According to Browne et al. (2011), urban services should permit adaptation to restrictions (internal and external), especially time restrictions and parking restrictions. They classified the UCC services into two different categories: logistics and value-added services (Browne et al. 2011) (Table 1).

Table. 1 Classification of urban service offers

N°	Category	Urban services offered	Source
1	Operational service	Shared user's services, multimodal operation	Fernie et al. (2000)
		Access to external storage	Aastrup et al. (2012)
2	Technical service	Cross-docking, automated storage	Fernie et al. (2000)
		fewer deliveries, additional stockholding, better inventory control, preparation of products, and greater consignment	Browne et al (2005); van Rooijen and Quak (2010)
		Arriving before the store opening time	Van Duin et al. (2010)
		Decrease of delivery frequencies, recording in the computer system	Aastrup et al. (2012)
3	Relational service	Collaboration creation services (Information system pooling)	Hingley et a. (2011); Makaci et al (2017)
		More-consolidated shipments	Aastrup et al. (2012)
4	Included restrictions	Time restriction, parking restriction	Browne et al (2011)
5	Value-added services	Additional stockholding, pre-retail activities (unpacking, price tagging, attaching antitheft devices), handling of reverse logistics (returns and recycling packaging materials), home delivery, and ordering processes	Browne et al (2005); van Rooijen and Quak (2010); Aastrup et al. (2012); Allen et al. (2012)

Source: adapted of Browne et al., 2011.

Kohn and Brodin (2008) highlighted the advantages of pooling flows in urban areas, which can be categorized into three classes: costs, services, and emissions. In contrast, Browne et al. (2005) classified these advantages into environmental, social, and economic aspects. The advantages of urban service offerings are summarized in Table 2. They will be confronted to the research findings in section 3.

Table 2. Advantages of the urban service offers

N°	Category	Advantage	Source
1	Economic aspect	Reducing inventory level, Reducing tied-up capital/ reducing capital investment, Reducing total distribution cost, Reducing fixed and variable costs, reducing learning costs for the organization	Abrahamsson (1993); Kohn and Brodin (2008); Qiu et al. (2015)
		Reducing inventory holding and management	Qiu et al. (2015)
		Lower the cost of transport per weight unit	Jackson (1985); Gupta and Bagchi (1987); Pooley and Stenger (1992); Tyan et al. (2003); Gümus and Bookbinder (2004)
		Offering additional storage in are with tower rental costs or moving logistics activities to the UCCs in order to gain large-scale advantages.	Johansson and Björklund (2017)
		More-efficient outbound transports and can reduce costs related to fuel, insurance, maintenance, and drivers.	Browne et al (2011)
2	Social aspect	Networks/ Relationships	Durand et al. (2012)
		Increased traffic near a UCC due to increased inbound freight transport	Browne et al (2005)
3	Environmental aspect	Reducing negative impacts of urban logistics on the environment (CO_2 emissions), air quality (emission of other pollutants), safety (accidents) and quality life in cities (noise, congestion, etc.), more environmentally friendly vehicles	Browne et Gomez (2011); Kohn and Brodin (2008); Durand et al. (2012); McKinnon (2000)
		Reducing the number of trucks on the road	McKinnon (2000)
		Reduction in heavier trucks, improved delivery service, work environments for receivers	Björklund and Gustafsson (2015)
4	Service aspect	Emplacement/Location, Alternatives to existing networks, more adapted to products specifies, Planification services	Durand et al. (2012)
		Reducing lead-time / Maintaining the lead-time / Delivery more frequently	Abrahamsson (1993) ; Kohn and Brodin (2008) ; Qiu et al. (2015)
		Decreasing emergency deliveries, Better utilize transport's capacity	Kohn and Brodin (2008)
		Increasing delivery performance	Abrahamsson (1993)

Source: adapted of Browne et al. (2005) and Kohn and Brodin (2008).

Despite these advantages, urban services also entail disadvantages. From an economic perspective, urban services incur set-up and operational costs for running the platforms, including expenses for personnel, electricity, and power (Browne et al. 2005). Furthermore, urban logistics platforms often face challenges in establishing a viable business model and identifying opportunities (Aastrup et al. 2012). Many urban logistics services depend on local, regional, or national incentives for their viability (Quak et al. 2014).

Logistics Service Quality (LSQ) for last-miles deliveries

There are different models of service quality presented in the literature. In particular, it is challenging to assess the performance of outsourced services; hence, the importance of relational performance (Stank et al. 2003) and the significant impact of lack of trust and the use of power (Grant 2005). According to Juga et al. (2010), operational service quality and personal service quality are more important than technical service quality in terms of logistics. However, this can vary depending on the context (country, economy, etc.). They break down these three types of quality as follows:

- Operational Service Quality: Ability to adhere to schedules / Ability to offer services promptly / Ability to provide sufficient capacity.
- Personal Service Quality: Service-mindedness of personnel / Accessibility of personnel / Expertise of personnel.
- Technical Service Quality: Technical quality of physical resources / Technical quality of the information system / Problem-free electronic communication.

Other dimensions also play a role in the perceived quality of services, such as the costs and image of logistics service providers (LSP) (Andreassen and Lindestad 1998). In terms of sustainability, several indicators of quality are often cited, including the decrease of congestion, the number of jobs destroyed/created, as well as greenhouse gas emission rate, energy consumption, noise level, etc. (Morana and Gonzalez-Feliu 2015).

Evolution of urban service offers and its adoption of innovation

In the context of UCCs, many researchers have identified difficulties in achieving sufficient levels of profitability to ensure their viability (Gonzalez-Feliu 2011) and the

need to attract more consumers (Triantafyllou et al. 2014; Ville et al. 2013) and/or reduce service costs (Allen et al. 2014). A potential solution to these challenges is the extension of offered services, as highlighted by scholars such as Finnegan et al. (2005), particularly through the exploration of sustainable services (Lindholm and Ballantyne 2016) and innovation.

Innovation is often identified as solution to the main problems of last-mile logistics. Thanks to « *radical innovation in urban last mile logistics, using environmental-friendly transportations modes (e.g., cargo bikes), consolidation points (e.g., micro hubs) and new digital premium service model (e.g., time window alignments).”* (Engelhardt 2023, 911). However, innovations lead to additional costs and urban logistics services are often at the edge of break-even points when they are reached. In addition, they are characterized by a collective dynamic that involves multiple stakeholders (Nilsson and Christopher 2018). This reinforces the complexity of the relational dynamics among the actors, including relations of power, interests, resistance, etc. (Farchi et al. 2023). For example, initiatives related to the concept of smart cities are grounded in information systems and information sharing via digital innovations (Taniguchi 2021) between public and private partners. Many logistics solutions rely on these innovations, despite real difficulties in sharing and barriers that are challenging to overcome (Illemanne et al. 2021). As these initiatives are somewhat experimental, support from public actors remains crucial (Raimbault, 2021).

Research design

In order to identify twhat kind of offer attracts services providers and shippers in using UCCs, this research propose a monographic longitudinal qualitative research. The sesign of research summarize the presentation of the case studied, ULS of Cordeliers in Lyon, , the main informants and the analysis grid used.

Data collection

To conduct a longitudinal case study of the ULS of Cordeliers, we conducted two series of interviews during distinct periods in 2017 (as reported in Nimtrakool, 2018) and in 2023. Qualitative research was carried out through semi-structured interviews, direct observation, and the utilization of secondary data. The interviews involved key stakeholders, such as local logistics service providers, delivery companies, and retailers

operating within the ULS of Cordeliers.

The initial set of interviews, conducted in 2017, comprised three sessions. These interviews involved two primary private operators (a carrier and distributor) of the platform, along with a public authority in Lyon actively engaged in platform space rental. The second set of interviews is currently a work in progress. We have completed interviews with four stakeholders, including a public authority in Lyon and three last-mile delivery companies employing environmentally friendly vehicles. These companies represent potential users of the ULS of Cordeliers in 2023. Additional interviews are planned with each party involved.

Key informants

Firstly, the purposive sampling of key stakeholders, such as logistics managers, delivery personnel, and urban planners, ensures a holistic understanding. Additionally, snowball sampling can be employed to identify auxiliary participants, fostering a nuanced grasp of the intricate web of logistics dynamics. Seeking a diverse range of perspectives, including those from local businesses, residents, and policymakers, would enrich the analysis.

This work in progress has involved interviewing the Lyon authorities, who own and rent this platform to the ULS of Cordeliers. Today, the interviewees include the urban project manager related to Lyon authorities and three last-mile delivery companies with environmentally friendly vehicles.

Data analysis methods

We will employ NVivo to conduct a thematic analysis of key informants' needs, satisfaction, and dissatisfaction concerning urban logistics services (ULS) at Cordeliers, specifically focusing on urban last-mile delivery. This analysis will involve evaluating sentiments, identifying the primary drivers of service acceptability, and pinpointing areas for improvement.

First results

The research being in progress the first results present the context and history of ULS of Cordeliers, the portfolio of services actually proposed and the first advantages identified

by the users. Then, we extract the main expected contribution and the limits of the research.

The ULS of Cordeliers Context

Over time, the ULS Les Cordeliers has evolved and has been followed by the establishment of several other ULS in the Lyon area. It underwent a creation phase on April 26, 2012, by the Metropolis of Lyon, initially established for the DERET messaging company. In 2014, OOSHOP, the online grocery shopping brand and a subsidiary of the Carrefour group, joined ULS by pooling resources with the DERET company in a complementary manner.

This ULS represents a collaboration involving four public and private partners: Lyon Parc Auto (LPA), the Lyon Metropolis, DERET Transporter, and OOSHOP. Lyon Parc Auto manages parking for the Lyon Metropolis and is also a partner of the community. It operates as a mixed economy company, with both public and private entities as shareholders. Lyon Parc Auto serves as a facilitator and catalyst by initiating the ULS of Cordeliers project and bringing together two partners, DERET Transporter, and OOSHOP. In this role, Lyon Parc Auto orchestrates the components of a solution to enhance optimization, functioning as a neutral service provider for the ULS of Cordeliers. From the beginning of this initiative, the Metropolis of Lyon is the main shareholder of Lyon Parc Auto. Through its political will, it promotes urban logistics, particularly by establishing ULS to address issues related to the transportation of goods in the city. Lyon Parc Auto (LPA) and the Metropolis of Lyon support the ULS of Cordeliers by reducing the space rental charges for both users (DERET transporter and OOSHOP).

The ULS of Cordeliers occupies an area of 350 m^2 on the ground floor of the Cordeliers parking lot in Lyon. This location has been made available by Lyon Parc Auto (LPA). All delivery vehicles from the ULS of Cordeliers are electric. DERET Transporter has two electric trucks, and OOSHOP has two electric vehicles. The sharing of space at the ULS of Cordeliers, as well as its supply, is shared between DERET Transporter and OOSHOP. This ULS is divided into several parts. There are two specific fenced areas respectively occupied by DERET Transporter and OOSHOP. This area includes a dry goods storage space for DERET Transporter, a refrigerated area for fresh products for OOSHOP, and a common space for unloading vehicles. The platform is equipped with 24/7 video surveillance to ensure the security of the site.

The ULS of Cordeliers Logistics Service Portfolio

The ULS of Cordeliers Logistics Service Portfolio offers a diversification of service offerings, including car-sharing, offices, urban logistics, etc., coupled with the integration of new forms of mobility and decarbonization. The activity of the ULS depends significantly on the context in which it finds itself. For instance, constraints imposed on flows such as pedestrianization, density, and regulations will influence the types of services sought by stakeholders and, consequently, the viability of the ULS.

The prospect of implementing the Low Emission Zone (LEZ), reinforcing constraints, strengthened the idea of developing the activities of the ULS and directing it towards adapted services. This was accompanied by a phase of renovating the premises to transform and adapt them to flow objectives, vehicles, and the need for more comfortable premises for employees.

We can classify the ULS of Cordeliers Logistics Service Portfolio into five different categories:

- Operational service: urban space sharing, goods transportation pooling from rural areas, urban platform facilities, and equipment sharing.
- Technical service: logistics services catering to last-mile delivery, same-day delivery, time-specific delivery, and customized delivery solutions based on user preferences, route optimization software, and IoT-enabled tracking systems.
- Relational service: decarbonization and Customer Service Relationship (CSR).
- Included restrictions: time windows restrictions, vehicle types, height and weight restrictions, pedestrian restrictions zone, LEZ restrictions in the center of Lyon.
- Value-added services: return logistics (collection, recycling, etc.), addressing customer demands to organize the process for them and estimate the cost. They are a mix of technical, operational and relational services.

For the advantages and needs of both existing and potential users, using the same categories identified in review literature (table 2) when possible, we present our finding. We identified four categories of advantages linked to service offer:

- Economic aspect: Reducing the cost is rarely possible
- Social aspect: Partnership Models - collaboration between logistics companies and local businesses has emerged as a prominent trend, enabling streamlined

delivery processes and fostering synergistic growth of the ULS of Cordeliers. Strong and lasting partnerships have been created with an alignment to respond to the business model in the urban area and the objectives of the Lyon Metropolitan. Regular exchanges with stakeholders take place without necessarily providing systematic feedback.

- Environmental aspect: Environmental certifications (e.g., noise certibruit) and an objective is to have 50% of flows decarbonized. Environmentally friendly vehicle use is emphasized. Sustainability Initiatives are cited: The ULS of Cordeliers highlights the increasing adoption of sustainable practices in last-mile delivery, including the use of electric vehicles, alternative fuel options, and eco-friendly packaging materials, aligning with the city's environmental sustainability goals. Initiatives also aim to improve employment conditions in the ULS and during tours.
- Service aspect (especially, technological dimension): Several logistics providers in the ULS of Cordeliers emphasize the need for technological integration services, such as route optimization software, IoT-enabled tracking systems, and the enlargement of the ULS areas to enhance the efficiency of last-mile delivery operations. For stakeholders, “everything is good to take” in terms of innovation. Everything is a potential source of experimentation, especially in terms of information systems and information transfer. However, not all innovations are relevant due to the small size of the structure, for example, automation.

However, experiments do not necessarily lead to permanent activities (e.g., river activities) due to the investment needs and the profitability of activities, which are not always high. They also participate in all round tables and exchanges on flows in the city, particularly around the implementation of the LEZ in Lyon.

In the state of our research, the advantages more widely put forward as particularly important in the choice of use of the UCC des Cordeliers are the social aspects and the avoidance of restrictions (regulatory, congestion, geographical, etc.).

Expected theoretical and managerial contributions

Analyzing logistics services in last-mile delivery within the ULS of Cordeliers realm reveals critical insights into optimizing urban delivery networks. Addressing the evolving dynamics of ULS users and potential users’ demands, sustainability concerns, and

technological advancements, this study proposes a comprehensive framework for enhancing logistics efficiency, fostering sustainable practices, and meeting users' needs in the urban logistics ecosystem.

This study also provides essential insights for the ULS of Cordeliers manager and similar platforms, aiding their understanding of current logistics service providers within the platform. By utilizing the results, key stakeholders of the ULS can effectively identify the existing and potential users' needs in urban logistics services, consequently facilitating the enhancement of current services. Furthermore, ULS managers can proactively cultivate strategic partnerships with the identified logistics service providers, amplifying operational efficiency and bolstering user satisfaction. ULS are media toward collaborative test or experiment, often including innovation. It also permits the customization of services offer depending on the needs of the partners.

Finally, at a most global perspectives, Emission Zones (LEZ) have created the conditions for their innovation adoption. The perspectives of LEZ can create challenges for different involved stakeholders in urban areas. The reactions of the stakeholders to this type of regulations and its consecutive constraints can teach public manager as well as ULS manager lessons for the future.

Limitations and perspectives

The first limitation concerns the selection of the research field. Our choice is confined to a single urban logistics platform. While there are numerous solutions associated with urban logistics spaces aimed at improving overall performance, our decision was justified by the interest that academic researchers have shown in this field. Nevertheless, the scarcity of studies on the longitudinal logistics service offerings and their evolution for both existing and potential users is a noteworthy limitation. This constraint may impact the generalizability of our findings and restrict their applicability to a broader context.

The second limitation involves the exclusive use of a qualitative methodology, specifically case studies employing semi-structured interviews. Our objective is to comprehensively explore all necessary data concerning the evolution of the Cordeliers urban logistics service and its users over the past six years. However, it is important to note that relying solely on semi-structured interviews may limit access to certain data that could be uncovered through alternative methods.

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