



EXPLORING THE INTERACTION BETWEEN URBAN FREIGHT AND LAND USE

PART 2: INDOOR SPACE

MAR 2023 // WRITTEN BY LORENA AXINTE & ROSA VAN GESTEL

Traditionally, logistics functions have been separated from city centres and residential neighbourhoods. However, various ongoing trends – such as an increase in home deliveries, or policies to reduce motorised traffic in city centres – are causing changes in the way logistics are organised. These changes affect both the vehicles used, and the spaces needed to support logistics operations. More than two decades ago, academics warned that e-commerce – as part of ‘tomorrow’s cyber city’ – will exert strong land use influences (Cervero, 2000, as cited in Pettersson et al., 2016). However, unlike consumer demands and technological innovations, urban infrastructure tends to be much less flexible, leading to conflicts between the planned use of space (as originally designed) and its actual use.

In a [previous insight article](#) we explored the interaction between urban freight transport and open space, which is often public. In this second instalment, we focus on indoor spaces to discuss the connections between different urban set-ups (e.g., inner and outer neighbourhoods, dense and sparsely populated areas) and various characteristics of logistics facilities (e.g., size, function such as mono use and mixed use, etc.). We first take a macro approach for locational patterns, to discuss the coexistence of logistics both in urban cores and in peripheral areas. We then focus on specific logistics facilities to illustrate how the real estate market is evolving. We explore various new trends, both those supported by public authorities (e.g., logistics hotels), and unsanctioned (e.g., dark stores), before outlining the implications for initiatives such as URBANIZED.

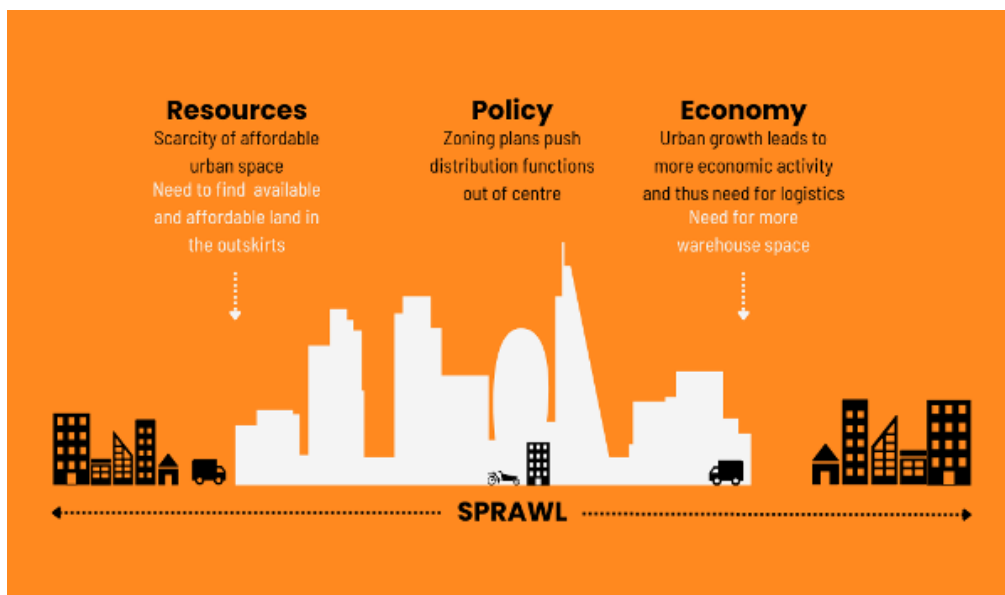
The intersection of space and logistics – ongoing developments

Urban space is used in many ways, ranging from residential to commercial functions, and from greenery to space for mobility. Growing urban populations and new claims for urban space challenge cities’ ability to accommodate these different uses while maintaining liveable urban environments. A record demand for logistics space in the past few years (McLaughlin, 2022) is making it difficult for logistics stakeholders to navigate through the scarcity of urban land. There are various ways in which the logistics sector responds to the increasing spatial need for its operations.

Logistics sprawl

The scarcity of urban space drives overall real estate prices to increase, pushing logistics stakeholders to search for available and affordable land outside of central areas. Locating in suburban areas simultaneously enables the development of large warehouses to benefit from economies of scale (Buldeo Rai, 2022). This tendency of logistics activities moving further away from urban centres is referred to as logistics sprawl.

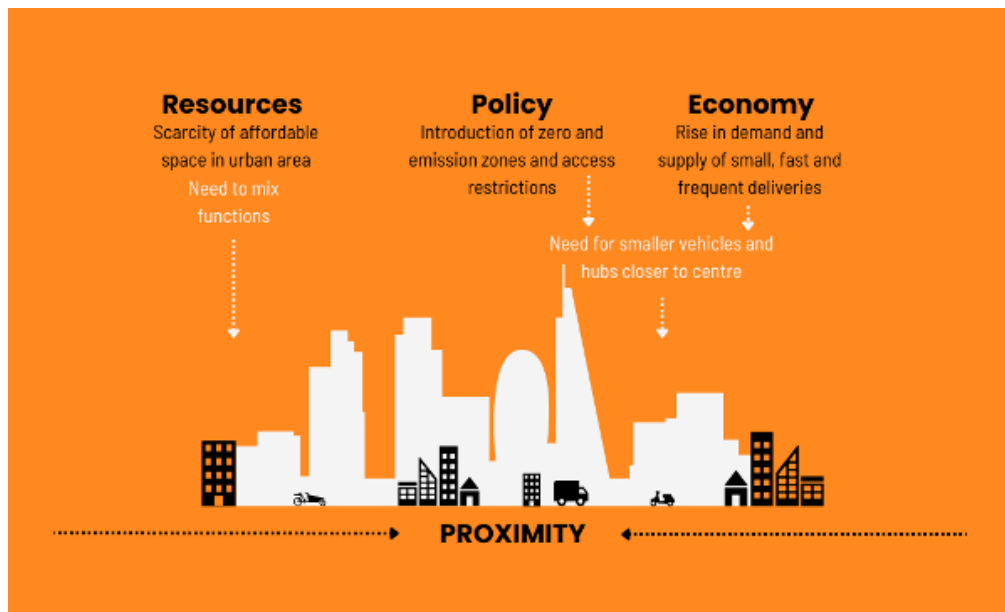
It is akin to the trend of urban sprawl in which urban functions geographically expand, often as low-density and single-use developments. Similarly to urban sprawl, the pattern of logistics facilities being developed in cities' outskirts induces the need for more vehicle kilometres travelled as distances towards destinations increase. Thus, as the competition for urban land use may drive logistics facilities out of – often high demand – urban centres, negative externalities such as CO₂ emissions and local air pollutants may increase (Sakai et al., 2019).



Proximity logistics

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Nevertheless, governments often favour suburban areas as locations for logistics facilities, as this type of land use often brings low contribution to tax revenues (Xiao et al., 2021), and may generate negative externalities in the denser urban cores (Buldeo Rai et al., 2022). To compensate for the larger distances between suburban areas and end consumers, the logistics facilities are often located in highly accessible areas, e.g., close to highways (Heitz et al., 2017).



Factors influencing these trends

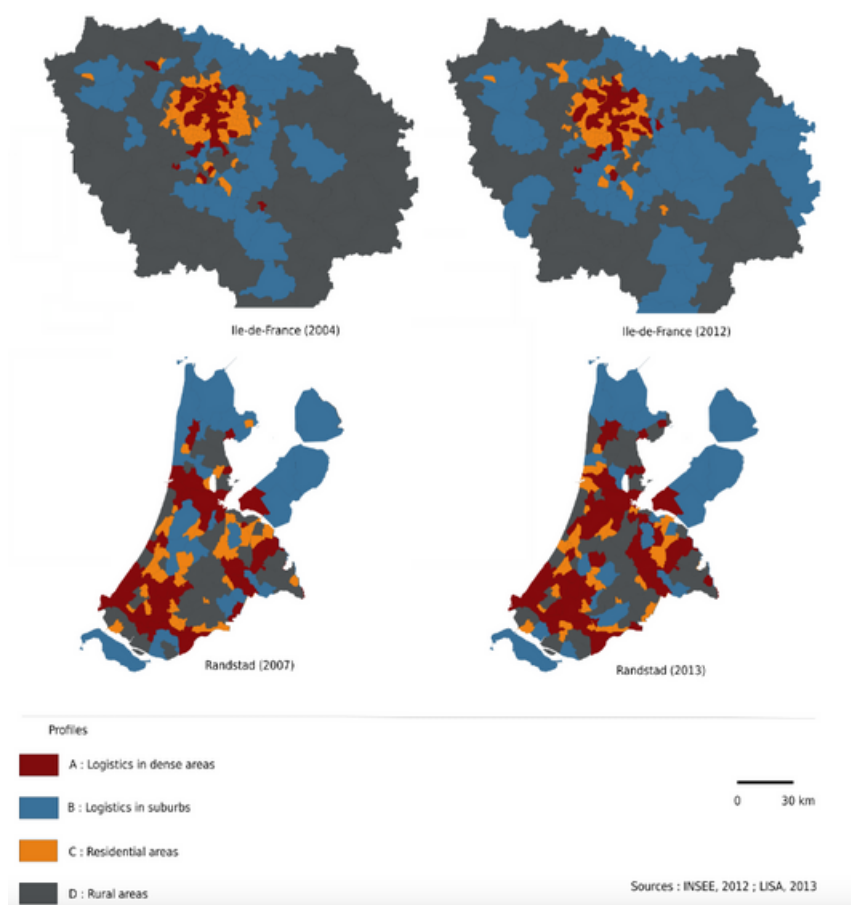
The concentration and de-concentration trends of logistics facilities around urban centres are both visible, sometimes even within one metropolitan area (Heitz et al., 2017). Several factors influence the spatial configuration of logistics activities, out of which three seem to be playing a key role (Xiao et al., 2021):

- Economic and industrial factors (e.g., innovations in technology, new business models, changes in consumer behaviour, the rise of the on-demand economy and e-commerce, etc.)
- Policies and regulations (e.g., zoning plans, the introduction of Urban Vehicle Access Restrictions (UVARs), etc.)
- Resource endowments (e.g., the availability of resources such as land, labour, and transport accessibility)

The influence of each factor on logistics land use differs per context. Examining five large cities around the world, Buldeo Rai et al. (2022) state that all case studies show the trend of proximity logistics, mostly as a result of economic developments.

The land use scarcity as well as high regulation of urban developments would not theoretically drive logistics facilities closer to the city centre. However, the rise of e-commerce and changing demand are strong determinants that induce proximity logistics. At the same time, Heitz et al. (2017) conclude that differences in logistics sprawl and proximity can be explained by the intrinsic urban structure and policies. For example, the monocentric structure of metropolitan Paris with larger transport nodes in its surrounding peripheral areas, pulls logistics activities towards these more accessible suburbs. In the Randstad, a Dutch metropolitan area with multiple urban centres, connecting roads are often highly congested, reducing the accessibility of suburban zones. As accessibility is highly important for logistics activities, locating in less accessible areas could lead to increased operational costs. The polycentric structure may therefore be the reason why logistics facilities are more centred in the Randstad, according to Heitz et al. (2017). Additionally, the study acknowledges the influence of land use planning policies in the Netherlands that focus on mitigating urban sprawl in order to preserve the “Groene Hart” – a natural area in the Randstad.

It seems evident that although some factors may have stronger impacts than others, it is often a combination of those that determine the spatial configuration of logistics facilities in a given context, as illustrated in the visuals above.



Future prospects

Matching the ever-fluctuating economy, policy developments and available resources for logistics with urban land use requires careful organisation. Thus, urban planners and logistics stakeholders need to think about the (rather unpredictable) future of urban logistics and development of the aforementioned trends, especially when making long-term decisions (e.g., regarding zoning, or choosing hub locations).

A study commissioned by the city of Rotterdam (BCI, 2021), expects an increase of city logistics hubs, in parallel with a continued rise of micro hubs within the city. The authors also anticipate an increase in the development of large e-fulfilment centres operating on city level instead of the current regional level. This implies that the trend of proximity logistics is expected to continue in the coming 5-10 years in the city of Rotterdam. Similarly, Paul Dijkstra, CFO at CTP Netherlands, owner of the CTPark Amsterdam City, foresees the combination of these larger city hubs with smaller facilities close to the city centre as the way forward for future urban logistics. Despite the occurrence of logistics sprawl in Paris, Heitz et al. (2017) note that the city has recently started to take measures to promote logistics facilities in or near the city centre.

With the continued development of proximity logistics, BCI (2021) recommends that public authorities focus on carefully integrating logistics functions into the dense and mixed-use city. The need for combining logistics with other urban functions is identified as inevitable according to a future scenario analysis for logistics in Rotterdam (PosadMaxwan et al., 2022). Proximity logistics has also been forecasted outside of Europe, as the Global Head of Research at Prologis states: *"The future of logistics real estate is urban"* (McLaughlin, 2022, as cited in Hirsch, 2022).

Amount and types of real estate used for logistics in cities

Besides the anecdotal evidence for increased land use for logistics, the European Logistics Occupier Survey 2022 (CBRE, 2022) shows that 75% of businesses surveyed are expecting to grow their logistics spatial footprint in the next three years. Companies are increasingly seeking locations outside traditional logistics hubs, with 32% making urban locations a high priority. This seems more important for omnichannel retailers, 3PLs, online retailers and post and parcel. In contrast, traditional retailers and companies in the manufacturing sector are not interested in expanding their logistics footprints in urban locations.

The same survey shows that the greatest challenges for logistics occupiers are cost escalation (primarily in energy and labour), as well as labour skills and shortages. Unlike in previous years, environmental concerns are intensifying, mostly sparked by new regulations introduced by local and national governments. Regarding real estate specifically, logistics occupiers face challenges related to rent increases and space supply issues, as well as location, suitability, and obsolescence of existing facilities. Generally, the five most decisive factors when choosing a location are availability of space, availability of suitable labour force, quality of business infrastructure, environmental quality (induced by new regulations and a mindset shift for logistics occupiers), and real estate cost. When selecting a building, the real estate cost, the building design, and the lease options are critical. Sustainability concerns (e.g., ratings and certificates) have also doubled compared to two years ago. In fact, 63% of respondents would

be willing to pay a premium over market rate for a certified green facility. Still, the survey also shows that although 78% of respondents have a net zero carbon target, only 17% have a dedicated budget for associated actions (e.g., alternative energy use, rainwater capture, electric charging points for an electrified fleet, LED lighting).

The logistics real estate market provides various typologies of logistics facilities, and there is no consensus among academics and practitioners on a unified way of differentiating between them (e.g., using factors such as size, location, functions, etc.). One of the most straightforward typologies is presented by the ULaaDS project, which distinguishes between; 1) large-scale hubs, 2) urban consolidation centres, 3) micro-hubs and mobile depots, and 4) collection and delivery points. The differentiating criteria include size, location, geographic reach, inbound and outbound vehicles, material handling and handling level, and storage.

Similarly, Sogaris – a well-known logistics real estate developer from Paris – differentiates between larger sites called urban logistics platforms (between 20.000 - 50.000 m²), medium sites on the outskirts called urban distribution spaces (1000 - 10.000 m²) and smaller ones called urban delivery spaces (up to 1000 m²) in the centre. This urban-regional network of logistics facilities is key for the operation of micro hubs, which can be a good solution to reduce heavy traffic in city centres, according to Damien Zachert – development manager at Sogaris.



There are also typologies determined by certain characteristics (e.g., facilities for e-commerce or supporting cycle-logistics). For instance, a study commissioned by Rotterdam Municipality, TNO and BCI (2022) distinguished between dedicated and multi-client hubs, which are then further split into 11 hub types, mostly based on the sector and

and activity performed (e.g., parcel sorting centre, regional hub for online groceries, etc.). This study estimates that of the total area currently used for hubs in Rotterdam and the surrounding region (50.3ha), only 5% is dedicated to multi-client hubs that allow bundling flows of goods from multiple shippers. Considering the introduction of the Zero Emission Zone and the increase in logistics activities, multi-client hubs might require 4-6 times more space by 2030, putting additional pressure on the city's resources. The issue is not only caused by limited available space for new developments, but rather the competition with other functions with significantly higher real estate value (e.g., commercial, residential, etc.). Nonetheless, there are opportunities to use existing vacant logistics real estate, encouraging the development of multi-client hubs. Due to relatively small surfaces in Rotterdam, only some types of smaller or more flexible businesses might be suitable. There is also the possibility of brownfield redevelopment into logistics real estate, yet the associated costs of demolition or reconversion can often be too high for developers (and their potential clients).

When logistics and other land uses collide

It is becoming increasingly common for consumers to receive food and other groceries within minutes of ordering, mostly targeting spontaneous and emergency purchases (de Boer et al., 2022). The rise in quick commerce requires proximity to high demand areas, enabling flash deliverers to bring goods to the consumer in under 30 minutes. Thus, small logistics facilities have continued to appear in urban centres over the last 10 years.

The rapid increase in quick commerce deliveries can cause friction when it meets the less flexible urban infrastructure and policies. Although the small logistics facilities support the fast delivery of goods with small and zero emission vehicles such as (e-)cargo bikes and scooters, the way they are perceived by citizens and public authorities is controversial. This is often based on the image that was set during the period in which quick commerce deliverers rapidly entered the market a few years ago. The quick commerce logistics facilities – often called dark stores in media due to their sealed windows and restricted access – were associated with nuisance as they mostly operate in residential or mixed-use areas. According to Jos Streng, working at the traffic and transport department for the city of Rotterdam, the city received complaints about dark stores, often concerning either traffic safety or noise (e.g., music or loud talking near the stores in residential areas). However, this type of behaviour is undesirable from any public space user, and not necessarily limited to or resulting from dark stores. Local governments must therefore be careful when developing regulations specifically for such quick commerce facilities, as the trend observed in groceries may well be adopted in other segments (e.g., restaurants).

In the Netherlands, the so-called *dark stores* are often registered as regular stores, while they actually function mostly as distribution centres. As there was no requirement for a permit in Amsterdam in the past, many stores have appeared in the city in previous years, overwhelming public authorities. Due to complaints about nuisance, the city tried to regulate this development by forcing the quick commerce facilities to close down, on the basis that their activities did not comply with the current zoning plan (Gemeente Amsterdam, 2022). The fast-delivery company Getir responded to this by combining one of their facilities with a regular supermarket, but after investigation by the city,

Amsterdam concluded that Getir's main activity was still focused on rapid deliveries. If the company would not close one of its locations, they would have to pay a penalty of 20.000 euros. In the meantime, the city of Amsterdam developed a plan for *dark stores*, clarifying the rules for where these facilities are (not) allowed, guided by a decision framework. Criteria includes, for instance, having indoor space for parking and staff, and no sealed windows. While preparing this plan during 2022, new *dark stores* were unable to open in Amsterdam.

Regulation for the location of quick commerce facilities has now been introduced in many cities, supporting a better match between the development of quick commerce and a pleasant living environment. However, it is not only the public authorities responding to their citizens' needs; quick commerce companies have already made changes in their operations to align better with their neighbours (e.g., residents, other businesses, etc.). Getir, for instance, already stopped taping their windows one year ago – in fact, all Getir stores in the Netherlands now showcase work from local artists in their windows (see image below). Additionally, due to owning distribution centres and trucks that supply their facilities, Getir can align the times they supply their stores to the residents' preference. According to Sandro Slijepčević, manager of public affairs at Getir, it would be helpful if cities re-evaluated the current way in which quick commerce facilities fit into local neighbourhoods and made decisions based on that. While in most cities the process of obtaining a permit is clear, based on a set of defined criteria, Getir found that in Amsterdam, the process is more ambiguous. Despite their decision framework, the city of Amsterdam requires i) an additional unanimous agreement by four municipal departments, and ii) approval from the district-level political authority. These are required even if all criteria are met in order to provide a permit in mixed areas, which is crucial for quick commerce companies. From Sandro Slijepčević's perspective, allowing quick commerce facilities in Amsterdam seems to remain an arbitrary decision rather than a fact-based one. For public authorities to be able to regulate the development of logistics hubs within cities, evaluations should be very clear and measurable, as their decisions affect both citizens and businesses.



Getir "art store" in Amsterdam (Photo credit: Getir)

Innovations in real estate logistics

It's not only the logistics operators, but also the logistics real estate market that has had to adapt to various changes in demand and other ongoing trends. An innovative example of such adaptation is the logistics hotel concept, developed by Sogaris. The first of its kind, Chapelle International, was inaugurated in 2018, offering a mixed-use facility integrated in Paris' 18th district. The land was owned by SNCF Espaces Ferroviaires and sold to Sogaris after a project call. The city of Paris advised on regulations to ensure the land could accommodate urban logistics activities. Currently, the hotel hosts DPD France, Metro (cash and carry supermarket), a data centre for the city of Paris, some neighbourhood facilities (e.g., fitness club, restaurant, etc.), as well as the district's heating plant. The green roof allows for urban farming, bringing environmental benefits to the surrounding area. Some of the most important characteristics for logistics hotels are the accessibility by various means of transport (both for people and for goods), and the potential for mixed use. While urban logistics remain the primary function (60%), the other uses bring economic benefits (e.g., raising the price of real estate), as well as social ones, increasing the social acceptability of a logistics facility in a rather central location. Sogaris is currently developing its second logistics hotel within the future Bercy-Charenton neighbourhood, which will integrate residential, commercial, office and logistics functions. Five hectares out of the total 80 will provide a multimodal logistics hotel with access to roads, trains, and trams. Damien Zachert believes that such mixed-use developments represent the future of logistics real estate, as cities are discovering their advantages compared with traditional big box logistics facilities.

Cubework provides another example of how logistics real estate is adapting to modern demands. Its 50 warehouses are distributed across 17 states in the US, offering both warehouse and office space. Target customers include internet sellers, small business owners and entrepreneurs, who prefer on-demand, flexible lease conditions. The warehouse space can be adapted, ranging between 45 – 60.000 m², and renters have access to amenities such as loading docks or forklift rentals. Besides, Cubework positions itself as a creative, collaborative workspace, hosting events and social gatherings, while also offering, in some cases, access to gyms, business suites and conference rooms.

The reconversion of a former underground car park in Paris into an urban delivery space of 1600 m² in Grenier Saint-Lazare is an additional innovative example of logistics facilities. The concept was developed by Sogaris and a group of partners for a call for projects called *Reinventing Paris – The underside of Paris*. The inverted building will serve the local shopkeepers and inhabitants, offering storage space for commercial goods and personal belongings. In addition, the site will also host a cycle logistics micro hub, aiming to facilitate transport by cargo bike.



Impression of the underground logistics facility in Grenier Saint-Lazare (Photo credit: Sogaris)

CTPark Amsterdam City is another example of the market's adaptation to changing priorities, responding to Amsterdam's goals for zero emission city logistics from 2025. The building generates its own energy via solar and wind, and aims to set an example for sustainable logistics facilities. Operated and owned by CTP, it offers more than 12,5ha for storage, last mile distribution and office space, spread over several floors. The advantages for tenants include close location to Amsterdam's city centre, good water and road connections (including boat docks, a bike path which would allow cargo bike deliveries, and connections to public transport), fast electric charging points, and the possibility of bundling activities and goods with other tenants. In fact, Paul Dijkstra, CFO at CTP Netherlands, mentioned that the selection criteria for tenants includes the potential for bundling. The aim is to reduce the number of vehicles and trips going into the city centre, which can be difficult in practice due to already standardised logistics processes. To overcome this, CTP is holding discussions with leaders of various companies, ensuring that change is initiated at a higher strategic level. Among the sectors targeted, CTP is looking at construction companies (as they might already be used to waterway logistics), HORECA, retail and 3PLs.

The contribution of URBANIZED in changing urban environments

These developments and trends in logistics real estate require innovative vehicles which can adapt to various contexts. The urban-sized electric light commercial vehicle (e-LCV) developed in the URBANIZED project enables zero-emission deliveries in urban areas with varying spatial structures of logistics facilities. The modular cargo body can be easily swapped between a compartmentalised cargo body solution, a closed van box, and a refrigerated body, also possessing an e-hand-truck auxiliary that facilitates door-to-door deliveries. This offers flexibility to logistics operators that need to match their operations with the future of urban logistics. Due to its size and being electrically powered, the URBANIZED vehicle fits with the urban centres that are increasingly introducing zero- or low-emission zones. At the same time, unlike smaller vehicles such as cargo bikes, the URBANIZED vehicle can carry more weight and cover larger distances, making the design functional both in contexts of logistics sprawl and proximity.

Contributions

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