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Nicolas Raimbault, Adeline Heitz

► **To cite this version:**

Nicolas Raimbault, Adeline Heitz. Logistics Urbanization, Between Real Estate Financialization and the Rise of Logistics Urban Planning. Natacha Aveline-Dubach. Globalization and Dynamics of Urban Production, 1, Wiley, pp.73 - 103, 2024, 9781789451382. 10.1002/9781394257492.ch4 . hal-04756507

HAL Id: hal-04756507

<https://hal.science/hal-04756507v1>

Submitted on 28 Oct 2024

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5. LOGISTICS URBANIZATION, BETWEEN REAL ESTATE FINANCIALIZATION AND THE RISE OF LOGISTICS URBAN PLANNING

NICOLAS RAIMBAULT

ASSOCIATE PROFESSOR AT NANTES UNIVERSITÉ

ADELINE HEITZ

ASSOCIATE PROFESSOR AT THE CONSERVATOIRE NATIONAL DES ARTS ET METIERS

Preprint version of:

Raimbault, N, Heitz, A (2024). “Logistics Urbanization, Between Real Estate Financialization and the Rise of Logistics Urban Planning”, N. Aveline-Dubach (ed.), *Globalization and Dynamics of Urban Production*, London: Wiley-ISTE, pp. 73–103. <https://doi.org/10.1002/9781394257492.ch4>

Introduction

For about half a century, changes in capitalism have led to the globalization, fragmentation and flexibilization of value chains. These are based on a just-in-time organization of production and distribution and, more recently, are being transformed by the explosion of e-commerce. All these dynamics are leading to a marked development of logistics activities (Coe 2014).

Logistics activities organize and manage the flow of goods between the various links in the economic system, from production sites to consumption sites, with the aim of optimizing lead times and costs. Logistics includes both concrete and physical operations, such as transport and warehousing (the preparation of orders and loads in logistics facilities), and more organizational operations of flow management, which are part of "supply chain management"¹.

¹ *Supply chain management* is the management, through and within a network of upstream and downstream organizations, of both relationships and flows of materials, information and resources.

The origins of these flows, and even more so their destinations, correspond to the major metropolitan areas. Indeed, these are the main consumption areas for goods produced on a global scale. Logistics activities are therefore becoming essential services for daily urban life, as the SARS-CoV-2 pandemic and the various containment episodes in 2020 and 2021 have clearly shown (Benvegnù *et al.* 2020).

In order to organize these flows, logistics activities rely on specific locations where goods are unloaded, sorted, grouped into containers, pallets or parcels and reloaded into new vehicles. These places correspond, on the one hand, to large infrastructures emblematic of economic globalization: seaports and airports. On the other hand, it is the warehouses that are the most numerous logistics locations. Some of these warehouses can be called "logistics platforms" or "distribution centers", "hubs", "fulfilment center" or "sorting centers". We will use the term "logistics facility" here to refer to all these logistics buildings and logistics facilities. These buildings are essential for the organization of flows on different scales. Mostly used to supply metropolitan areas, warehouses are concentrated in and around major cities. They are part of the ordinary landscape of urban peripheries. The development of logistics activities has thus resulted in the intense production of urban and (outer-)suburban spaces.

The objective of this chapter is to present the contemporary dynamics of logistics urbanization corresponding to the different activities and logistics sites in urban and suburban areas. Indeed, the supply chain relies on very different logistics spaces: from warehouses of more than 100,000 m² in remote logistics parks to urban logistics facilities for organizing the last mile² with decarbonized vehicles (i.e. Cargo cycles or electric vehicles), via small logistics facilities nestled in former commercial premises, old industrial areas, and even parking lots. These urbanization dynamics will be analyzed as different modalities of articulation between urban planning, economic development policies and real estate market interventions, in relation to the demands of companies in the logistics sector.

Based on the case of the Ile-de-France region, the chapter highlights a phenomenon of dualization in the production of metropolitan logistics spaces (Heitz 2021) and gathers evidence indicating the generalization of this phenomenon in many urban regions. An experimental urban logistics urban planning, supported by public actors, contrasts with the private logics of the development of peripheral business parks where the majority of warehouses are located (Raimbault 2017). Between these two poles, an "intermediate logistics" (Heitz 2021) maintains itself at a low level, often in old industrial zones. In this way, we propose a reflection on the issues of public regulation, in terms of development, urban and regional planning tools and economic development policies, corresponding to the different dynamics of logistics urbanization. These distinctions are necessary in order to consider the contemporary ecological and social issues of logistics activities within urban spaces.

The Île-de-France region has been a prolific field for studies devoted to logistics dynamics (Dablanc and Frémont 2015; Raimbault 2017; Heitz, 2017). Consequently, this region is a privileged source of analysis and examples in this chapter. Often, evidence gathered in other areas helps to put the Ile-de-France results into perspective. We therefore propose elements of comparison with other northern metropolitan areas and, to a lesser extent, with southern

² The last mile is the set of logistic and transport operations that constitute the last link of the logistic chain, materialized by the last journey of the vehicle to deliver the goods from the last warehouse where it was processed to the final customer (company or individual).

metropolitan areas (for a work dedicated to southern logistics -dynamics, see : Mareš and Savy 2021).

Based on a review and perspective of the growing body of work on logistics urbanization, the chapter successively examines the logistics development of (outer-)suburbs, that of urban logistics in the centers and, finally, the persistence of intermediate logistics in the former industrial suburbs.

Logistics development in the outer-suburbs: a dynamic of sprawl and financialization of logistics real estate

The logistical development of major metropolitan areas on a global scale has mainly involved the massive construction of warehouses on the outskirts of metropolitan areas since the 1980s. These warehouses serve the supply of consumer basins, i.e., large metropolises, and the organization of flows of goods on an international and regional scale. Their construction is part of the movement of urban sprawl and suburbanization, which has continued to grow. The multiplication of outer-suburban logistics zones is directly fueled by the financialization of logistics real estate. The issues arising from the urbanization of logistics on the outskirts of cities are those of diffuse urbanization: soil artificialization and difficult access to jobs.

An increase in the number of logistics facilities to supply major cities

The development of logistics activities on a global scale is closely linked to the transition from Fordism to post-Fordism, i.e. the emergence of globalized, flexible and increasingly financialized production systems (Coe 2014). The efficiency of these production systems, which are split up into numerous suppliers and controlled downstream by the principals (make to order), is based on the use of just-in-time production. However, this organization leads to a multiplication of shipments of goods of ever smaller sizes to be processed (Bonacich and Wilson 2008). This organization increases tenfold the logistics services required, both operational (transport and especially good handling) and strategic (supply chain management). Moreover, the generalization of this system of production on a global scale, has led to an increase in the travelled distances and fragmentation of supply chains (Hesse 2008; Cowen, 2014; Danyluk 2018). Downstream, retail and e-commerce industries are expanding their empire in the commercial realm with a business model also based on efficient logistics systems with ever-shorter delivery times. . The goal is to sell a product before paying the supplier, which means that trade logistics must be highly responsive to get suppliers' product onto store shelves or customers' packages quickly (Bonacich and Wilson, 2008). In this way, logistical efficiency becomes crucial for the entire production and distribution system and makes it possible to control the latter from downstream (Hesse, 2008).

The construction of several generations of warehouses has made this "logistics revolution" possible (Bonacich and Wilson 2008). Logistics facilities are multiplying in and around metropolises around the world. A first generation of warehouses was built by manufacturers to optimize supplies and shipments around their production lines. At the same time, mass retail groups are developing their logistics facilities to support the growth of their activities. These groups, like Wall Mart in the United States, are building giant warehouses of several tens of thousands of square meters, and even more than 100,000 square meters for the largest (Bonacich and Wilson 2008). These facilities are often referred to by these groups as "distribution centers" or "hubs". In the latter, four basic operations can be carried out: collection and sorting of goods,

packing and unpacking operations, cross-docking (switching from one mode of transport or type of vehicle to another), and storage. In contrast to traditional warehouses, the objective of mass retail establishments is to limit the storage of goods, in order to quickly deliver to final customers (Cidell 2015).

These shippers³ from manufacturing or retail do not necessarily manage the warehouses they use directly. Indeed, many of them decide to outsource all or part of their logistics activities to a third party logistics or logistics service provider (LSP). The latter then manages the shipper's flows and stocks in its own warehouses. Shippers can also entrust a LSP with the operation of only part of their logistics facilities, while keeping control of their overall supply chain. The meteoric growth of logistics service providers from the 1980s onwards, whose best-known names are Géodis, DHL, XPO logistics, STEF and Kuehne+Nagel, has led to a wave of new warehouse construction.

Finally, during the last two decades, the growth of logistics activities has accelerated further with the explosion of e-commerce globally. According to the United Nations Conference of Trade and Development (UNCTAD), e-commerce grew by 16% between 2017 and 2018 (UNCTAD, 2020). 87% of Britons, 80% of Americans and 73% of Chinese made purchases on the Internet in 2018 (UNCTAD, 2020). In France, according to the Federation of e-commerce and distance selling, e-commerce represents 13.4% of retail trade in 2020, compared to 9.8% in 2019⁴. This growth is due both to companies specializing in e-commerce alone, known as "pure players", and to mass retail groups that are developing an online shopping offer in response. As they develop their activities, pure player e-merchants are building many new warehouses. In fact, according to a Prologis study on the United States, pure players need three times more warehouse space than traditional retailers⁵. Their logistics organizations are based on three types of site. First, the parcels sent to their customers are prepared in very large warehouses. Second, the loading of delivery vehicles to homes and outlets is organized in smaller sites. Finally, the third type of site is the small warehouses set up in the heart of cities for so-called "instant" deliveries and quick commerce

Amazon's warehouses are emblematic of the case for pure players (Blanquart et al. 2019). The company calls its largest warehouses "fulfillment centers." In these, goods from suppliers arrive. Several thousand workers prepare the packages ordered by Amazon's customers. The organization is industrial; these places can be described as "parcel factories" (Gaborieau 2016). These logistics facilities are very large, often over 100,000 square meters. The parcels are then shipped by road to two types of sites: mostly to the warehouses of courier companies⁶ specialized in parcel delivery (such as the Post Office in France) and, sometimes, to Amazon's sites from which the company itself organizes some of its urban deliveries. Courier companies have a network of relatively small logistics facilities, known as "sorting centers" or "parcel's delivery agencies," located near the heart of urban areas. The explosion of e-commerce has been a boon to these LSP, who have therefore expanded their warehouse networks. Amazon's other parcels are delivered directly by the group's logistics subsidiary, Amazon Logistics. To organize these deliveries and offer products with fast

³ The shippers are the owners of the goods. They are mainly industrialists, large-scale distribution companies and e-commerce companies.

⁴ Source: Fevad, 2021: <https://www.fevad.com/bilan-du-e-commerce-en-2020-les-ventes-sur-internet-atteignent-112-milliards-deuros-grace-a-la-digitalisation-acceleree-du-commerce-de-detail/>

⁵ Source: Prologis, "COVID-19 Special Report #6: Accelerated Retail Evolution Could Bolster Demand for Well-Located Logistics Space", 2020: <https://www.prologis.com/logistics-industry-research/covid-19-special-report-6-accelerated-retail-evolution-could-bolster>

⁶ Courier service is the transport activity that handles small shipments (less than three tons), as opposed to full truck loads. The transport of parcels is emblematic of the shipments managed by courier companies.

delivery, the company develop smaller facilities than suburban fulfilment centers. The company calls them "sortation centers", "delivery stations" or "fast delivery hubs", mostly located into dense urban areas close to consumers. Whether they are operated by couriers or by the logistics subsidiaries of e-retailers, these logistics facilities, which also rely on the work of dozens or even hundreds of workers, make it possible to organize home deliveries or pick-up point deliveries by light vehicles.

The logistis sprawl of metropolitan areas on a global scale

The development of logistics activities is one facet of the broader dynamics of metropolization. On the one hand, metropolitan areas, as the main economic hubs, concentrate warehouse construction. On the other, within metropolitan areas, these warehouses are spreading further and further from the centers and thus contributing to the expansion of these areas. This phenomenon is referred as "logistics sprawl" (Frémont & Dablanc, 2015). Indeed, these activities require large buildings located within or near large urban areas. In order to establish a facility, the challenge for the companies concerned is to find large, inexpensive land on which it is possible to construct a large building on the ground floor, with truck access and parking facilities. These lands must offer good accessibility to the heart of the urban area: they must be well connected to freeways, ring roads and, to a lesser extent, to rail, port and airport infrastructures.

The geography of logistics locations therefore follows a relatively similar evolution in most urban regions around the world (Dablanc and Browne 2020), in two distinct phases. In the first phase, from the 1970s to the early 1990s, warehouses were mainly built in the industrial and working-class suburbs inherited from the Fordist period, where large plots of land were available that were relatively well connected to road, rail and even waterway transport networks. Warehouses thus complement existing industrial zones when they do not directly replace manufacturing sites that are closing. The case of the former industrial suburbs of the inner belt of Paris is emblematic⁷. In North America, suburban industrial zones are hosting more and more logistics facilities, as shown by work conducted in Atlanta (Dablanc and Ross, 2012) or in Los Angeles (De Lara 2018). This first stage of logistical urbanization goes largely unnoticed insofar as the construction of a warehouse in an existing industrial zone rarely raises significant political issues. These logistics facilities are now partly obsolete. However, they are still used for industrial and wholesale logistics activities, as in Brussels (Strale, 2020) or Berlin (2008), which brings us back to the issues of intermediate logistics (see section 3).

Then, starting in the 1990s, a new generation of larger, more modern warehouses was built in new areas beyond the historically industrial suburbs. We are witnessing a true phenomenon of logistics sprawl in many urban regions on a global scale (Dablanc and Browne 2020). Case studies are numerous in Europe-Paris (Raimbault and Bahoken 2014), The Randstad (Heitz et al. 2017), Gothenburg (Heitz et al. 2020)-as well as in North America-Chicago (Cidell 2011), San Francisco (Hesse 2008), Atlanta (Dablanc and Ross 2012), Los Angeles (Dabanc 2014), Toronto, Vancouver, and Calgary (Woudsma et al. 2016). A growing body of work reports logistical sprawl in Latin America-Belo Horizonte (Guerin et al. 2021)-and East Asia-Tokyo (Sakai et al 2015), Shanghai and the Yangtze River Delta (He et al, 2019), and Wuhan (Yuan and Zhu 2019). This sprawl is also documented within emerging countries' metropolises, such as Casablanca (Debie and Mareï

⁷ In particular in the municipalities of Gennevilliers, Ivry-sur-Seine, Vitry-sur-Seine, Nanterre and Saint-Denis.

2019) or Delhi (Gupta 2017). Indeed, the growing demand for logistics space is driving the dynamics of logistics location further and further out to the periphery. New warehouses are being set up in business parks (fig. 1), developed in the outer-suburbia, at the urbanization front, or even in the exurban fringes, where larger plots of land are available and cheap, and close to highway infrastructures, which makes it possible to compensate for the distance from the deliveries center by excellent road accessibility. In this sense, this logistics urbanization contributes directly to urban sprawl. The transformation of former agricultural land into logistics zones within the peri-urban ring road clearly contributes to land artificialization. The term "logistics sprawl" also emphasizes the similarities in these areas between the logics of residential and logistics outer-suburban development, combining the search for cheap land and road accessibility. In the case of the Paris region, outer-suburban warehouses represent more than 75% of the surface area of logistics real estate (Heitz 2017). The price of land for logistics activities is approximately €8,000/m² in the city of Paris, €5,500/m² in the inner suburbs and €1,350/m² in the outer suburbs⁸.

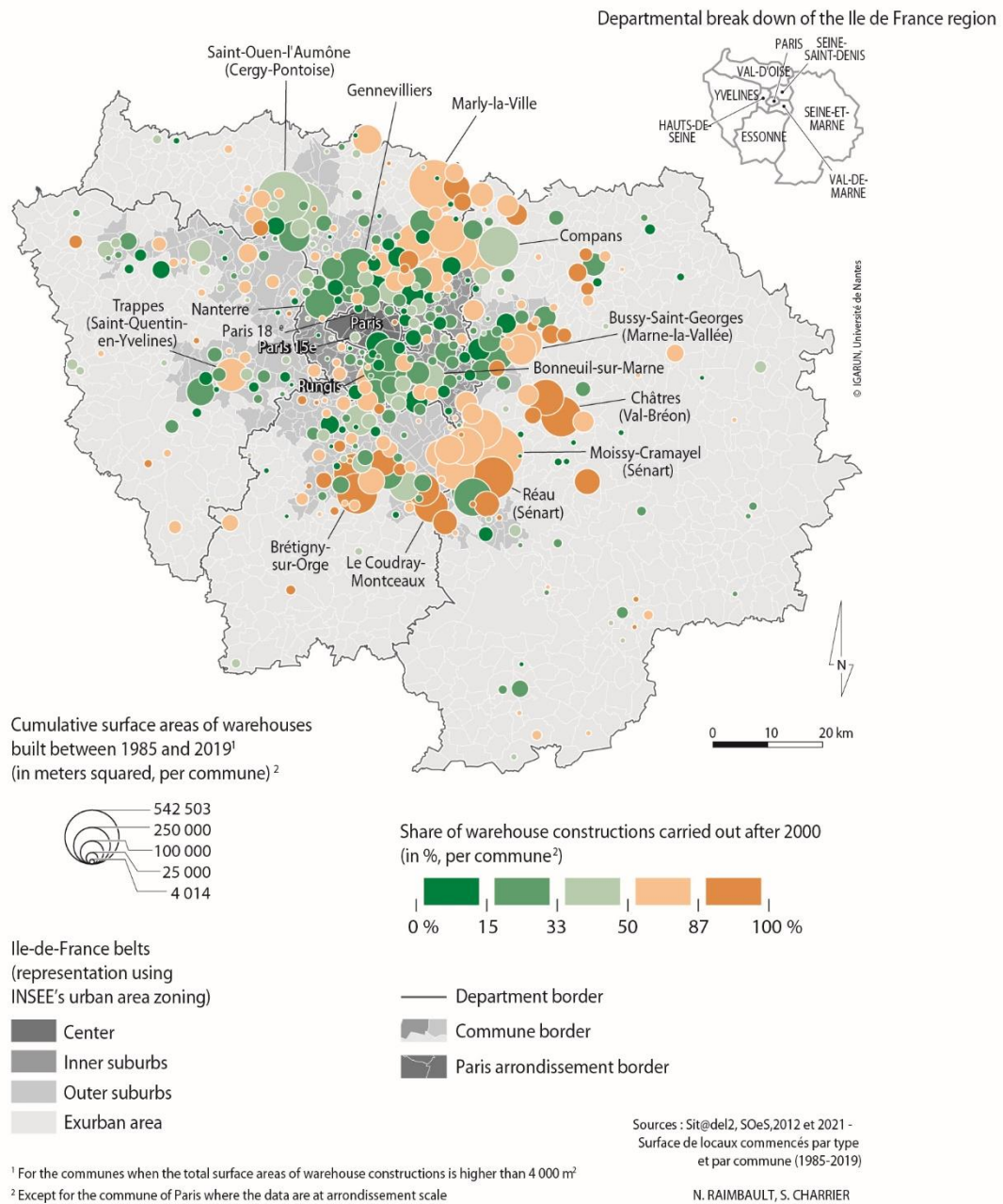
Figure 1 - Landscape of a logistics zone (Parc de l'A5 in Réau, 77)



Credits: Nicolas Raimbault, 2021

⁸ Source: OfficeLocations, 2020

Figure 2 - Logistics sprawl in the Ile-de-France region



The case of Île-de-France shows that logistics sprawl does not uniformly affect the entire urbanization front but rather specific large sectors (fig. 2). Indeed, a broad northern, eastern, and southern crescent is emerging, which to some extent extends the historical industrial suburbs (Heitz *et al.* 2018). This geography can be explained, on the one hand, by the configuration of transport networks, which are more suitable in this eastern part (A 104 outer ring road) and, on the other, by the social division of space: the very upmarket western suburbs do not offer space for logistics activities, as land is too expensive and the employment areas are not very suitable (logistics facilities depend on a working-class workforce). A similar configuration can be found in Los Angeles, where a vast logistics sector has emerged on the eastern edge of the metropolis, the "Inland Empire," concentrating warehouses and workers of Latin American origin (De Lara 2018).

Finally, this suburban logistics geography reflects the structuring of a specific urbanization dynamic. This mode of production of logistics spaces articulates two modalities of action. First, these logistics zones are the result of strategies of specialized real estate developers and investors (Raimbault, 2022). Second, these strategies are supported by the planning and economic development policies and choices of outer-suburban local authorities (Raimbault, 2017). This mode of space production was gradually structured during the 1990s and has proven to be particularly attractive to the demand of companies in the logistics sector.

Financialized production of outer-suburban logistics zones

Today, logistics real estate is a type of financial investment sought after by major institutional investors such as banks, insurance companies, pension funds and sovereign wealth funds, in the same way as investment in commercial real estate or in shares/bonds. Investment products involving logistics facilities are therefore offered on the financial markets, within specialized or diversified real estate funds. Logistics real estate is therefore financialized. The key players in this financialization are international real estate developers and investors, who specialize in the logistics real estate market (Raimbault 2022). This financialization is a crucial dimension of the mode of production of space specific to the dynamics of logistics sprawl.

Since the 1990s, the logistics real estate market has been structured around large international firms specializing in the management of logistics real estate assets⁹. The leaders in the sector, Prologis, Global Logistic Properties, Goodman and Segro (from the United States, Singapore, Australia and the United Kingdom respectively) have developed a business model that consists of acting as developers, fund managers¹⁰ and even land developers. Their main income comes from the warehouses they own and rent out. Their goal is therefore to build up vast holdings of logistics real estate on a global scale. As developers, they build numerous warehouses around major cities (Hesse, 2004, 2008), partly with the capital raised via funds, and then embed them within investment funds, whether listed or not. Where possible, these real estate companies develop private logistics parks. Indeed, rather than building and renting out warehouses spread across different industrial zones, the leaders of this market prefer to develop closed complexes of several warehouses of which they are the sole owners and managers (fig. 3). These private developments therefore entail the integration of the entire real estate chain: the construction of buildings, but also the development of the business park and its daily management, instead of the intermunicipal government that traditionally develop and market industrial lands and then manage the public spaces of these lands, notably the roads (Raimbault 2022).

Indeed, in the outer-suburbia, many small local governments do not have the administrative, operational and financial resources to conduct the large-scale development projects required to create logistics parks. The supply of private logistics parks has therefore met with the interest of these local governments in search of economic development, particularly to increase their tax revenues. Many local governments have welcomed private logistics park projects presented to them by international real estate companies. Such firms offer to finance and manage all of these

⁹ A financial asset is a security or a contract, which can be traded (for example on a financial market). An asset is included in its owner's holdings and is likely to produce income or a capital gain for its holder.

¹⁰ Investment funds are investment vehicles in which several investors join together, each contributing a share of the capital, in order to acquire a portfolio of properties and to earn income from them both by leasing and by reselling (arbitrage). These funds are managed by third-party companies whose business is to select the assets to be acquired and resold: the fund manager.

operations, from the modification of planning documents to the marketing of buildings and the long-term maintenance of the parks (Raimbault 2022). The principle of these logistics parks thus leads to the privatization of part of the local development policies: the design, maintenance and even access to the logistics zone are the exclusive responsibility of the manager. It also privatizes economic development policies - the choice of companies renting in the park depending solely on its manager (Raimbault 2017).

Figure 3 - Entrance to the Prologis "Moissy 2 Les Chevrons" logistics park in Moissy Cramayel (77)



Credits: Nicolas Raimbault, 2021

This kind of logistics parks has thus multiplied on the urbanization front in many metropolitan areas around the world: in Paris (Raimbault 2022), Berlin (Hesse 2008), Frankfurt (Barbier et al 2019), the Bay Area (Hesse 2008), Atlanta (Dablanc and Ross 2012), but also, for example, in Mexico City (David and Halbert 2014) and Sao Paulo (Magnani, M., & Sanfelici 2021; Yassu 2021).

At the same time, some logistics real estate projects have been made possible by the strategies of local governments in these outer-suburban areas. In order to increase their tax revenues and, to a lesser extent, increase the number of jobs, some local authorities are launching policies to develop vast industrial lands designed to accommodate warehouses. The availability of these plots is a godsend for real estate developers-investors. In the Île-de-France region, the case of the “New Towns”¹¹ shows how public land developer in charge of urbanizing these areas have collaborated with developers to concentrate logistics facilities (Raimbault 2017). Similar entrepreneurial approaches have occurred in the Frankfurt metropolitan area (Barbier et al 2019) or around Atlanta (Dablanc and Ross 2012).

The financialization of logistics real estate finally brings a capacity to produce logistics parks in areas where the local authorities concerned do not have the capacity to carry out such projects alone. The offer made by major logistics real estate firms in these remote outskirts is therefore a powerful vector for logistics sprawl. It offers cheap space for logistics activities and relative

¹¹ New Towns were planned by the French government in the 1970s in order to regulate the urbanisation of the Paris region.

economic development, in terms of local taxation and jobs, to areas on the outer-suburbs that are often unable to attract companies on their own.

The challenges of regulating the diffuse urbanization of economic activities

The dynamics of logistics sprawl are in direct opposition to the very principle of a regional development policy for logistics spaces, which could be justified by these environmental and social issues. With this mode of production, it is the real estate industry that plans its investments: local governments simply negotiate their landing.

Logistics sprawl raises two main ecological issues. First, it contributes, like residential and commercial urbanization, to the artificialization of land, and thus to the reduction of land available for agriculture. Second, it increases the distances traveled by delivery vehicles and, consequently, greenhouse gas emissions and local pollution from freight transport (Coulombel et al. 2018; Perez-Martinez 2020). In addition, the distance of these logistics parks from river port and rail infrastructures limits the possibilities of modal shift, while road transport represents 90% of freight transport in France. These warehouses are also often far from the places of residence of logistics workers, who are still mostly concentrated in the historical industrial suburbs (Raimbault 2020). The distance complicates the daily commute of these workers. In addition, logistics zones are often located in municipalities that are poorly served by public transportation. These elements make this workforce dependent on the automobile, which again raises ecological but also social issues. Indeed, access to jobs is complicated for these low-skilled workers, who are finding it increasingly difficult to afford a car (Korsu and Wenglenski 2010).

Finally, logistics sprawl exacerbates the challenges posed by diffuse urbanization, which also concerns economic activities. While the outer-suburbs still largely escape binding planning and rarely receive the attention of governments operating on a metropolitan scale, the financialization of real estate, with the resulting forms of privatization, raises crucial issues of public regulation of the urbanization of these peripheries, both in terms of planning and of public tools for urban development.

Logistics development in urban centers: urban logistics

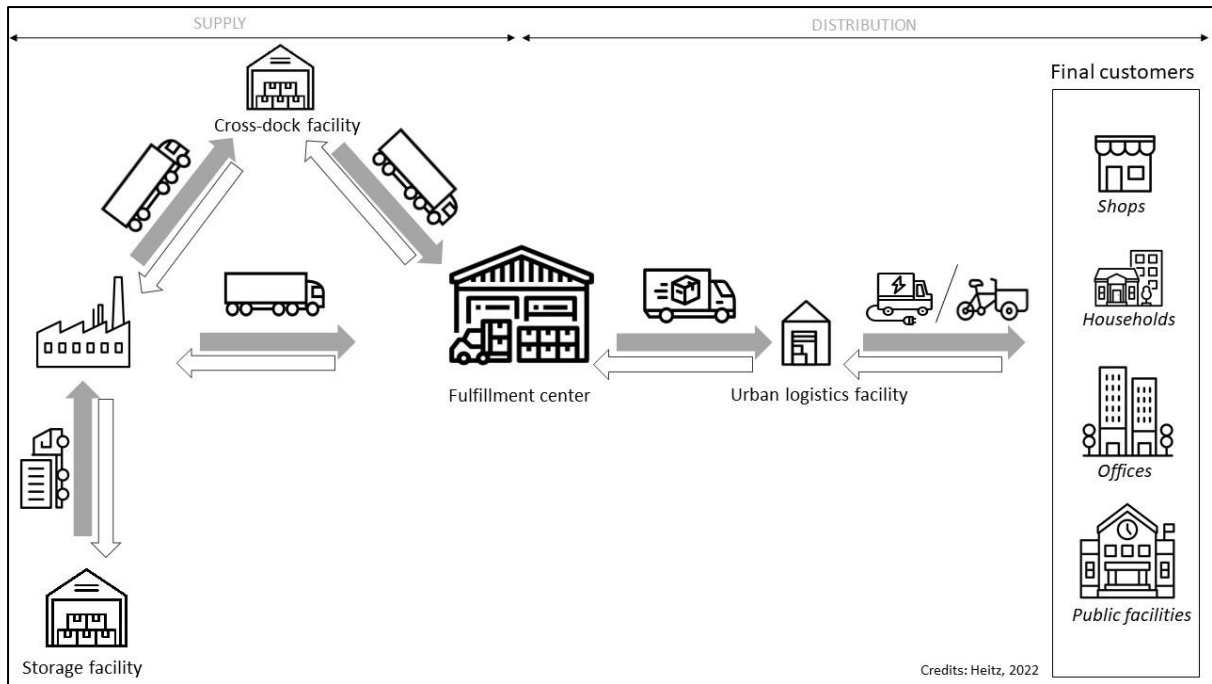
In contrast to (outer-)suburban logistics development, public policies seek to encourage a "return of logistics activities to the city center" (Diziain *et al.* 2012), which is consistent with sustainable urban policies (e.g. promoting urban densification and mix-used development). The conceptual framework of urban logistics, which appeared in the 2000s, proposes to integrate the development of these activities in dense urban areas, with architectural and urban innovations to ensure their integration into the urban fabric. . This model challenges a functionalist and spread out vision of the city (Reigner *et al.* 2013) by giving the logistics function, mostly developed in the suburban areas, the opportunity to develop in dense and central urban areas. Urban logistics make it possible to achieve the objectives of functional mix by keeping the productive activities of storage and handling of goods in the city.

The rise of logistics real estate in urban centers: urban logistics facilities

Urban logistics aims to optimize the flow of goods in cities in order to limit their negative effects (pollution, congestion), by regulating traffic and parking on the one hand, and by developing urban logistics real estate on the other hand. Several typologies of urban logistics facilities coexist in the literature. Onstein et al. (2021) describe the typology of facilities that has emerged as a result as going from 'XXL' to 'XXS'. This typology focuses on a various range of existing size among logistics facilities. XS or XXS ones are dedicated to urban logistics. Buldeo-Rai and al. (2022) propose a typology of facilities dedicated to proximity logistics based on three criteria (size, service, area and activity). Here, we choose to rely on a simple typology that distinguished two types of logistics functions: cross-docking, on the one hand, and storage and fulfilment, on the other hand (Heitz, 2021). First, urban logistics facilities dedicated to cross-docking operations in order to organize the modal shift of goods to clean vehicles (electric, natural gas, hydrogen) or demotorized vehicles (bicycles) were designed to organized the "last mile" and(i.e. the final delivery to shops, offices, public services, or inhabitants. They are known as known as Urban Consolidation Center (UCC).

Then, a second type of urban logistics facility corresponds to the rise of e-commerce (Rodrigue, 2020; Heitz, 2021). The strong growth of fast deliveries is driving demand for urban logistics real estate development in all metropolitan areas (Dablanc, 2018):not only for cross-docking facilities but for facilities that host storage functions for products (fresh or with a high turnover) ordered and delivered in a few hours. These logistics facilities, of several hundreds of square meters, are part of the logistics organization of e-retailers, whether they are mass retailers or pure players (i.e. Amazon), but above all of the carriers and logistics service providers to whom shippers subcontract urban distribution. Among them, we find traditional last mile players (i.e. La Poste, DHL, UPS) but also and increasingly, start-ups that offer delivery services from these urban logistics facilities (Buldeo-Rai and al. 2022). For mass retailers, these small logistics facilities are generally back-up bases near their stores, allowing them to increase their storage space for proximity logistics services. The development of this urban logistics does not concern all logistics sectors. E-commerce, but also to a lesser extent, mass distribution and last-mile carriers are the main users. Recently, several digital platforms (restaurant, food, consumer goods) offering instant delivery services, known as "quick commerce", have appeared on the market (Dablanc *et al.* 2017) (i.e. Amazon Prime Now). Proximity to the consumer is essential for these services, as they need to be able to deliver within a few hours. The rise of the dark stores is a good example of this quick commerce development. Dark store are retail facility that resembles a conventional supermarket but is not open to the public, housing goods used to fulfil orders placed online. So, they can be classified as warehouses. They are developed by startups (i.e. Gorilas, Getir) which offer instant deliveries (less than 20 minutes) to their consumers, relying on gig economy workers. These dark stores are controversial because they tend to develop in the place of former stores, becoming the symbol of a physical trade competed by the e-commerce, arousing debates on the impact of the digital economy on the city. E-commerce and quick commerce increase demand for logistics facilities in the heart of cities.

Figure 3 – Illustration of an urban logistics facility(Heitz, 2022)



Unlike (outer-)suburban logistics real estate, urban logistics is characterized by small surfaces, integrated into existing buildings (former industrial or logistics buildings, former parking lots, railway halls) or "hollow spaces", i.e., abandoned spaces that are not the subject of any urban project (for example, under infrastructure, such as the Paris ring road: figure 4). In Japan, Takuybin, an express parcel service specializing, in particular, in home deliveries, has long been developing platforms in the heart of cities (Dablanc 2009). Inspired by this model, urban logistics facilities vary in size (between 100m² and 1000m²) and can also be integrated into buildings with other functions (housing, offices, shops), following the example of logistics hotels such as the one at Chapelle International in the 18th arrondissement of Paris (Figure 5). The urban logistics facilities thus make it possible to densify and diversify land uses, but also to reappropriate spaces formerly dedicated to the automobile in a context of decreasing car use in the city. These logistics facilities can also reinvest, by renewing them, former sites dedicated to the transport of goods, such as railway or river spaces, making this activity part of the long history of cities.

Figure 4- ULS "P4 Pantin Logistique" (Paris 19th arrondissement) under the ring road a) goods grouping/deconsolidation area, b) external view of the building (credits: Heitz, 2021)



Today, urban logistics real estate in the Paris region represents about 5% of the region's total logistics real estate market. The recent enthusiasm for urban logistics does not make it a dominant trend in the logistics real estate market, which is still mainly located on the outskirts (Heitz 2021). The price of land, and therefore the high rents in dense areas, is an obstacle to the development of real estate for urban logistics, compared to the low rents offered in outer-suburban logistics parks. In addition to the cost of land, the production costs of urban logistics facilities, which are not standardized buildings like (outer-)suburban warehouses, but are "tailor-made" to fit into a dense urban fabric, are higher. This may explain the reluctance of real estate developers and private investors to invest in urban centers until very recently. In the absence of private investment, public actors tried to develop an initial real estate offer at the end of the 1990s. For nearly thirty years, urban logistics was the subject of public experimentation (Debie, Heitz 2017). It was not until the recent period that a logistics urban planning and a nascent real estate market emerged from these experiments.

Towards a logistics urban planning

For a long time, the implementation of public policies in favor of the development of urban logistics remained a matter of local transport regulations (traffic, parking) and urban experimentation in terms of logistics real estate. This also explains the low volume of urban logistics facilities and UCC built in cities since the 1990s. The role of public authorities has been to encourage their development through experimentations.

UCC were the first form of urban logistics facilities experimented within European city centers (i.e., Monaco, La Rochelle (France), Bristol (UK), Vicenza (Italy)), in the 2000s (Browne and Ryan 2011;) as early as the late 1990s. Similar to small cross-docking logistics facilities they are mainly used by carriers specializing in parcel delivery that can make the last mile with cargo bikes or electric vehicles. While Paris has been a highly invested field, other European cities have also been the subject of UCC experiments (Gonzalez-Feliu 2018) carried out by local public actors or public companies in partnership with certain carriers (Browne et al. 2018). In Ile-de-France, the public

company Sogaris¹², which specializes in the development and investment of logistics spaces, has developed several real estate projects dedicated to urban logistics such as the Beaugrenelle (15th arrondissement of Paris) UCC.

These UCCs quickly became a controversial issue with respect to their funding, feasibility, and effectiveness (Leonardi *et al.* 2012). Indeed, the main problem with these experiments has been their financial return. In many cases, regardless of the public funding provided, these projects were not economically viable (Kin 2015). Some of them even ceased activity (i.e. La Rochelle). The cost of land in the city center was a major obstacle to the profitability per square meter of logistics activities and the possibility of setting up in less dense areas for less money. In addition, there was less need for e-commerce at the time, and there were far fewer carriers or logistics operators interested in these projects. In 2014, in France, the number of parcels delivered was about 462 million, compared to one billion in 2020¹³. The local governments, who defended these projects with the aim of optimizing the circulation of goods flows in cities, often found themselves confronted with modest effects, leaving these projects to appear as "urban logistics utopias that did not materialize" (Dablanc 2018).

More recently, other forms of urban logistics facilities have been experimented with, such as logistics hotels. Mainly developed in France, although still few in number, these logistics hotels allow for financial equalization between office, retail, service and housing activities and logistics activities. The diversity of activities helps to alleviate the financial problems of urban logistics facilities by offering a better return on the land acquired. These hotels are designed in particular to accommodate logistics activities related to e-commerce and parcel delivery. Other projects are being carried out by public or semi-public institutions in the Paris region or elsewhere. This is the case, for example, with the logistics hotel project in the Port of Lyon, which is being carried out by the Compagnie Nationale du Rhône and the Lyon metropolitan government. Whether it is a question of UCC or logistics hotels, the transition from urban experimentation to a model that can be generalized to all urban areas, which would make it possible to systematize urban logistics, takes time and relies, in terms of planning, on public action. In addition, the change in attitude of private sector actors (carriers, logistics service providers, retailers, e-retailers and real estate developers) with regard to urban logistics in recent years has contributed to the evolution of the role of the public authorities. From a public policy that pushes these experiments to improve the circulation of goods in the city in a context of tightening regulations (i.e. low emission zones), we are moving towards a public policy that tries to improve the land use regulation. Indeed, the rise of the quick commerce logistics facilities, that are more or less compatible with the sustainability objectives set by planning questioned the role of the public authorities in this development.

¹² Sogaris is a public developer and real estate investor specializing in logistics spaces. It has been created in the 1970s to manage the Rungis National Interest Market. Then, it has gradually evolved to specialize in logistics real estate. Its majority shareholders are the departments of Paris and the inner suburbs of the Ile-de-France region.

¹³ Evolution du marché des services de livraison e-commerce depuis 2015, Etude Colissimo, 2021

Figure 5 - Chapelle International (Paris 18th arrondissement) a) Entrance to the railway hall, b) Entrance to the "Metro" warehouse (credits: Heitz, 2018)



Long neglected by urban planning, the logistics issue is gradually making its way onto the public agenda, particularly in European metropolises, in the context of the fight against pollution (by identifying pollutant emissions from road freight transport) and against urban sprawl (by identifying the contribution of logistics to land artificialization) in metropolitan areas. Faced with these new challenges, some local authorities are integrating logistics issues into the objectives of their local urban planning documents and the organization of urban mobility.

Today, the impact of public policies on urban logistics is significant, whether direct, through dedicated policies (i.e., subsidies for urban logistics facilities projects, reserved land, dedicated parking), or indirect, through environmental, social, or organizational regulations designed to restrict the accessibility of freight vehicles to cities and limit flows. Beyond the urban experiments conducted, local authorities are rethinking their urban planning tools in order to integrate this issue into city planning. The case of Paris illustrates the means developed in terms of urban planning to promote the development of urban logistics.

Insert n°1 - Urban planning in Paris

In terms of planning, the city of Paris has, since 2013, integrated urban logistics development objectives into its documents with the aim of reducing the flow of goods and associated pollutants, and of framing the effects of the growing demand of residents for e-commerce (Debie and Heitz, 2017). The City of Paris had also initiated "goods" charters, an instrument of coordination between transport and logistics operators, shopkeepers and even residents since 2006.

In terms of urban design, they can impose the creation of urban logistics facilities, as is the case with "location perimeters" in Paris. These are perimeters within which project designers are obliged to integrate a logistics facility in order to serve the future neighborhood and district. (Buldeo-Rai, 2022)

In terms of regulations, the Paris municipality has created dedicated areas in its Local Urban Plan (*Plan Local d'Urbanisme*, PLU) for logistics activities. This is the meaning of the "Major Urban Services" (*Grands Services Urbains*, UGSU) zoning, which is often located at the gates of Paris, along the railway lines and the Seine (Raimbault et al., 2018).

Public policies through regulations can encourage companies to change their behavior. The development of low emission zones (LEZ) in European cities (Browne et al. 2005) or night-time deliveries in the United States (Holguin-Veras et al. 2014) are all regulations that are pushing companies to rethink the organization of their last mile and the vehicles they use. The new objectives regarding ecological transition strongly reinforce the attention paid to urban logistics.

For the past ten years, major cities have been working to better integrate logistics activities, particularly urban logistics, into urban planning and design. Examples from the Netherlands, Sweden (Citylab, 2018) and New York show this shift in focus by public authorities (Raimbault *et al* 2018) More recently, the European Commission has included the issue of urban logistics in the “mobility” package and produced a best practice guide for collaboration and public policy (European Commission, 2018).

Thus, urban logistics is gradually moving from being politically unthinkable to a lever for urban development, and a means of implementing environmental objectives to regulate the urban mobility of goods. Urban logistics also serves new forms of collaboration between transport and logistics operators, which until now have been little involved in dialogue with public actors. While this logistics issue is still dealt with unevenly from one city to another (Heitz and Dablanc, 2019), we can observe, in the major metropolises, the rise of logistics urban planning policies, i.e., a way of thinking about space and tools that make it possible to develop and organize logistics activities and the flows associated with them. Beyond urban experiments, it seems that we have entered a new era for urban logistics planning. This observation should not overshadow that we are witnessing a duality in logistics urbanization, between poorly regulated suburban areas and the consolidation of public actions dedicated to urban logistics in regard with proximity logistics. The Île-de-France region offers a good example of this configuration.

The rise of a logistics real estate market in urban centers

Since the late 2010s, the behavior of developers and investors has changed. This has been driven, additionally, by the Covid-19 crisis, which increased demand for e-commerce, but also a context where the ecological transition is encouraging stricter access conditions for polluting vehicles, such that local governments have gradually changed their view of urban logistics. While they have long neglected this sector in the absence of strong demand from carriers and shippers commensurate with development costs, they now perceive an urgent need to develop logistics real estate.

In Paris and the inner suburbs, demand for land and logistics real estate has increased considerably in recent years, leading to higher rents. The emergence of "XXS" urban warehouses, which are neither planned nor financed by public policies, unlike the case of the logistics hotels presented above, marks a turning point in the development of urban logistics. Since 2017, small logistics facilities supported by real estate investors have emerged in the dense Paris area to meet this new demand from service providers and shippers. For example, in the parisien dense urban area, real estate developer Segro has built a warehouse in Gennevilliers for Ikea and Leroy Merlin (for their e-commerce channel) to organize their last mile, and developer CBRE has rehabilitated a hall in Pantin for the Saint Gobain group (a distributor of construction materials).

Finally, it appears that two forms of production of urban logistics spaces coexist today. On the one hand, urban experiments led by public actors have made it possible to stimulate a real estate dynamic. These still account for the majority of urban logistics development. On the other hand, an emerging, semi-autonomous, market is emerging, in which traditional logistics real estate developers and investors are beginning to position themselves, as are shippers and logistics service providers themselves. While public authorities initially provided the impetus for urban logistics real estate, they are now seeking to support this emerging private market through planning, urban programming and land regulations. The challenge for the urban logistics sector is to enter a phase of generalization and standardization of a real estate model in order to limit the additional costs of production in an urban environment and thus be more competitive in relation to suburban areas.

Logistics spaces in the inner suburbs: the case of intermediate logistics as a blind spot in logistics urban planning

This dual interpretation of outer-suburban logistics, on the one hand, and urban logistics, on the other, must be qualified. The observation of logistics activities in the suburbs of metropolises, dense but non-central areas, which do not offer the land availability of outer-suburban or exurban areas, shows the existence of a third category, constituting a blind spot for research and public policies. Intermediate logistics, constituting a fabric of diverse logistics activities that can be applied to urban distribution, as well as on a national or international scale, is distinct from the urban and outer-suburban logistics mentioned above.

Permanence and mutations of intermediate logistics activities in the suburbs

While transport and logistics operators and public authorities are currently working on the development of urban logistics in dense areas of metropolises, particularly in the hypercenters, there is already a logistics real estate stock in dense areas, in the inner suburbs. Similar to urban logistics in that it is integrated into a dense urban fabric, intermediate logistics brings together activities that are not often present in the central cities. These include warehouses in the industrial or wholesale trade sector, often held by small owners (SMEs, VSEs), as Strale in Brussels (Strale 2020), Hesse in Berlin (2008) or Heitz in Ile-de-France (Heitz 2021) have shown. These logistics facilities can be used both for urban distribution or for regional, national and continental trade. These former industrial suburbs, often affected by deindustrialization, have thus retained a fabric of logistics activities that continue to provide low-skilled labor jobs.

Warehouses belonging to the intermediate logistics sector, which are often old, are not subject to specific development projects. In Ile de France, these logistics activities represent about 20% of the real estate stock in the region, and correspond to non-standardized logistics facilities (pointed roofs, wooden frames, height of less than 10m, no dock doors or maneuvering area for heavy goods vehicles, etc.). The nature of the buildings can sometimes be misleading and make one think of trades, retailing or manufacturing activities (Figure 6). However, these buildings do have a logistics function. Large logistics providers, mass distribution or e-commerce are less represented there than in outer-suburban logistics zones (Heitz *et al.* 2017).

Figure 6 - Intermediate warehouses in the Paris inner suburbs, a) Saint Germain warehouse in Romainville, b) Warehouse being destroyed in Bagnolet



credits: Stessy APAU, Aminata BARO, Valentin CARRAUD, Carmen COQ, Sacha GABILAN, Thomas-Oshagan HALADJIAN, Julia JAÏS, Justin LE BIHAN, Camille MARION, Eurydice PALLON¹⁴, 2020

These suburbs, because of their proximity to the central cities, are subject to strong urban pressure. They are very attractive for the development of new services, businesses and residential projects (Albecker, 2015). Given the pressure on land, competition with other sectors of activity and urban renewal policies, intermediate logistics is tending to decline and is being redeployed to outer-suburban logistics zones. The latter are attracting transport, logistics and retail operators, previously located in the suburbs, in search of a larger, more modern and less expensive warehouses. The municipalities in the inner suburbs rely on the development of new activities to accelerate their economic and urban transition. Faced with a housing project, the installation of a new metro station, intermediate logistics activities often find themselves pre-emptively replaced, without another logistics activity being integrated into the new urban program of the neighborhood (Debrie and Heitz 2017).

Paradoxically, certain specific areas within these suburbs are relatively protective of logistics activities, such as the economic activity zones (EAZs). Developed in the 1970s and 1980s, these EAZs are home to numerous industrial, commercial, trades and logistics activities. These zones, preserved by urban planning documents, without being well integrated into the urban fabric, allow logistics to be maintained. However, as they are identified as going against the grain of a city model based on functional diversity, these zones tend to be the subject of requalification policies. The difficult identification of logistics activities in these areas (Heitz *et al.* 2021), contribute to the invisibility of this intermediate logistics.

In addition, new activities related to the emergence of digital platforms are also appearing in these areas. There are more and more “quick commerce” and “rapid delivery” facilities, such as

¹⁴ L'IMMOBILIER LOGISTIQUE INTERMÉDIAIRE DANS LA PETITE COURONNE, Le cas du territoire d'Est Ensemble Compte rendu de l'atelier Ecole d'Urbanisme de Paris et Sogaris, supervised by Adeline HEITZ and Elvan ARIK.

"dark kitchens"¹⁵ (Aguiléra *et al.* 2018). These new logistics activities contrast with the characteristics of intermediate logistics marked by wholesale trade and industrial logistics. It is, in fact, an urban logistics intended for last-mile delivery. The players in the logistics real estate market are therefore interested in these areas and start to invest in them to develop urban logistics dedicated to e-commerce and parcel delivery. For example, real estate developers can buy land occupied by an intermediate logistics activity and renovate the building, then replace the activity with a e-commerce or delivery logistics activity. The development of logistics in the suburbs therefore also entails the renewal of logistics activities.

The port and airport areas, managed as transport infrastructures, are also privileged areas for logistics redevelopment. They are also mainly located in these inner suburbs. In the Paris region, the port of Gennevilliers, the port of Bonneuil sur Marne and Orly airport are preserved logistics zones that continue to develop. In these areas, as in business parks, there is a new interest on the part of logistics players to develop and densify logistics activities. Amazon has built a warehouse in the port of Bonneuil, and Ikea and Leroy Merlin share another in the port of Gennevilliers. While the objective is not necessarily to use the river to make their deliveries, these spaces guarantee their users proximity to Paris and a lower land price than in the city center. The role of public infrastructure managers is essential in the redevelopment of these business parks. Following the example of the large maritime ports (Magnan 2014), they develop these areas to make them attractive to logistics companies (Raimbault 2019). These activity zones thus constitute land opportunities in dense urban areas for the redevelopment of logistics, particularly concerning urban logistics.

Intermediate logistics, a blind spot in public policy

Despite these recent developments in business parks, intermediate logistics remains a blind spot in local public policies. The French case illustrates the absence of urban planning for this type of activity. Often poorly identified, these activities are rarely the object of public policy attention, and are even pushed out of new urban projects that focus on other activities. In the absence of strong public policies insisting on the preservation of land for productive activities (industrial or logistics), we are witnessing a gradual mutation of intermediate logistics facilities to the benefit of other urban projects focused on office activities or residential development, or other forms of urban logistics dedicated instead to e-commerce activities.

Finally, the resilience of intermediate logistics depends on two main factors. First, the degree of public policy involvement and planning to preserve or develop logistics activities. Second, the interests and strategies of logistics real estate developers, who follow the demand of carriers and shippers, and who are increasingly inclined to invest in land located in dense areas given the needs of e-commerce. The future of intermediate logistics is linked to the development of urban logistics beyond the walls of central cities.

Combined with urban renewal, the decline of this intermediate logistics in the dense zone sheds light on the process of logistics dualization, i.e., the existence of two concomitant real estate markets, (outer-)suburban and urban, which do not meet the same demand from logistics operators.

¹⁵ Kitchens of restaurants that only offer delivery (i.e. Frichti).

At the same time, the identification of a declining intermediate logistics sector highlights the heterogeneity of logistics, composed of both recent warehouses located in city centers and older warehouses, which may also be used for last-mile distribution, also located in dense urban areas, but mostly in the inner suburbs. Above all, the observation of intermediate logistics illustrates the major changes in production and consumption systems, and the changes in historically industrial suburbs. From the manufacturing industry to e-commerce logistics, the inner suburbs of large metropolises remain, albeit to a lesser extent, productive areas providing low-skilled jobs, especially blue-collar jobs (Raimbault 2020). The absence of public policies on logistics in these suburbs reflects the difficulty these areas have in seizing the tools of logistics urban planning to support this change, but also the problems of governance within metropolitan areas. Municipalities hosting logistics activities refuse to be the "servants" of others and gather negative externalities, and tend to limit logistics projects. The absence of a coordinated logistics policy at the regional or metropolitan level also puts them in difficulty when faced with the arrival of "giants" like Amazon or Alibaba.

Conclusion

The chapter highlights the existence of three concomitant dynamics of logistics urbanization. They explain the contemporary landscape of logistics spaces within metropolitan areas. On the one hand, the strategies of international real estate investors are causing logistics sprawl that is poorly regulated by planning policies. On the other hand, public actors in the metropolitan cores are promoting the development of urban logistics facilities and gradually developing urban planning expertise for urban logistics. Between these two poles, an intermediate logistics sector is maintained at a low level or is asserting itself, for the real estate market, as a new front for the development of urban logistics, partly renewing the productive function of inner suburbs.

These three dynamics indicate the importance, for public regulation tools, of going beyond the urban/(outer-)suburban, center/periphery dichotomy, in order to evolve towards an urban planning apparatus, on the scale of metropolitan areas, that can respond to the various economic, social and ecological challenges of the metropolitan logistics development (Heitz 2021).

Reflections on the production of logistics spaces are still very recent and many aspects remain unexplored. Beyond the academic world, these issues are gradually being highlighted by new dynamics. On the one hand, certain local authorities are questioning the place of productive functions in urban fabrics and are grasping the current importance of logistics activities, particularly because they continue to employ workers in the city and in the former industrial suburbs (PUCA 2021). On the other hand, social movements are gradually emerging around logistics spaces. Strikes and struggles led by logistics workers are increasingly numerous and highlight the social stakes of this development (Benvegnù and Gaborieau 2017). Large demonstrations, bringing together environmental and labor activists are expressed in particular against Amazon's new warehouse projects. Beyond the sole case of Amazon, these movements highlight the problems raised by large, outer-suburban and exurban logistics facilities: land artificialization, increased flows of goods at different scales, poor quality of jobs and difficulties in accessing them.

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