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Where goods meet people: a conceptual framework integrating urban freight transport into land use and public space

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ABSTRACT

Urban transport planning has long centred on the movement of people, while transport of goods is more often treated as a secondary concern. This paper develops a conceptual framework that integrates people and goods transport as interconnected systems, linking long-term land use and network decisions with the short-term dynamics through which public space is designed, allocated, and managed. Using the framework as an analytical lens, we review empirical evidence on four urban planning trends: curbside management, the superblock model, the 15-minute city, and logistics zoning. The framework and review reveal recurring blind spots: people-oriented initiatives often understate implications for goods transport, while goods-oriented initiatives tend to overlook wider impacts on people's mobility and city life. We conclude with a research agenda for embedding urban freight more structurally within transport planning and urban design.

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Urban freight; transport planning; mobility; land use and transport; conceptualisation; research agenda

1. Introduction

Transport of people tends to benefit from prominent attention from public authorities, with ambitious goals to reduce emissions and improve quality of life and considerable resources allocated to achieving those goals (Buser et al., 2025; Hartl et al., 2024; van Burgsteden et al., 2024). Transport of goods is often treated as a private-sector matter, which helps explain its marginalisation in planning and policy agendas (Janjevic et al., 2019; Rosales & Haarstad, 2023). Indeed, hardly any public discourse about the current and future states of cities includes a vision for freight (Bjørgen & Ryghaug, 2022; Haarstad et al., 2024; Maxner et al., 2025). Yet as centres of exchange, cities fundamentally depend on freight transport. In fact, "there are very few activities in a city that do not involve the movement of [goods]" (Cui et al., 2015, p. 584). The question, then, is how urban freight transport fits in.

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Often, urban freight transport must operate within the limited space that is available. Many freight activities depend on short-term access to the curb and can extend onto sidewalks during loading, unloading, and carrying goods to doorsteps (Dalla Chiara & Goodchild, 2025). As a result, freight operations compete with public space that is typically allocated to other uses, creating friction for both operators and other users. These frictions surface when delivery couriers cruise for parking (Dalla Chiara & Goodchild, 2020), walk long distances from legal stopping locations (Allen et al., 2018), or resort to illegal parking (Ghizzawi et al., 2024). As freight activity grows alongside other urban functions, these individual responses produce, in aggregate, safety risks and recurring parking violations (Chen et al., 2017).

Similar issues in the transport of people have been treated as a systems problem since the 1960s, supported by conceptual frameworks and models of the interaction between transport and land use (Wegener, 2004). Such frameworks and models capture slow cycles of long-term changes in land use and transport infrastructure, and fast cycles of daily travel behaviour and movement patterns that unfold within those structures (Bertolini, 2012). This body of work has been central to understanding how travel patterns shape, and are shaped by, the spatial configuration of cities (Stead & Marshall, 2001). It has not only advanced research but also informed planning practice with policies that guide city design and the allocation of public space (Nieuwenhuijsen & Khreis, 2016). If the transport of goods is included in such policy and design guidance at all, it is typically treated as an additional flow or as an externality that needs to be addressed (Bjørgen & Ryghaug, 2022; Haarstad et al., 2024).

The academic literature on urban freight transport has expanded substantially, reflecting its growing prominence within transport studies. One major strand of this literature focuses on optimising networks of logistics facilities and freight trips within existing spatial and regulatory constraints (e.g. Crainic et al., 2004; Lehmann & Winkenbach, 2024). Indeed, an optimisation perspective is embedded in the influential foundational work framing the urban freight transport domain. Taniguchi et al. (2001), for example, describe it as "[…] the process for totally optimising the logistics and transportation activities by private companies in urban areas while considering traffic environment, traffic congestion and energy consumption within the framework of a market economy" (p. 3). More recent definitions continue to foreground optimisation of urban freight transport alongside the mitigation of externalities such as congestion and emissions (Rodrigue et al., 2020). In this paper, we treat urban freight transport primarily as enabling urban functioning, without including a specific optimisation objective. Consistent with this framing, a second strand of the literature empirically observes or estimates urban freight trips (e.g. Holguín-Veras et al., 2011; Sánchez-Díaz, 2017) and traces changes in the design of logistics networks (e.g. Fried & Goodchild, 2023; Woudsma et al., 2008).

What is missing is a conceptual framework that captures the spatiotemporal rhythms of goods transport in the city. This gap is particularly pressing because transport systems for goods and people make simultaneous and often competing claims on the limited space on streets, sidewalks, and at the curb. The resulting tensions cannot be resolved through isolated, local interventions alone. They require a clearer understanding of the underlying dynamics through which the two systems co-evolve. Building on well-established planning models for people transport, this paper develops an equivalent spatiotemporal framing for goods transport. The framework distinguishes and connects slow cycles, through which

land-use and infrastructure decisions shape the siting of logistics facilities, and fast cycles, through which public space is designed, allocated, and managed for freight activity. Crucially, it shows how these freight rhythms interact with their counterparts in people transport. In doing so, we provide a lens through which both researchers and planners can better understand, anticipate, and coordinate the role of freight transport in cities.

The remainder of this paper is organised as follows. Section 2 describes the conceptual approach used to develop and apply the framework. Section 3 introduces the conceptual framework, while Section 4 uses it as an analytical lens to examine four current urban planning trends and the interactions between people and goods transport. The paper concludes with a research agenda in Section 5 and concluding remarks in Section 6.

2. Conceptual approach

This paper employs a two-stage conceptual approach to construct a framework for understanding people and goods transport in cities. To this end, we follow the methodological guidance of van Wee and Banister (2016) for transport reviews that aim to add value by proposing innovative conceptual frameworks through the synthesis of existing literature.

In Stage 1 (framework construction), we drew on foundational and synthesising literature on land-use–transport interaction, accessibility, travel demand, mobility, and the relationship between urban form and travel behaviour (e.g. Bertolini, 2012; Hansen, 1959; Lowry, 1964; Ortúzar & Willumsen, 2011; Stead & Marshall, 2001; Wegener, 2004; Wegener & Fürst, 1999). We compared the recurring concepts and causal relationships in these traditions with corresponding concepts in urban freight and logistics scholarship. Through iterative comparison across both domains, we identified a parsimonious set of analogous elements and feedback relationships and combined them into the conceptual framework presented in Section 3.

In Stage 2 (framework-guided analysis), we used the framework as a diagnostic lens to examine four distinct trends in urban planning: curbside management, the superblock model, the 15-minute city, and logistics zoning. These trends were selected as archetypes, with each representing policy, planning, or design interventions originating in a distinct cycle of the framework: curbside management in the fast cycle for goods transport, the superblock model in the fast cycle for people transport, the 15-minute city in the slow cycle for people transport, and logistics zoning in the slow cycle for goods transport. The selection of these trends draws on the authors' cumulative domain expertise in urban and transport planning as well as exchanges and experiences in public–private partnerships and applied research projects with industry and policy partners.

To operationalise Stage 2, we adopted a concept-centric, integrative review approach (Snyder, 2019; Webster & Watson, 2002). Such an approach differs from a systematic review in both purpose and logic of inference. The aim was not exhaustive coverage of each trend or estimation of how frequently particular findings occur, but conceptual comparison and synthesis. We use this literature to compare how the four trends have been studied and to trace their consequences for people and goods transport. Our review approach supports such conceptual comparison, but it does not allow us to estimate how common particular effects are.

Literature was identified in two steps. First, for each trend, we anchored the search in recent review papers to establish the baseline of current focus. Comprehensive reviews

exist for curbside management (Castrellon & Sánchez-Díaz, 2024; Ghizzawi et al., 2024), the superblock model (Nieuwenhuijsen et al., 2024), and the 15-minute city (Carvalho et al., 2025; Sepehri & Sharifi, 2025). For logistics zoning, given the relative nascency of academic research, we anchored our search in recent reviews of municipal planning practices (Conway, 2024; Fried et al., 2026). Second, from these anchors, we conducted forward and backward snowball searches and selected additional studies using the following inclusion criteria. We included empirically grounded studies that explained a pressure or problem to which a trend responded, how the trend was translated into changes in land use or public space, the resulting consequences for people and goods transport, or the implications for planning or governance. We excluded studies that were purely technical or had no implications for land use or public space, were descriptive without contributing to these analytical categories, or focused primarily on non-urban contexts.

3. Conceptual framework

This section introduces a conceptual framework that integrates people and goods transport systems. We first introduce the foundational models from the transport planning literature (Section 3.1), and then present the proposed framework (Section 3.2), before turning to how it highlights conflicts and complementarities at the people–goods interface (Section 3.3).

3.1. Conceptualisations from transport planning literature

In the transport planning literature, there is a long tradition of recognising and conceptualising the spatial interaction between population, transport, and urban form (Lowry, 1964). Such work acknowledges feedback loops between the transport system and the land-use system, consisting of the location of households and other urban functions, with broad social and economic impacts (Geurs & van Wee, 2004). The development of the transport network, and the *accessibility* it creates (Hansen, 1959), shapes the distribution of land use in a positive feedback loop over time. This has informed the development of Land Use and Transport Interaction (LUTI) models applied to the planning of cities around the world (Wegener, 2004; Wegener & Fürst, 1999), allowing urban and transport planners to study how the two systems interact and ultimately co-evolve over decades.

Alongside this slow cycle, travel is shaped by the spatial interaction between households and other urban functions in a fast cycle of *mobility* (Bertolini, 2012). This fast cycle is typically captured in travel forecasting models, dominated by the four-stage model since the 1960s (Ortúzar & Willumsen, 2011). The first two stages result in trip generation based on the size, characteristics and location of the population, and trip distribution based on the size and location of workplaces and other activities, resulting in travel demand. The last two steps assign trips to different transport modes and finally to the transport network, resulting in flows. Parallel to these modelling efforts, a body of literature has developed conceptualisations of the interaction between urban form and travel patterns since the 1990s, often focused on large-scale motorised travel (Stead & Marshall, 2001). A particular focus has been on identifying the characteristics of the built environment, such as density, location and land use, that foster more sustainable modes of travel, including walking, cycling, and the use of public transport (Ewing & Cervero, 2001, 2010; Lee & Moudon, 2006).

This knowledge has shaped today's urban planning discourse, and consequently the policies defining the planning of cities and the design of public spaces (Nieuwenhuijsen & Khreis, 2016). Freight transport is included in some of the above-mentioned models but typically only as a generic additional flow or an externality affecting the fast cycle of mobility. What is still missing is a broader conceptual framework that systematically integrates goods and people transport.

3.2. The proposed conceptual framework and its elements

The proposed conceptual framework (Figure 1) includes the elements and cycles from established models of the transport of *People* (in the bottom half), introduces several

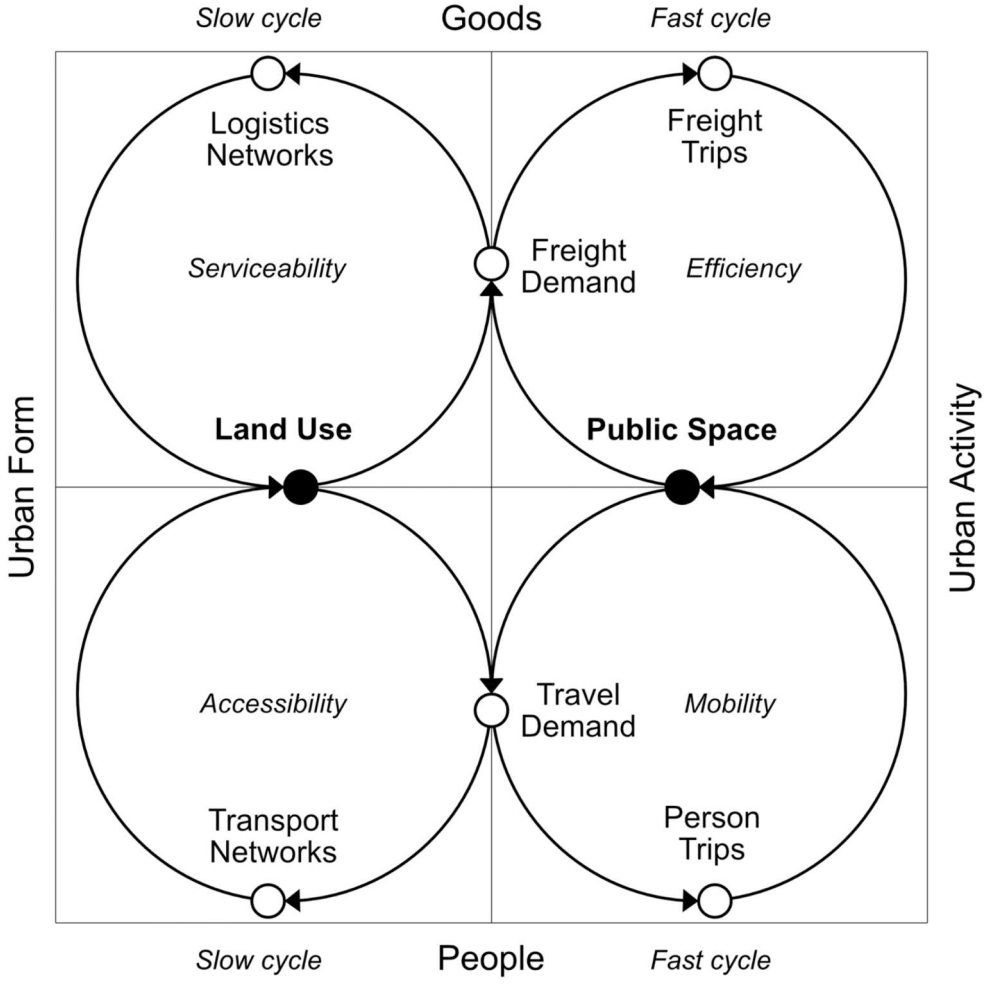


Figure 1. Conceptual framework integrating people and goods transport by pairing Slow and Fast cycles: Accessibility/Mobility for people and Serviceability/Efficiency for goods. The slow cycles link to long-term Urban Form, while the fast cycles capture Urban Activity, with both domains interacting at Land Use and Public Space.

elements related to the transport of *Goods* (in the top half) and shows how both interact. The framework also distinguishes between long-term, *Slow cycles* (on the left-hand side) and short-term, *Fast cycles* (on the right-hand side). This creates four cycles: for people, the well-known slow cycle of *Accessibility* (e.g. Wegener & Fürst, 1999) and fast cycle of *Mobility* (e.g. Bertolini, 2012; Ortúzar & Willumsen, 2011), and for goods, *Serviceability* (slow) and *Efficiency* (fast) as the equivalent cycles we propose here.

For the transport of people, *Travel Demand* drives the development of *Transport Networks* across modes, which in turn creates conditions for the establishment or expansion of different types of *Land Use*. This expansion and reconfiguration of households and activities, in turn, increases *Travel Demand* and closes the slow cycle of *Accessibility*. *Travel Demand* also initiates the fast cycle of *Mobility*, by establishing the need to travel between various origins and destinations. This need is converted into *Person Trips* through the selection of suitable travel modes and routes, which make use of available *Public Space*. The quality and availability of space for travel (including parking), or the lack thereof in the form of congestion and overcrowding, will influence *Travel Demand* and impact the mode and route of trips.

We propose *Efficiency* as the goods equivalent of the fast cycle of *Mobility*. While people transport focuses on ease of movement and participation in activities, goods transport is commonly organised around process optimisation. The fast cycle of *Efficiency* is initiated by *Freight Demand*. This mirrors how *Land Use* generates *Travel Demand* in people transport. In the case of goods, the type and size of firms serve as the equivalent of households. The modelling of *Freight Demand* has a long tradition, with early studies by Baumol and Vinod (1970) and Winston (1983) explaining *Freight Trips* as the outcome of firms balancing inventory and transport costs. Later contributions, such as Tavasszy et al. (1998) and Jaller et al. (2015), developed models that represent freight flows across regions and modes, incorporating aspects such as warehousing and multimodal transport. More recently, research has explicitly turned towards urban contexts, including households as *Freight Demand* generators (de Bakshi et al., 2020; de Bok & Tavasszy, 2018; Mafla-Hernández et al., 2025; Sakai et al., 2020; Sánchez-Díaz, 2017), and assigning these *Freight Trips* to routes and networks that draw on *Public Space*, thereby closing the fast cycle of *Efficiency*.

Similarly, we propose *Serviceability* as the goods equivalent of the slow cycle of *Accessibility*. Just as *Accessibility* shapes where people choose to live, *Serviceability* shapes where freight operators locate logistics facilities to serve the city effectively. However, unlike the *Transport Networks* that shape *Accessibility* for people, *Logistics Networks* are typically designed by private-sector actors. Current practice is characterised by the demand-driven, operator-centred design of *Logistics Networks*, leading to the establishment and expansion of *Land Use* for storage and transhipment facilities (Janjevic & Winkenbach, 2020; Rodrigue, 2020), thereby closing the slow cycle of *Serviceability*.

The top and bottom halves connect at two junctions along the people–goods interface: *Land Use*, where land use patterns co-locate or separate origins and destinations for people and goods, and *Public Space*, where the design, allocation, access management, and enforcement of streets and curbs govern how goods and people transport share the available urban space. The framework sits between *Urban Form* (i.e. the enduring physical structure of the city) and *Urban Activity* (i.e. the day-to-day flows of people and goods), which we treat as the broader background to our analysis.

3.3. The people–goods interface

The spatial organisation of cities has been the focus of numerous urban design and planning guidelines over the past two decades (e.g. Auckland Transport, 2020, 2022; Department for Transport, 2007; Global Designing Cities Initiative, 2016). These guidelines, informed by studies of the built environment and travel behaviour, emphasise factors such as density, diversity, and accessibility (Ewing & Cervero, 2001, 2010; Lee & Moudon, 2006). Their main perspective has been on the transport of people, aiming to create multimodal, multifunctional streets for more liveable cities (Gehl, 2013). Freight transport, when mentioned at all, is usually treated as an externality to be managed. Our framework places goods transport on equal conceptual footing with people transport and highlights two junctions at the people–goods interface where conflicts and complementarities become most apparent.

First, at the *Land Use* junction, long-term land-use decisions should balance people-oriented uses (e.g. housing, leisure, retail, public amenities) with goods-oriented uses (e.g. logistics facilities). When urban freight needs are insufficiently integrated into long-term plans on the left side of the framework, freight operators face spatial constraints that carry over into daily freight activities on the right side. Because logistics facilities often struggle to compete with higher-value land uses, these functions risk being displaced, leading to logistics sprawl, which in turn results in inefficient operations, including longer vehicle routes, extended delivery times, and increased congestion and emissions (Dablanc & Rakotonarivo, 2010). Conversely, deliberate integration can create complementarities, for instance through mixed-use buildings with parcel storage areas, micro-hubs, or shared delivery spaces (Buldeo Rai et al., 2022).

Second, at the *Public Space* junction, balancing people and goods transport involves the coordinated design, allocation, access management, and enforcement of streets, sidewalks, bicycle lanes, loading areas, and parking. Without integration, conflicts arise, manifesting as inefficient freight movements, compromised pedestrian and cyclist safety, and increased congestion and pollution (Fried et al., 2024). Multifunctional infrastructure and dynamic regulations can turn these tensions into complementarities (Butrina et al., 2020). For example, streets serving pedestrians during daytime can function as delivery zones in off-peak hours, supporting both logistics productivity and urban liveability (Holguín-Veras et al., 2018; Sánchez-Díaz et al., 2017).

The framework does more than connect people and goods transport at the two junctions. Because the four cycles are connected through *Land Use* and *Public Space*, pressures can also travel diagonally across the framework. Land-use strategies in the *Accessibility* cycle, such as the decentralisation of everyday functions, redistribute *Freight Demand* and thereby change the volume, timing, and spatial pattern of *Freight Trips* using *Public Space*. In the opposite direction, recurring frictions in the *Efficiency* cycle, such as cruising for parking and illegal stopping, can prompt cities to redesign streets, reallocate parking, or codify loading provision in design standards, gradually reshaping the *Transport Networks* and *Land Use* that structure *Accessibility*, with consequences for who can access public space and services. Similar diagonal effects run through the other pair of cycles. Access interventions in the *Mobility* cycle, such as circulation changes and vehicle restrictions, alter the conditions under which locations can be served and thus influence where

freight operators locate facilities within *Logistics Networks* in the *Serviceability* cycle. Conversely, facility-siting decisions in the *Serviceability* cycle can concentrate *Freight Trips* locally and alter congestion and safety conditions for *Person Trips*, as well as noise exposure for nearby residents. The trend analyses in Section 4 trace these cross-cycle interactions empirically.

4. Four trends and their implications for the people–goods interface

The following sub-sections analyse four selected urban planning trends through the lens of our conceptual framework, with Figure 2 positioning the four trends within it. For each trend, we identify the originating pressure within its respective cycle, introduce the resulting policy, planning, or design intervention, and evaluate how current empirical research addresses the cascading effects at the people–goods interface.

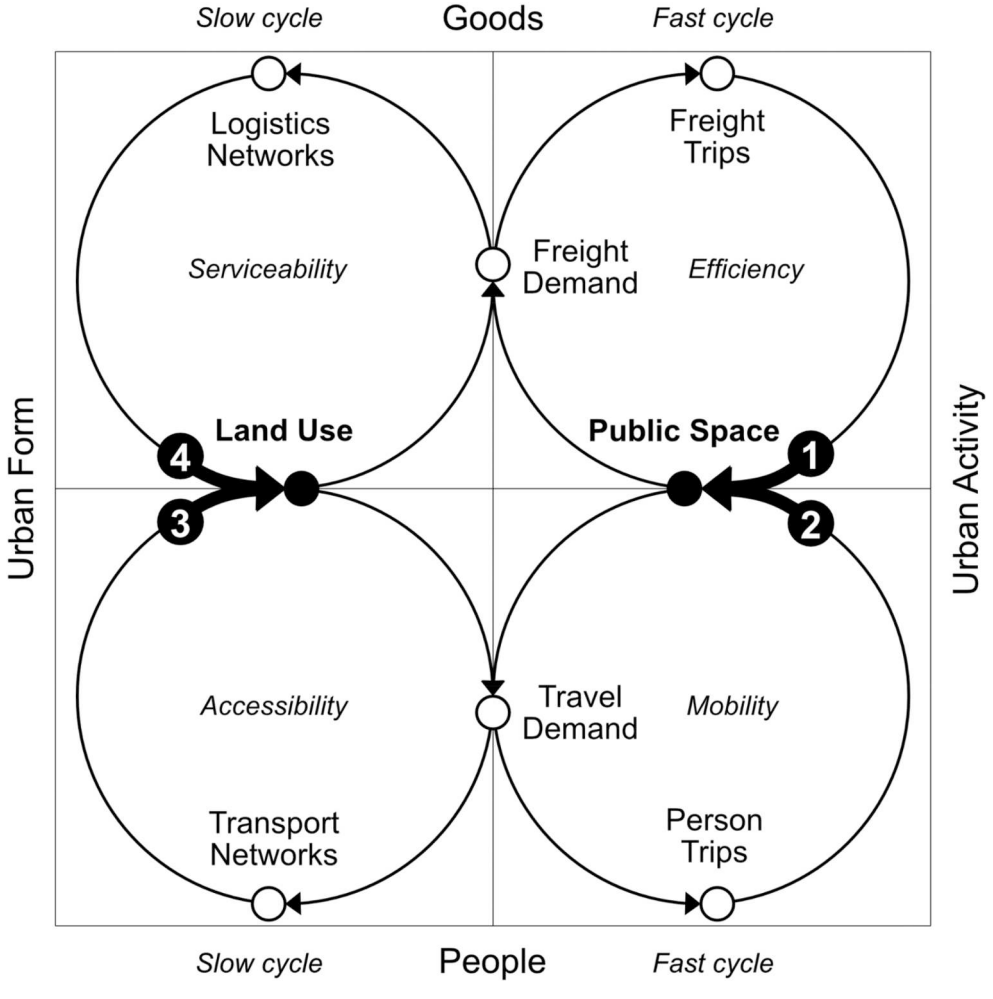


Figure 2. Positioning the four trends in the conceptual framework. 1 = Curbside management; 2 = The superblock model; 3 = The 15-minute city; 4 = Logistics zoning.

4.1. Curbside management

In the *Efficiency* cycle (Goods/Fast), pressure arises when the stopping and loading demand generated by *Freight Trips* exceeds available street and curb capacity. Each pick-up or delivery requires a freight vehicle to stop. In dense urban environments, this transition from driving to loading and unloading is concentrated at the curb, making it a primary bottleneck for freight activity. When designated *Public Space* is scarce or poorly located, carriers face productivity losses through longer search times (i.e. cruising for parking), prolonged dwell times, and missed stops, with illegal parking often used as a fallback option (Dalla Chiara & Goodchild, 2020; Iacobucci et al., 2022). These behaviours reduce efficiency and increase congestion and emissions.

Curbside management intervenes at the *Public Space* junction to resolve these pressures. Empirical findings consistently show that appropriately located loading and unloading space, well-managed time limits, and the provision of real-time curb information have a positive influence on the efficiency of freight transport (Castrellon et al., 2024; Castrellon & Sánchez-Díaz, 2024; Dalla Chiara et al., 2022; Ghizzawi et al., 2024; Girón-Valderrama et al., 2019; Mor et al., 2020; Tao & Qian, 2024). Active enforcement of loading-zone regulations further improves efficiency by limiting unauthorised occupancy, reducing cruising, and increasing turnover (Fransoo et al., 2022; Mora-Quiñones et al., 2024).

The curb is a resource shared by goods and people transport. Both lawful use by people, such as parking or short pick-ups, and unlawful use, such as double-parking, directly affect access for freight transport, leading to longer dwell times, more cruising, and reduced schedule reliability (Kim & Wang, 2022; Zhao et al., 2025). In the other direction, goods-oriented measures at the curbside, such as allocating more space to loading, setting shorter parking durations for cars, or adjusting prices for general parking, alter the mobility options available to people (Pochowski et al., 2022; Xu & Sun, 2024). The timing and location of freight activity also vary with urban activity patterns, so arrivals and dwell times at loading zones vary by time of day and built environment features that simultaneously shape travel demand (Kalahasthi et al., 2022).

Overall performance benefits from curb rules that are designed jointly for travel and freight demand (Xu & Sun, 2024). Still, goods-oriented measures at the curb often overlook their effects on people transport, and vice versa. In practice, responsibility for the curb is often fragmented across parking, transport, and public-works agencies, with many cities only recently creating dedicated curbside management units or pilot projects (Butrina et al., 2020; Gregg & Maisel, 2025). This fragmentation, coupled with incomplete usage data and limited enforcement capacity, complicates integrated decision-making (Diehl et al., 2021; Palacios-Argüello et al., 2025).

4.2. The superblock model

In the *Mobility* cycle (People/Fast), pressure originates from *Person Trips*, particularly on local, residential streets. In many grid-based cities, the distinction between arterial roads and local streets has blurred, allowing cars to permeate every part of the urban fabric in search of the fastest route, marginalising pedestrians and other users (Nello-Deakin, 2022). This worsens air quality, increases noise exposure, and reduces safety, negatively affecting liveability and public health (Mueller et al., 2020).

The superblock model intervenes at the *Public Space* junction to mitigate these pressures. It reorganises neighbourhood streets by directing through-traffic to perimeter roads and pacifying interior streets for walking, cycling, and social use. Barcelona's superblocks have become the canonical case in the literature (Scudellari et al., 2020), but the model has gained international uptake, with variations planned or implemented in other cities (Nieuwenhuijsen et al., 2024). Empirical evaluations suggest that these interventions can reduce car usage through traffic evaporation (Nello-Deakin, 2022; Nieuwenhuijsen et al., 2024) and significantly lower residents' exposure to air pollution, noise, and heat, thereby generating substantial public health benefits (Mueller et al., 2020; Nieuwenhuijsen et al., 2024). While often introduced as tactical experiments (Nello-Deakin, 2022), these interventions effectively change the street hierarchy and how people can access public space (Eggimann, 2022).

Attention to freight transport is limited. Even in commercial districts such as Barcelona's Eixample, freight needs were originally sidelined, with unloading zones often reallocated to other uses such as terraces or green infrastructure (Frago & Morcuende, 2024). This required ex post adaptations and compromises, including adding goods loading areas and accommodating waste infrastructure (e.g. garbage containers) alongside other curbside uses (Frago & Morcuende, 2024). Our framework explains why such a reactive approach may be risky. When freight is treated as an afterthought, conflicts intensify and efficiency declines. Yet freeing up space from cars also creates opportunities. Calmer streets can reduce pressure on the curb and make deliveries more reliable. If freight transport is considered from the outset, space can be reserved for freight activities, reducing the need for complex ex post rules. In this way, superblocks could evolve not only as a tool for liveability and health, but also as an enabler of more efficient, low-nuisance urban freight transport.

4.3. The 15-minute city

In the *Accessibility* cycle (People/Slow), pressure originates from *Transport Networks* that have historically favoured car dependence. This created vast distances between housing and amenities, generating high travel demand and unequal access.

The 15-minute city intervenes at the *Land Use* junction to address this disconnect. Carlos Moreno popularised the concept that everyday needs should be reachable within roughly 15 min by walking or cycling (Moreno et al., 2021). Six core urban functions (i.e. living, working, supplying, caring, learning, and enjoying) are identified as the basis of local accessibility (Moreno et al., 2021; Teixeira et al., 2024). Recent reviews show that the literature clusters around accessibility, mobility, walkability, and quality of life (Sepehri & Sharifi, 2025). Performance metrics focus on how far residents must walk or cycle to amenities, typically using distance- or population-based indicators (Carvalho et al., 2025). While the narrative has proven compelling, recent work cautions against overstating novelty (e.g. Mouratidis, 2024). Many principles overlap with earlier traditions such as the "compact city" (Dantzig & Saaty, 1973), the "city within the city" (Krier, 1984), and "new urbanism" (Duany et al., 2000).

Attention to freight remains limited, even though its implications are likely substantial. *Freight Demand* follows *Land Use* and varies by district type (e.g. office cores, business parks, high-street retail) because establishments differ in what, how much, and how often they receive goods (Sánchez-Díaz, 2017). In a 15-minute city, decentralising everyday functions is likely to reallocate *Freight Demand*, shifting commercial activity towards

more and smaller establishments and reshaping consumer shopping behaviour. Evidence on consumer shopping is mixed. One recent study finds that households in new, car-reduced neighbourhoods place more e-commerce orders (Gruber et al., 2023), while another reports that residents on car-reduced streets are less likely to be frequent online shoppers (Buldeo Rai et al., 2024). Yet another suggests that access to a private car has no effect (Tejada & Conway, 2025). If freight transport is treated as an afterthought, the resulting *Freight Trips* may strain *Public Space* and undermine the concept's goals. Considering freight transport at an early planning stage, for example by allocating space for e-commerce pick-up points (Orhan & Wallace, 2025), can help align the 15-minute city with accessibility and environmental goals.

4.4. Logistics zoning

In the *Serviceability* cycle (Goods/Slow), pressure arises from the outward relocation of logistics facilities within *Logistics Networks*. Driven by high urban land values, a lack of available space, and economic optimisation, logistics facilities are increasingly pushed towards the urban periphery. This phenomenon, known as logistics sprawl, undermines the spatial proximity between supply and demand, ultimately leading to more freight vehicles, longer distances travelled, and increased emissions (Dablanc & Rakotonarivo, 2010; El Yadari et al., 2025; Fried & Goodchild, 2023).

Logistics zoning intervenes at the *Land Use* junction to counter this outward migration. It refers to policies that preserve or mandate space for freight activities, or reintegrate such activities within the urban fabric (Fried et al., 2026). By securing space for goods handling close to consumers, such as through industrial preservation zones or mixed-use requirements, planners aim to close the feedback loop, enabling low-emission delivery modes like cargo bikes that require proximity (Heitz & Berthon, 2026; Kin et al., 2024).

While logistics zoning successfully anchor logistics facilities within the urban fabric, it rarely considers the implications for people transport in a holistic or equitable manner. Research on the spatial distribution of logistics facilities focuses on operational efficiency and emissions, often overlooking impacts on local communities (El Yadari et al., 2025). This academic blind spot is mirrored in planning practice. Zoning policies predominantly frame people as sources of conflict (e.g. noise complaints or safety risks) that drive operational restrictions, rather than as integrated users of the space (Fried et al., 2026; Kin et al., 2024). In fact, empirical evidence from New York City demonstrates that traditional logistics zoning has often concentrated these facilities near vulnerable residential communities, exacerbating social equity issues (Tejada & Conway, 2026). Furthermore, while zoning can protect industrial land, it frequently fails to integrate logistics facilities with other urban functions (Heitz & Berthon, 2026). Seen from a planning perspective, this reflects a broader tendency to accommodate urban freight through separation and mitigation, rather than actively designing it into mixed *Land Use* (Buldeo Rai et al., 2022; Conway, 2024; Fisher & Heitz, 2026).

4.5. Synthesis

Using our conceptual framework as an analytical lens shows that urban planning trends are not isolated interventions, but systemic responses that seek to rebalance a dynamic

equilibrium. Each trend follows a distinct logic in which pressure builds up in one specific cycle (e.g. *Mobility* or *Efficiency*) due to a system constraint or misalignment, prompting planners to intervene at a specific junction (e.g. *Public Space or Land Use*) to relieve that pressure. However, because the cycles are interconnected, relieving pressure in one part of the framework can trigger cascading effects. Interventions in fast cycles often necessitate changes in slow cycles, while changes in the top half of the framework alter the constraints for the bottom half, and vice versa.

The four trends make these cross-cycle interactions concrete. The 15-minute city shows how slow-cycle *Land Use* choices for people reshape fast-cycle *Freight Demand* and the resulting curb pressure. Curbside management shows the reverse movement, where recurring fast-cycle frictions in goods transport become codified over time in street design and planning standards. The superblock model illustrates how fast-cycle access interventions for people alter the *Serviceability* of inner-urban locations for logistics, while logistics zoning shows how slow-cycle facility siting decisions change traffic, safety, and walking conditions for people, including for communities with the least influence over those decisions.

Beyond this general system logic, our framework-guided analysis highlights a conceptual asymmetry in how the literature integrates these trends over time. On the *People* side (bottom half), the reviewed literature exhibits greater temporal integration in both directions. Concepts like the 15-minute city explicitly leverage the slow cycle (altering *Land Use*) to resolve pressures in the fast cycle, such as automobile-based *Person Trips*. Conversely, interventions in the fast cycle, such as street pacification in the superblock model, are understood to feed back into the slow cycle, eventually reshaping *Land Use*. The literature thus acknowledges that form shapes flow, and that flow, in turn, reshapes form. On the *Goods* side (top half) of our conceptual framework, the literature is more temporally segmented. Research on curbside management predominantly focuses on optimising the fast cycle (*Efficiency*) through design, regulation, and enforcement, often treating *Freight Demand* as given. While research on logistics zoning addresses the problem of logistics sprawl in the slow cycle (*Serviceability*), it remains largely decoupled from the operational mechanics that define the day-to-day *Efficiency* of urban deliveries. This temporal fragmentation within urban freight research exacerbates the disconnect between people-oriented and goods-oriented interventions at the people–goods interface.

These systemic disconnects result in a consistent pattern of mutual neglect, where people-oriented interventions often view freight as an external nuisance to be restricted, while goods-oriented interventions fail to account for the mobility and accessibility needs of people in cities. From the trend analyses, four missing links stand out. First, on the goods side, research on the fast cycle of *Efficiency* and the slow cycle of *Serviceability* remains temporally disconnected (Sections 4.1 and 4.4). Second, street typologies and design standards rarely specify a place for goods transport, even though curbside conflicts vary across street and area types and can have equity implications (Sections 4.1, 4.2, and 4.4). Third, cities lack established routines for involving freight stakeholders when public space is redesigned, as the ex-post adaptations in superblock implementations illustrate (Section 4.2). Fourth, the freight transport consequences of people-oriented neighbourhood strategies remain uncertain, with mixed empirical evidence on how improved local accessibility reshapes *Freight Demand* (Sections 4.2 and 4.3). These missing links structure the research agenda that follows.

5. Research agenda and implications for practice

The synthesis in Section 4.5 identified four missing links at the people–goods interface, and each defines one topic of the research agenda. Section 5.1 takes up the temporal segmentation between the goods-side cycles, Section 5.2 addresses the absence of goods transport in street typologies, Section 5.3 examines design guidelines and engagement routines for redesigning public space, and Section 5.4 covers the uncertain freight consequences of people-oriented neighbourhood design. For each topic, we relate the gap to the evidence reviewed in Section 4 and formulate example research questions. The questions are not intended to be exhaustive, but to provide inspiration for future studies that integrate urban freight transport more fully into land use and public space planning.

5.1. Temporal interactions between goods transport cycles

The analyses of curbside management (Section 4.1) and logistics zoning (Section 4.4) showed that goods-oriented research remains split between fast-cycle operations and slow-cycle planning, with little attention to how the two condition each other. Urban freight transport is most visible at short timescales and when pressure on Public Space is high. Examples include trucks parked in the wrong place, delivery vans crowding the curbside, and noise disturbing nearby residents. To manage these growing tensions, planners and policymakers often turn to short-term interventions to mitigate freight-related externalities, such as vehicle restrictions, delivery time windows, or temporary unloading zones (Butrina et al., 2020; Palacios-Argüello et al., 2025). While these mitigate immediate conflicts, they do not resolve underlying issues in the *Serviceability* cycle of our framework. Freight operators are optimising within the constraints of the spatial configuration and regulatory context of cities. This does not imply that planning should always start from the slow cycle. Short-term interventions can legitimately come first when they are used to diagnose shortcomings and to sequence longer-term changes. Without complementary slow-cycle adjustments, however, such interventions risk undermining *Efficiency* (Quak & de Koster, 2007) and provoking backlash that ultimately erodes their durability.

Example research questions:

- RQ1: To what extent are planners and policymakers aware of the longer-term implications that follow from their fast-cycle urban freight transport interventions, and how does this awareness shape the durability of policy outcomes?
- RQ2: How can the slow-cycle demands created by fast-cycle urban freight transport interventions be anticipated and accommodated by public authorities?

5.2. Integrating freight transport into street typologies

Sections 4.1 and 4.2 showed that conflicts between people and goods transport at the curb are shaped by street design, yet the typologies through which planning differentiates streets rarely account for goods transport (e.g. Auckland Transport, 2020). Integrating goods transport more prominently within those typologies (i.e. at the *Public Space* junction along the people–goods interface) would enable more efficient urban freight transport. Doing so also matters for equity, as freight traffic and logistics land uses have historically been concentrated near marginalised communities, with associated health and safety burdens (Fried et al.,

2024). Linking these street typologies to the planning of logistics facilities deeper within cities (Buldeo Rai et al., 2022; Fisher & Heitz, 2026; Heitz & Berthon, 2026) could also help align delivery patterns with spatial constraints created through the slow cycles of the framework.

Example research questions:

- RQ3: What urban freight transport activities are associated with different street and area types (e.g. historic city centres, mixed-use corridors, suburban neighbourhoods), and how can these profiles be consistently identified to inform planning?
- RQ4: How can planning embed rules so that those who generate or benefit from freight activity bear a proportionate share of local externalities, and where do current practices fall short?

5.3. Street design guidelines and stakeholder engagement at the people–goods interface

The superblock case (Section 4.2) illustrates how freight requirements tend to surface only after public space has been redesigned, prompting exemptions and ex post adaptations. As cities prioritise walking, cycling, and public transport, street design guidelines increasingly need to account for goods transport alongside people transport. One potential strategy is to assign time-of-day roles to the same *Public Space* (e.g. morning freight loading, midday cycling priority). Yet the evidence remains thin on whether such temporal arrangements actually harness complementarities at the people–goods interface without creating hidden costs for delivery efficiency or for walking and cycling conditions. Urban freight is shaped by fragmented actors (e.g. operators, couriers, receivers, building managers, platforms) whose incentives and constraints differ (Ringsberg et al., 2023). Most cities lack established routines for involving them when developing or revising design guidelines. Academic work has mainly examined engagement through pilot projects or ex ante evaluations, leaving limited insight into which forms of participation make a difference (Paddeu et al., 2024).

Example research questions:

- RQ5: Do time-of-day street and curbside rules reduce conflicts without decreasing urban freight transport efficiency or undermining walking and cycling conditions?
- RQ6: At which stages of the planning cycle (problem diagnosis, co-design, piloting, codification) does engagement with freight stakeholders most strengthen street design guidelines?

5.4. Neighbourhood design and its impact on the people–goods interface

The mixed evidence on shopping and delivery behaviour in car-reduced neighbourhoods (Section 4.3) indicates that the freight consequences of people-oriented neighbourhood design remain poorly understood. Many cities are making *Land Use* choices and redesigning *Public Space* to improve *Accessibility* and discourage car-based mobility. What this means for freight transport is still uncertain. On the one hand, less car use may drive demand for e-commerce, as residents substitute car-based shopping trips with home deliveries. On the other hand, redesign inspired by principles such as the 15-minute

city may improve the local availability of goods, potentially making B2B restocking of local shops more complex. In any case, *Freight Demand* need not rise for *Freight Trips* to become more visible in *Public Space*. With cars occupying less space, *Freight Trips* may account for a larger share of urban traffic and curb use, becoming a more noticeable element of everyday urban life.

Example research questions:

- RQ7: In neighbourhoods planned around 15-minute accessibility, to what extent do changes in local accessibility alter demand for e-commerce versus in-person shopping?
- RQ8: As goods and services become more locally accessible, how do B2B transport patterns change?
- RQ9: What minimum set of short-term street design measures and longer-term land use policies is needed to meet freight demand while improving sustainability?

5.5. Implications for planning, governance, and street management

The framework offers an analytical lens for identifying where planning problems originate, where they materialise, and which actors need to be involved. Three implications for practice follow from the framework and the reviewed trends.

First, the framework helps transport planners distinguish fast-cycle symptoms from slow-cycle causes. Recurring curbside conflicts, such as cruising for parking and illegal stopping, are commonly addressed through enforcement, time windows, or allocation rules. The reviewed evidence shows that such measures can improve *Efficiency* (Section 4.1), but persistent conflicts may also reflect constraints in the *Serviceability* cycle, including a failure to reserve sufficient space for logistics functions in long-term land-use decisions (Section 4.4).

Second, the framework can broaden the criteria used to assess interventions on either side of the people–goods interface. Decisions on logistics-facility location are typically assessed in terms of freight efficiency and emissions, although the reviewed evidence also points to effects on local traffic, safety, and equity (Section 4.4). Conversely, people-oriented interventions such as superblocks and the 15-minute city are assessed mainly in terms of accessibility, mobility, health, and liveability, while their implications for freight operations receive little attention (Sections 4.2 and 4.3). Street typologies and design guidelines provide a practical means of institutionalising this broader assessment.

Third, the framework can help identify which actors need to be involved, and when. The four cycles map onto responsibilities that in most cities are divided across departments for transport planning, land use and zoning, parking and enforcement, public space design, and economic development. Public authorities can use the framework to identify which departments share responsibility for a problem at the people–goods interface and to organise engagement with freight operators, couriers, receivers, and building managers at specific stages of the planning cycle, from problem diagnosis and design to piloting, codification, and evaluation (Section 5.3). Used in this way, the framework can help departments coordinate measures for people and goods transport, connect immediate street-management problems to longer-term land-use and network decisions, and clarify who needs to act at each stage.

6. Concluding remarks

The movement of people and goods is essential to a vibrant, well-functioning city. Cities plan in detail for how people move. Freight transport, by contrast, often becomes visible in urban planning and policy debates primarily through its negative impacts, including congestion, double parking, and safety concerns. This paper responds by developing a framework that brings people and goods transport into a single conceptual lens. The proposed framework builds on established conceptualisations for people transport and adds equivalent elements for goods transport. It brings these together in four connected cycles. For people transport, it uses the well-known accessibility and mobility cycles. For goods transport, it introduces serviceability and efficiency as their counterparts. The framework links these cycles at two critical junctions along the people–goods interface. These are land use, which shapes where activities and deliveries concentrate, and public space, which shapes how streets and curbsides are allocated and used.

Using the framework as an analytical lens, we reviewed empirical evidence across four planning trends (i.e. curbside management, the superblock model, the 15-minute city, and logistics zoning) and found a recurring pattern. People-oriented interventions often view freight transport as an external nuisance to be restricted, while goods-oriented interventions often fail to account for the mobility and accessibility needs of people in cities. The resulting research agenda prioritises analysing temporal coupling between the slow and fast cycles of goods transport, embedding freight needs within street typologies and design guidelines, and examining how neighbourhood and land-use strategies intended to improve accessibility reshape freight demand and public-space pressures. Taken together, these directions support a more structural integration of urban freight into transport planning research and provide practical entry points for planners to reconcile the competing claims that people and goods transport place on urban space in sustainable and liveable cities.

Authors contributions

Conceptualization: PB, BK, HBR, JG; Funding acqui**s**ition: PB, BK, HBR; Visualization: JG; Writing – original draft: PB, BK, HBR, JG; Writing – review & editing: PB, BK, HBR, JG.

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References

Allen, J., Piecyk, M., Piotrowska, M., McLeod, F., Cherrett, T., Ghali, K., Nguyen, T., Bektaş, T., Bates, O., Friday, A., Wise, S., & Austwick, M. (2018). Understanding the impact of e-commerce on last-mile light goods vehicle activity in urban areas: The case of London. *Transportation Research Part D: Transport and Environment*, *61*, 325–338. https://doi.org/10.1016/j.trd.2017.07.020

Auckland Transport. (2020). *Roads and streets framework. (Design Guide No. Version 2)*. https://at.govt.nz/media/1983549/roads-and-streets-framework-may-2020-web.pdf

Auckland Transport. (2022). *Urban street and road design guide (Transport Design Manual, Version 1.1)*. https://at.govt.nz/media/1989354/urban-street-and-road-design-guide-1-1-2022.pdf

Baumol, W. J., & Vinod, H. D. (1970). An inventory theoretic model of freight transport demand. *Management Science*, *16*(7), 413–421. https://doi.org/10.1287/mnsc.16.7.413

Bertolini, L. (2012). Integrating mobility and urban development agendas: A manifesto. *disP – The Planning Review*, *48*(1), 16–26. https://doi.org/10.1080/02513625.2012.702956

Bjørgen, A., & Ryghaug, M. (2022). Integration of urban freight transport in city planning: Lesson learned. *Transportation Research Part D: Transport and Environment*, *107*, 103310. https://doi.org/10.1016/j.trd.2022.103310

Buldeo Rai, H., Kang, S., Sakai, T., Tejada, C., Yuan, Q., Conway, A., & Dablanc, L. (2022). 'Proximity logistics': Characterizing the development of logistics facilities in dense, mixed-use urban areas around the world. *Transportation Research Part A: Policy and Practice*, *166*, 41–61. https://doi.org/10.1016/j.tra.2022.10.007

Buldeo Rai, H., Mariquivoi, J., Stas, L., & Mommens, K. (2024). Planning for parcels – E-commerce in the future city. In L. Tavasszy, M. Browne, & M. Piecyk (Eds.), *Advances in transport policy and planning: Vol. 14. Freight transport planning* (pp. 205–221). Academic Press. https://doi.org/10.1016/bs.atpp.2024.09.002

Buser, M. A., Ramezani, S., Stead, D., & Arts, J. (2025). Policy packaging for land-use and transport planning: The state-of-the-art. *Transport Reviews*, *45*(3), 333–365. https://doi.org/10.1080/01441647.2025.2462037

Butrina, P., Le Vine, S., Henao, A., Sperling, J., & Young, S. E. (2020). Municipal adaptation to changing curbside demands: Exploratory findings from semi-structured interviews with ten U.S. cities. *Transport Policy*, *92*, 1–7. https://doi.org/10.1016/j.tranpol.2020.03.005

Carvalho, T., Farber, S., Manaugh, K., & El-Geneidy, A. (2025). Assessing the readiness for 15-minute cities: A literature review on performance metrics and implementation challenges worldwide. *Transport Reviews*, *45*(5), 801–827. https://doi.org/10.1080/01441647.2025.2513530

Castrellon, J. P., & Sánchez-Díaz, I. (2024). Effects of freight curbside management on sustainable cities: Evidence and paths forward. *Transportation Research Part D: Transport and Environment*, *130*, 104165. https://doi.org/10.1016/j.trd.2024.104165

Castrellon, J. P., Sánchez-Díaz, I., & Gil, J. (2024). Smart loading zones. A data analytics approach for loading zones network design. *Transportation Research Interdisciplinary Perspectives*, *24*, 101034. https://doi.org/10.1016/j.trip.2024.101034

Chen, Q., Conway, A., & Cheng, J. (2017). Parking for residential delivery in New York City: Regulations and behavior. *Transport Policy*, *54*, 53–60. https://doi.org/10.1016/j.tranpol.2016.12.005

Conway, A. (2024). Accounting for freight in modern urban planning and design. In L. Tavasszy, M. Browne, & M. Piecyk (Eds.), *Advances in transport policy and planning: Vol. 14. Freight transport planning* (pp. 1–32). Academic Press. https://doi.org/10.1016/bs.atpp.2024.09.008

Crainic, T. G., Ricciardi, N., & Storchi, G. (2004). Advanced freight transportation systems for congested urban areas. *Transportation Research Part C: Emerging Technologies*, *12*(2), 119–137. https://doi.org/10.1016/j.trc.2004.07.002

Cui, J., Dodson, J., & Hall, P. V. (2015). Planning for urban freight transport: An overview. *Transport Reviews*, *35*(5), 583–598. https://doi.org/10.1080/01441647.2015.1038666

Dablanc, L., & Rakotonarivo, D. (2010). The impacts of logistics sprawl: How does the location of parcel transport terminals affect the energy efficiency of goods' movements in Paris and what

can we do about it? *Procedia-Social and Behavioral Sciences*, *2*(3), 6087–6096. https://doi.org/10.1016/j.sbspro.2010.04.021

Dalla Chiara, G., & Goodchild, A. (2020). Do commercial vehicles cruise for parking? Empirical evidence from Seattle. *Transport Policy*, *97*, 26–36. https://doi.org/10.1016/j.tranpol.2020.06.013

Dalla Chiara, G., & Goodchild, A. (2025). The role of walking in last-mile urban deliveries. *Transportation*, https://doi.org/10.1007/s11116-025-10633-6

Dalla Chiara, G., Krutein, K. F., Ranjbari, A., & Goodchild, A. (2022). Providing curb availability information to delivery drivers reduces cruising for parking. *Scientific Reports*, *12*(1), 19355. https://doi.org/10.1038/s41598-022-23987-z

Dantzig, G. B., & Saaty, T. L. (1973). *Compact city: A plan for a liveable urban environment*. W. H. Freeman.

De Bakshi, N., Tiwari, G., & Bolia, N. B. (2020). Influence of urban form on urban freight trip generation. *Case Studies on Transport Policy*, *8*(1), 229–235. https://doi.org/10.1016/j.cstp.2019.04.004

de Bok, M., & Tavasszy, L. (2018). An empirical agent-based simulation system for urban goods transport (MASS-GT). *Procedia Computer Science*, *130*, 126–133. https://doi.org/10.1016/j.procs.2018.04.021

Department for Transport. (2007). *Manual for streets [guidance]*. Thomas Telford Publishing. https://assets.publishing.service.gov.uk/media/5a7e0035ed915d74e6223743/pdfmanforstreets

Diehl, C., Ranjbari, A., & Goodchild, A. (2021). Curbspace management challenges and opportunities from public and private sector perspectives. *Transportation Research Record*, *2675*(11), 1413–1427. https://doi.org/10.1177/03611981211027156

Duany, A., Plater-Zyberk, E., & Speck, J. (2000). *Suburban nation: The rise of sprawl and the decline of the American dream*. North Point Press.

Eggimann, S. (2022). The potential of implementing superblocks for multifunctional street use in cities. *Nature Sustainability*, *5*(5), 406–414. https://doi.org/10.1038/s41893-022-00855-2

El Yadari, M., Jawab, F., & Moufad, I. (2025). Logistics sprawl: A systematic literature review. *IEEE Engineering Management Review*, *53*(1), 82–99. https://doi.org/10.1109/EMR.2024.3443240

Ewing, R., & Cervero, R. (2001). Travel and the built environment: A synthesis. *Transportation Research Record*, *1780*(1), 87–114. https://doi.org/10.3141/1780-10

Ewing, R., & Cervero, R. (2010). Travel and the built environment: A meta-analysis. *Journal of the American Planning Association*, *76*(3), 265–294. https://doi.org/10.1080/01944361003766766

Fisher, R., & Heitz, A. (2026). Toward an urban logistics design: Programming logistics in mixed-use urban projects in Île-de-France. *European Planning Studies*, *34*(4), 785–804. https://doi.org/10.1080/09654313.2025.2607058.

Frago, L., & Morcuende, A. (2024). Urban planning paradoxes and sociospatial fragmentation: The superblock Barcelona case (2016-2023). *International Journal of Urban and Regional Research*, *48*(6), 1055–1078. https://doi.org/10.1111/1468-2427.13273

Fransoo, J. C., Cedillo-Campos, M. G., & Gámez-Pérez, K. M. (2022). Estimating the benefits of dedicated unloading bays by field experimentation. *Transportation Research Part A: Policy and Practice*, *160*, 348–354. https://doi.org/10.1016/j.tra.2022.03.023

Fried, T., & Goodchild, A. (2023). E-commerce and logistics sprawl: A spatial exploration of last-mile logistics platforms. *Journal of Transport Geography*, *112*, 103692. https://doi.org/10.1016/j.jtrangeo.2023.103692

Fried, T., Goodchild, A., Browne, M., & Sánchez-Díaz, I. (2024). Seeking equity and justice in urban freight: Where to look? *Transport Reviews*, *44*(1), 191–212. https://doi.org/10.1080/01441647.2023.2247165

Fried, T., Tejada, C., Dennis-Bauer, S., Bolbaatar, O., Goodchild, A., Marshall, J. D., Olmedo, O., & García, L. (2026). Logistics of zoning, zoning for logistics: Toward healthy and equitable development for urban freight. *Journal of the American Planning Association*, *92*(1), 15–32. https://doi.org/10.1080/01944363.2025.2515134

Gehl, J. (2013). *Cities for people*. Island Press.

Geurs, K. T., & van Wee, B. (2004). Land-use/transport interaction models as tools for sustainability impact assessment of transport investments: Review and research perspectives. *European Journal*

of Transport and Infrastructure Research, *4*(3), 333–355. https://doi.org/10.18757/ejtir.2004.4.3.4272.

Ghizzawi, F., Galal, A., & Roorda, M. J. (2024). Modelling parking behaviour of commercial vehicles: A scoping review. *Transport Reviews*, *44*(4), 743–765. https://doi.org/10.1080/01441647.2024.2305202

Girón-Valderrama, G. C., Machado-León, J. L., & Goodchild, A. (2019). Commercial vehicle parking in downtown Seattle: Insights on the battle for the curb. *Transportation Research Record*, *2673*(10), 770–780. https://doi.org/10.1177/0361198119849062

Global Designing Cities Initiative. (2016). *Global street design guide*. Island Press. https://islandpress.org/books/global-street-design-guide

Gregg, K., & Maisel, J. (2025). Cutting across the curb – A review of recent developments in municipal curb management policy in America and Canada. *Transport Policy*, *164*, 196–205. https://doi.org/10.1016/j.tranpol.2025.01.031

Gruber, J., Heldt, B., & Seidel, S. (2023). New neighborhood, old habits? Delivery preferences of residents in new development areas and their assessment of alternative parcel logistics concepts: A case study of Berlin. *Journal of Shipping and Trade*, *8*(1), 7. https://doi.org/10.1186/s41072-023-00138-9

Haarstad, H., Rosales, R., & Shrestha, S. (2024). Freight logistics and the city. *Urban Studies*, *61*(1), 3–19. https://doi.org/10.1177/00420980231177265

Hansen, W. G. (1959). How accessibility shapes land use. *Journal of the American Institute of Planners*, *25*(2), 73–76. https://doi.org/10.1080/01944365908978307

Hartl, R., Harms, P., & Egermann, M. (2024). Towards transformation-oriented planning: What can sustainable urban mobility planning (SUMP) learn from transition management (TM)? *Transport Reviews*, *44*(1), 167–190. https://doi.org/10.1080/01441647.2023.2239497

Heitz, A., & Berthon, J. (2026). In search of operational tools in urban planning for the development of urban logistics spaces: The case of logistics urban design in Paris. *Transportation Planning and Technology*, *49*(1), 99–120. https://doi.org/10.1080/03081060.2025.2476747

Holguín-Veras, J., Encarnación, T., González-Calderón, C. A., Winebrake, J. J., Wang, C., Kyle, S., Herazo-Padilla, N., Kalahasthi, L., Adarme, W., Cantillo, V., Yoshizaki, H., & Garrido, R. (2018). Direct impacts of off-hour deliveries on urban freight emissions. *Transportation Research Part D: Transport and Environment*, *61*, 84–103. https://doi.org/10.1016/j.trd.2016.10.013

Holguín-Veras, J., Jaller, M., Destro, L., Ban, X., Lawson, C., & Levinson, H. S. (2011). Freight generation, freight trip generation, and perils of using constant trip rates. *Transportation Research Record*, *2224*(1), 68–81. https://doi.org/10.3141/2224-09

Iacobucci, E., McDonald, N., Edwards, C. H. W., & Steiner, R. (2022). Using social media to understand challenges faced by US urban parcel delivery drivers: Reports from the curb. *Transport Policy*, *126*, 96–106. https://doi.org/10.1016/j.tranpol.2022.07.013

Jaller, M., Sánchez-Díaz, I., & Holguín-Veras, J. (2015). Identifying freight intermediaries: Implications for modeling of freight trip generation. *Transportation Research Record*, *2478*(1), 48–56. https://doi.org/10.3141/2478-06

Janjevic, M., Knoppen, D., & Winkenbach, M. (2019). Integrated decision-making framework for urban freight logistics policy-making. *Transportation Research Part D: Transport and Environment*, *72*, 333–357. https://doi.org/10.1016/j.trd.2019.05.006

Janjevic, M., & Winkenbach, M. (2020). Characterizing urban last-mile distribution strategies in mature and emerging e-commerce markets. *Transportation Research Part A: Policy and Practice*, *133*, 164–196. https://doi.org/10.1016/j.tra.2020.01.003

Kalahasthi, L. K., Sánchez-Díaz, I., Castrellon, J. P., Gil, J., Browne, M., Hayes, S., & Sentis Ros, C. (2022). Joint modeling of arrivals and parking durations for freight loading zones: Potential applications to improving urban logistics. *Transportation Research Part A: Policy and Practice*, *166*, 307–329. https://doi.org/10.1016/j.tra.2022.11.003.

Kim, W., & Wang, X. (2022). Double parking in New York City: A comparison between commercial vehicles and passenger vehicles. *Transportation*, *49*(5), 1315–1337. https://doi.org/10.1007/s11116-021-10212-5

Kin, B., Buldeo Rai, H., Dablanc, L., & Quak, H. (2024). Integrating logistics into urban planning: Best practices from Paris and Rotterdam. *European Planning Studies*, *32*(1), 24–44. https://doi.org/10.1080/09654313.2023.2242400

Krier, L. (1984). The city within the city. *Architectural Design*, *54*(7-8), 70–105.

Lee, C., & Moudon, A. V. (2006). The 3Ds+ R: Quantifying land use and urban form correlates of walking. *Transportation Research Part D: Transport and Environment*, *11*(3), 204–215. https://doi.org/10.1016/j.trd.2006.02.003

Lehmann, J., & Winkenbach, M. (2024). A matheuristic for the two-echelon multi-trip vehicle routing problem with mixed pickup and delivery demand and time windows. *Transportation Research Part C: Emerging Technologies*, *160*, 104522. https://doi.org/10.1016/j.trc.2024.104522

Lowry, I. S. (1964). *A model of metropolis (RAND Research Memorandum RM-4035-RC)*. RAND Corporation. https://www.rand.org/pubs/research_memoranda/RM4035.html

Mafla-Hernández, F. J., Gonzalez-Calderon, C. A., & Posada-Henao, J. J. (2025). Freight trip generation modeling for large facilities in urban areas: An empirical investigation. *Transport Policy*, *163*, 102–115. https://doi.org/10.1016/j.tranpol.2025.01.008

Maxner, T., Dalla Chiara, G., & Goodchild, A. (2025). The state of sustainable urban last-mile freight planning in the United States. *Journal of the American Planning Association*, *91*(1), 88–101. https://doi.org/10.1080/01944363.2024.2324096

Mor, A., Speranza, M. G., & Viegas, J. M. (2020). Efficient loading and unloading operations via a booking system. *Transportation Research Part E: Logistics and Transportation Review*, *141*, 102040. https://doi.org/10.1016/j.tre.2020.102040

Mora-Quiñones, C. A., Fransoo, J. C., Velázquez-Martínez, J. C., Cárdenas-Barrón, L. E., & Escamilla, R. (2024). Assessing the impact of loading-unloading zones in emerging markets: Evidence from Mexico. *Transportation Research Part D: Transport and Environment*, *137*, 104486. https://doi.org/10.1016/j.trd.2024.104486

Moreno, C., Allam, Z., Chabaud, D., Gall, C., & Pratlong, F. (2021). Introducing the "15-Minute City": Sustainability, resilience and place identity in future post-pandemic cities. *Smart Cities*, *4*(1), 93–111. https://doi.org/10.3390/smartcities4010006

Mouratidis, K. (2024). Time to challenge the 15-minute city: Seven pitfalls for sustainability, equity, livability, and spatial analysis. *Cities*, *153*, 105274. https://doi.org/10.1016/j.cities.2024.105274

Mueller, N., Rojas-Rueda, D., Khreis, H., Cirach, M., Andrés, D., Ballester, J., Bartoll, X., Daher, C., Deluca, A., Echave, C., Milà, C., Márquez, S., Palou, J., Pérez, K., Tonne, C., Stevenson, M., Rueda, S., & Nieuwenhuijsen, M. (2020). Changing the urban design of cities for health: The superblock model. *Environment International*, *134*, 105132. https://doi.org/10.1016/j.envint.2019.105132

Nello-Deakin, S. (2022). Exploring traffic evaporation: Findings from tactical urbanism interventions in Barcelona. *Case Studies on Transport Policy*, *10*(4), 2430–2442. https://doi.org/10.1016/j.cstp.2022.11.003

Nieuwenhuijsen, M., de Nazelle, A., Cirach Pradas, M., Daher, C., Dzhambov, A. M., Echave, C., Gössling, S., Iungman, T., Khreis, H., Kirby, N., Khomenko, S., Leth, U., Lorenz, F., Matkovic, V., Müller, J., Palència, L., Pereira Barboza, E., Pérez, K., Tatah, L., … Mueller, N. (2024). The Superblock model: A review of an innovative urban model for sustainability, liveability, health and well-being. *Environmental Research*, *251*, 118550. https://doi.org/10.1016/j.envres.2024.118550

Nieuwenhuijsen, M. J., & Khreis, H. (2016). Car-free cities: Pathway to healthy urban living. *Environment International*, *94*, 251–262. https://doi.org/10.1016/j.envint.2016.05.032

Orhan, C. C., & Wallace, S. W. (2025). E-commerce shipments in an X-minute city: Informing authorities on freight transport through parcel lockers. *Transportation Research Part A: Policy and Practice*, *199*, 104545. https://doi.org/10.1016/j.tra.2025.104545

Ortúzar, J. D., & Willumsen, L. G. (2011). *Modelling transport (4th ed.)*. Wiley. https://doi.org/10.1002/9781119993308

Paddeu, D., Lyons, G., Chatterjee, K., & Calvert, T. (2024). Practitioner views on transport planning's evolution – A Sisyphean task still ahead? *Transport Policy*, *156*, 89–100. https://doi.org/10.1016/j.tranpol.2024.07.015

Palacios-Argüello, L., Castrellon, J. P., & Sánchez-Díaz, I. (2025). From pilot to policy: Examining the transition towards institutionalized practices in freight curbside management. *Transport Policy*, *164*, 244–254. https://doi.org/10.1016/j.tranpol.2025.02.005

Pochowski, A. L., Crim, S., Liu, L., Trask, L., Sherman Baker, C., Woodworth, S., & Klion, J. (2022). Solving the curb space puzzle through the development of a curb space allocation tool. *Transportation Research Record*, *2676*(10), 601–621. https://doi.org/10.1177/03611981221090514

Quak, H. J., & de Koster, M. B. M. (2007). Exploring retailers' sensitivity to local sustainability policies. *Journal of Operations Management*, *25*(6), 1103–1122. https://doi.org/10.1016/j.jom.2007.01.020

Ringsberg, H., Brettmo, A., & Browne, M. (2023). Exploring Swedish urban freight stakeholders' interests in public spaces. *Cities*, *133*, 104131. https://doi.org/10.1016/j.cities.2022.104131

Rodrigue, J.-P. (2020). *The geography of transport systems (5th ed.)*. Routledge. https://doi.org/10.4324/9780429346323

Rodrigue, J.-P., Conway, A., Dablanc, L., Giuliano, G., Lee, J.-S., & O'Brien, T. (Eds.). (2020). *City logistics: Concepts, policy and practice*. MetroFreight Consortium. https://globalcitylogistics.org/

Rosales, R., & Haarstad, H. (2023). Governance challenges for urban logistics: Lessons from three Norwegian cities. *Environmental Policy and Governance*, *33*(3), 221–231. https://doi.org/10.1002/eet.2015

Sakai, T., Alho, A. R., Bhavathrathan, B. K., Dalla Chiara, G., Gopalakrishnan, R., Jing, P., Hyodo, T., Cheah, L., & Ben-Akiva, M. (2020). SimMobility Freight: An agent-based urban freight simulator for evaluating logistics solutions. *Transportation Research Part E: Logistics and Transportation Review*, *141*, 102017. https://doi.org/10.1016/j.tre.2020.102017

Sánchez-Díaz, I. (2017). Modeling urban freight generation: A study of commercial establishments' freight needs. *Transportation Research Part A: Policy and Practice*, *102*, 3–17. https://doi.org/10.1016/j.tra.2016.06.035

Sánchez-Díaz, I., Georén, P., & Brolinson, M. (2017). Shifting urban freight deliveries to the off-peak hours: A review of theory and practice. *Transport Reviews*, *37*(4), 521–543. https://doi.org/10.1080/01441647.2016.1254691

Scudellari, J., Staricco, L., & Vitale Brovarone, E. (2020). Implementing the Supermanzana approach in Barcelona: Critical issues at local and urban level. *Journal of Urban Design*, *25*(6), 675–696. https://doi.org/10.1080/13574809.2019.1625706

Sepehri, B., & Sharifi, A. (2025). X-minute cities as a growing notion of sustainable urbanism: A literature review. *Cities*, *161*, 105902. https://doi.org/10.1016/j.cities.2025.105902

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Stead, D., & Marshall, S. (2001). The relationships between urban form and travel patterns: An international review and evaluation. *European Journal of Transport and Infrastructure Research*, *1*(2), 113–141. https://doi.org/10.18757/ejtir.2001.1.2.3497

Taniguchi, E., Thompson, R. G., Yamada, T., & van Duin, J. H. R. (Eds.). (2001). *City logistics: Network modelling and intelligent transport systems*. Pergamon. https://doi.org/10.1108/9780585473840

Tao, T., & Qian, S. (2024). Do smart loading zones help reduce traffic congestion? A causal analysis in Pittsburgh. *Transportation Research Part E: Logistics and Transportation Review*, *192*, 103796. https://doi.org/10.1016/j.tre.2024.103796

Tavasszy, L. A., Smeenk, B., & Ruijgrok, C. J. (1998). A DSS for modelling logistic chains in freight transport policy analysis. *International Transactions in Operational Research*, *5*(6), 447–459. https://doi.org/10.1111/j.1475-3995.1998.tb00128.x

Teixeira, J. F., Silva, C., Seisenberger, S., Büttner, B., McCormick, B., Papa, E., & Cao, M. (2024). Classifying 15-minute cities: A review of worldwide practices. *Transportation Research Part A: Policy and Practice*, *189*, 104234. https://doi.org/10.1016/J.TRA.2024.104234

Tejada, C., & Conway, A. (2025). An empirical approach to modeling online shopping and its effects on urban freight planning: The case of New York City. *Case Studies on Transport Policy*, *21*, 101473. https://doi.org/10.1016/j.cstp.2025.101473

Tejada, C., & Conway, A. (2026). Measuring the social effects of urban logistics facilities development, the case of New York City. *Transportation Planning and Technology*, *49*(1), 7–34. https://doi.org/10.1080/03081060.2024.2397386

van Burgsteden, M., Grigolon, A., & Geurs, K. (2024). Improving community wellbeing through transport policy: A literature review and theoretical framework, based on the capability approach. *Transport Reviews*, *44*(6), 1161–1186. https://doi.org/10.1080/01441647.2024.2374818

van Wee, B., & Banister, D. (2016). How to write a literature review paper? *Transport Reviews*, *36*(2), 278–288. https://doi.org/10.1080/01441647.2015.1065456

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, *26*(2), xiii–xxiii. https://doi.org/10.2307/4132319

Wegener, M. (2004). Overview of land use transport models. In D. A. Hensher, K. J. Button, K. E. Haynes, & P. R. Stopher (Eds.), *Handbook of transport geography and spatial systems* (pp. 127–146). Emerald Group Publishing Limited. https://doi.org/10.1108/9781615832538-009

Wegener, M., & Fürst, F. (1999). *Land-use transport interaction: State of the art (Deliverable D2a of the project TRANSLAND; Berichte aus dem Institut für Raumplanung Nr. 46)*. Universität Dortmund, Institut für Raumplanung. https://doi.org/10.2139/ssrn.1434678

Winston, C. (1983). The demand for freight transportation: Models and applications. *Transportation Research Part A: General*, *17*(6), 419–427. https://doi.org/10.1016/0191-2607(83)90162-0

Woudsma, C., Jensen, J. F., Kanaroglou, P., & Maoh, H. (2008). Logistics land use and the city: A spatial–temporal modeling approach. *Transportation Research Part E: Logistics and Transportation Review*, *44*(2), 277–297. https://doi.org/10.1016/j.tre.2007.07.006

Xu, Z., & Sun, X. (2024). Economic analysis of on-street parking with urban delivery. *Transportation Science*, *58*(6), 1300–1318. https://doi.org/10.1287/trsc.2024.0569

Zhao, Y., Li, C., Lim, J., & Masoud, N. (2025). A microsimulation study of curb space operational strategies and user behaviors. *Transportation Research Part E: Logistics and Transportation Review*, *203*, 104346. https://doi.org/10.1016/j.tre.2025.104346