

Municipal Strategy on Urban Freight Distribution

Horizon 2030



Strategy
March 2023
1st edition

Barcelona Regional

BR

BARCELONA
REGIONAL
AGÈNCIA
DESENVOLUPAMENT
URBÀ



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Municipal Strategy on Urban Freight Distribution. Horizon 2030

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Collaborators

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1. Introduction

Urban freight distribution (UFD) is a basic necessity for the urban economy and life in the city and is directly related to Barcelona's commercial activity and economic competitiveness.

The Horizon 2030 Municipal Strategy on Urban Freight Distribution (EDUM, in the Catalan acronym) aims to be a planning and coordination instrument with a view to meeting the city's current UFD needs in harmony with the guidelines of Barcelona's Urban Mobility Plan (PMU) 2024.

In the current urban context, with problems such as air pollution, the impacts of our dependence on fossil fuels, noise pollution and the heat island effect, Barcelona is steering its urban agenda towards the redefinition of its mobility and public space model.

As such, the city is rolling out a consolidated and internationally renowned project that will make it possible to take strides towards a healthier, fairer and safer public space model that favours social, economic, local and everyday relations. The project proposes a new street model that reduces the presence of private vehicles and incorporates the climate factor and everyday life as elements to be taken into account when redefining spaces.



To help reach this goal, the PMU 2024 focuses its strategic objectives towards improving the efficiency of urban freight distribution in the city and reducing frictions between UFD and the rest of the city's motorized traffic. These are the ideas upon which the EDUM has been developed.

This strategy, which is based on a meticulous diagnosis of the current state of UFD in Barcelona, is structured into 3 major programme approaches, 10 key objectives and 34 action proposals. The strategy also includes a prioritization and monitoring section, with the timeline envisaged for its implementation, and monitoring indicators. It also includes the roll-out of the UFD Office, which will be responsible for coordination, liaising between the public and private agents and driving the implementation of the EDUM.

The EDUM is an initiative fostered by Barcelona City Council, which has put together a Steering Group led by the Manager's Office for Mobility and Infrastructures and coordinated by the Chief Executive's Office, with the support of Barcelona de Serveis Municipals (B:SM) and Barcelona Regional (BR).

The definition of the EDUM also included the participation of other public bodies, including the Manager's Office for the Environment and Urban Services; the Manager's Office for the Chief Architect; the Manager's Office for Town Planning; the Manager's Office for the Security and Prevention Area; the Manager's Office for the Municipal Institute of Markets; the Directorate for Commerce, Restaurants and Consumer Services; the Directorate for Strategic Projects; the Directorate for Energy Services and Environmental Quality; the Directorate for Planning Services; the Directorate for Heritage; the Barcelona Municipal Tax Office; the Commissioner for the 2030 Agenda; the Directorate-General for Traffic; Mercabarna; the Barcelona Guàrdia Urbana police force; and Barcelona Activa.

These public bodies have pooled their efforts to create workspaces in which the various stakeholders from the private sector, as well as representatives of citizens' associations and trade unions, have put forward their opinions and participated in defining the EDUM and the lines of action to be developed.

The outcome of this process is the Horizon 2030 Municipal Strategy on Urban Freight Distribution (EDUM). It represents the first step towards the construction of the future public-private governance of UFD and the roadmap to be followed to improve the distribution of goods in the coming years.

2. UFD characterization

What is UFD?

Urban freight distribution (UFD) encompasses all activities associated with the delivery and collection of goods, as well as certain types of services that occur within a city. In reference to urban logistics, UFD involves transport, handling, storage, waste management, returns and home deliveries, among other processes.

The logistics sector is responsible for transporting goods into the city and, once in the urban area, all activities related to distributing goods to their final destination are considered to be UFD. Accordingly, UFD is generally defined as the final stage of the transportation and distribution of goods originating from anywhere in the world.

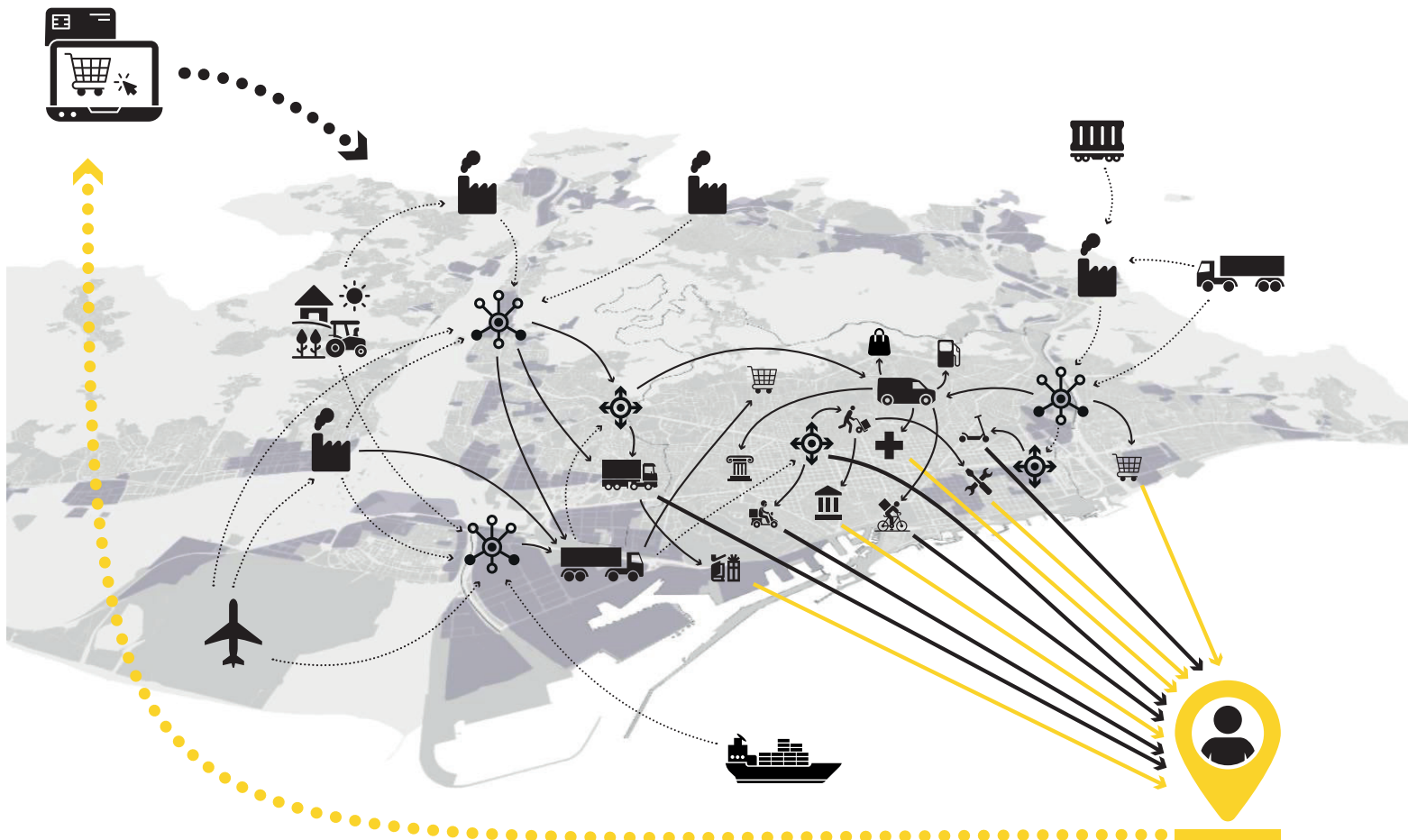
UFD is an activity that supports the development of the urban economy and meets some of the population's most basic needs, such as food and health, among others. Accordingly, UFD makes it possible to sustain life in the city and supplies commercial and productive activity, creating thousands of jobs.

In Barcelona, one of the main logistics hubs in the Mediterranean and Southern Europe, the logistics sector is estimated to generate approximately 50,000 jobs¹ and account for as much as 12.7% of GDP.² However, it should be highlighted that UFD is still a heavily male-dominated sector, with men accounting for around 80% of the workforce in the province of Barcelona.³

1 Hermes database. Diputació de Barcelona, 2020.









2 *El comerç a Barcelona 2019* [Barcelona commercial report 2019]. Ajuntament de Barcelona.

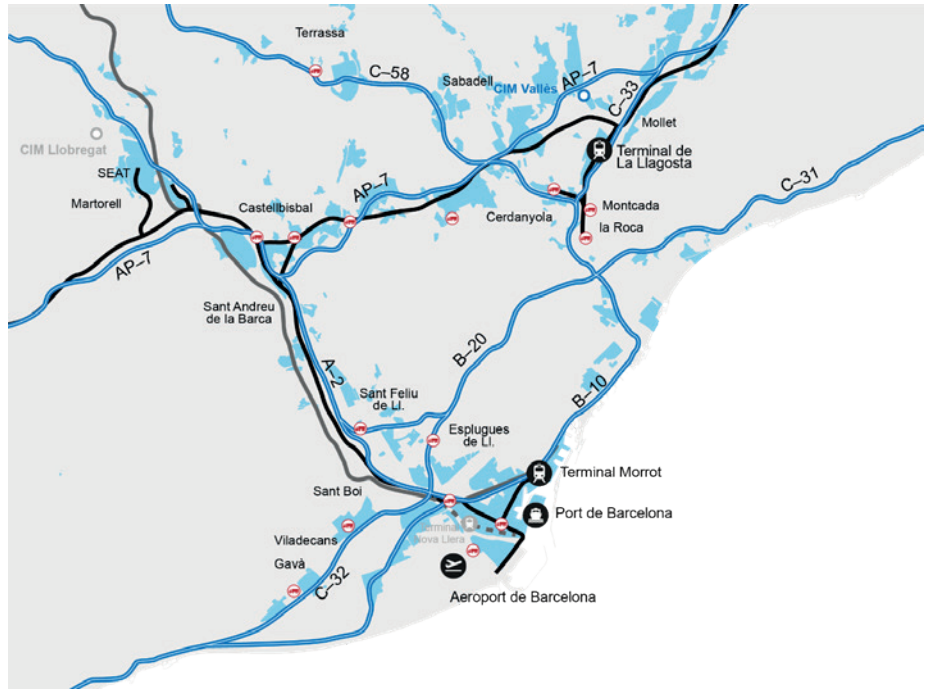
3 *Els sectors econòmics emergents i la formació professional a la Regió Metropolitana de Barcelona* [Emerging economic sectors and vocational and education training in the Barcelona Metropolitan Region]. Observatori de l'FP a Barcelona, 2020.



Land and logistics infrastructure

Source: Barcelona Regional

-  Road
-  Railway
-  Lorry parking facilities
-  Railway terminal
-  Planned railway terminal
-  LH
-  Planned LH
-  Industrial estate



The entry of goods into the city

With respect to logistics in Catalonia, roads are the main means used to transport goods into and out of the city. Sea transport is the second most common method, with railway transport bringing up a distant rear. This highlights the desperate need for investment in the region's railway network. In fact, it trails far behind the rest of Europe in terms of rail freight transport, especially given its lack of capacity and intermodality, but also due to its low interoperability.

The Barcelona metropolitan area constitutes a major logistics hub, hosting a substantial portion of Catalonia's logistics infrastructure: major road and rail corridors, the port, the airport, numerous industrial estates and logistics hubs (LH).

Industrial estates and metropolitan logistics land are crucially important to urban freight distribution. They are key economic ecosystems for the city and often serve as the starting point for the final stage of the supply chain.

To be precise, the metropolitan area of Barcelona is home to 198 industrial estates. They cover a surface area of approximately 4,800 hectares of land and accommodate much of its logistics activity and 23% of its jobs.⁴



Modal distribution of goods transport in Catalonia

Source: *Els indicadors de competitivitat del Sistema Logístic Català* [The competitiveness figures of the Catalan Logistics System]. Observatori de la Logística, 2020

⁴ *Avanç del PDU metropolitana* [Draft of the Metropolitan Urban Master Plan]. AMB, 2019.

2.1. UFD models

To better understand how UFD works in the city, a classification that divides this activity into three different models is provided below. Each one of the models presented has specific characteristics in terms of type of goods, territorial dynamics, delivery times and frequencies, and other key aspects of urban freight distribution.

This conceptualisation exercise is the result of exhaustive analysis and constitutes a fundamental step forward in the characterization of this activity in the city. The following three UFD models have been studied:

- **B2B** (business-to-business), or distribution to establishments, is the best-known and most studied UFD model. It covers a wide range of establishments in the city, such as hotels and restaurants, groceries and supermarkets, high-street clothing shops, or health and education centres.
- **B2C** (business-to-consumer), or distribution to the end customer, is the model that encompasses e-commerce. In contrast to B2B, in this model it is the businesses themselves that deliver their goods directly to the customer, rather than the customer visiting the shop. This model adds a new stage to the supply chain: the "last mile".
- **USD** (urban service distribution) is the model that encompasses service provision activities that, in a complementary manner, include the transportation of goods. This model includes waste collection, removals, construction and renovation and technical support, among other services. Despite its comparative lack of consideration until now, it makes up a significant slice of the urban distribution pie.

B2B

Business-to-business
or traditional UFD

B2C

Business-to-consumer
e-commerce

USD

Urban service
distribution



94,748
establishments

B2B or traditional UFD

Barcelona's trade model, which is characterized by its local nature, community roots and extensive presence throughout the urban fabric, is one of the city's main economic activities and a key element for competitiveness, neighbour structuration and social cohesion.

In B2B, the type of goods to be transported (fresh produce, high-value products, hazardous materials, etc.) is the most important factor to be considered. The timing of deliveries may vary, but there is generally adherence to a schedule, with a given frequency and more or less consistent volumes. For this reason, the B2B model has been classified into twelve types or submodels taking into account the type of goods, the activity group and the main distribution model.

The three main submodels in B2B are "local non-food shops", "offices" and "HORECA" (grouping all establishments in the hotel, restaurants and catering sector). These three large groups account for 70% of all the city's establishments and are responsible for more than 60% of B2B deliveries.

Most of Barcelona's establishments are concentrated in the city centre, mainly in the Eixample district, but also extending up to the neighbourhoods of Vila de Gràcia and Sant Gervasi-Galvany and down to the sea in the Ciutat Vella district. At the same time, there are also high-concentration hubs of establishments on shopping streets and in other historical centres of the city.

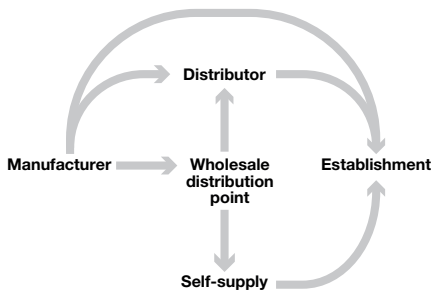
The city's wide variety of establishments makes for an equally diverse B2B supply chain. Accordingly, in addition to products distributed directly by the manufacturer, in which no other parties are involved, the B2B supply chain also includes intermediate distributors and wholesalers, as well as establishments that supply their own goods.

Regional, metropolitan and local regulations force certain establishments to have storage facilities or loading docks within their facilities. However, the majority of Barcelona's establishments do not have their own loading and unloading facilities and they often have insufficient storage space or none at all. Due to this shortage, and the possibilities offered by the public space to carry out this activity, most delivery drivers end up using the public space for their loading and unloading operations.

	Local non-food shop 28,657 establishments
	Offices 25,898 establishments
	HORECA 16,614 establishments
	Local grocery shop 6,583 establishments
	Administration and culture 6,487 establishments
	Repairs and services 6,252 establishments
	Pharmacies 1,199 establishments
	Non-food chain 996 establishments
	Food chain 935 establishments
	Bookshops and newsagent's shops 701 establishments
	Health 224 establishments
	Filling stations 202 establishments

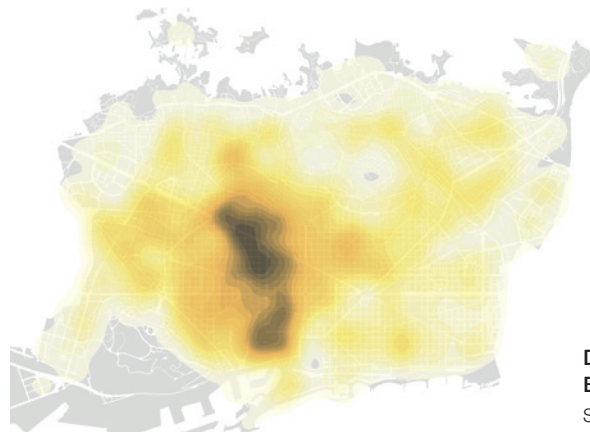
The B2B submodels

Source: Barcelona Regional



The B2B supply chain

Source: Barcelona Regional



Density of establishments in Barcelona

Source: Barcelona Regional, based on the Google Places API, 2019

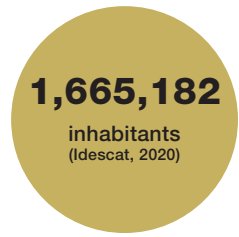
B2C and the rise of e-commerce

The most significant characteristic of B2C is that, in this model, it is the customer who decides on the frequency, means and times of their goods deliveries. Although sometimes the city's local businesses also distribute their goods directly to the end user (as occurred during the pandemic), B2C is characterized by the presence of major multisector marketplaces. These are often perceived as a threat by local trade and add little to the local economy. Many of these marketplaces are international operators whose corporate headquarters are located abroad and provide minimal contributions to both the country's and city's public coffers.

Another problematic aspect of this model is that most online stores do not directly deliver their products, rather they subcontract this work out to self-employed logistics operators and sometimes even to individuals who may or may not be officially registered. This raises concerns about the working conditions of the people who do this work.

Given that in B2C delivery time is the element with the greatest effect on the supply chain (even more so than the type of goods), the three submodels that make up B2C have been defined in accordance with this criterion.

Accordingly, in the B2C model the submodels are distinguished according to whether the delivery is "standard" (> 24 h), "same-day" (< 24 h) or "immediate" (< 2 h, mainly businesses with delivery service). The time factor is important, given that the more urgent a delivery is, the less easy it is to consolidate the load and to optimize and take advantage of routes. This results in the order generating a greater degree of externality.



Standard delivery (>24 h)



Same-day delivery (<24 h)

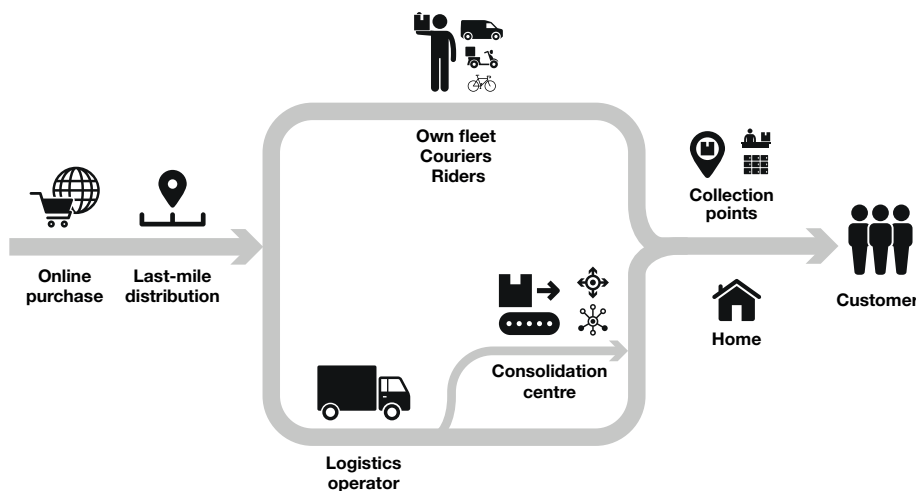


Immediate delivery (<2 h)

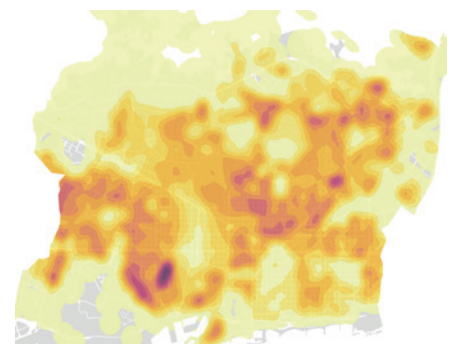


The B2C submodels

Source: Barcelona Regional



The B2C supply chain
Source: Barcelona Regional



Population density
Source: Barcelona Regional, based on INE data, 2019

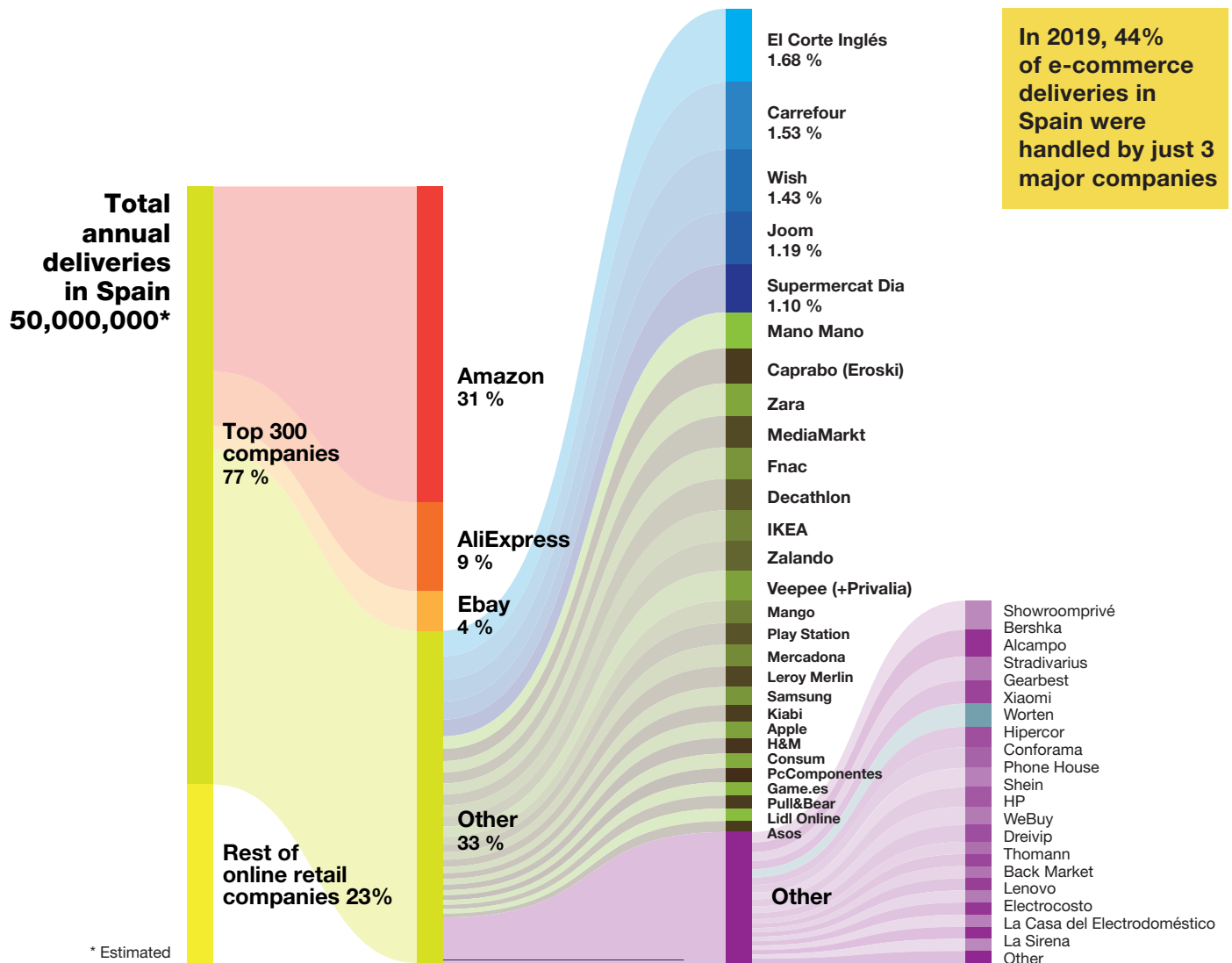
In contrast to B2B, B2C deliveries are less predictable, given that they do not adhere to a pattern of any kind. However, there are moments throughout the year with a high demand, such as Christmas and Black Friday. This activity is also affected by unexpected situations, such as the COVID-19 pandemic.

In fact, the pandemic has only accelerated the already growing digitalization of commerce. From 2018 to 2020 in Catalonia, online shopping showed an increase of 44.6%⁵, and it is estimated that Barcelona experienced similar growth. Furthermore, it should also be taken into account that Spain's online shopping market share is similar to that of its neighbours, but it still pales in comparison to the United Kingdom and Germany.

Additionally, in 2018⁶ 86% of online shopping deliveries in Barcelona were made to homes and offices and only 14% to "collection points".⁷ In relation to this, it is estimated that direct deliveries to homes and offices generate an increase in total deliveries of 11% due to failed deliveries (the buyer is absent when the goods are delivered). There is an additional 10% increase (even from convenience points) due to returns of purchased items (known as reverse logistics).

Distribution of e-commerce deliveries in Spain among the leading companies

Source: Barcelona Regional, based on data from Top 300 Guide, 2020



5 *Comerç online i mobilitat. Evolució 2018 – 2020* [E-commerce and mobility. Evolution from 2018 to 2020]. Generalitat de Catalunya, 2020.

6 *Estimació de la demanda teòrica de l'e-commerce* [Estimation of the theoretical demand of e-commerce]. Barcelona Regional, 2020.

7 The term "collection points" includes collection from an establishment's premises, from local businesses, from lockers and from the offices of logistics operators.

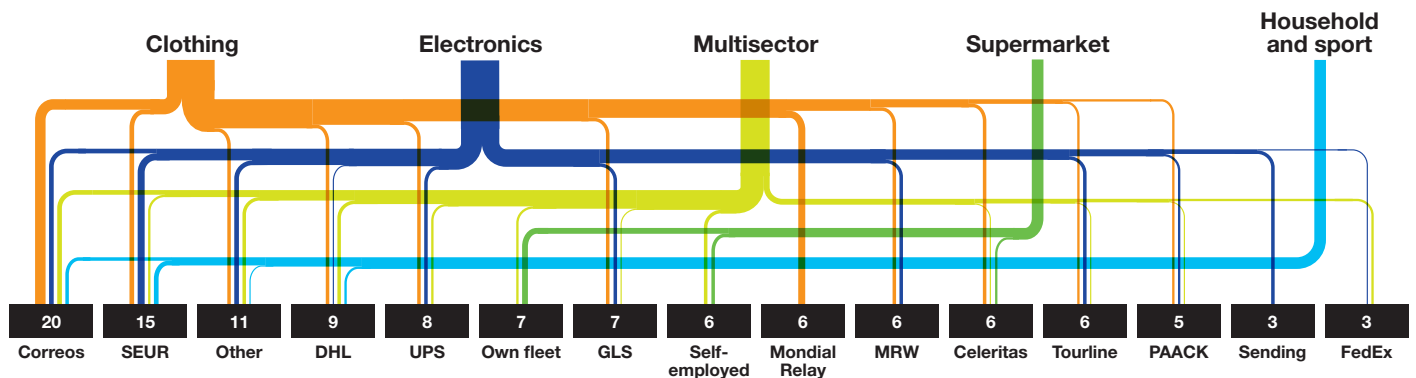
When it is the consumer who collects the purchase from a collection point, the environmental impact of the delivery is minimized. In home deliveries, this last mile is often done with a van or other private motor vehicle that uses spaces set aside for loading and unloading, or even parks in non-compliance with regulations (double parking, etc.).

Consumer awareness is a key element to reduce the impact of the B2C model, but the marketplaces also play an important role. They offer the same or similar prices for home deliveries and deliveries to collection points, when in reality the logistics (and environmental) costs are much higher for home deliveries. Moreover, the option of home delivery is generally automatically selected when the purchase is made, making it difficult for the customer to make more sustainable decisions.

In relation to territorial distribution, another aspect of the B2C model is that its delivery concentration does not depend on the location of the establishments, but on the concentration of the population, their age and purchasing power (income), displacing demand for space for loading and unloading activities to residential areas.

B2C is a model that has grown rapidly in recent years and still has great potential for further growth. It generates a significant impact on the public space, but also offers opportunities for improvement, especially in the delivery methods and vehicles used. Although B2C involves a great number of different actors, a large volume of deliveries are generated by a few shops and logistics operators. If the operators were to collaborate with each other, the negative impacts caused by this model could be minimized.

Main logistics operators used by e-commerce sector in Barcelona
Source: Barcelona Regional



Correos works with virtually 40% of the companies analysed.

Other operators such as SEUR (DPD Group), DHL and UPS work with more than 15% of the companies analysed.

The logistics providers collaborating with the city's primary e-commerce enterprises underwent scrutiny via direct inquiries and simulated purchasing exercises. The simulations encompassed 51 companies, accounting for no less than 64% of the overall e-commerce shipments in the country. The accompanying infographic demonstrates how the breadth of each sector's association correlates directly with the number of partnering businesses.

94,748
establishments
1,665,182
inhabitants

USD, the great unknown

USD has been broken down into six submodels: installations, maintenance and repairs; construction work; municipal services (cleaning, etc.); movers; sales representatives; and other transport services. Some of these activities have their own management model (waste management, special transport and healthcare transport), while others are carried out sporadically (moves and repair services). Additionally, certain activities, such as construction, often require a licence or special permit.

The work undertaken to characterize USD in Barcelona did not unearth many references to other cities addressing the specifics of this model, its classification, the definition of its needs or much less its quantification. The USD model has not yet been studied in any depth, which means that useful knowledge in this area is sorely lacking. As its main activity is not the distribution of goods, it has been kept separate from UFD even though they share space on the public thoroughfare.

London is one of the few cities where information on this type of activity has been found. It is believed to be on the increase due to the growing trend of companies to outsource their specialist services, such as IT and services related to the use of increasingly complex technology that requires frequent maintenance and repairs. It is reasonable to expect that this model is also on the rise in Barcelona.

The territorial distribution of USD is also unknown. However, it is expected to be influenced by two factors that affect both B2B and B2C. Firstly, USD is thought to be present in areas with a large number of establishments in order to meet their business needs. Secondly, it is considered to be widely distributed in areas with high residential density in order to meet the needs of private households.

In any case, the management of UFD should also take into account USD, with regard to both the management of space for loading and unloading and in relation to environmental externalities.

- 
Installations, maintenance and repairs
- 
Construction work
- 
Municipal services
- 
Movers
- 
Sales representatives
- 
Other transport services

The USD submodels
Source: Barcelona Regional

The theoretical demand of the models

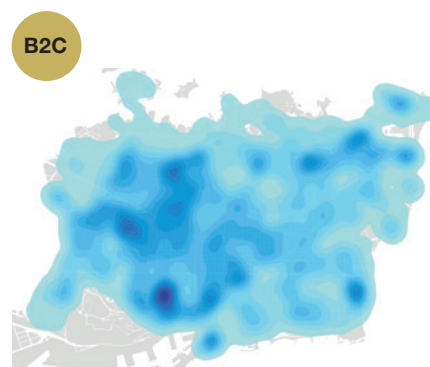
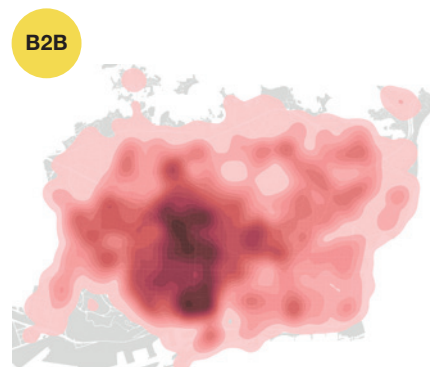
According to a survey carried out on establishments in Barcelona,⁸ it is estimated that B2B generates around 145,000 daily deliveries on average in the city. Although it is made up of twelve submodels, more than 75% of the deliveries pertain to provisioning just four of them: "HORECA" (22%), "offices" (20%), "local non-food shops" (20%) and "local grocery shops" (14%).

Although the majority of establishments are concentrated in the city centre, the high supply frequency of some submodels broadens the high-demand area, extending its pressure beyond the city centre to shopping streets and markets, among other places.

With regard to B2C, it is estimated that, taking into account homes, offices, collection points, failed deliveries and reverse logistics, in 2018 there were more than 98,000 deliveries per day in Barcelona.⁹ This figure mainly corresponds to standard deliveries, given that immediate or same-day deliveries are usually carried out by courier services and, as such, not given to being easily broken down by area.

Taking into account this theoretical estimation of e-commerce for 2018, B2C deliveries in Barcelona in 2020 could have exceeded 142,000 deliveries, which is practically the same volume as that of B2B physical establishments (although there is a lack of data from Barcelona to verify this).

In the case of USD, we can infer that its territorialization is strongly related to the concentration of establishments and residential areas. However, there is still no clear understanding of the individual contribution of these factors to its distribution and territorialization. Even though fieldwork has been carried out¹⁰ to better understand how it works, it is necessary to expand the knowledge base of the submodels that make it up, as well as their dynamics, in order to establish more accurate conclusions.



Density of daily B2B deliveries in Barcelona

Source: Barcelona Regional, based on *Estimació de la demanda teòrica de l'e-commerce* [Estimation of the theoretical demand of e-commerce], 2020

Density of daily B2C deliveries (offices and homes)

Source: Barcelona Regional, based on *Estimació de la demanda teòrica de l'e-commerce* [Estimation of the theoretical demand of e-commerce], 2020

⁸ *Enquesta a establiments* [Survey of establishments]. Barcelona Regional and CERES, 2021.

⁹ *Estimació de la demanda teòrica de l'e-commerce* [Estimation of the theoretical demand of e-commerce]. Barcelona Regional, 2020.

¹⁰ *Anàlisi d'ús de l'Àrea DUM* [Analysis of the use of the L&U Area]. Barcelona Regional, 2021.

2.2. Logistics spaces

The availability of L&U spaces on the public space

Goods loading and unloading (L&U) activities in the city are mainly carried out on the public space, with only a marginal presence in private spaces.

Barcelona offers a range of different types of spaces for this purpose.¹¹ First, there are some 8,500 spaces in the city's regulated parking system, which are grouped into L&U areas. The majority of these areas operate continuously in business hours (8 am to 8 pm) and require temporary validation, which can be obtained using the SPRO app or other means. On certain streets, generally shopping streets and those with a high presence of pedestrians, L&U areas are marked solely by vertical signage – without any ground markings – and are only accessible during specific timeframes throughout the day. The maximum permitted parking time in all these spaces is generally 30 minutes.

In conditions similar to these L&U areas, but outside of the regulated parking system, there are around 1,500 additional spaces that do not require online validation. In total, therefore, there are some 10,000 L&U spaces in the city placed at the disposal of delivery drivers and logistics operators free of charge.

Besides the more conventional areas, the city also features time windows in multiuse lanes (currently six in Barcelona) or pedestrianized streets (such as Portal de l'Àngel), which offer flexibility in the use of public space. These are zones without designated parking spaces but are made available during specific hours (typically during low-traffic times, such as from 10 am to 5 pm) for loading and unloading purposes. Finally, at night (from 9 pm to 7 am) it is also possible to carry out logistics activities on the streets, although in this case special permits are required to control their location and prevent noise from exceeding the established limits.

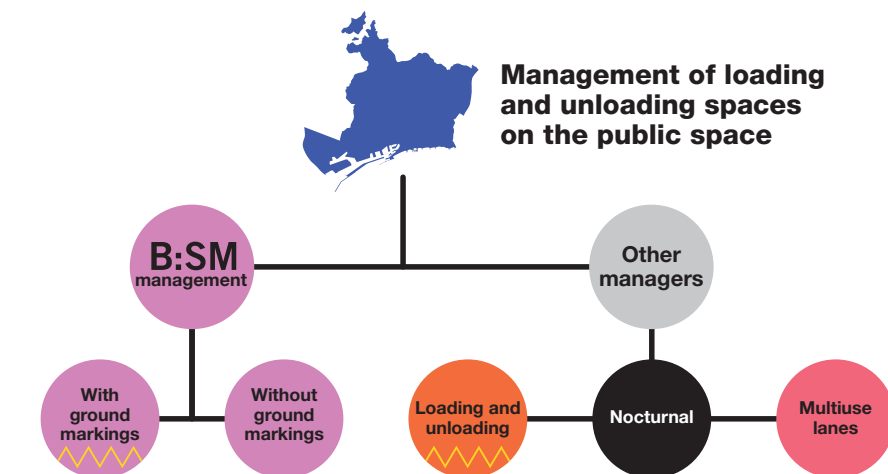


Vertical signage for L&U Area spaces

Source: Barcelona City Council

The management of loading and unloading spaces on the public space

Source: Barcelona Regional



¹¹ B:SM and Ajuntament de Barcelona, 2020 (first quarter).



Spaces

2,610
L&U areas
9,988
spaces



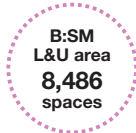
Sections of multiuse lanes

6.04 km
multiuse lane



Points that allow nighttime deliveries

71
unloading points

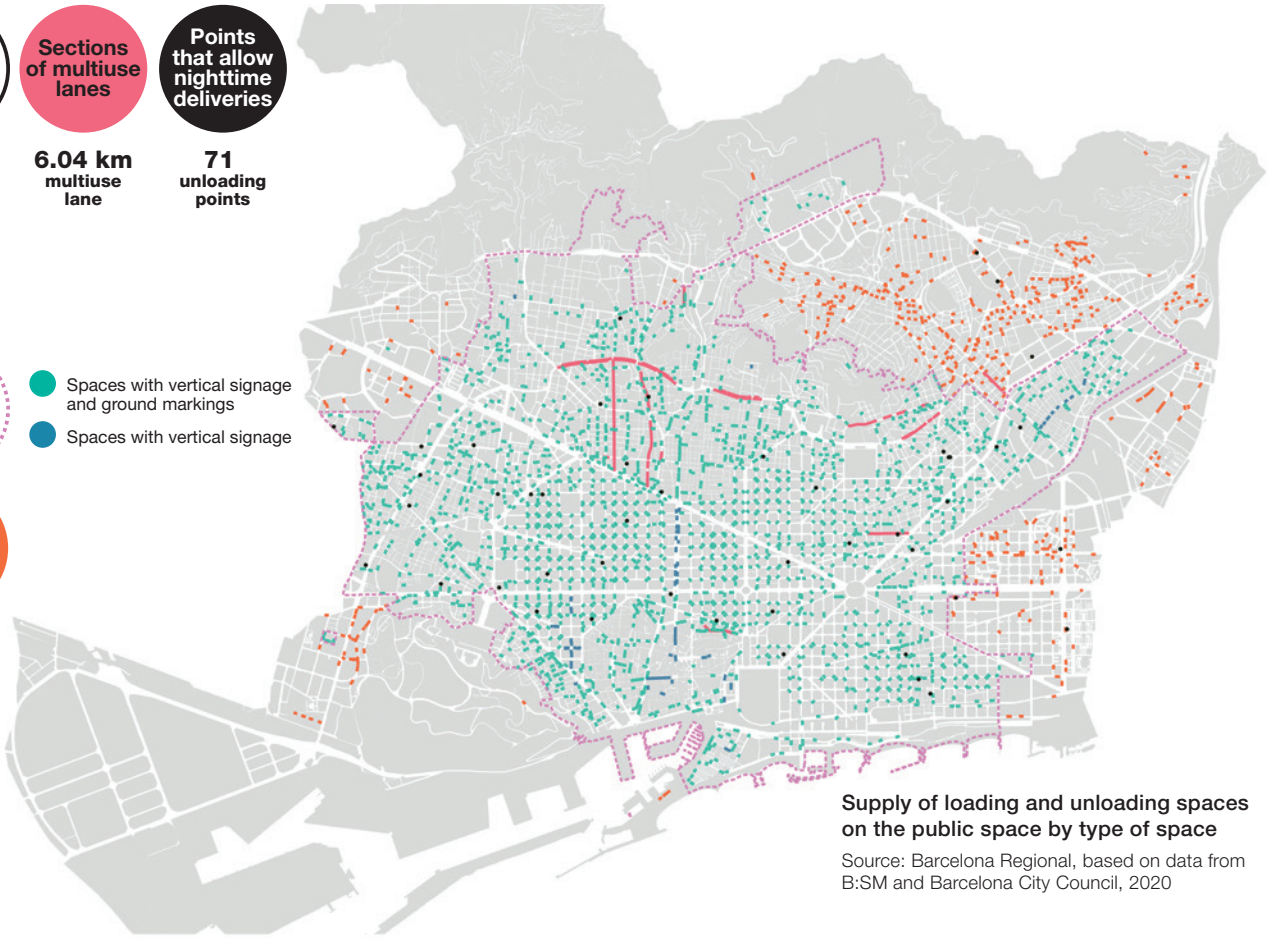


B:SM
L&U area
8,486
spaces

- Spaces with vertical signage and ground markings
- Spaces with vertical signage

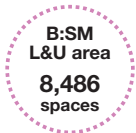


Outside the L&U area
1,502
spaces

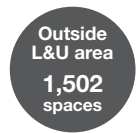


Supply of loading and unloading spaces on the public space by type of space

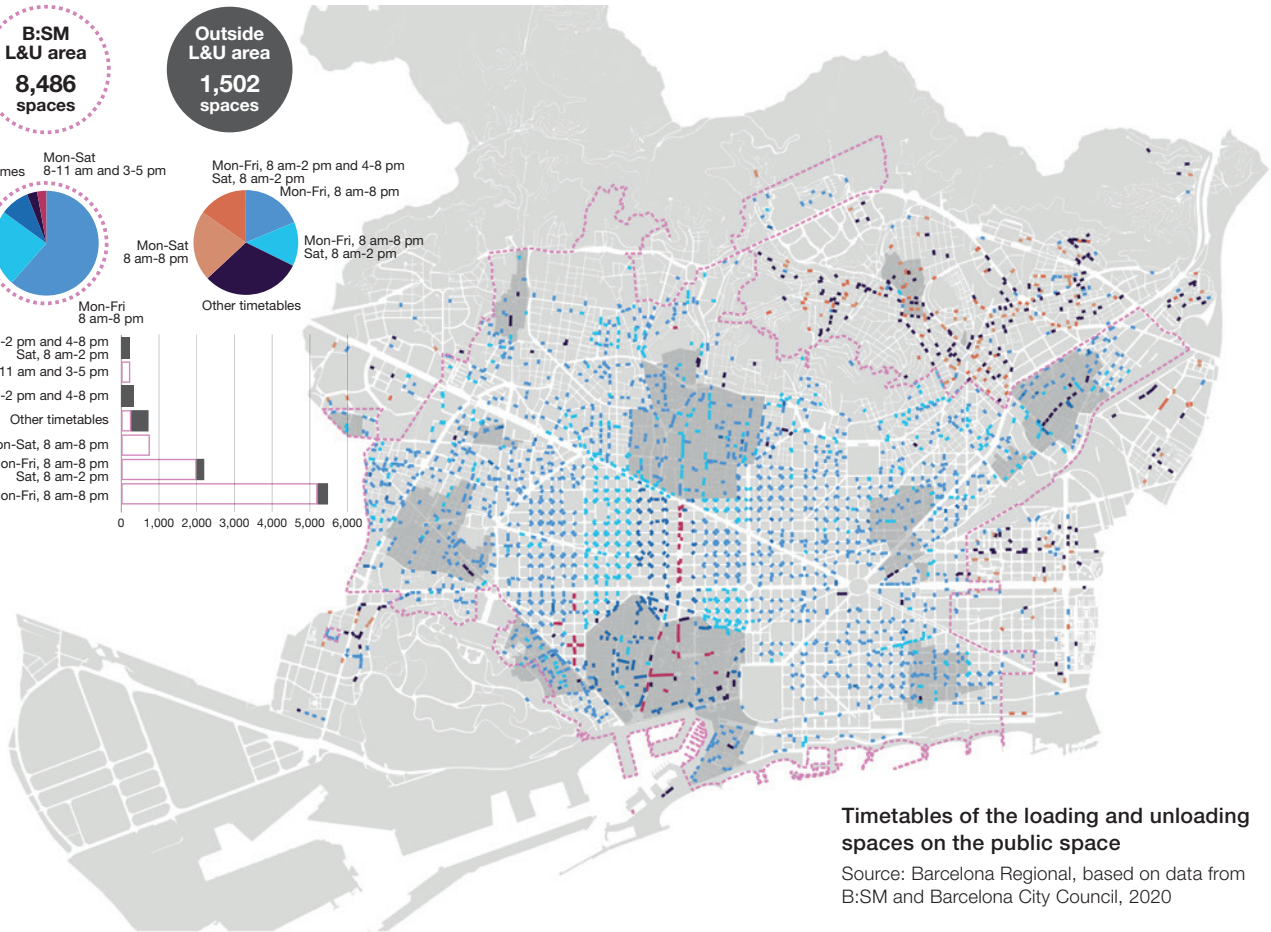
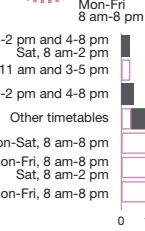
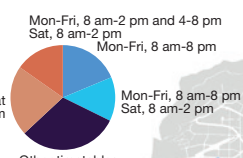
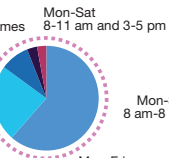
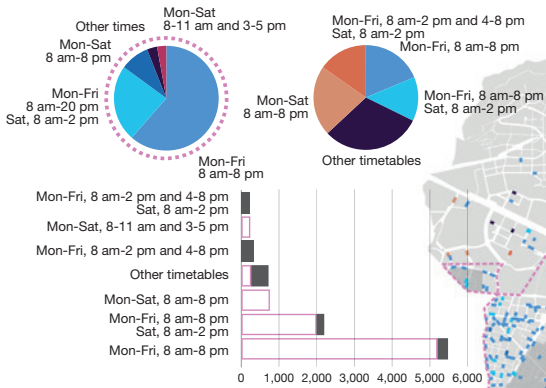
Source: Barcelona Regional, based on data from B:SM and Barcelona City Council, 2020



B:SM
L&U area
8,486
spaces



Outside L&U area
1,502
spaces



Timetables of the loading and unloading spaces on the public space

Source: Barcelona Regional, based on data from B:SM and Barcelona City Council, 2020

Taken together, the various types of spaces described, the specific characteristics of certain areas in the city and the various managers of these spaces result in a notable variety of operating hours within the city.

Although from 2005 to 2018 the overall number of surface parking spaces was reduced by 36%, the spaces for loading and unloading only decreased by 8%. As part of the public space redefinition process that is currently taking place in the city, efforts are being made wherever possible to restrict loading and unloading to specific times (on pedestrian streets) or to relocate them.

The L&U Area and the SPRO app

The SPRO app is a key tool to understand and control the evolution of demand for the city's L&U spaces. It provides information about the number of stops and their length of stay, the submodels involved, the distribution of demand in terms of times and locations, etc.

However, analysis of all the operations registered by the areaDUM app¹² in 2018¹³ reveals that not all activity is registered. By estimating the mobility that the registered activity would suggest and comparing it with reference data, calculations show that the data from the application account for only 50% of actual stops, 17% of trips and 7% of vehicle-kilometres associated with freight (vans and lorries) in the city. Data from fieldwork conducted in 2021 concur with the analysis of the app's data,¹⁴ finding that only 44% of operations in the L&U areas had been registered in the SPRO app.



SPRO app logo

Source: B:SM

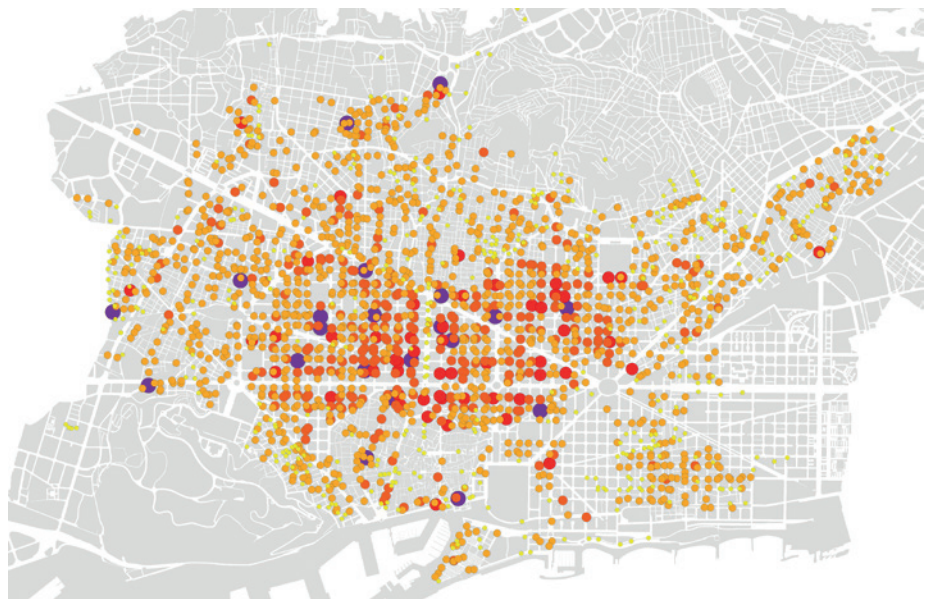
Number of stops per day per L&U space

Source: Barcelona Regional, based on data from the areaDUM app, 2018

- 0-3
- 4-6
- 7-8
- 9-10
- 11-18

35,688
operations
per day

4.4
operations per
space per day



¹² AreaDUM was the app used prior to the implementation of the current SPRO app.

¹³ *Explotació de la base de dades de l'aplicació areaDUM* [Study of the areaDUM app database]. B:SM and Barcelona Regional, 2020.

¹⁴ *Anàlisi d'ús de l'Àrea DUM* [Analysis of the use of the L&U Area]. Barcelona Regional, 2021.

The new SPRO app, active since 2020, includes improvements with respect to its predecessor and aims to increase the proportion of records collected through it. The progressive education of users and continuous review of the design and functionality of the app are expected to perfect its data collection and increase its reliability. In this way, the app could become a very useful work tool, offering, for example, information about the occupation of spaces in real time. This will only be possible if all parking is registered, including vehicles driven by people with reduced mobility (PRMs).

Taking advantage of the definitive expansion of the app, both in Barcelona and other municipalities in the metropolitan area of Barcelona, SPRO is expected to become a valuable tool for public administrations to manage their L&U spaces on the public space.

An approach to the behaviour of the models on the streets

Within the framework of this strategy, from 27 April to 19 May 2021 the fieldwork study "Analysis of the use of the L&U Area" was conducted. Although it covered only a small sample, it exhaustively controlled all the movements of some high-demand L&U areas located mainly in the Eixample district. The results of the study have made it possible to draw a significantly better picture of the behaviour of the models on the streets and, especially, in the overall L&U Area.

Initially, the city's L&U infrastructure (spaces) was dimensioned based on the needs of B2B, with regard to both the location of spaces (proximity to establishments) and the length of stay, with commercial timetables from 8 am to 8 pm and a maximum parking time of 30 minutes. The fieldwork, however, revealed that B2B activities, with an average stopping time of 21 minutes, account for only 18% of the total occupancy time of the spaces, a much lower value than expected.

With regard to B2C, although it is estimated that in 2020 the volume of deliveries was similar to that generated by B2B, the smaller size of the packages and the high concentration of deliveries facilitate more agile handling of the shipments. Therefore, currently, B2C is considered to spend only half as much time using surface L&U spaces as B2B (9%). However, if the growth trend is confirmed and the delivery methods are not redirected, the space occupied by B2C could practically equal that of B2B or even exceed it in coming years.

The volume of deliveries made in each B2C stop varies depending on population concentration. In densely populated areas like the Eixample district, several parcels are usually delivered per stop, resulting in an extended average parking time that equals that of B2B (21 minutes). In less densely populated areas, however, the stoppage time may be shorter, given that fewer packages are delivered per stop.

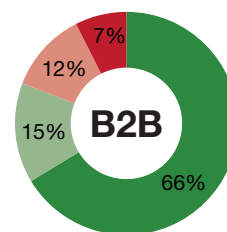


Correct registrations in the app by parking duration

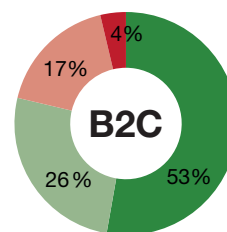
Source: *Anàlisi d'ús de l'Àrea DUM* [Analysis of the use of the L&U Area]. Barcelona Regional, 2021

Parking durations by model

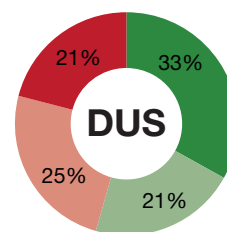
Source: *Anàlisi d'ús de l'Àrea DUM* [Analysis of the use of the L&U Area]. Barcelona Regional, 2021



21 minutes
Average time parked

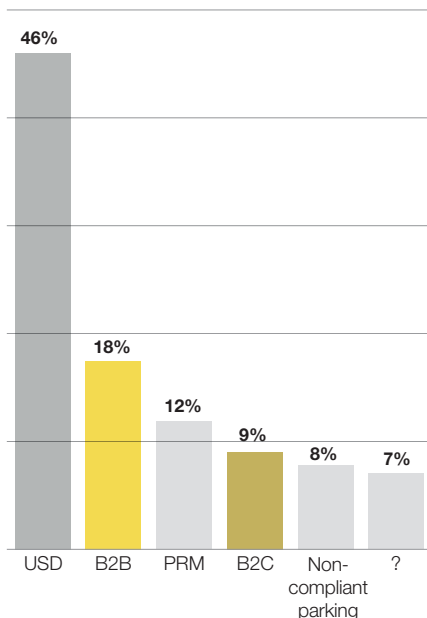


21 minutes
Average time parked



47 minutes
Average time parked





L&U Area occupancy time percentages

Source: *Anàlisi d'ús de l'Àrea DUM* [Analysis of the use of the L&U Area]. Barcelona Regional, 2021

Finally, the study also made it possible to see that USD accounts for 46% of the time L&U areas are occupied, compared to 18% for B2B and 9% for B2C. If it is taken into account that the average duration of USD stops in L&U areas is around 47 minutes (significantly exceeding the permitted standard time), it can be deduced that, in many cases, activities are carried out at the establishment or home (repairs, for example) while the vehicle is left in the L&U area, consequently blocking the parking space's rotation.¹⁵

The study's data reveal that, in the dimensioning of L&U areas, the focus should be expanded to take into account the behaviour and needs of all UFD models. However, these are preliminary results and it will be necessary to extend this fieldwork to the entire city and gain a more in-depth understanding.

A mismatched supply and demand

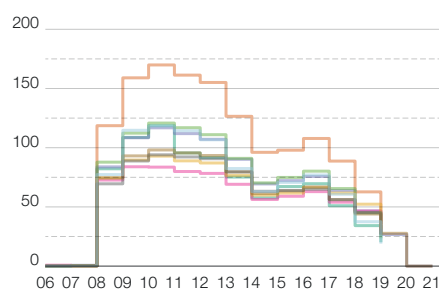
Despite the multiplicity of timetables mentioned previously, there is a constant supply of spaces for loading and unloading: the spaces are mainly static and are generally offered from 8 am to 8 pm. Demand, however, varies considerably over the course of the day, with a high concentration of activity in the morning.

It is estimated that more than 60% of L&U operations in the city take place between 8 am and 2 pm. The remaining 40% take place from 2 pm to 8 pm, although this demand is not uniform either, given that there is a significant drop-off registered after 6 pm. This variable demand, therefore, is not exactly matched by the constant supply of places.

In addition to concentrated demand, L&U areas attract other users, who are not always authorized. People with reduced mobility (PRMs) have permission to park there without time limits, generating very long stays. Although they account for a small number of vehicles (3% of stops), they amount to 12% of the total occupation time of the spaces. Moreover, unauthorized users also park in L&U areas (7% occupation time). They are generally private citizens who occupy the spaces both at times of peak UFD demand and after 6 pm in order to leave their vehicle there overnight.

Number of stops per year per L&U space and hour [working days]

Source: Barcelona Regional, based on B:SM data from the areaDUM app, 2018



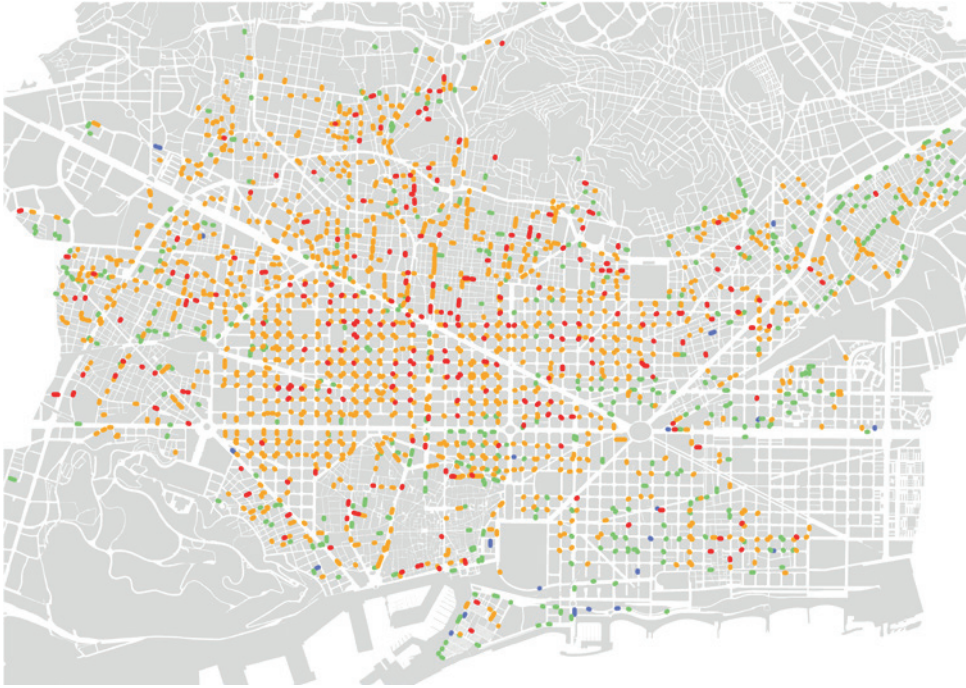
- Ciutat Vella
- Eixample
- Gràcia
- Horta-Guinardó
- Les Corts
- Sant Andreu
- Sant Martí
- Sants-Montjuïc
- Sarrià-Sant Gervasi

The accumulation of users and the concentration of activities in the mornings means that some L&U areas of the city are operating at the very limits of their capacity. In the afternoons, however, the decrease in demand results in lower occupation levels. However, even though demand for more spaces and more time is a recurrent theme,¹⁶ B:SM's data¹⁷ indicate that in the mornings only 13% of L&U areas experience a high rate of occupation (65% to 100%).

¹⁵ Take into account that the vehicles of certain sectors are issued with special parking permits in Barcelona's L&U Area, allowing stays of over 30 minutes in off-peak hours.

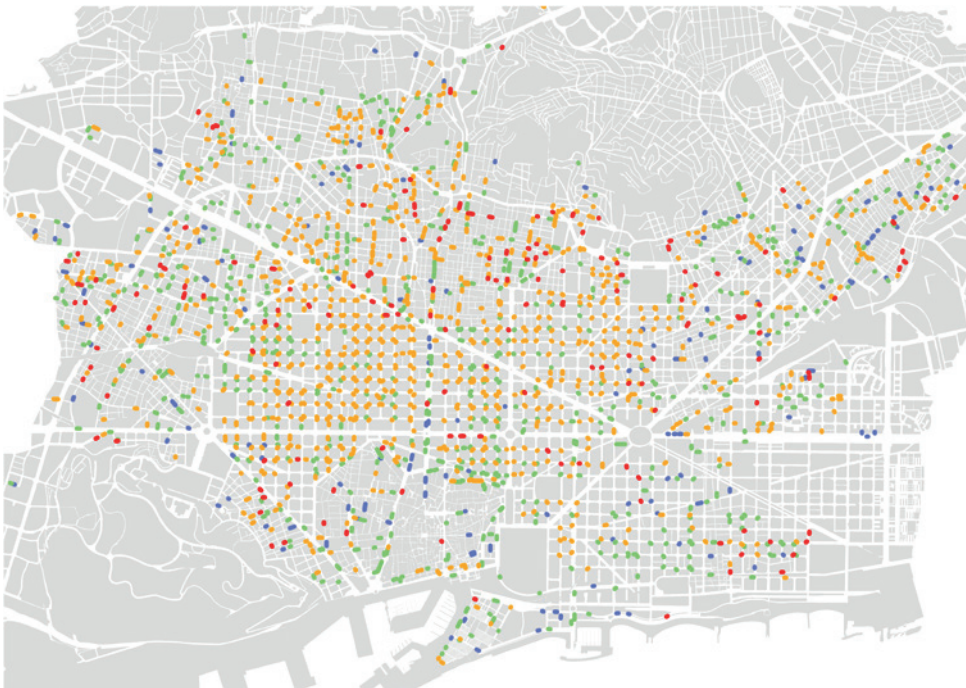
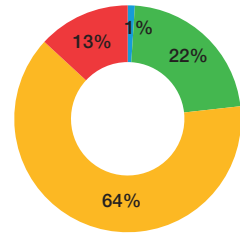
¹⁶ *Enquesta a usuaris de l'aplicació SPRO* [SPRO app user survey]. Barcelona City Council, B:SM and Barcelona Regional, 2020.

¹⁷ *Estudi sobre l'ocupació real de les àrees DUM* [Study on the actual occupation of L&U areas]. B:SM and Barcelona City Council, 2021.



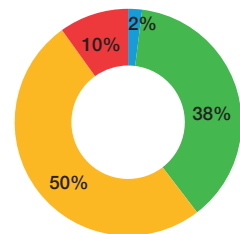
Occupancy of L&U areas in the morning

Source: B:SM and Barcelona City Council, May-June 2021



Occupancy of L&U areas in the afternoon

Source: B:SM and Barcelona City Council, May-June 2021

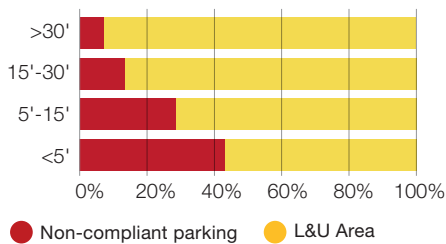
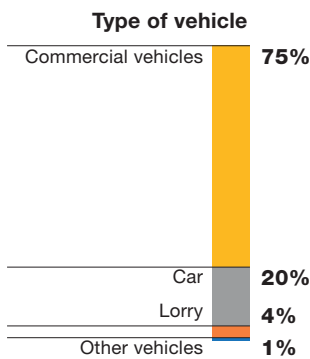
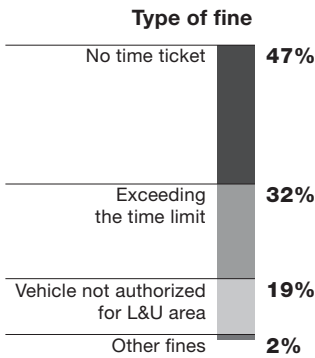
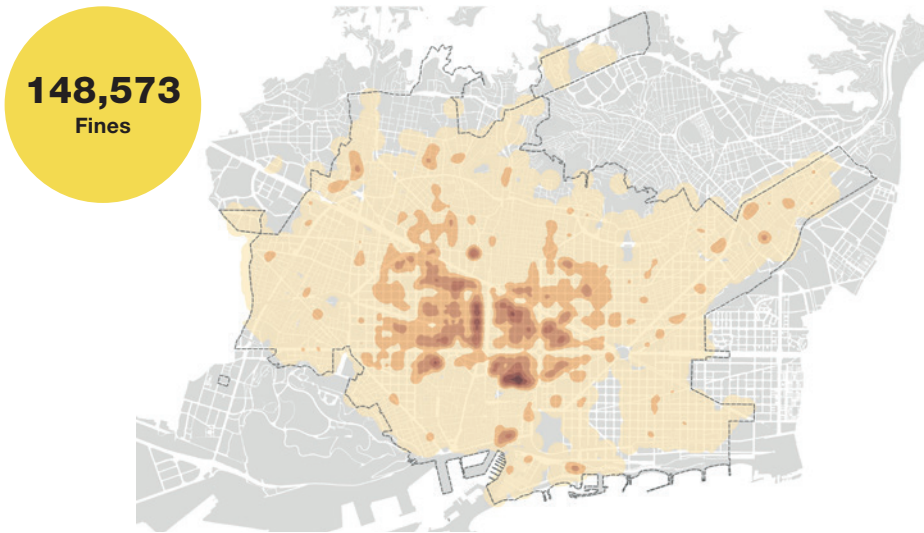


Occupancy of the UFD Area

- 0%-10%
- 10%-35%
- 35%-65%
- 65%-100%

Concentration of fines issued by B:SM traffic wardens in the L&U Area

Source: Barcelona Regional, based on data analysis from B:SM, 2019



Non-compliant parking (parking outside the L&U Area) by duration

Source: *Anàlisi d'ús de l'Àrea DUM* [Analysis of the use of the L&U Area]. Barcelona Regional, 2021

When L&U areas are saturated there is an increase in non-compliant parking, mainly by B2B and B2C, given that most operations are completed quickly. In the case of USD these infractions outside of the established spaces are less frequent, as parking durations tend to be longer. Moreover, B2B activities often involve large delivery volumes. This leads to prioritising spaces close to the delivery point. If the available parking spot is far away, it is possible that the driver will park in non-compliance outside of the allotted spaces.

This problem is accentuated in specific urban fabrics of the city where there are large numbers of commercial establishments and spaces are hard to find, such as the historic centres and the city's main arteries. Residential zones, with a more scattered distribution of establishments, also encounter this issue.

Analysis of non-compliant parking shows that fines focus on the use of L&U spaces rather than on what happens outside of the allotted spaces. It has also been found that the Eixample district is where the highest number of sanctions are registered, due to its high level of activity. Outside of this central area, the use of the app and the allotted spaces is much lower, due to reduced visibility of operations and lower enforcement effort. Moreover, the penalties for not having validation, exceeding the permitted time or undue use, are low (€40-60), contributing little to controlling non-compliant parking.

With a view to better balancing supply and demand, L&U activities could be fostered at specific times or in off-peak periods. Some of the demand could also be transferred to off-peak times through corrective measures and incentives, alleviating demand at peak time. Multipurpose lanes, the addition of multipurpose or multiuse spaces (L&U-blue (visitors), L&U-green (residents)), time slots for L&U on the new green avenues, the promotion of nocturnal UFD strategies and the establishment of long-stay parking space for USD are measures that would enable the flexible use of public space, optimizing it to meet all needs effectively. Moreover, the extension of the general timetable of L&U areas is also being studied.

Alternatives to conventional delivery

Private L&U spaces can be found off the public space. In this regard, Decree 344/2006 on the Regulation of generated mobility assessment studies, the Amendment of the Urban Planning Regulations of the 2018 General Metropolitan Plan and the Ordinance on the provision of spaces for loading and unloading in buildings of 1999 set out the minimum requirements for interior loading docks. These regulations have resulted in the installation of loading docks at hotels and logistics platforms at shopping centres, among other requirements. Despite these regulations, the majority of establishments do not have their own loading docks and, in any case, these measures only apply to the B2B model.

To make progress towards more efficient alternative delivery methods, at least from an environmental and public space occupancy perspective, attempts have been made at both the European and local scales to implement initiatives and pilot tests (though not always with successful results). The aim is to change how goods are consolidated and distributed in the city, through the implementation of freight consolidation centres and networks of convenience points.

Pilot tests have shown that the profit margins of B2B freight consolidation centres are low. Their impact on the total number of operations is also quite limited. B2C, however, shows greater potential in this regard. The types of packages generally delivered in e-commerce facilitate working with consolidation centres, from which they can be delivered by sustainable last-mile vehicles, such as cargo bikes and PMVs (personal mobility vehicles).

In Barcelona there are 681 convenience points (2020),¹⁸ where logistics companies and establishments can deposit orders to be collected by consumers. These points, however, do not constitute a unified distribution network, but are the superposition of various networks normally managed by major logistics operators. As a result, the end user does not have at their disposal a fixed and easily understood network of collection points. Instead, the collection point varies with each order, creating a lack of consistency for consumers.

Furthermore, not all logistics operators have a network of convenience points. Only those who have a substantial volume of deliveries can offer this service. Most online stores only outsource their home deliveries to logistics operators and often do not consider the convenience points option.

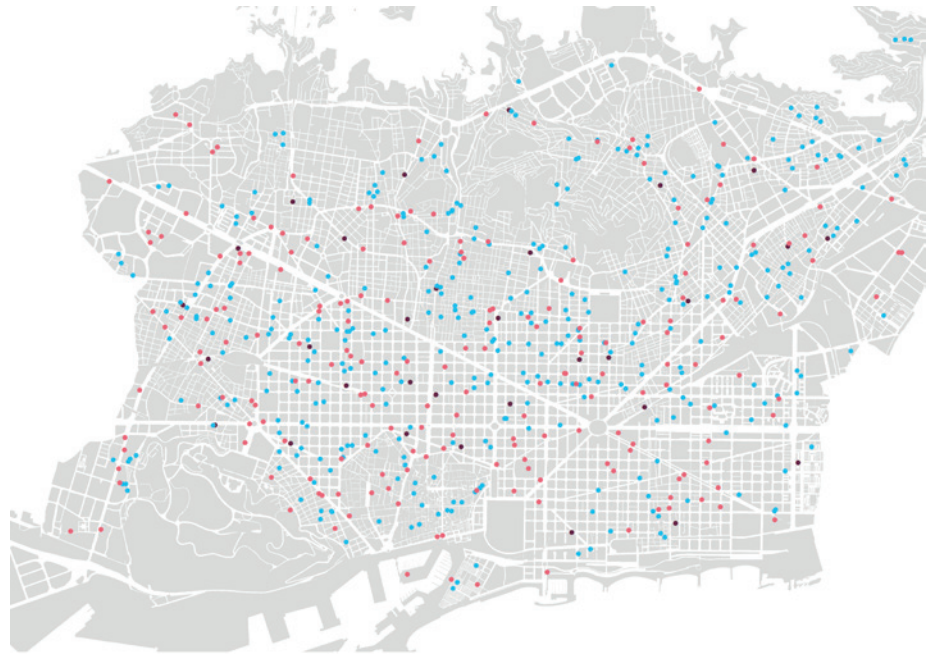
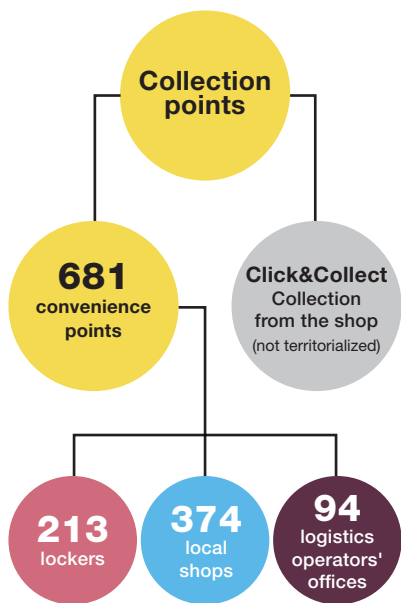
A single network of convenience points to which all logistics operators have access would benefit both the companies and the city. The consumer would have a single point of reference, regardless of the logistics operators employed, which would make the service more attractive.



Cargo bike operating in the centre of Barcelona

Source: Barcelona Regional

¹⁸ *Anàlisi dels punts de conveniència a la ciutat de Barcelona* [Analysis of convenience points in the city of Barcelona]. Barcelona Regional, 2021.



Location of convenience points in Barcelona

Source: Barcelona Regional

Shifting the preference towards convenience points over home deliveries would considerably reduce last-mile transport and, by extension, all its externalities. Additionally, consumers need to be re-educated in their consumption habits, encouraging them to use these spaces. Both logistics operators and online stores should also prioritise this method in cases in which the goods to be delivered permit it.

The city is not homogeneous and requires mixed solutions

The strategies that are proposed to improve UFD's efficiency and reduce its externalities must be adapted to the various areas of the city, given that each area has its own specific goods distribution needs, related to the density of its establishments, residents and visitors, its urban fabrics and its layout.

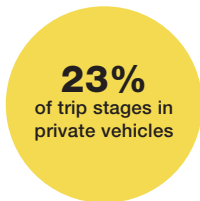
In the Eixample district, for example, there is a high concentration of UFD activities (around 40% of all operations), and the future layout of the green avenues will change its configuration. The historic centres, characterized by the coexistence of visitors and establishments, pose challenges due to limited parking availability; and in the residential areas there is a significant reduction in establishments, but not in the need for private vehicle parking and home deliveries. This diversity of urban layouts and needs means that no single logistics space strategy can be applied uniformly across the whole city.

It will be necessary, therefore, to combine surface and underground measures, depending on the area of the city in question, along with incentives or restrictions in accordance with the needs of each zone.

2.3. Externalities and impact

The mobility of vans and lorries as the main generator of environmental externalities

Trip stages are a good indicator to measure the mobility of people and goods. According to data from 2018, trip stages in vans and lorries in Barcelona amounted to a total of almost half a million (490,561), representing 23.4% of all mobility in private vehicles (2.1 million stages).

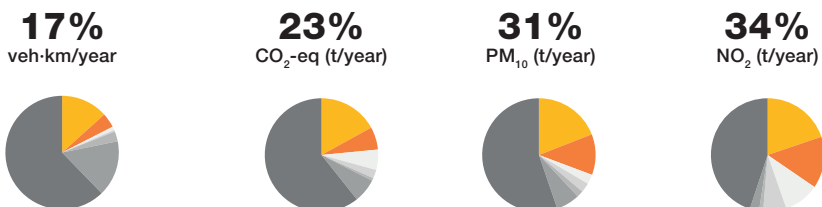


However, to assess the environmental impact of this mobility, the most suitable indicator is vehicle-kilometres, given that it takes into account the length of the trips and all the vehicles driving on the city's roads. In this case, the mobility of vans and lorries accounts for 17.5% of the annual vehicle kilometres for all types of vehicles (2018). Vans are the most popular vehicle (13.3%), while lorries account for just 4.2%.

Although goods mobility pales to that of people, the contribution made by vans and lorries to gaseous pollutants is much greater than their proportionate mobility. Accordingly, while their contribution in terms of CO₂-equivalent (CO₂-eq) is 23%, their contribution in terms of PM₁₀ and NO_x is 31% and 34%, respectively. This is because vans and lorries are larger vehicles and mainly use diesel, with higher emissions in terms of local pollutants (PM₁₀ and NO_x) and a smaller CO₂-eq contribution compared to petrol.

Contribution of van and lorry mobility to environmental pollution

Source: Barcelona Regional, 2018



Category	veh-km/year (thousands)	veh-km/year (%)	CO ₂ -eq (t/year)	CO ₂ -eq (%)	PM ₁₀ (t/year)	PM ₁₀ (%)	NO ₂ (t/year)	NO ₂ (%)
Vans (LDV)	592,678	13.3%	163,347	17.0%	38.7	19.1%	551.0	19.8%
Lorries (MDV & HDV)	185,551	4.2%	62,388	6.5%	23.6	11.6%	410.4	14.7%
Buses	44,443	1.0%	55,844	5.8%	5.6	2.8%	281.5	10.1%
Coaches	20,815	0.5%	23,484	2.4%	5.5	2.7%	184.2	6.6%
Mopeds	127,231	2.9%	7,334	0.8%	3.8	1.9%	32.5	1.2%
Motorcycles	708,546	15.9%	65,430	6.8%	13.6	6.7%	73.6	2.6%
Cars	2,770,779	62.3%	584,173	60.7%	112.0	55.3%	1,249.8	44.9%
Total	4,450,043	100.0%	961,999	100.0%	202.71	100.0%	2,783.07	100.0%

All strategies that reduce mobility, in terms of vehicle-kilometres, or that improve the emission factors of vehicles will have a very positive effect on the reduction of the contribution made by vans and lorries to environmental externalities.

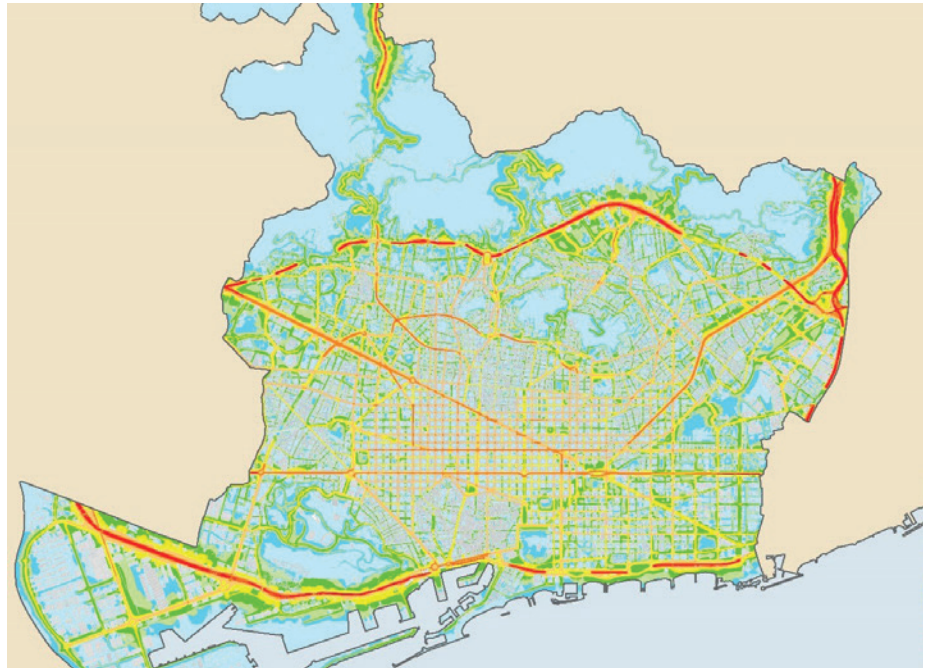
Beyond quantifying the impacts on a global level, it would be of interest to discern the percentage that corresponds to each model (B2B, B2C and USD) and whether in fact all the mobility of vans and lorries can be associated with UFD. Unfortunately, information associating the vehicles with the models is not currently available. The inclusion of this information in the database of the Directorate-General for Transport (DGT) would make it possible to perform this analysis, study the evolution of the models and better focus policies.

Daytime goods traffic noise map

Source: Environmental Assessment and Management Department, Barcelona City Council, 2020

dB(A)

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 75 - 80
- ≥ 80



Nighttime goods traffic noise map

Source: Environmental Assessment and Management Department, Barcelona City Council, 2020



The greening of vehicles, a major challenge to reach decarbonization

In 2020, the Barcelona census fleet¹⁹ included almost 95,000 vans and lorries in the city (approximately 45% of all vehicles in the metropolitan area of Barcelona), of which 93% were light vehicles (N1). In both the census fleet and the operating fleet, there is a clear predominance of fossil fuels, with fewer than 2% using alternative fuels. Of these, the smaller ones (N1) opt for electricity, while the larger ones (N2 and N3) use gas.

Notwithstanding, only 12.7% of the operating fleet in the city are registered in Barcelona. The rest of the vehicles, as detected by the cameras of the LEZ (Low Emissions Zone), are registered in other municipalities in the metropolitan area of Barcelona (12.6%), the rest of Catalonia (40.8%), or the Spanish State and other countries (33.9%).

With regard to the total operating fleet, data from the LEZ control cameras indicate an upward trend in replacing vehicles without environmental stickers, with a major increase in ECO stickers and, to a lesser degree, in Zero and C stickers.

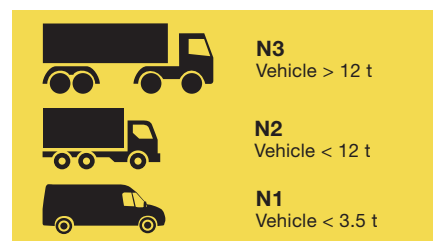
The path to be followed, led by the European Union and adopted by its Member States, is to decarbonize all vehicles. In the case of UFD, this is especially important, given that it is an essential activity for the development of life in the city and is almost entirely lacking in alternatives for its operation. The European Parliament has recently (2023) approved a measure that will prohibit the sale of petrol and diesel vehicles from 2035, as part of the EU's package to reduce greenhouse gas emissions by 55% by 2030. This measure has yet to be ratified by the Council of Europe, but CO₂ emissions from vans are expected to be halved by 2035.

The Spanish Government periodically launches major subsidy programmes for the renewal and electrification of vehicles (MOVEA, MOVALT, MOVES). Such measures quadrupled the number of commercial vehicles using alternative fuels in the Barcelona metropolitan area from 2015 (478 vehicles) to 2020 (1,891 vehicles). However, the impact of this type of subsidy is much lower in commercial vehicles than in private cars.

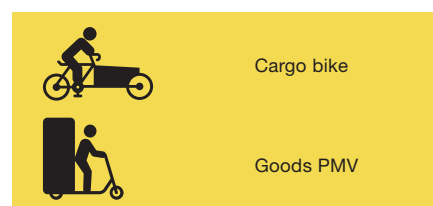
To ensure an effective transition towards more sustainable vehicles, subsidies should also focus on commercial vehicles. Improving the definition of these subsidies, along with the predicted increase in affordability of electric vehicles in the coming years, and any restrictions applied in the urban scope, could significantly contribute to the greening of vehicles, at least small ones (N1).

Of the models included in the study, BC2 is the one that initially presents the greatest potential for vehicle greening. This can be achieved either by replacing N1 vehicles that use fossil fuels with others that pollute less or are completely sustainable, or by reducing the total number of N1 vehicles. They would be replaced with other types of UFD vehicles, such as cargo bikes and personal mobility vehicles (PMVs).

Vehicles used for goods transport

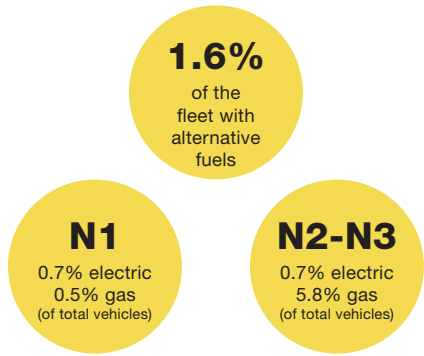


New types of goods vehicles



Source: Barcelona Regional, based on the regulations of the Directorate-General for Traffic (DGT)

¹⁹ Directorate-General for Traffic, 2020.



The impact of these new means of transport is, however, still low. According to the cargo bike register managed by B:SM, currently (2023) there are only 82 vehicles registered in Barcelona. However, several observational studies carried out in the streets estimate that the number of these vehicles is much higher than the number officially registered, which means that few companies are opting for registration even though it is compulsory. Both the DGT and Barcelona City Council are working intensely to regulate the conditions for the use of these new vehicles, and to determine the optimal parking locations for them.

Census fleet of vans and lorries by type of fuel in Barcelona

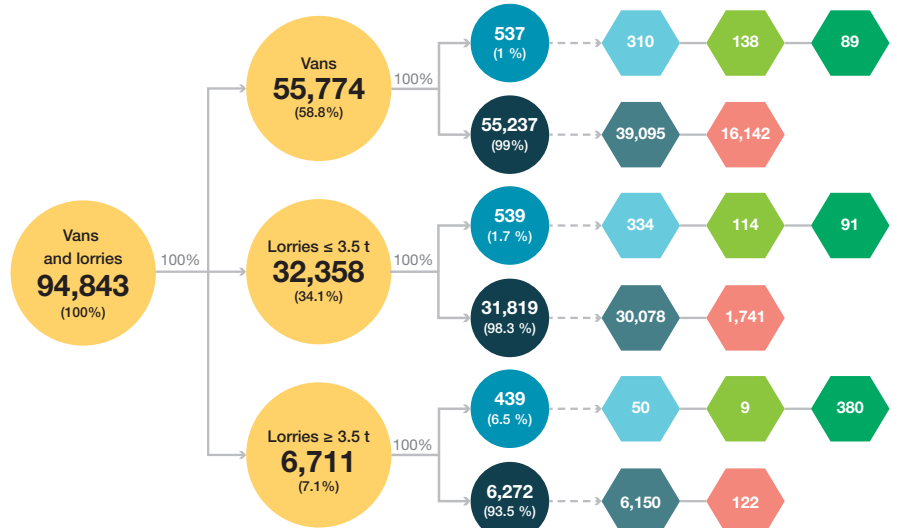
Source: Barcelona Regional, based on data analysis from the DGT, 2020

Alternative fuels

- Electric
- LPG (liquefied petroleum gas)
- CNG (compressed natural gas)

Conventional fuels

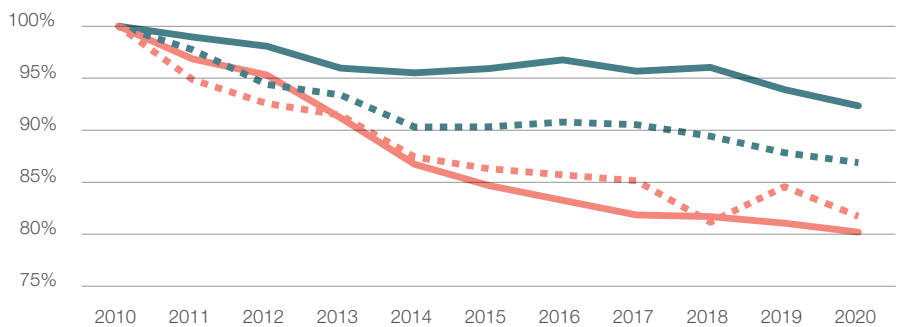
- Diesel
- Petrol



Census fleet of vans and lorries using fossil fuels in the LEZ: relative evolution

Source: Barcelona Regional, based on data analysis from the DGT

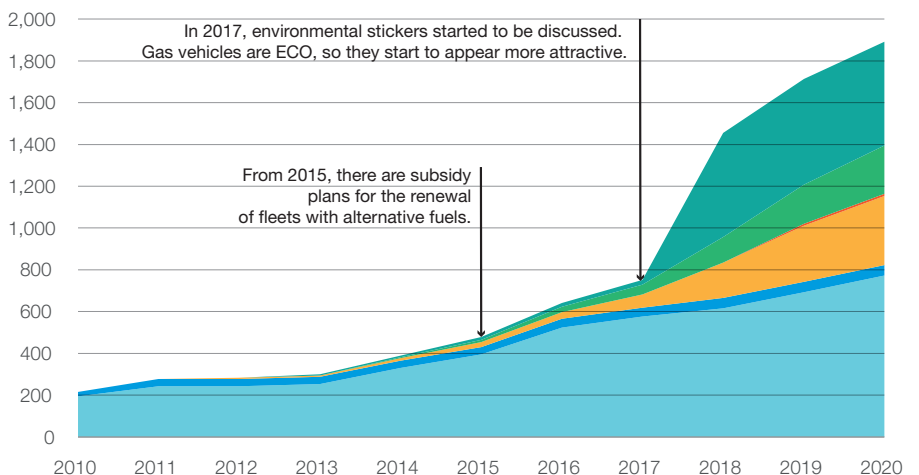
- N1 diesel
- N1 petrol
- - - N2 - N3 diesel
- - - N2 - N3 petrol



Evolution of the census fleet of vans and lorries using alternative fuels in the LEZ

Source: Barcelona Regional, based on DGT data

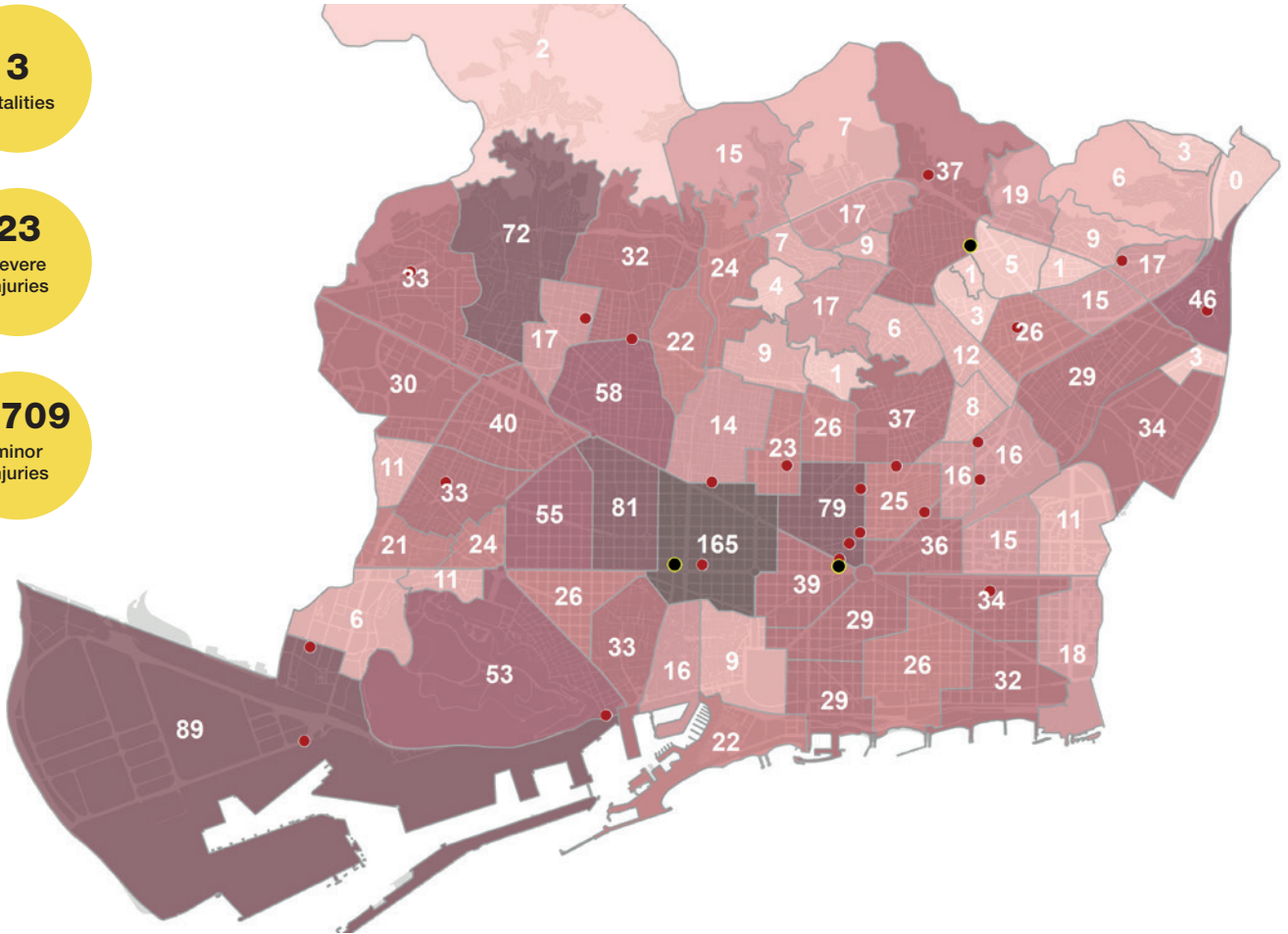
- N1 electric
- N2 - N3 electric
- N1 LPG
- N2 - N3 LPG
- N1 CNG
- N2 - N3 CNG



3
fatalities

23
severe injuries

1,709
minor injuries



Road traffic accidents involving vans and lorries

Vans and lorries were involved in 16.9% of the road traffic accidents that took place in Barcelona in 2019. Although it is a significant percentage, it should be clarified that this figure is very similar to their mobility figure (17.5% in terms of vehicle-kilometres) and that, therefore, they cannot be said to have a high accident rate.

The vans and lorries involved in accidents in Barcelona in 2019 caused 3 fatalities, 23 severe injuries and 1,709 minor injuries. Vans were responsible for the majority of the victims (80.8% of severe injuries and deaths), given that they are the most common commercial vehicle.

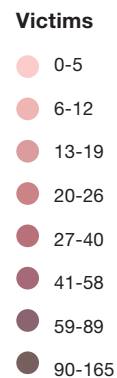
Although the situation has been improving in recent years, in general, lorries continue to be responsible for more severe accidents than other vehicles. In contrast, in the case of vans, there has been an increase in the seriousness of the accidents in terms of injuries and fatalities. Therefore, it is necessary to continue working with both lorries and vans to reduce the number of accidents and the harm caused to their victims.

With regard to the territorial distribution of these accidents, most of them occur in Eixample, the district with the greatest intensity of deliveries in all models. Eixample is not only home to higher UFD activity, but it also registers more mobility and a greater confluence of means of transport. In many areas, pedestrians, bicycles and scooters can be found alongside vans and lorries, private cars, motorcycles and other vehicles.

Victims of accidents involving vans and lorries

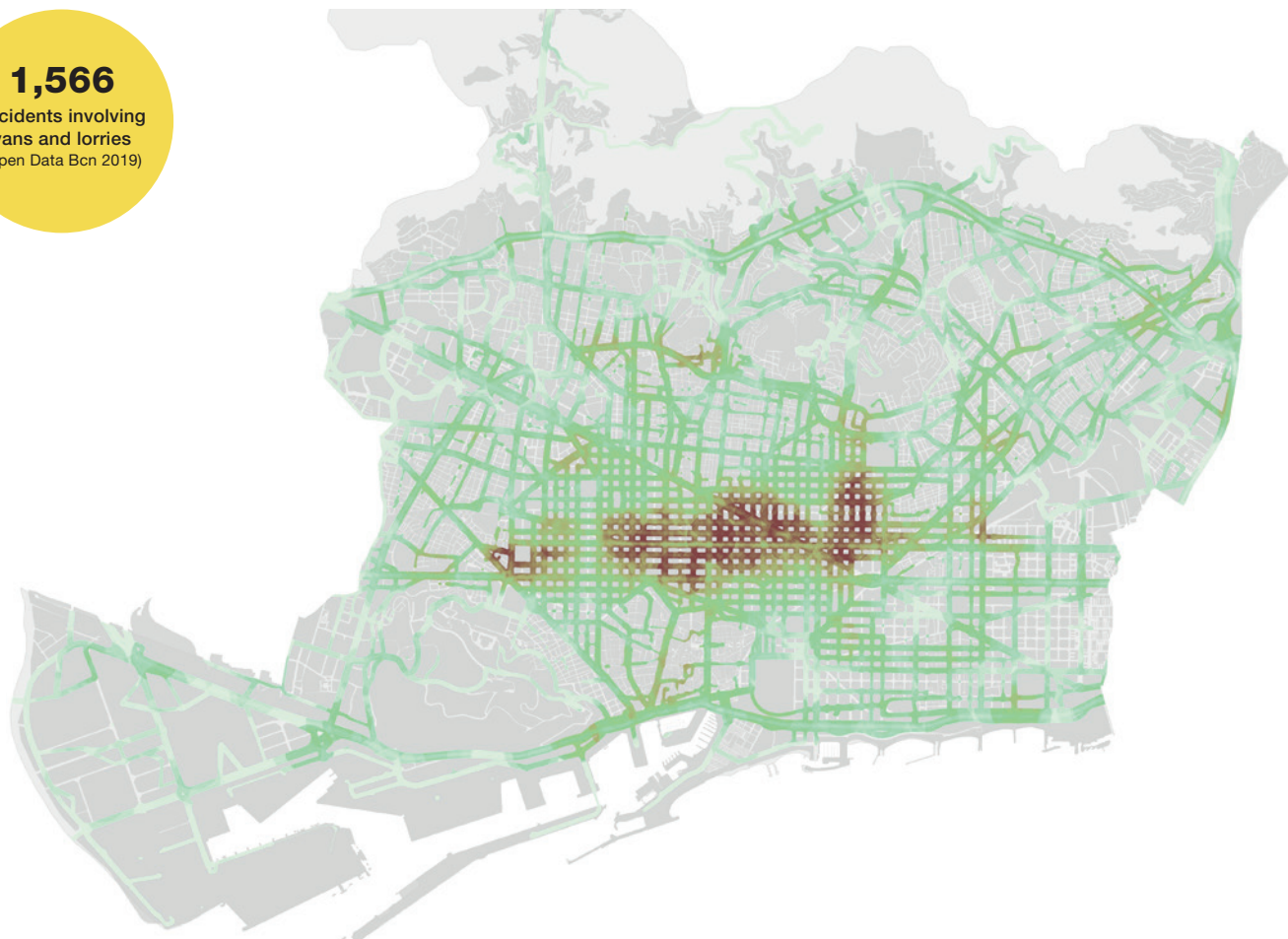
Source: Barcelona Regional, based on data analysis from the Guàrdia Urbana, 2019

- Fatality
- Severe injury



1,566

accidents involving
vans and lorries
(Open Data Bcn 2019)



Accident rate associated with vans and lorries

Source: Barcelona Regional, based on data analysis from the Guàrdia Urbana, 2019

Urban couriers with a high degree of vulnerability



Finally, it should be stated that the accident rate for bicycles and, especially, PMVs has suffered a significant increase in recent years, mainly due to the increase in their mobility, but also due to constant interaction with the rest of vehicles, which travel at higher speeds, and have the capacity to do more serious harm to people.

The actions currently being taken by the city to generally reduce speed (Barcelona 30 City, new radars, etc.), the new projects to calm the traffic in school environments, the superblocs, the green avenues and the traffic calming of new areas will certainly contribute to reducing accident rates and decreasing the number of victims, especially severe injuries and fatalities.

However, it is also necessary to think about specific measures for goods vehicles, given their dimensions and blind spots. In order to raise awareness about the blind spots of long vehicles among other road users, the DGT, in collaboration with Barcelona City Council and other administrations, has launched a large-scale campaign to indicate these blind spots by placing stickers on the outside of such vehicles, which can now be seen around the city. The implementation of ADAS (advanced driver-assistance systems) in large vehicles is also being worked on.

3. A city strategy

The Horizon 2030 Municipal Strategy on Urban Freight Distribution (EDUM) is a citywide strategy aimed at addressing current challenges in relation to urban freight distribution. It provides a roadmap for the coming years that will allow progress to be made towards a city model in which UFD can be carried out as efficiently, sustainably and safely as possible.

The goal of this strategy is to foster the city's commerce and improve the competitiveness of its companies, while reducing the externalities of urban freight distribution in public spaces and in the city's air, making UFD an activity compatible with everyday life.

The goals and proposals put forward in the strategy are consistent with the guidelines established in metropolitan, sector and territorial plans on urban freight distribution. They are in alignment with the current urban agenda, in which Barcelona is committed to reducing the space for private vehicles, improving the city's air quality and fostering local living.

The EDUM has been led by Barcelona City Council, but it has been developed in conjunction with the private sector. The strategy is based on three major programme approaches, each one associated with one of the three UFD models:

1. **Facilitate** the distribution of goods to commerce, companies and other establishments (B2B model) in an efficient, orderly, sustainable and safe manner.
2. **Organize** the new means of distributing goods to the end users (B2C model) and favour active, sustainable mobility.
3. **Incorporate** the distribution associated with services (USD model) into the governance of UFD.



The programme approaches synthesize the three main UFD commitments that the City Council is planning to implement in the coming years, and form the backbone of the key objectives to be achieved by the EDUM. These objectives are:

1. Enhance the flexibility of parking availability and improve management of on-street parking.
 - ➔ Increase the time available for loading and unloading in regulated spaces by 20% and work on rebalancing demand.
2. Enable and foster the creation of spaces off the public space.
 - ➔ Have 33% of home and office deliveries made via urban consolidation centres (UCCs).
 - ➔ Have 40% of online purchases delivered to collection points.
3. Foster the greening of UFD fleets.
 - ➔ Reduce emissions associated with urban freight distribution by 50%.
4. Promote cycle logistics deliveries and more environmentally efficient logistics solutions.
 - ➔ Achieve a tenfold increase in the number of cycle logistics vehicles, bringing the total to more than 800.
 - ➔ Achieve 500 nocturnal UFD points.
 - ➔ Have a UFD railway service with the capacity to transport 62,000 tonnes per year.
 - ➔ Set up at least one load pooling platform.
5. Make progress towards Vision Zero accidents in the accident rate related to UFD.
 - ➔ Make progress towards zero fatalities and zero severe injuries.
6. Optimize the use of L&U areas and minimize non-compliant parking in UFD by facilitating the activity's compatibility with everyday life.
 - ➔ Achieve a 60% reduction in non-compliant parking associated with UFD.
7. Guarantee and foster the existence of logistics land on the metropolitan scale.
 - ➔ Maintain the Barcelona metropolitan area's current 4,800 ha of industrial land.
8. Make progress in the regulatory standardization and management of UFD on the metropolitan scale.
 - ➔ Extend SPRO to 75% of the metropolitan municipalities.
9. Set up a forum for the generation of UFD knowledge, participation and governance with the agents involved.
 - ➔ Create the UFD Office as the channel for all communication with the sectors involved.
 - ➔ Hold at least one meeting per year of the UFD working groups to monitor the strategy.
 - ➔ Create a municipal UFD Observatory (UFD Data Center).
10. Make Barcelona a hub for innovative UFD technologies and solutions.
 - ➔ Support companies and research centres that offer innovative solutions for the city's UFD.

These objectives will be met by rolling out the action proposals described in the next chapter. Some of these proposals are already being implemented, others are in their early stages, and yet others need more time to determine how best to execute them. The continued cooperation and heavy involvement of the private sector will be necessary for many of the proposals to be successfully rolled out.

A roadmap agreed with the private sector

Although logistics is a growing sector, with respect to both GDP and the volume of goods transported, it is also mainly a private industry about which government agencies have limited knowledge. In this regard, an extensive diagnosis has been performed with the aim of obtaining specific data and analysis categories to better understand how UFD works in Barcelona and form the basis of the strategy's proposals and development.

The extensive diagnostic work carried out in recent years has involved a wide variety of tasks to gather new information, such as obtaining data about establishments using Google Places;¹ three ad hoc surveys (one on the city's establishments,² one on the municipal markets,³ and another on users of the SPRO app);⁴ fieldwork to gather data on the use of the city's loading and unloading spaces;⁵ the exploitation of the data gathered by the areaDUM app in 2018;⁶ the creation of a database on the collection points available in the city,⁷ and an estimation of the demand for B2C deliveries.⁸

Moreover, the EDUM is also the result of collaboration with all the stakeholders involved, from both the public and private sector. In this respect, in 2022, Barcelona City Council, in cooperation with the city's most representative economic and business associations and the main trade unions, signed the Pact for a New Urban

Freight Distribution Model in Barcelona. This sets out, in partnership with the private sector, the main actions to be carried out to improve the city's current UFD model and marks the start of the process of constructing a public-private governance of UFD.

From June to October 2022, a number of participatory sessions were held within the context of the development of the EDUM to allow the members of the Pact and the various organizations involved in UFD to put forward their points of view on sector needs in general and the specific model to which they belong (B2B, B2C or USD). These sessions generated both forums for open debate and several proposals and projects with significant development potential.

A great deal of interest in the EDUM was shown throughout the participatory process, with the constructive participation of more than 60 organizations, representing the professional interests of delivery drivers, logistics operators, commercial chains and groups of establishments, among others. The public sector, citizens' groups and trade unions were also represented.

The participatory sessions not only made it possible to register concerns, but also to specify and prioritize the proposals. This process adds legitimacy to this document, which is presented as an agreed roadmap that sets out the steps to be followed in relation to UFD for the coming years.

1 Data on establishments gathered and processed with the Google Places API (application programming interface). Barcelona Regional, 2019. In Barcelona almost 95,000 establishments have been identified as forming part of B2B demand, thanks to the commercial information obtained via the Google Places API. This database differs from the commercial census carried out on ground-floor premises, given that it provides data on establishments located in upper floors, such as offices and medical practices, while Barcelona City Council's commercial census only provides information about ground-floor premises.

2 *Enquesta a establiments* [Survey of establishments]. Barcelona Regional and CERES, 2021. Survey carried out by Barcelona Regional and CERES on 1,070 establishments in the B2B submodels, obtaining information on the needs of each type of establishment and the volume of deliveries of each submodel, as well as the use they make of the infrastructure and their perception of it.

3 *Enquesta a mercats* [Survey of markets]. IMMB and Barcelona Regional, 2021. The survey was carried out on 39 municipal markets, obtaining responses from 28 directors and 209 establishments.

4 *Enquesta a usuaris de l'aplicació SPRO* [SPRO app user survey]. Barcelona City Council, B:SM and Barcelona Regional, 2020. The survey obtained responses from 1,534 users.

5 *Anàlisi d'ús de l'Àrea DUM* [Analysis of the use of the L&U Area]. Barcelona Regional, 2021. The study analyses the *in situ* operation of L&U areas, obtaining information about occupancy and use, and comparing the records obtained with those from the SPRO app on the same days.

6 *Explotació de la base de dades de l'aplicació areaDUM* [Study of the areaDUM app database]. B:SM and Barcelona Regional, 2020. The data facilitated by B:SM correspond to recorded stops in regulated L&U spaces throughout 2018. The database contains ten million records with information about the date, time and location of the stops.

7 *Anàlisi dels punts de conveniència a la ciutat de Barcelona* [Analysis of convenience points in the city of Barcelona]. Barcelona Regional, 2020. Information obtained from simulations of purchases from the websites of the logistics operators that have collection points for e-commerce products.

8 *Estimació de la demanda teòrica de l'e-commerce* [Estimation of the theoretical demand of e-commerce]. Barcelona Regional, 2020. It used the data from two studies based on surveys carried out in 2018, the land registry, the register of inhabitants and household income: (1) *L'anàlisi del comerç a Barcelona: físic i online. Recomanacions per a guanyar competitivitat* [An analysis of commerce in Barcelona: on-site and online. Recommendations to increase competitiveness]. Barcelona Oberta, 2018, and (2) *Comerç online i mobilitat: orientacions cap a un model sostenible* [E-commerce and mobility: guidelines to achieve a sustainable model]. Generalitat de Catalunya, November 2018.

Map of UFD stakeholders in Barcelona



EDUM participatory sessions

Source: Barcelona City Council, 2022

4. Action proposals

The proposals presented below are structured into the following four blocks: the roll-out of the necessary infrastructure; the development of management instruments; communication, knowledge and innovation strategies; and the promotion of public-private collaboration in various areas of governance. Of these proposals, some are already being implemented, while others are still in the initial stages.

The first block includes measures for the creation of new logistics infrastructures and the maintenance of existing ones in order to strengthen and drive the development of UFD outside the public space.

The second block presents proposals for the management and definition of policies that mainly depend on government agencies. They include the management of surface-level areas, the promotion of alternatives to conventional delivery, collaboration with other institutions and regulatory changes that favour the sustainable development of UFD.

The third block presents proposals aimed at increasing the likelihood of success of the EDUM (Municipal Strategy on Urban Freight Distribution) and its actions based on campaigns to communicate the measures applied, raise the awareness of users and disseminate general knowledge.

Finally, the fourth block includes measures designed to facilitate the roll-out of the strategy through the creation of coordination bodies for public and private actors, the creation of a UFD Office and the search for funding for its development.





A. Necessary infrastructure

- A.1 Promotion of e-commerce collection points
- A.2 Creation of B2C UCCs
- A.3 Creation of B2B UCCs
- A.4 Creation of MADCs
- A.5 Creation of intermodal railway hubs
- A.6 Provision of logistics land in industrial estates



C. Communication, knowledge and innovation

- C.1 Improvement of communication channels
- C.2 Communication of the EDUM
- C.3 Communication and awareness campaigns
- C.4 UFD training and skill building
- C.5 Monitoring of international good practices
- C.6 Creation of a goods survey



B. Management instruments

- B.1 Flexible use of public space
- B.2 Study of the use conditions of L&U spaces
- B.3 Study of the USD model
- B.4 Strengthening of nocturnal UFD
- B.5 Improvements in the control of non-compliant parking
- B.6 Extension of the L&U Area
- B.7 Improvements to the SPRO app
- B.8 UFD improvements at markets
- B.9 Sustainable mobility in local marketplaces
- B.10 Load capacity pooling platform
- B.11 Monitoring of UFD traffic
- B.12 Classification and registration of UFD vehicles with the DGT
- B.13 Implementation of ADAS and blind-spot warning stickers
- B.14 Policies for the promotion of sustainable vehicles
- B.15 Amendments of regulations related to UFD
- B.16 E-commerce fees and taxes



D. Governance

- D.1 Creation of the UFD Office
- D.2 Creation of the UFD Observatory
- D.3 UFD policy laboratory
- D.4 Metropolitan coordination board
- D.5 Funding for UFD innovation
- D.6 Promotion of a UFD cluster



4.1. Roll-out of the necessary infrastructure

The majority of UFD operations are carried out on the public space. Therefore, the goal is to increase the use of alternative spaces, while fostering cooperation among companies in the sector. In e-commerce, deliveries to collection points constitute the most efficient means, given that multiple deliveries can be made at the same point. Moreover, the option of consolidating these parcel deliveries and making final deliveries with alternative vehicles reduces the externalities of the delivery of goods bought online.

A.1 Promotion of e-commerce collection points

With this proposal the aim is to increase the proportion of deliveries made to collection points, thereby reducing the number of trips to homes and offices and the associated number of failed deliveries.

To achieve this, collection points will be actively promoted along with the operators who use this delivery method, especially those that offer a multi-operator service (shared collection points). In this way, operators with lower business volumes will be able to have delivery points, avoiding network superposition.

Around a thousand collection points – a number similar to that of supermarkets or pharmacies – would be sufficient for the city. This would guarantee everyone nearby access to a collection point without unnecessarily increasing the number of deliveries made by the operators.

A shared network made available in an app or on a website would allow end customers to have a reference point that would almost always be the same location, making the service more practical. The recipients' convenience is paramount to ensure the growth of this delivery system.



A.2 Creation of B2C UCCs

Barcelona is already home to several urban consolidation centres (UCCs), which consolidate goods and take charge of their last-mile delivery. Some occupy a surface area of 100 to 300 m², with the capacity to manage and deliver around 1,500 parcels per day. These are mainly ground-floor premises and the parcels are normally delivered with cargo bikes or PMVs with a medium-sized capacity.

Other UCC models, in contrast, prioritize smaller, more flexible sites at numerous locations. These generally have an area of 25 m² and serve as practical temporary storage facilities from which deliveries can be made on foot, by bicycle or PMV, given that the loads are much smaller. As cargo bikes and similar vehicles are not used for the final delivery, they can be located underground or in car garages. Such models have not yet achieved stabilization in an ever-changing market in which alternatives to conventional delivery are being explored.

The creation of B2C UCCs aims to promote and consolidate these delivery systems in the city by, for example, maintaining the subsidies of the "Impulsem el que fas" (We boost what you do) programme, or consider the provision of spaces suitable for the development of these alternatives. The objective would be for around a third of all deliveries made to homes and offices to use these consolidation spaces.



Source: @bicicletaAMB

With regard to the provisioning of shops and establishments in the city, the atomization of the sector challenges the creation of efficient routes. The consolidation of these goods on different scales and the alternatives used to bring them into the city could improve delivery efficiency and offer solutions in urban fabrics with special difficulties.

A.3 Creation of B2B UCCs

Several areas of Barcelona have the potential to benefit from the installation of B2B UCCs. These are the district of Ciutat Vella, the centre of the Poblenou neighbourhood and shopping streets like La Rambla, Gran de Sant Andreu and Sants, which have already shown their willingness to work with similar alternatives.

B2B UCCs generally work well with a surface area of around 250 to 300 m². They are spaces that can receive goods in off-peak hours – or at night – and enable synergies with possible municipal access distribution centres (MADCs), decongesting L&U areas in peak hours.

The goods received by UCCs are consolidated and generally delivered with low-impact vehicles. They can also offer complementary services such as labelling and temporary storage. The proposal is to launch and support pilot consolidation centres with similar characteristics.

However, analysis of these distribution systems has revealed that it is difficult to meet the various delivery needs of establishments and ensure the economic viability. The application of restrictive measures to the areas where they are implemented, as well as the involvement of government, will be key to their success. These are aspects to be developed within the framework of this strategy.

A.4 Creation of MADCs

European experiences have shown the benefits of municipal access distribution centres (MADCs), which from their location in the outskirts manage and consolidate deliveries before prior to entry into the city. In some cases, a reduction of up to 77% of the distance covered to serve the same number of establishments has been registered.

In the metropolitan area of Barcelona there are various potential sites for the installation of such centres, including the Mercabarna food-trading estate. Its large number of food suppliers, distributors and organizational structures could serve HORECA and local grocery shops, two of the submodels that generate the most deliveries in the city. The possibility of an MADC in the free trade zone for non-food goods is also to be considered as a complement to that proposed at Mercabarna, in addition to another located in the Besòs economic activity estates to serve the east of the city.

These spaces offer the advantage of more affordable prices for logistics land and good connections with the main road network. They also facilitate the transition towards more sustainable delivery, given that by concentrating operations they can offer recharging points for electric vehicles, as well as synergies with the B2B and B2C UCCs mentioned previously.



A.5 Creation of intermodal railway hubs

Cities like London and Paris have seen potential in the use of certain urban railway spaces. Intermodal nodes may become strong allies in the evolution towards a more sustainable provisioning system, while revalorizing existing railway infrastructures.

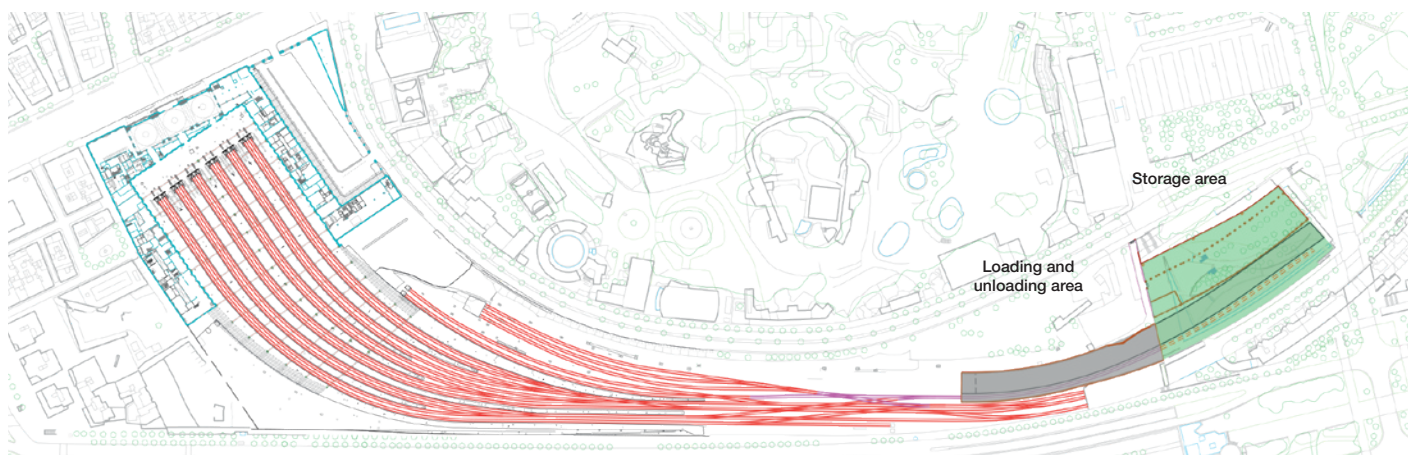
Goods could be loaded onto the train at stations in the metropolitan area (Granollers, La Llagosta, Rubí, etc.), and subsequently transferred to the city centre. For their unloading, the Estació de França station of the Adif railway network, the Plaça Catalunya and Plaça Espanya stations of the FGC railway network and the

Can Tunis area are being studied. Depending on which destination is chosen, it will be necessary to coordinate UFD activities with current passenger operations, adapt the spaces or terminal to allow the freight carriages to be unloaded, or renovate the facilities that were previously used for this purpose. Notwithstanding, the implementation of this initiative is expected to be a complex process due to the requirements of the various stakeholders involved.

Proposed site of the intermodal UFD centre at the Estació de França station

Source: Barcelona Regional

(Other sites studied: the Vall d'Hebron railway sheds and the disused Gaudí metro station on line 2).



The land used for logistics activities plays a fundamental role in UFD, not only in the value chains of the urban economy, but also in the running of the city. If the required logistics space were not available, it would be necessary to seek locations further afield, which would generate an increase in the externalities associated with the activity and a decrease in the area's competitiveness.

A.6 Provision of logistics land in industrial estates

Given the vital importance of preventing the offshoring of UFD activity, the necessary urban planning conditions will be created for logistics to be located and carried out at economic activity estates and in the urban continuum.

The proposal is based on the need to adapt the urban planning conditions of these spaces, initially by reviewing the uses compatible with urban planning code 22, and guaranteeing that logistics, transport and storage activities do not compete with other activities that may be accommodated in other fabrics, such as commercial or service activities.

Work will also be done to adapt the urban planning parameters in order to include the new logistics approaches characterised by the incorporation of technology and the more efficient use of land.

Industrial land in the metropolitan area of Barcelona

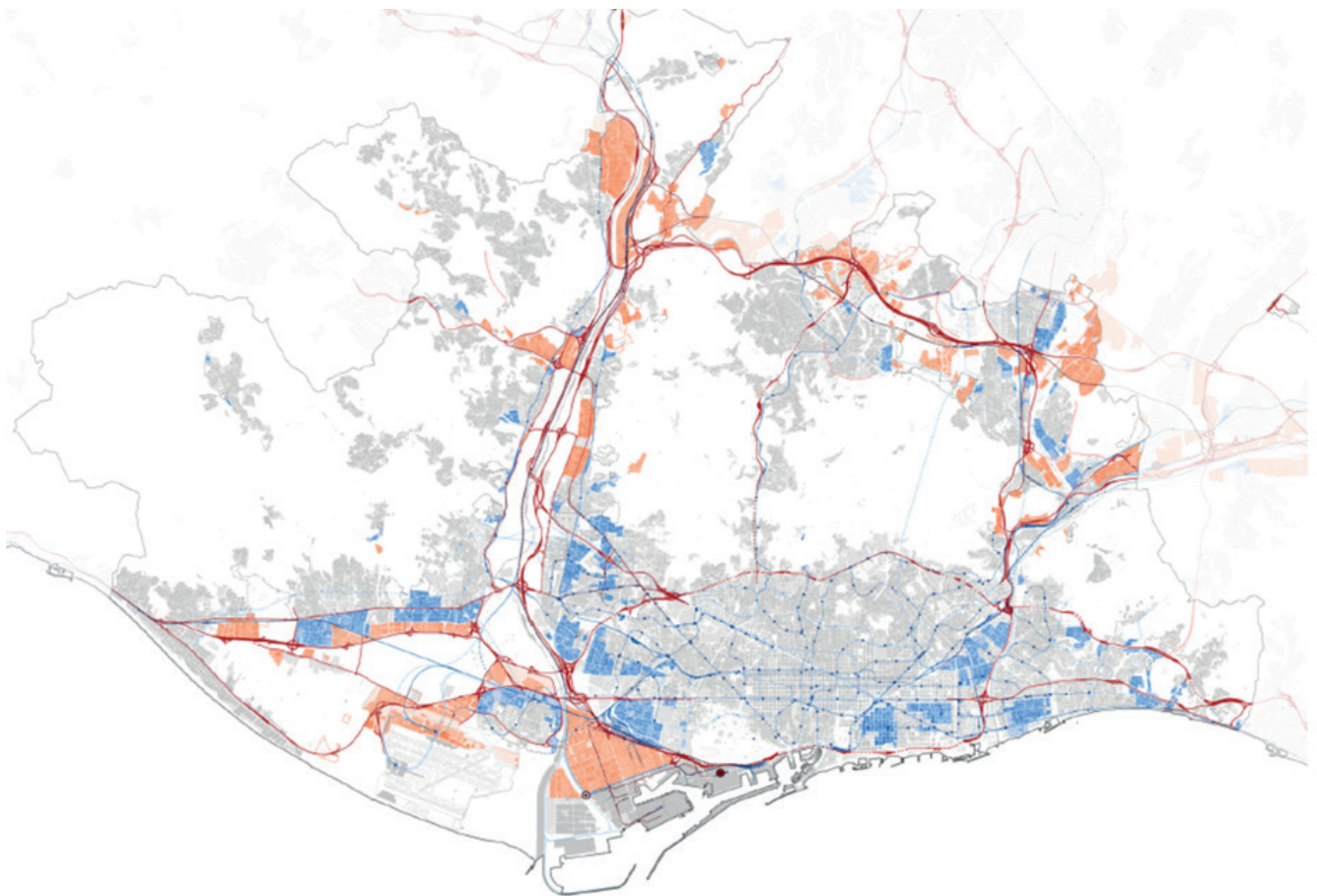
Source: Metropolitan Urban Master Plan (PDUM), Plan draft. AMB, 2019

Model 1

● Activity in territorial corridors

Model 2

● Integrated activity in urban continuums





4.2. Development of management instruments

Barcelona is undergoing a change in the prioritization of the uses of the public space, putting pedestrians first. This means that surface-level space is a scarcity and a valuable asset whose use needs to be optimized. The management of this space on the public thoroughfare and of the tools that regulate it is undoubtedly one of the actions with the most far-reaching impact ever to be undertaken by the city's government.

B.1 Flexible use of public space

The objective of the proposal is to maximize the flexibility of parking spaces for UFD in the city and dispense with the rigidity of single-use spaces. In this context, the aim is to work with the idea of "space hours". Spaces are offered by the hour and their use may change over the course of the day. This makes it possible to offer more spaces at times of peak demand and use them for other purposes when UFD demand is lower.

A variety of tools are available to achieve this flexibility. One of the main ones is the implementation of multipurpose parking spaces, whose use changes with the time of day. Shared uses, such as UFD-blue (visitors), UFD-green (residents) and UFD-motorcycles, will be studied.

Another aspect to be worked on is offering areas without delimited spaces that can be used at certain times for loading and unloading, such as time slots on the multiuse lanes, the future green avenues and other pedestrianized streets, such as Portal de l'Àngel. These areas are not to be made available for parking all day, as the aim is to prioritize pedestrian mobility and the enjoyment of public space, but they are to allow L&U in periods of maximum UFD demand in a way that is compatible with everyday life.

This flexibilization, as its name suggests, must then be adapted to the characteristics of each area. Accordingly, the solutions that might be applied in Ciutat Vella may differ from those in place in Eixample, as well as the green avenues and non-regulated parking areas. It will therefore be necessary to meet the needs of each area with the most suitable solution, taking into account all the users of the public space.



B.2 Study of the use conditions of L&U spaces

The possibility of adapting the use conditions and duration of stays of the different UFD vehicles according to their model and activity will be studied. With the help of the SPRO app, work could be done with respect to the differentiation of the B2B, B2C and USD models and their submodels. The scope of the variability of the conditions will also study the extension of the L&U Area timetable from 7 am to 9 pm, as well as the allowance of longer stays for vehicles with low or zero emissions.

Another aspect that could be developed is the professional UFD card, also associated with SPRO. It could allow points to be accumulated or lost (in order to manage penalties more consistently) and make it possible to quickly and easily request one-off permits for specific operations through the app, among other advantages.

To define all these specific measures, it is essential to carry out in-depth fieldwork and analysis of the behaviour of the models on the streets. Additionally, it involves the full development of the SPRO app to determine actual demand in the city and its peculiarities, improving an increasingly complex but necessary process.



B.3 Study of the USD model

Due to the importance of USD with regard to the occupation of space, it is necessary to study this model in more depth. Accordingly, the aim is to design studies that analyse and characterize its submodels, the sizes and classes of its vehicles, its specific needs and their territorial distribution, and the parking time that is necessary, among other aspects.

Our current knowledge of USD barely scratches the surface, so a more detailed understanding of it will make it possible to make more informed decisions with regard to surface-level planning or specific alternatives, such as underground parking. Optimal conditions for the development of USD could then be offered, without affecting the operation of other models or uses in the public space.



B.4 Strengthening of nocturnal UFD

Nocturnal UFD makes it possible to transfer part of the L&U demand in peak hours. This reduces congestion, allows for the use of larger-capacity vehicles, and in many cases, it means that unloading can take place right in front of the premises. This distribution system is mainly suitable for supermarkets and other food and non-food chains, although other beneficiaries, such as hotels, could be studied.

The aim with the development of this strategy is to improve the City Council's internal capacity to manage permits, thus increasing the number of nocturnal operations in the city.

The Council will review the procedures for securing these nocturnal UFD permits to streamline them and make them more affordable, while guaranteeing residents' rights to silence and rest as well as the security of the operations. This will foster an increase in the number of nocturnal operations carried out in Barcelona on a regular basis and will reduce unauthorized ones.

Moreover, other alternatives to promote nocturnal UFD could be sought, such as the organization of sessions to disseminate the current protocols or to assess the activation of a subsidy programme to carry out the necessary sound measurements.

The diversity of users of L&U spaces and the various needs of the models, along with high levels of non-compliant parking by both operators and private citizens, mean that L&U areas are often operating at the very limits of their capacity. Certain behaviours hinder the efficiency of urban logistics, such as private vehicles and PRMs parking in L&U areas, as well as long-term parking. The lack of space in L&U areas means that non-compliant parking is also extended to places beyond the allotted spaces.

B.5 Improvements in the control of non-compliant parking

The control of non-compliant parking is one of the main lines of action to make UFD more efficient.

To this end, work is being done with an operational unit of B:SM that specializes in UFD. The operational teams responsible for controlling non-compliant parking will also be strengthened with the latest technologies and future developments. For example, work is being done to incorporate cameras with ANPR (automatic number plate recognition) technology and to have scan cars patrolling the streets. At the same time, to facilitate the registration of the maximum number of operations, work will be done to streamline the registration process in SPRO.

The new UFD non-compliant parking control model will review the proportionality and impact of fines both for UFD vehicles and for private vehicles that park in L&U areas and hinder the system's optimal development.

Coordination with the Guàrdia Urbana police force will be essential to guarantee an efficient control system aligned with the city's goals and which can also be extended beyond the allotted spaces.

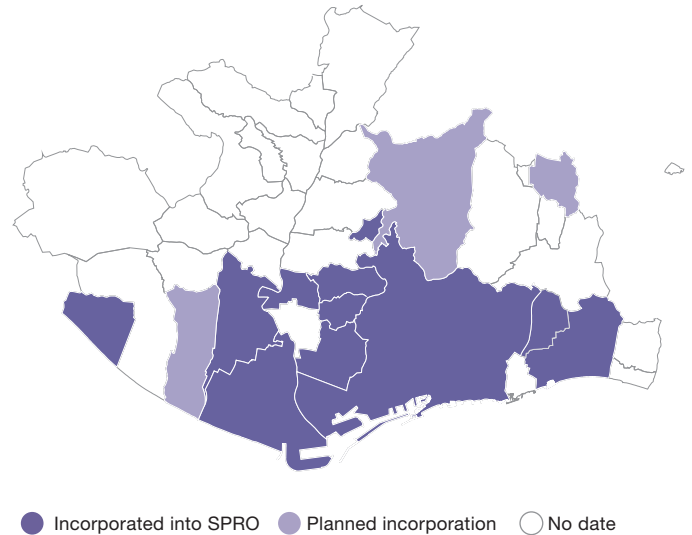


The uniform management and control of all the city's L&U spaces will make it possible to register all operations with a single app. The adoption of the same method and app by all the municipalities in the metropolitan area would prevent each one managing UFD in its own independent manner. As such, the SPRO app is a key tool to enhance knowledge and deliver improved services that effectively meet the needs of UFD.

B.6 Extension of the L&U Area

To standardize the management system, work will be done in two areas. In the city, the aim is to fully extend the regulated parking area. With regard to the rest of the metropolitan area, the goal is to increase the number of participating municipalities in the coming years.

The project will make it possible to visualize, through a single application, the parking hours and operating days of each area, as well as their maximum length of stay, among other pieces of information. This will make finding a legal parking spot easier, quicker and more efficient, and ensure compliance with the established conditions.



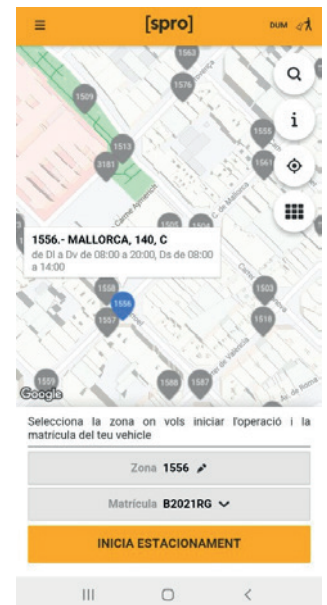
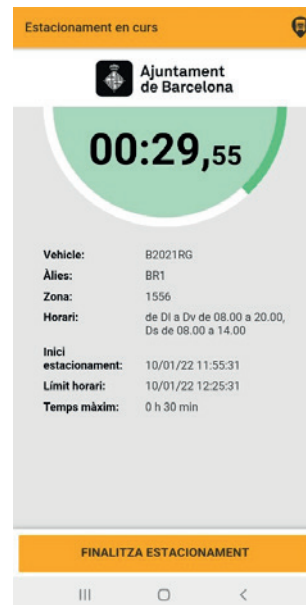
B.7 Improvements to the SPRO app

With this proposal the aim is to consolidate SPRO as a benchmark tool, increasing its use, making it more functional and incorporating aspects to improve its management, knowledge and the service it provides.

The main group of measures focus on making registration an almost immediate and effortless process. If this is achieved, it is highly likely that more short-term operations will be registered. The operational viability of automatically closing operations could also be studied with a view to improving registration quality.

Secondly, work will be done on aspects related to the application's interface. For example, it will be possible to browse freely through SPRO when an operation is under way. The information that it offers is also to be improved: spaces that can be used according to timetable, type, availability, etc.

Finally, improvements to the app's control aspects will also be considered, such as the management of registered profiles, a scoring system to reward good behaviour and not allowing incorrect registrations far away from the vehicle's actual location.



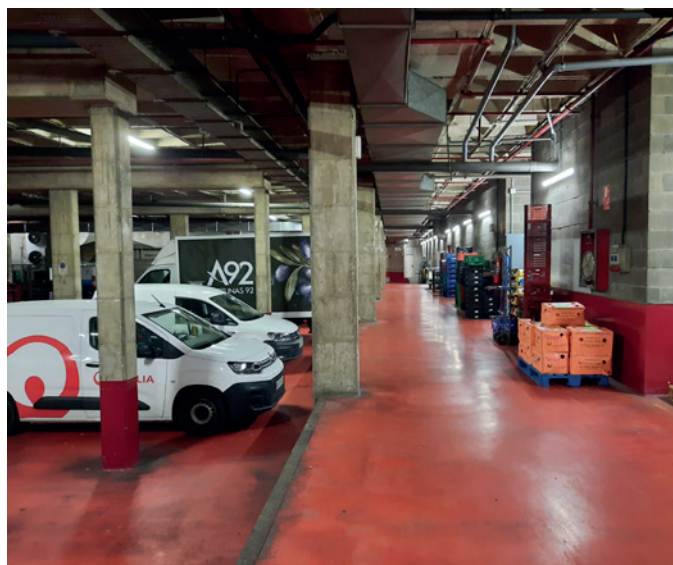
With regard to the city model, the EDUM also seeks to foster local business. In this context, the markets play a key role in the city, given that they are the backbone of local commerce and contribute to socioeconomic dynamism. For this reason, it is essential to bring their operability more in line with the ever-changing needs of consumers.

B.8 UFD improvements at markets

The aim of this proposal is to expand the information we have about logistics at the markets and to analyse the L&U areas of their platforms and surrounding areas. The goal is also to improve the control of access to the platforms, automating it and monitoring the operations.

Efforts will also be made to enhance the efficiency of space utilisation and the provisioning of goods. This will be achieved, for example, by fostering cooperation between the various establishments and nocturnal unloading operations, in addition to any synergies that may arise with Mercabarna and any other MADCs in the city.

Finally, if possible and necessary, markets that do not have logistics platforms will be equipped with them. In this process, the installation of recharging points for electric vehicles will also be considered to facilitate the transition towards more sustainable vehicles.



B.9 Sustainable mobility in local marketplaces

Efforts are under way to consolidate a digital platform for local establishments that wish to offer their products online. A private initiative launched by BarnaCom, BCNMarket, allows these retailers to join, and further developing this would be highly beneficial. In a similar vein, the Municipal Institute of Markets of Barcelona is also working on a platform to centralize orders.

These platforms may facilitate the promotion of more sustainable delivery alternatives, such as parcel lockers or other collection points at the markets. Moreover, if a joint marketplace is created, it will be easier to optimize delivery services with deliveries made by bicycle or other sustainable vehicles, besides working with small delivery companies or social foundations to prevent precarious employment conditions in the courier sector.



In all the UFD activities described previously, return trips without a load and vehicles operating at half capacity are examples of the inefficient use of resources. Sharing the unused load capacity of these vehicles among multiple suppliers or goods receivers could maximize the loads of UFD vehicles in the city.

B.10 Load capacity pooling platform

The goal of this proposal is to identify the types of UFD that are most suitable for participation in mutualization projects and their potential actors. Based on this exploratory work, pilot tests will be implemented involving both the senders and receivers of goods, as well as the delivery drivers, adopting an approach similar to that of circular economy projects.

It would be interesting to include a load pooling system like the ones used in road haulage sector, identifying where there are barriers or room for improvement. Awareness-raising campaigns could also be launched in the various sectors involved, along with incentives to promote companies' participation in the project.

One of the main problems when controlling and understanding the mobility and externalities generated by UFD lies in the identification of the vehicles involved. Analysis of the data collected from the control points of the ZBE (linked to the DGT's database) and the detailed classification of these vehicles and their UFD model would make it possible to break down the impacts by model and better focus the policies to be implemented.

B.11 Monitoring of UFD traffic

Data from the ZBE's cameras are being used to prepare periodic reports with a view to gaining a better understanding of the mobility and externalities of goods vehicles.

Finally, another major piece of information included in these reports is externalities. By estimating the average emission factor for each type of vehicle and the mobility of vans and lorries, the total emission values for NO₂, PM₁₀, PM_{2.5} and CO₂ can be obtained.

With these reports it is possible to classify the operating fleet in terms of the distribution and evolution of vehicles, breaking them down individually to monitor fleet renewal. They are also used to determine where the vehicles are from, what type of fuel they use, their environmental stickers, etc. In the future, it will also be possible to determine the percentage that can actually be attributed to commercial mobility, in addition to the contribution made by each model (B2B, B2C and USD) to the mobility of vans and lorries.



B.12 Classification and registration of UFD vehicles with the DGT

Barcelona City Council is collaborating with B:SM, the Barcelona Metropolitan Area (AMB), Barcelona Regional (BR) and the Directorate-General for Traffic (DGT) to design a suitable method of classifying commercial vehicles. This classification will be based on the models presented in this strategy.

submodels. It would also be interesting to add other aspects such as vehicle size.

In addition to the base classification by model (B2B, B2C and USD), work will be done to flesh it out, as far as possible, with information about the corresponding

At the same time, the DGT, in an ongoing collaboration with Barcelona City Council, is also working on updating and improving the regulations regarding deliveries made by cycle logistics and new alternative delivery vehicles. For example, work is being done on the registration and/or certification of cargo bikes and PMVs designed for goods transport.

This collaboration with the DGT also has the aim of reducing the rate of accidents associated with UFD. From 2009 to 2019, the number of fatalities on urban streets decreased at an annual average rate of 1%, compared to 4% on interurban roads. Vulnerable road users (VRUs) account for the majority of these victims in urban areas.

B.13 Implementation of ADAS and blind-spot warning stickers

The DGT is working on a regulation that will require the installation of protection systems for vulnerable road users (VRUs) in urban environments with advanced driver-assistance systems (ADAS) such as presence detection devices and acoustic and/or lighting alert devices. The aim of these systems is to improve vision with respect to the presence of VRUs and thus improve driving safety. Barcelona City Council aims to be a pioneer in this area and is also working on a decree to make it mandatory for large vehicles.

Until these measures are applied, indirect means of indicating blind spots and improving vision may be of great use in making progress towards the proposed objective. This signage is advisable for both light goods vehicles and for rigid and articulated lorries (N1, N2 and N3).



With regard to externalities, the climate crisis and our dependence on fossil fuels highlight the need to transition towards more sustainable vehicles. This process, however, is not advancing as quickly as the problem requires. It is, then, considered necessary for government agencies to set the criteria and regulations to facilitate the change in model.

B.14 Policies for the promotion of sustainable vehicles

The proposal is to collaborate with the Spain's Ministry for the Ecological Transition and the Demographic Challenge (MITECO) to define working groups with the local authorities and UFD actors. This will allow state aid and subsidy programmes to also be adapted to the commercial sector. It will also enable debate on the fiscal measures that are to accompany and drive the change in model, in addition to any other aspects that may affect the sector, such as the evolution of the ZBE (low emissions zone).

In addition to the aid programmes, municipal policies will be put forward to foster alternative infrastructure for UFD, enabling sustainable delivery using cargo bikes

and PMVs. Barcelona City Council will also consider promoting the development of a zero-emissions UFD vehicle adapted to the city of Barcelona.



B.15 Amendments of regulations related to UFD



In recent years, some operators have expressed their willingness to use car parking spaces for logistics purposes. The recently approved Special Urban Plan for new activities in Barcelona's car parks considers car parks

to be mobility-associated service centres. This regulatory change makes it possible for car parks to play host to different types of logistics microplatforms, functioning as centres to receive goods and carry out their last-mile distribution with sustainable means. It also enables other uses, such as the installation of lockers, recharging points for electric vehicles and cash machines.

Additionally, the Special Use Plan for activities related to home deliveries regulates activities arising from the digitalization of consumer habits through e-commerce and limits any new impacts generated in the urban grain.

These amendments are examples of the necessary adaptation of the regulations to the city's process of constant change. The strategy will continue to be honed in this respect in order to produce regulations in line with the current state of UFD.

B.16 E-commerce fees and taxes

Progress is being made on the establishment of a municipal tax to be applied – within the current legal framework – to companies that carry out postal shipments in the city of Barcelona. The taxable event is the special use of the public domain with the aim of directly distributing goods acquired through e-commerce to the final destination indicated by the consumer. This taxable event excludes deliveries to collection points, thereby promoting more efficient and sustainable delivery methods.

The proposed fee is based on the estimation of the spatial use of the public domain and the turnover of the postal operators. This tax constitutes a major step forward at an international level in which there are practically no other experiences like it anywhere else in the world.

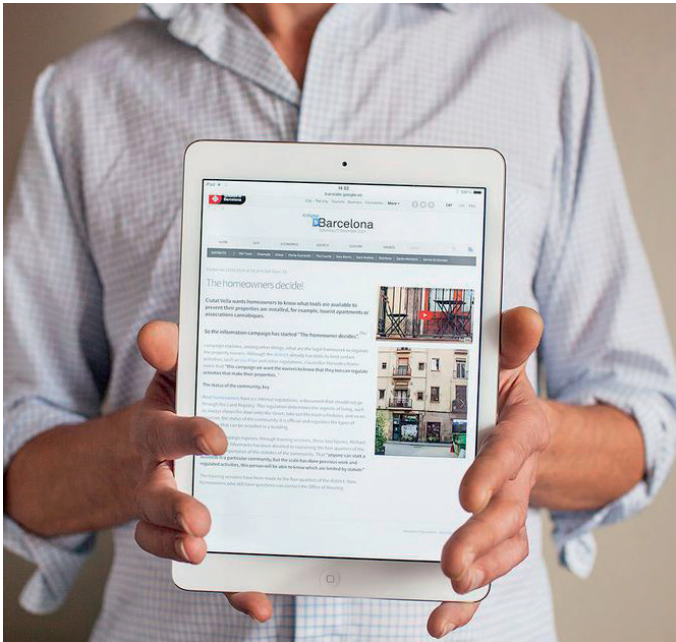




4.3. Facilitate communication, knowledge and innovation

A good communication strategy is essential for enhancing the efficiency of the UFD system. The development of the website, SPRO and the creation of the UFD Office constitute significant improvements in this regard. The EDUM creates the framework necessary to nurture these information and communication channels while also raising consumer awareness.

C.1 Improvement of communication channels



Pre-existing communication channels will be strengthened, and new ones will be generated in order to guarantee the availability of information. Firstly, a section specifically for UFD will be opened on Barcelona City Council's website with useful information for delivery drivers, establishments and the general public: timetables, basic parking conditions, key regulations, etc. It will also include general information about UFD in the city, the EDUM, UFD processes and the UFD Office.

Secondly, the inclusion of a suggestions box will be considered, aiming to provide users of the L&U areas and residents with a platform to submit information and obtain responses regarding any problems or aspects to be improved in the city's parking operations. An interactive map indicating hotspots and incidents could support the proposed online suggestions box.

C.2 Communication of the EDUM

The strategy's dissemination channels may include the websites of the various government agencies involved, the SPRO app, and specific logistics forums such as specialist trade publications for hauliers and other organizations related to shops and services (guilds, chambers of commerce, retailer associations, etc.).

It would also be interesting to contact the main actors involved in or affected by the roll-out of the EDUM to encourage them to actively follow and participate in all the phases of the process. These initiatives will keep the EDUM alive and continually foster new proposals over the coming years.

C.3 Communication and awareness campaigns



These campaigns will have two distinct targets: end consumers and industry professionals.

In relation to end consumers, the main goal will be to reduce the percentage of home deliveries with respect to the overall number of parcels shipped in the city. The focus will be on raising the general public's awareness of the impact associated with home deliveries. These campaigns would have to be carried out over

a sustained period of time and be aimed mainly at young people (82.6% of young people make online purchases compared to 54% of the general public). They will stress the negative impact of delivering online purchases on the environment (air and noise pollution, excess packaging, etc.), on the economy (precarious employment, weakening of the commercial fabric, etc.) and from a social standpoint (risk of compulsive buying, among others).

In relation to delivery drivers, the aim is to add value to UFD and foster accountability in the industry, highlighting the sector's importance to the running of the city and calling for good practices and the minimization of adverse impacts on the city.

Additionally, other campaigns could be launched to promote local commerce and healthier and more sustainable consumer habits.

Also in regard to the professional sector, it is important to note that UFD is increasingly distancing itself from conventional goods transport. Changes in the urban environment, along with a high level of self-employed delivery drivers, mean that these professionals' training does not fully meet current needs.

C.4 UFD training and skill building

A training programme is to be designed to improve UFD professionals' skills and knowledge. The course will include both theoretical and practical aspects and could be associated with a job bank.

The aim is for it to be offered by Barcelona Activa and other interested agents both in-person and online. The online option will be offered in an audiovisual format and will be permanently available, thereby reducing the cost and making it possible to be followed at any time of year.

The course content would be varied and include the context of delivery (regulations, rights and responsibilities, the EDUM, emerging trends in the sector, etc.), environmental aspects (transport externalities and management of waste generated by the activity), ICT tools (SPRO and support, planning and route optimization tools) and occupational health and safety (operational risks, civil responsibility and good



Against a backdrop of constant change, being open to knowledge developed by other cities makes it possible to identify successful practices that can be applied to Barcelona. Studying the alternatives adopted in the international scope may be extremely beneficial for the evolution of UFD in the city. At the local scale, UFD is also suffering from a dearth of information, hindering the ability of government agencies to provide a suitable response to the actual needs of the system.

C.5 Monitoring of international good practices

Initiatives will be undertaken to regularly carry out studies at the international scale on the various areas of UFD. This would make it possible to gather experiences applicable to Barcelona City Council and other municipalities and cities in Catalonia.

Moreover, work is also being done to increase participation in international initiatives such as

workshops, collaborations, as well as project consultations outside the city. Barcelona belongs to the C40 Cities Climate Leadership Group and participates in the Urban Mobility programmes organized by the European Institute of Innovation (EIT). Efforts will also be made to hold events in the city related to UFD, thereby expanding the knowledge base of the sector.

C.6 Creation of a goods survey

In other mobility areas, periodic surveys such as the *Enquesta de mobilitat en dia feiner* [Survey on mobility on working days, EMEF] are conducted in the realm of personal mobility. These surveys are carried out to generate knowledge that can be used by government agencies and other bodies for studies. In this vein, the aim is to seek synergies with the Barcelona Metropolitan Transport Authority (ATM) and other stakeholders with a view to designing, creating and conducting a periodic survey on goods in order to obtain quality data about the UFD sector.

The purpose of the survey would be to gather global data such as the volume of operations, the periodicity of deliveries and traffic patterns, as well as the peculiarities of the various UFD models and their differences (B2B, B2C and USD). These data could be accompanied with more specific aspects such as information about the workers (age, sex, experience in the sector, etc.), the type of company (self-employed, vehicle fleets, etc.) and the deliveries (timetables, types, parking duration, etc.).

It would also be interesting to consider the periodicity of the survey carried out on establishments – as was done within the framework of the EDUM diagnosis – and of the survey *L'anàlisi del comerç a Barcelona: físic i online* [An analysis of commerce in Barcelona: on-site and online]. This will make it possible to have a first-hand understanding of current shopping habits.





4.4. Public-private collaboration in various areas of governance

The processes of analysis and continual improvement of the UFD system need to go beyond the municipal level. This will require the coordination of the various public bodies and the participation of the private operators. This coordination will also make it possible to develop a knowledge hub for the sector and homogenize UFD management criteria in the city and the metropolitan environment.

D.1 Creation of the UFD Office

The role of the UFD Office must be to facilitate the implementation of the proposed actions and effectively address any concerns or new projects that may arise within the framework of this strategy. The main goal of the UFD Office is, then, to provide a frame of reference for the leadership of this process, while also acting as an intermediary between government and the agents involved.

The aspects to be covered by the UFD Office could include: the establishment of annual EDUM implementation plans, the monitoring of the strategy's indicators, the organization of working groups, the identification of lead projects, the creation of UFD working groups in the districts, the management of

the UFD portal, and direct intermediation between government and the agents involved.

The UFD Office has now been opened and it will continue to be developed in the coming years. It can be contacted by email at oficinamercaderies@bcn.cat.



oficinamercaderies@bcn.cat

D.2 Creation of the UFD Observatory

The UFD Observatory will be issued with all the information gathered in the drawing up of the strategy. Other information relevant to UFD will also be gathered, sorted and presented in a structured manner, making it the reference point for operators and companies in the sector.



<https://dum.bcnregional.com>

This information and exchange of data may facilitate decision-making for companies and find patterns that can generate synergies. It will be important to continuously update it with new information and ensure that it functions as an analysis centre through the development of technical validation work and the correction of the data obtained, as well as the updating of the defined catalogue of indicators.

D.3 UFD policy laboratory

The policy laboratory for the implementation of the EDUM will be responsible for studying new measures that may improve the city's UFD, complementing the EDUM and making it even more powerful and relevant. These measures will generally have their roots in the government agencies and, therefore, Barcelona City Council should lead work sessions and round tables involving the various organizations and operators.

The laboratory will study different policies, both based on the city's various urban layouts and general approaches, such as financial incentives for using lockers or delivery points rather than home deliveries, incentives for using sustainable or low-emission vehicles, and the viability of monitoring trips made by goods vehicles using a tachograph or other means.

D.4 Metropolitan coordination board

Although traffic ordinances fall under municipal competence, it seems reasonable to establish homogeneous bases to standardize the operating conditions of UFD. These conditions are already similar to each other in the various municipalities in the metropolitan area, especially those that form part of the urban continuum.

The coordination board should be led by supramunicipal institutions such as the AMB and the ATM, and include the participation of the municipalities and other institutions like B:SM, which would offer its knowledge of the management of L&U spaces in various municipalities.

The board could develop the technical resources necessary for the implementation of SPRO (or a similar tool) in the rest of the municipalities, thereby making progress towards the standardization of UFD in the metropolitan municipalities.



Finally, it should be taken into consideration that Barcelona is home to a substantial and internationally renowned ecosystem of research and innovation in a wide variety of scopes, including sustainable mobility. In this context, UFD is one of the sectors that has sparked the most interest, with high expectations in terms of technological, organizational and vehicle developments.

D.5 Funding for UFD innovation

Barcelona City Council has submitted two declarations of interest for the NextGenerationEU recovery fund, in which the funding of the EDUM plays a key role. In this line, the proposal contemplates seeking similar funding opportunities, such as the calls for MOVES plans or

other projects related to UFD within the framework of the EIT or the C40 Cities network. This would achieve external economic contributions that would strengthen efficient and sustainable development.

D.6 Promotion of a UFD cluster



Steps will be taken to structure an industrial and technological cluster around UFD in Barcelona. The first step will be to identify the key actors who are to take part, as well as collaboration opportunities with the private sector and significant flagship projects. The cluster will design and foster UFD improvements and test and implement ideas in today's complex urban environments. The industrial cluster will also make it possible to maximize the attraction of R&D and industrial and technological development project resources and talent.

4.5. Consensus and positive evaluation of the proposals

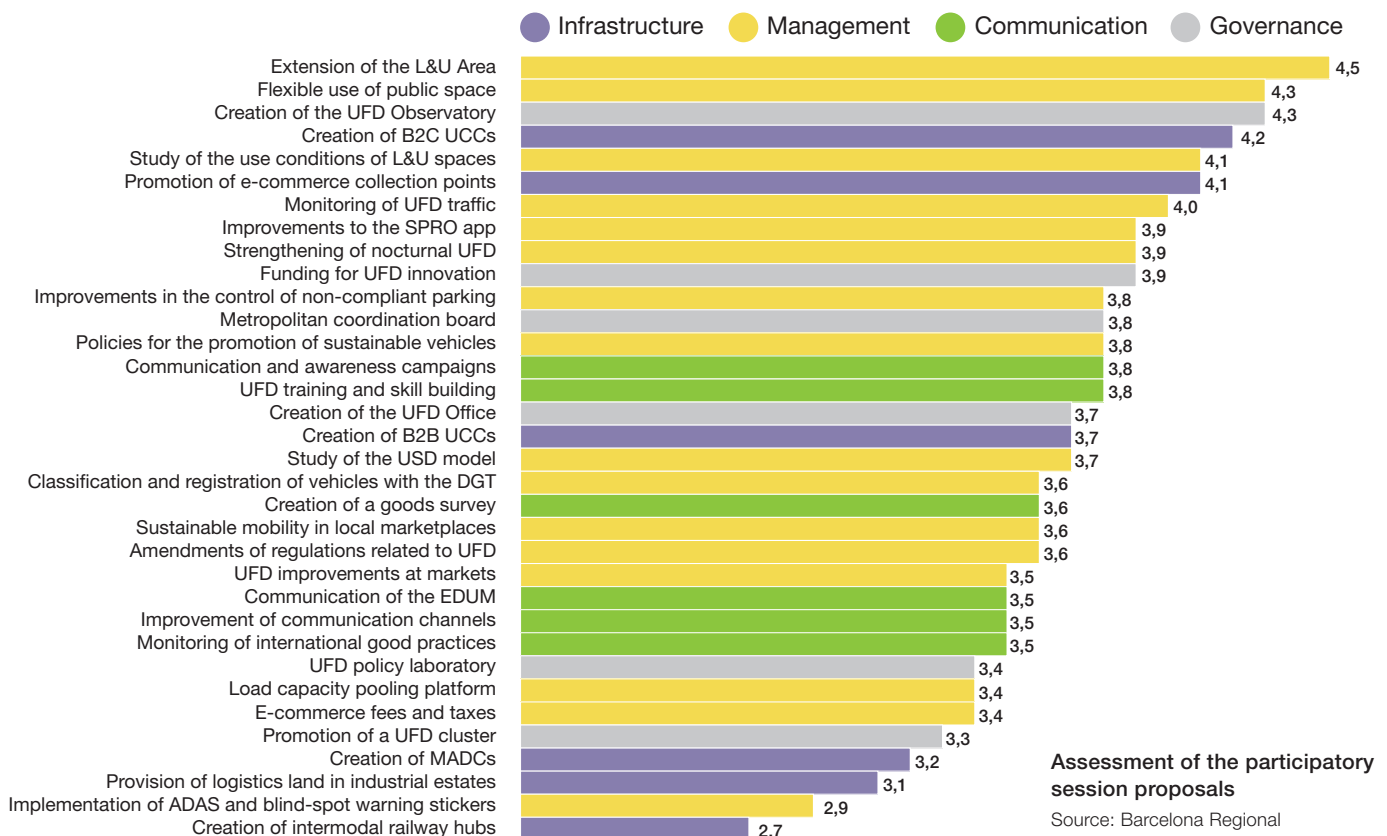
These action proposals were submitted to the stakeholders in a joint final session, in which they were rated from 1 (low priority) to 5 (maximum priority), and there was also the option of making final contributions.

The average score of the measures was 3.7 out of 5, validating the strategy's catalogue of proposals and strengthening its consistency and assertiveness in relation to the complex world of UFD. The scoring of each one of the proposals, moreover, also provides a reference order of prioritization.

In this prioritization, the highest-rated measures vary in nature, although those related to the management of the space on the public thoroughfare (extension of the L&U Area, flexibilization and study of the use conditions of L&U spaces, SPRO improvements, etc.) stood out. It should also be stated that B2C infrastructure proposals were rated significantly higher than those referring to B2B.

With regard to the final suggestions put forward by the stakeholders, there were numerous requests for a meeting to tackle certain aspects of the proposals, in addition to offers of participation in the definition of certain strategies to be developed.

The closure of the EDUM participatory process marks the end of the city strategy definition phase, consolidating the unanimous will of the various stakeholders in the sector to make progress towards a better UFD model. At the same time, it represents approval for the start of the implementation of the proposals, and the launch of the body that is to be responsible for promoting, coordinating and supervising this implementation, the UFD Office.



5. Prioritization and monitoring

With a view to making the EDUM an effective roadmap, a schedule has been established to prioritize the proposals with the agents involved. Monitoring indicators have also been defined to assess the roll-out of the measures through to 2030, and the UFD Office has been created.

Although the EDUM's impact on the city as a whole will be difficult to measure, sixteen indicators linked to the strategy's key objectives have been identified to monitor its implementation in the coming years, considering timeframes culminating in 2027 and 2030.

Finally, Barcelona City Council has created the UFD Office. The aim is for this office to serve as the point of reference for the management of UFD in the city, as well as to coordinate and drive the implementation and monitoring of the strategy. The UFD Office will also liaise with the private sector and coordinate the government's internal tasks in relation to UFD.



Timeframes and stakeholders involved

	Proposals	Timeframe	Stakeholders involved
Necessary infrastructure	A1 Promotion of e-commerce collection points	Short-term	DSM, B:SM, logistics operators, e-commerce retailers
	A2 Creation of B2C UCCs	Medium-term	DSM, B:SM, Barcelona Activa, logistics operators, e-commerce retailers
	A3 Creation of B2B UCCs	Long-term	DSM, distributors, retailer associations
	A4 Creation of MADCs	Medium-term	DSM, AMB, Mercabarna, CZF, IMMB, logistics operators, distributors
	A5 Creation of intermodal railway hubs	Long-term	DSM, Adif, Renfe, TMB, FGC
	A6 Provision of logistics land in industrial estates	Permanent	AMB, Manager's Office for Town Planning
Management instruments	B1 Flexible use of public space	Permanent	DSM, B:SM
	B2 Study of the use conditions of L&U spaces	Short-term	DSM, B:SM, BR, UFD stakeholders
	B3 Study of the USD model	Short-term	DSM, B:SM, BR, USD stakeholders
	B4 Strengthening of nocturnal UFD	Short-term	DSM
	B5 Improvements in the control of non-compliant parking	Short-term	B:SM, GUB
	B6 Extension of the L&U Area	Long-term	DSM, AMB, B:SM, Barcelona metropolitan area councils
	B7 Improvements to the SPRO app	Permanent	DSM, B:SM, AMB
	B8 UFD improvements at markets	Medium-term	IMMB, B:SM, retailer associations
	B9 Sustainable mobility in local marketplaces	Short-term	IMMB, retailer associations, logistics operators
	B10 Load capacity pooling platform	Long-term	DSM, AMB, B:SM, private stakeholders, logistics operators
	B11 Monitoring of UFD traffic	Permanent	DSM, AMB, DGT, BR
	B12 Classification and registration of vehicles with the DGT	Short-term	DSM, AMB, B:SM, BR
	B13 Implementation of ADAS and blind-spot warning stickers	Short-term	DSM, DGT, GUB
	B14 Policies for the promotion of sustainable vehicles	Permanent	DSM, Manager's Office for the Environment and Urban Services
	B15 Amendments of regulations related to UFD	Short-term	DSM, B:SM, Manager's Office for Town Planning, BR
	B16 E-commerce fees and taxes	Short-term	DSM, Tax Agency
Communication, knowledge and innovation	C1 Improvement of communication channels	Permanent	DSM
	C2 Communication of the EDUM	Short-term	DSM, Communication (Barcelona City Council)
	C3 Communication and awareness campaigns	Short-term	DSM, Communication (Barcelona City Council), AMB, ATM, Generalitat
	C4 UFD training and skill building	Medium-term	DSM, AMB, Barcelona Activa
	C5 Monitoring of international good practices	Permanent	DSM, BR, academia
	C6 Creation of a goods survey	Medium-term	DSM, AMB, ATM, BR
Governance	D1 Creation of the UFD Office	Permanent	DSM
	D2 Creation of the UFD Observatory	Permanent	DSM, BR, B:SM, AMB, ATM
	D3 UFD policy laboratory	Permanent	DSM, B:SM
	D4 Metropolitan coordination board	Long-term	DSM, AMB, Barcelona metropolitan area councils
	D5 Funding for UFD innovation	Permanent	DSM, Europeans funds, C40, KIC mobility
	D6 Promotion of a UFD cluster	Medium-term	DSM, AMB, ATM, logistics operators, distributors

Adif: Administrador de Infraestructuras Ferroviarias; **AMB:** Àrea Metropolitana de Barcelona; **ATM:** Autoritat del Transport Metropolità; **BR:** Barcelona Regional; **B:SM:** Barcelona de Serveis Municipals; **CZF:** Consorci de la Zona Franca; **DGT:** Direcció General de Tràfic; **DSM:** Direcció de Serveis de Mobilitat; **FGC:** Ferrocarrils de la Generalitat de Catalunya; **GUB:** Guàrdia Urbana de Barcelona; **IMMB:** Institut Municipal de Mercats de Barcelona; **Renfe:** Red Nacional de Ferrocarrils Españoles; and **TMB:** Transports Metropolitans de Barcelona.

Monitoring indicators

The sixteen indicators that will assess the main objectives of the EDUM and monitor its implementation in the coming years are listed below.

	Current	2027	2030	Units	
O1	Enhance the flexibility of parking availability and improve management of on-street parking				
	Indicator 1. Hours per day provided for L&U parking in regulated spaces	123,000	133,000	148,000	h/day
O2	Enable and foster the creation of spaces off the public space				
	Indicator 2. Percentage of deliveries to homes and offices via UCCs	2.8	15	33	%
	Indicator 3. Percentage of online purchases delivered via collection points	14	24	40	%
O3	Foster the greening of UFD fleets				
	Indicator 4. Emissions of CO ₂ -eq associated with UFD	225,735	180,588	112,868	t/year
	Indicator 5. Emissions of PM ₁₀ associated with UFD	62.3	50	31.2	t/year
	Indicator 6. Emissions of NO _x associated with UFD	961.4	769	480.7	t/year
O4	Promote cycle logistics deliveries and more environmentally efficient logistics solutions				
	Indicator 7. Number of cargo bikes registered in the city	81	369	800	units
	Indicator 8. Number of nocturnal UFD points	72	243	500	units
	Indicator 9. Annual tonnes of goods carried via rail for UFD	0	24,800	62,000	t
	Indicator 10. Number of load pooling platforms	0	1	1	units
O5	Make progress towards Vision Zero accidents in the accident rate related to UFD				
	Indicator 11. Fatalities in accidents involving vans and lorries	3	0	0	fatalities
	Indicator 12. Severe injuries in accidents involving vans and lorries	23	0	0	severe injuries
O6	Optimize the use of L&U areas and minimize non-compliant parking in UFD by facilitating the activity's compatibility with everyday life				
	Indicator 13. Average number of commercial vehicles illegally parked by length of road	1.188	0.903	0.475	vehicles/km of road
O7	Guarantee and foster the existence of logistics land on the metropolitan scale				
	Indicator 14. Hectares of industrial land	4,800	4,800	4,800	ha
O8	Make progress in the regulatory standardization and management of UFD on the metropolitan scale				
	Indicator 15. Number of metropolitan municipalities that use SPRO	10	17	27	units
	Indicator 16. Percentage of spaces in Barcelona regulated by SPRO with respect to the total	85	100	100	%
O9	<i>Does not require monitoring indicators</i>				
O10	<i>Does not require monitoring indicators</i>				

Barcelona City Council UFD Office

In order to foster the implementation of the strategy, Barcelona City Council has created the UFD Office, which falls under the authority of the Directorate for Mobility Services (DSM). Its functions are described below.

Liaison with private-sector stakeholders

The UFD Office must enable the establishment of swift, efficient and direct communication between government agencies and the private agents involved in UFD. The functions assigned in this respect are as follows:

- Liaising with stakeholders related to UFD in the first instance.
- Help the various urban logistics agents to solve their operational doubts in relation to UFD and advise them on the processing of paperwork.
- Collect any requests and proposals that may be submitted, assess them internally and issue responses.
- Provide guidance to private initiatives.
- Management of the UFD Portal on the municipal website.

Coordination of its organization both internally and between government agencies

The UFD Office must operate as a cross-cutting coordination platform between departments and government agencies with competence in the area of urban freight distribution. In this regard, the tasks to be carried out are as follows:

- Design and discussion of proposals with local public bodies for all proposals that have a more direct impact on the public space: Barcelona de Serveis Municipals (B:SM), the Barcelona Guàrdia Urbana (GUB) police force, the Directorate for Mobility Services (DSM), etc.
- Creation of working groups with Spanish Government bodies: Directorate-General for Traffic (DGT), the Ministry for the Ecological Transition and the Demographic Challenge, etc.
- Collaboration and coordination with supramunicipal administrations for the implementation of proposals (Generalitat de Catalunya, AMB, ATM, etc.).
- Interdepartmental coordination for all cross-cutting initiatives within the City Council (Ecology, Urbanism, Infrastructures and Mobility Area; Economy, Employment, Competitiveness and Taxation Area, etc.).
- Collaboration with the Municipal Institute of Markets and Mercabarna for the implementation of proposals related to B2B.

Driving the strategy forward

Finally, the UFD Office is to be the body responsible for the implementation and monitoring of the EDUM's proposals. In this regard, the office will be responsible for:

- Fostering the implementation of the EDUM 2023-2030 by coordinating both the actions proposed in it and those developed by other stakeholders.
- Calling and coordinating meetings of the working groups for the monitoring of the EDUM and the promotion of projects.
- Monitoring the execution indicators of the EDUM, assessing the implementation of the proposals and proposing amendments.
- Fostering regulatory proposals and new projects related to UFD.

The publication of this document coincides with the soft opening of the UFD Office, which, despite being in its early stages, is already equipped with a fully trained staff and a recently opened communication channel, the email address **oficinamercaderies@bcn.cat**.

Glossary

ADAS	Advanced driver-assistance system. Electronic systems that both assist with driving and improve vehicle safety. Their main function is to prevent fatalities and injuries by reducing the number of accidents or minimizing their impact.
Alternative fuels	Fuels that can replace petrol and diesel and are from renewable sources or generate less pollution. They include electrical energy, certain gaseous fuels and biofuels.
areaDUM	The app that was used to manage Barcelona's L&U areas until 2020, when it was replaced with the current SPRO app.
B2B	Business-to-business. It refers to the distribution of goods to establishments.
B2C	Business-to-consumer. It refers to the distribution of goods to end consumers.
Click & Collect	A service that allows the user to buy a product online and then collect it from the establishment.
CNG	Compressed natural gas. An alternative fuel mainly made up of methane.
Collection point	All the infrastructure in the city used for the collection of products purchased online. It includes convenience points (lockers, local business establishments and logistics operators' offices) and collection from the shop itself (Click & Collect).
Convenience point	Spaces placed at the disposal of online retailers by logistics operators to allow customers to collect their online purchases. They may be lockers, local business establishments or the logistics operators' offices.
EDUM	Municipal Strategy on Urban Freight Distribution, referred to by its Catalan acronym.
L&U	Loading and unloading. It refers to a delivery driver supplying goods to or collecting goods from an establishment.
L&U Area	Overall term for the loading and unloading spaces in the regulated parking area.
Last mile	The last step in the B2C supply chain, in which the product is transported directly to its final destination in the urban area.
LEZ	Low emissions zone. An area of more than 95 km ² which includes Barcelona and the municipalities adjacent to the ring roads, where traffic of the most polluting vehicles is gradually being restricted.
LH	Logistics hub. Transport hub that receives goods for subsequent management and shipment or distribution. It is a major logistics platform for goods vehicles (lorries) with an extensive warehouse area. In Catalonia, logistics hubs are managed by CIMALSA, and each platform is home to various logistics, haulage and forwarding companies.
LPG	Liquefied petroleum gas. An alternative fuel mainly made up of butane and propane.
MADC	Municipal access distribution centre. It refers to major consolidation centres located close to urban settings, generally in industrial estates or economic activity areas in the outskirts.
Marketplace	A digital department store where retailers offer their products and services to users.
Multiuse lane	Sections of road that, during certain time slots, become spaces for the loading and unloading of goods.
Multiuse space	Regulated surface parking spaces that in certain time slots become spaces for the loading and unloading of goods.
Nocturnal UFD	Urban freight distribution carried out at night (from 9 pm to 7 am). It requires a permit.
Parcel locker	A self-service locker used as a collection point for goods bought online. The parcels are delivered by logistics operators and the customer collects them within a given timeframe. In some cases it is also possible to send and return parcels via these lockers.
PMV	Personal mobility vehicle. A one- or two-wheeled single-person vehicle propelled solely by an electric motor at speeds of between 6 and 25 km/h. They can only be equipped with a seat or saddle if they are equipped with a self-balancing system.
PRM	Person with reduced mobility. People who have a disability certificate and, therefore, can use parking spaces set aside for PRMs and also L&U areas.
Regulated area	Also known as the regulated parking area. A comprehensive planning system for street parking in which all the parking space in the regulation area is distributed according to priorities and regulated by means of the rules and fees included in Fiscal Ordinance 3.12. The types of spaces are: blue (visitors), green (residents and visitors), residents only, L&U, motorcycles, coaches and others (special bookings, etc.).
SPRO	A mobile app used to manage loading and unloading operations in the regulated parking area. It covers Barcelona and nine municipalities in the metropolitan area.
Traditional fuels	Oil-based fuels, generally petrol and diesel.
UCC	Urban consolidation centre. Spaces that are used for the reception, consolidation and distribution of goods for end consumers or shops and businesses located in an urban area.
UFD	Urban freight distribution. It encompasses all activities related to the delivery and collection of goods, as well as certain types of services, in cities.
USD	Urban service distribution. It refers to all activities that provide services in the city that could include urban freight distribution in a complementary manner.
VRU	Vulnerable road user. People who use bicycles, scooters or similar means to get around and as such are at greater risk of being involved in a road traffic accident than other users of the public space and also more vulnerable to driver error or negligence.

