

Governing the Infrastructural, Spatial, and Social Consequences of Urban Digital Food Delivery Platforms

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Abstract

Digital food delivery platforms (DFDPs) are transforming how food is distributed and consumed in cities, but also how urban space, infrastructure, and labor are organized. This article examines how DFDPs affect urban infrastructure in cities by analyzing their spatial, logistical, and governance impacts. Drawing on interviews with municipal officials, platform companies, and civil society actors in three Swedish cities, as well as document analysis and literature review, the study explores how DFDPs challenge conventional planning and regulatory frameworks. Using the lenses of spatial inequality, platform urbanism, and anticipatory governance, the article investigates how platforms operate through hybrid infrastructures that can affect land use, public space, and spatial equalities. While municipal responses remain fragmented and reactive, emerging experiments offer glimpses of more inclusive and future-oriented governance. The article suggests that urban planning approaches need to recognize DFDPs as infrastructural actors and integrate them into coherent regulatory strategies.

Keywords

anticipatory governance; digital food delivery platforms; gig economy; last-mile delivery; platform urbanism; spatial inequality; Sweden; urban infrastructure

1. Introduction

Digital food delivery platforms (DFDPs), including food delivery apps, online grocery services, and consumer-to-consumer food-sharing platforms, are transforming how food is distributed, accessed, and

consumed in urban environments (Bissell, 2020; Fernandez & Raine, 2021). These platforms represent a paradigmatic shift in food provisioning, characterized by real-time ordering of food, mobile logistics (i.e., logistics are carried out by individual, mobile workers rather than by fixed fleets, and coordinated digitally in real-time across the city), and the outsourcing of labor to individualized gig-workers (Bissell, 2020; George & Tomer, 2022a; Heidenstrøm & Hebrok, 2022; van der Laan & Orcholska, 2022). In doing so, they increasingly influence not only consumer behavior but also the organization of urban space, urban infrastructure, and labor relations (Bissell, 2020; Heidenstrøm & Hebrok, 2022; Samsioe & Fuentes, 2022; Schneider & Eli, 2023). The rise of DFDPs signals a reconfiguration of urban food systems into a distributed, on-demand service model that intersects with city logistics, micro mobility, environmental zoning laws, and the governance of public space (Li et al., 2020; Oncini et al., 2020).

This transformation has occurred rapidly and often beyond the scope of traditional urban governance (Suali et al., 2024; Vărzaru, 2024). While DFDPs have provided consumers with unprecedented convenience, speed, and variety, they also introduce new challenges: intensifying congestion and emissions through last-mile deliveries (Bissell, 2020; Donaldson, 2022; George & Tomer, 2022a); creating ambiguous labor arrangements via gig work (Friedman, 2014; Vandaele, 2022); and generating infrastructural demands that are not formally accounted for in city planning (Donaldson, 2022; Ghirlanda, 2024; Janatabadi et al., 2024). Moreover, municipalities are struggling with developing effective strategies to regulate and intervene in these platforms in order to avoid negative impacts on urban life and development. Despite the expanding role of DFDPs in cities, their infrastructural and spatial consequences remain underexplored in both policy and planning (Heidenstrøm & Hebrok, 2022). Globally, platform economies are increasingly shaping the rhythm and texture of urban life (Hardaker, 2021; Huws, 2020).

From transport to food delivery, platforms have become central intermediaries in how services are accessed and delivered, often by repurposing and extracting value from existing urban infrastructures (Shapiro, 2021; Srnicek, 2017). Their logic of operation—real-time data use, algorithmic coordination, and asset-light expansion—has enabled platforms to scale quickly while offloading infrastructural, environmental, and labor costs onto workers and municipalities. In cities worldwide, this shift has prompted urgent debates around the governance of shared space, mobility infrastructures, labor rights, and the ecological footprint of on-demand services (Hardaker, 2021; Riordan et al., 2023).

Among platform services, food delivery stands out for its ubiquitous, visible, and daily presence in urban space (Dal Gobbo et al., 2022). DFDPs operate not only in private kitchens and digital interfaces but also require the city's streets, sidewalks, parks, and transport systems to function. They blur distinctions between public and private, formal and informal, consumption and production. Yet, the integration of DFDPs into everyday life often occurs without accompanying adaptations in policy, planning, or public infrastructure (Heidenstrøm & Hebrok, 2022; Li et al., 2020; Meemken et al., 2022). As platforms grow, municipalities struggle to keep pace with the new spatial logics and infrastructural demands they generate.

These developments are particularly relevant to ongoing concerns with spatial justice and urban inequality (B.-Y. Lee, 2024; D. J. Lee, 2018). Cities have long been sites of uneven access to services, infrastructure, and public goods, shaped by historical patterns of segregation, zoning, and political power (Agyeman, 2022; Soja, 2013). Platformization introduces new forms of inequalities: While certain populations enjoy easy access to on-demand services, others disproportionately absorb their externalities—such as traffic, noise, or informal

labor conditions (B.-Y. Lee, 2024; Przybylinski, 2023). This raises critical questions about whose needs are prioritized in the organization of digital food systems, and how cities can ensure equitable access to infrastructure, space, and regulatory protection in the platform era.

As cities increasingly promote strategies for compactness, walkability, and multimodal mobility, aiming at reducing carbon footprint—such as the 15-minute city concept or climate-neutral logistics—DFDPs emerge as both an opportunity and a disruption (Elldér, 2024; Heidenstrøm & Hebrok, 2022). These platforms operate at the intersection of multiple systems—food delivery, transport, logistics, digital labor, and public space governance—yet rarely fall neatly into any single domain of municipal oversight (Hardaker, 2021). In Sweden, these issues arise in a planning context that is both ambitious and limited. Cities like Stockholm, Gothenburg, and Malmö pursue sustainability, inclusivity, and data-driven innovation. DFDPs can support car-free urban living, including for those with limited mobility. Yet cities struggle to regulate fast-changing services that cross administrative and regulatory boundaries. DFDP governance reveals tensions between digitalization and spatial justice, market-led innovation and public planning. Questions about who uses public space, on what terms, and for whose benefit, are becoming increasingly urgent as mobile, decentralized labor expands.

To analyze these dynamics, a qualitative case study has been conducted in the Swedish cities of Stockholm, Gothenburg, and Malmö. In doing so, our study addresses the growing body of international research on how DFDPs reshape urban life—touching on themes such as spatial inequality (Soja, 2013), platform urbanism (Bissell, 2023; Caprotti et al., 2022), and the capacity of cities to anticipate technological transformations (Muiderman et al., 2023) and govern their impacts. While this article focuses on the disruptive infrastructural and governance impacts of commercial food delivery platforms, some platforms—particularly peer-to-peer food-sharing models and emergency delivery partnerships—have also shown potential to reduce food waste and improve food access for vulnerable groups, especially during crises like the Covid-19 pandemic (Michellini et al., 2018; Nica-Avram et al., 2021; Zanetta et al., 2021).

1.1. Research Aims and Questions

This article investigates how DFDPs are reshaping urban infrastructures and the fabric of urban life. Of particular interest are the attempts of municipal governance to get a better grip on the social and spatial consequences of DFDPs in Sweden. The article seeks to answer two central questions:

1. How do DFDPs shape the spatial organization and use of urban infrastructure in Swedish cities?
2. How are municipalities and national actors responding to the infrastructural and governance challenges posed by DFDPs?

This study uses interviews with municipal actors, platform companies, and civil society in Stockholm, Gothenburg, and Malmö, along with policy documents and academic literature. It highlights the infrastructural, spatial, and governance challenges of DFDPs to support more anticipatory urban planning that tackles digitalization, labor precarity, and spatial justice.

2. Literature and Policy Context

DFDPs sit at the intersection of multiple research fields—urban planning, food systems, labor studies, and platform governance. As a result, their urban impacts must be understood through a multidisciplinary lens. Recent scholarship emphasizes that DFDPs do more than providing food access; they reorganize the infrastructures of urban provisioning (Bissell, 2020; Fernandez & Raine, 2021; George & Tomer, 2022b; Granheim et al., 2022). From a planning perspective, DFDPs shift consumption from fixed locations (e.g., grocery stores, restaurants) to distributed networks reliant on logistics hubs, courier fleets, and consumer data. These shifts have significant spatial and regulatory consequences.

A growing body of research documents the dual nature of DFDPs. On the one hand, they offer expanded access to food for consumers with digital and economic means (Granheim et al., 2022). On the other hand, they bypass regulatory frameworks, amplify labor precarity, and alter the use of public infrastructure (Meemken et al., 2022; Schneider & Eli, 2023; Stehrenberger & Schneider, 2023). The gig labor model, in particular, challenges welfare-state institutions and work environment regulations by introducing algorithmic control over workers who are legally classified as self-employed or employed on short contracts by workforce management firms. As a result, app companies are not held responsible for labor protections (Westregård, 2025).

Scholars have introduced the concept of platform urbanism (Barns, 2019; Bissell, 2023; Caprotti et al., 2022; Karvonen et al., 2020; A. Lee et al., 2020) to describe how digital platforms reorganize the city, often invisibly. Platforms such as Uber Eats, Wolt, and Foodora do not own the kitchens or vehicles that fulfill their services but act as coordinating intermediaries that extract value through data and scale. This creates challenges for urban governance, which is accustomed to regulating fixed entities—retailers, buildings, transport networks—rather than fluid assemblages.

Spatial inequalities are further reinforced by DFDPs through infrastructural placement and service targeting. Studies show that ghost kitchens are often located in low-rent districts while their services are marketed to affluent neighborhoods (Shapiro, 2021). Delivery workers, too, are spatially segregated from consumers, operating largely in outdoor, precarious conditions, often without access to restrooms, shelter, or secure parking. These dynamics echo long-standing critiques of food deserts and food apartheid, recontextualized in the digital age (Davies & Reid, 2024; George & Tomer, 2022b; Janatabadi et al., 2024).

In recent years, urban food policies have emerged as key instruments through which cities address sustainability, equity, and resilience in food systems (International Panel of Experts on Sustainable Food Systems, 2017; Moragues-Faus & Battersby, 2021). Initiatives such as the Milan Urban Food Policy Pact have catalyzed local governments to take more active roles in governing food provisioning, often focusing on local sourcing, food justice, and public procurement. However, most urban food policies still prioritize traditional supply chains and tend to overlook the impacts of platform-mediated distribution models (Barbour et al., 2023). This gap is significant, as DFDPs increasingly mediate access to food in urban areas while remaining outside the scope of existing food governance frameworks.

Policy responses to DFDPs remain limited and fragmented. In Sweden, strategies like the Swedish Food Strategy focus on sustainability and health but do not yet fully address platform-based delivery (Löfven &

Bucht, 2016; Regeringskansliet, 2025). On a local level, Stockholm, Gothenburg, and Malmö all have internal food policies regulating sustainability and health aspects in public food procurement and food environments. Still, neither city has a geographic food policy, embracing the role of food systems in the city, and has not signed the Milan Urban Food Policy Pact (2015).

The National Strategy for Sustainable Urban Development references digitalization and freight management but lacks concrete tools for municipalities dealing with gig-based delivery models. At the municipal level, Stockholm's Bicycle Plan and Vision 2040 emphasize walkability, reinforced bicycle infrastructure, and climate neutrality, but interview data suggest these frameworks do not yet incorporate DFDP-related logistics in planning for biking and walking infrastructure (Trafikkontoret Stockholms Stad, 2022). Strategies focusing on sustainable freight transport, like Gothenburg's Sustainable Urban Logistics Plan 2024–2030, mention common delivery lockers as an important distributed infrastructure and partnerships with logistics companies to develop sustainable solutions. Malmö's draft Traffic and Mobility Plan considers micro mobility and shared logistics in greater detail. Still, most of these policies remain in pilot stages. The 2024 EU Platform Work Directive (European Parliament & Council of the European Union, 2024) represents a significant policy shift, even though the final version does not include general EU-wide criteria for assessing whether platform workers should be classified as employees, but obliges member states to define these employment indicators for platform workers and ensure transparency in algorithmic management. In Sweden, the directive is expected to be implemented by 2025 following a government inquiry, which presents an opportunity to realign labor protections and public governance with the realities of platform work—though how these directives will address spatial and infrastructural concerns remains uncertain.

The literature and policy review reveal an underexplored area: how DFDPs impact urban infrastructure and spatial governance. While labor and health effects are increasingly studied, their material footprint and the capacity of urban institutions to respond remain less understood. This study uses spatial inequality, platform urbanism, and anticipatory governance as a framework to examine how DFDPs reshape infrastructure and governance, focusing on distributional impacts, infrastructural change, and institutional response. These concepts are detailed in Section 4.

3. Methodology

3.1. Data Collection

This study uses a qualitative, mixed-method approach combining semi-structured interviews with a review of national and local policy documents and academic literature. A qualitative approach was chosen to capture the situated experiences, institutional perspectives, and spatial practices related to DFDPs.

This study draws on 37 interviews, observational fieldwork, policy documents, and a literature review. Conducted between October 2024 and April 2025, interviews involved municipal officials (from planning, traffic, public health, and food policy departments), platform companies (including ghost kitchens), gig workers, and civil society actors in Stockholm, Malmö, and Gothenburg (Table 1). Participants were selected through purposive and snowball sampling. Interviews followed semi-structured guides tailored to each group and aligned with the study's focus on spatial inequality, platform urbanism, and anticipatory governance (see the Supplementary File). Most were recorded and transcribed; where not, detailed notes

were taken. Fieldwork in public courier hotspots (e.g., transit hubs, parks) documented logistical practices and infrastructure use, with informal conversations offering further insights.

The data collection process also included a targeted review of policy and strategy documents from the past five years, both at the national and municipal levels. Key documents analyzed include the Sweden's National Food Strategy, the National Strategy for Sustainable Urban Development, Gothenburg's Sustainable Urban Logistics Plan 2024–2030, Stockholm's Bicycle Plan, Vision 2040, Accessibility Strategy, and Freight Transport Plan, Malmö's draft Traffic and Mobility Plan, and the Platform Work Directive of the European Parliament and of the Council (2024). These documents provided a governance and policy context within which to interpret empirical findings, especially in relation to regulatory gaps, institutional capacity, and infrastructural adaptation. Additionally, relevant academic literature on platform urbanism, spatial inequality, hybrid infrastructures, and anticipatory governance was reviewed to develop a robust conceptual framework.

Table 1. Summary of data collection activities.

Stakeholder Group	Number of Participants	Method	Notes Taken
Municipal officials	10	Semi-structured interviews (in person/online)	Yes (audio recorded and transcribed; 2 note-based)
Platform representatives	4	Semi-structured interviews (in person/online)	Yes (audio recorded and transcribed; 1 note-based)
Gig workers (informal interviews)	20	Informal conversations during observational fieldwork	Yes (all note-based)
Civil society actors (e.g., advocacy groups for gig workers and one organization focused on labor rights)	3	Semi-structured interviews (in person/online)	Yes (audio recorded and transcribed; 2 note-based)

3.2. Data Analysis

The empirical material—including interview transcripts, policy documents, and field notes—was analyzed using the NVivo 15 qualitative data analysis software. A descriptive coding method was employed to structure and interpret the data (Saldaña, 2021). In the initial phase, descriptive codes were assigned to excerpts to summarize the main topics or activities discussed. These codes were subsequently refined into conceptual categories, allowing for the identification of recurring patterns and significant themes that emerged across different data sources.

The development of interpretive themes was guided by both existing literature and inductive insights from the data. These themes were used to contextualize the empirical findings within the study's research objectives and theoretical framework. Key thematic areas included:

- Platform impacts on public space and infrastructure: e.g., informal courier hubs, curb use, spatial conflicts;
- Labor conditions and governance gaps: e.g., precarious work, outsourced employment, lack of rest facilities;

- Municipal policy responses: e.g., pilot programs, regulatory fragmentation, departmental silos;
- Spatial inequality and exclusion: e.g., clustering of infrastructure in high-traffic areas, uneven distribution of burden.

The findings from these themes were triangulated across interviews, policy analysis, and relevant literature to surface both *commonalities and divergences*. A *critical urban governance lens* was applied throughout, focusing on how DFDPs challenge traditional regulatory frameworks and urban planning approaches. This analysis supports a grounded understanding of the governance gaps and infrastructural consequences associated with the platformization of urban food systems. To ensure validity, data were gathered through a mix of methods, including interviews, field observations, and policy documents. Coding consistency and theme development were cross-checked among researchers to enhance reliability.

4. Spatial Logics and Infrastructural Assemblages

To analyze how DFDPs affect urban infrastructure and governance in Swedish cities, this study draws on three interrelated theoretical frameworks: *spatial inequality*, *platform urbanism*, and *anticipatory governance*. These frameworks together allow for a critical and multidimensional interpretation of the infrastructural, spatial, and regulatory challenges posed by DFDPs. They are also helpful in examining the uneven geographies of food access, infrastructure burdens, and the governance gaps that DFDPs make visible.

First, the concept of *spatial inequality* provides an essential foundation for understanding how DFDPs interact with and reshape urban geographies. Drawing on Soja's (2013) formulation of spatial justice and Agyeman's (2022) idea of just sustainability, this lens focuses on how infrastructural benefits and burdens are distributed across space. In the context of DFDPs, spatial inequality manifests in multiple ways. Logistical infrastructures such as dark kitchens (facilities that prepare food exclusively for delivery), dark stores (warehouses set up for online grocery fulfillment), and delivery hubs (designated areas for organizing last-mile distribution) are often located in lower-income or industrial districts, while the consumption they enable is disproportionately concentrated in wealthier central neighborhoods. This spatial decoupling of production and consumption reinforces patterns of urban inequality, while the public space impacts—such as noise, crowding, and emissions—are often externalized to areas that lack political leverage or planning influence. This lens also highlights how labor geographies mirror infrastructural inequality, as precarious platform workers, often migrants or young people, are more likely to operate in marginalized conditions with minimal spatial rights in the urban landscape.

Second, *platform urbanism* conceptualizes DFDPs not simply as digital innovations, but as actors that produce and shape urban infrastructure. Following Bissell (2020, 2023) and Caprotti et al. (2022), platform urbanism frames DFDPs as infrastructural systems that blend algorithmic management with physical space—often without clear regulatory classification. Platforms do not merely coordinate logistics; they create new spaces of production (ghost kitchens), mobility (courier flows), and occupation (informal courier hubs). These spaces often exist in regulatory gray zones, where zoning laws, labor protections, and infrastructure planning have not caught up. The logic of platformization—rapid scaling, externalization of risk, and algorithmic control—disrupts the spatial governance tools available to municipalities. DFDPs thus challenge the municipalities' ability to manage urban transformation, not because of malice or evasion, but because the spatial logics they follow are fundamentally different from those of the welfare-regulated city, with institutions and regulations largely formed in the industrial era.

Central to understanding these processes is the notion of hybrid infrastructures—assemblages of digital coordination systems, physical resources, and urban labor that co-produce a new logistical layer in the city (Andersson et al., 2022; Fodor, 2021). Hybrid infrastructures are neither entirely public nor private, formal nor informal, fixed nor mobile. They emerge through the interaction of gig workers, app-based orders, physical mobility tools, and the use of underregulated public space for work-related purposes. Drawing on Andersson et al. (2022) and Fodor (2021), this concept reveals how infrastructure today is co-constructed at the intersection of algorithmic platforms and everyday urban navigation. From improvised courier hubs under bridges, to rest stops in shopping centers, to bikes and mopeds parked informally in green zones or along curbsides, hybrid infrastructures expose the spatial dependencies of the platform economy. They are infrastructural in function but invisible in planning—highlighting both the limitations of existing urban governance and the lived innovation of precarious workers. By attending to these assemblages, this article focuses not only on how infrastructure is evolving, but also how labor and mobility sustain it, and how cities must adapt to its informal logics.

Third, the concept of *anticipatory governance* (Muiderman et al., 2023) addresses how institutions respond to such emerging socio-technical systems. Anticipatory governance refers to the capacity of public institutions to engage with uncertain futures, especially in the context of rapid technological change. Applied to DFDPs, it helps explain the fragmented and reactive nature of municipal responses. Many cities are trying to regulate the increase in digital purchase and platform-facilitated home delivery, experimenting with shared delivery lockers, supporting electrified micro-logistics, and taking the initiative to dialogue with platform companies. Yet these initiatives remain largely uncoordinated, and many operate without a long-term strategic vision. Anticipatory governance demands more than technical adaptation—it requires institutional reflexivity, cross-sectoral coordination, and political will to address systemic transformations before their full consequences are felt.

This theoretical approach stresses the importance of inclusive governance involving platform workers, small food retailers, planners, and transport authorities. By applying anticipatory governance, the article highlights the mismatch between fast-moving platforms and slower municipal processes. Cities need tools to not just react, but actively shape platform futures aligned with equity, sustainability, and livability goals.

Together, these three frameworks offer a critical toolkit to unpack the infrastructural, labor, and spatial dimensions of DFDPs. Spatial inequality makes visible who gains and who loses from infrastructural change; platform urbanism uncovers the mechanisms by which digital systems reshape cities; and anticipatory governance reveals the challenges and opportunities of crafting proactive urban policy. Applying this theoretical triad throughout the analysis enables a more comprehensive and justice-oriented understanding of how DFDPs are not just disrupting cities—but becoming part of their infrastructural fabric.

5. Results

This section presents findings structured around the infrastructural, spatial, and governance effects of DFDPs in Stockholm. It incorporates direct quotations from interviewees and is organized in relation to the theoretical lenses of spatial inequality, platform urbanism, and anticipatory governance.

5.1. Hybrid Infrastructures and Urban Assemblages

The rise of DFDPs has produced a new form of urban infrastructure—one that is distributed, mobile, and hybrid. Such an infrastructure is not centrally planned nor publicly managed but are emergent, made through the everyday choices of gig workers and the operational logics of platforms. Rather than fixed facilities, DFDPs rely on assemblages of vehicles, mobility tools, mobile devices, informal rest zones, and opportunistic parking arrangements.

The vehicles used in food delivery—e-scooters, mopeds, bicycles, and hybrid models—are often chosen based on availability and affordability, not regulatory compliance, or infrastructural compatibility. These choices are shaped by the constraints faced by gig workers, who typically bear the full responsibility for maintenance, fuel, charging, and repair. There is little standardization across platforms, and cities lack mechanisms for monitoring or supporting these emergent mobility systems. As a result, vehicle performance, safety, and environmental impact vary widely.

Parking these delivery vehicles has become a highly visible flashpoint in the urban fabric. Gig workers must identify their own places to park their vehicles, wait between orders, and rest between shifts—activities that would be regulated in traditional logistics sectors. In Stockholm, this improvisational use of space has led to the informal conversion of green areas, pedestrian zones, and underutilized spaces under bridges into semi-permanent waiting or parking areas. These are not recognized in any zoning category and often fall into regulatory grey zones.

These informal infrastructures not only reflect a lack of planning but also represent an adaptive strategy by workers navigating a city not designed for them. Under bridges and near major transit hubs—such as Odenplan, Medborgarplatsen, or Fridhemsplan—couriers cluster to find shelter, access restaurants, or simply rest. These spaces are simultaneously public and private, mobile and fixed, visible and overlooked.

This hybrid infrastructure is a key manifestation of platform urbanism. It blurs the boundaries between work and public life, between planned infrastructure and lived experience. Unlike traditional logistics infrastructure—warehouses, freight corridors, and docks—these gig infrastructures are decentralized and transient. They rely on what is available, not what is planned. Yet they form the backbone of the digital food economy.

Moreover, this form of infrastructure reproduces precarity: It is informal, temporary, and unsupported. Unlike restaurant terraces, which require permits and often fees to occupy public space, gig worker hubs emerge without institutional recognition or support. Municipalities, as noted by several interviewees, do not see it as their role to “create fika spots for couriers”—a sentiment that reflects broader questions about whose labor is valued and whose needs are included in urban planning (Interviewee M3).

In this context, hybrid infrastructures challenge cities to rethink what counts as infrastructure, who it is for, and how it is governed. The digitalization of food delivery has not eliminated the need for urban infrastructure—it has only made it more invisible, informal, and unequal. Recognizing and addressing these hybrid assemblages is essential to any equitable approach to planning for digital platforms.

5.2. Platformization of Urban Logistics Under Data Opacity and Regulatory Gaps

DFDPs operate through hybrid infrastructures that combine digital ordering systems with physical food preparation and delivery networks. Stockholm's delivery system increasingly depends on ghost kitchens, fulfillment centers, and decentralized courier networks. These infrastructures tend to be located in industrial areas and peripheral neighborhoods with lower rents. As one planner from Stockholm Municipality noted: "Many of these kitchens operate out of places where you wouldn't even expect a food business. It's hard to regulate when they're outside traditional restaurant zones" (Interviewee M6).

This spatial mismatch exemplifies how logistical efficiency can deepen spatial inequality by externalizing infrastructural burdens—such as emissions, noise, and traffic—to marginalized areas, while centralizing convenience in wealthier districts. A food inspector in Malmö Municipality explained: "We're seeing new forms of food provision that aren't visible to the consumer. But the impact—waste, transport, energy—is very real in the areas where these services operate" (Interviewee M8).

Companies like MatHem and Oda manage delivery through large fulfillment centers, leveraging algorithms to optimize routes. In contrast, Foodora and Wolt use gig couriers for individualized deliveries via mainly bikes, e-scooters, or mopeds. This fragmented landscape complicates municipal coordination efforts. A traffic planner in Gothenburg stated: "It's not like you're dealing with one logistics company. It's many small actors, moving fast, loosely connected. It's hard to even identify who to talk to" (Interviewee M5).

Planners across cities expressed concern that while DFDPs benefit from this spatial flexibility, municipalities are left with the infrastructural consequences. "They can just choose a warehouse and start operations," said a freight strategist in Gothenburg, "but we're the ones who have to manage the traffic they generate, the waste, the access points" (Interviewee M7).

Municipal officials consistently expressed frustration with the lack of access to operational data from DFDPs. Unlike e-scooter firms, which are subject to permit regimes and are required to share mobility data, DFDPs operate under no such obligations. A planner from Stockholm's innovation office explained: "We ask for delivery data, but there's no legal basis to demand it. Without that, we're planning in the dark" (Interviewee M1).

This lack of transparency hinders anticipatory planning. Another planner observed: "We can't prepare for impacts we can't measure. We see the symptoms—congestion, noise—but not the flows behind them" (Interviewee M3). This regulatory asymmetry reflects the broader governance challenge of treating DFDPs as urban infrastructural actors while lacking the policy tools to manage them as such.

Additionally, some municipal actors noted how this data invisibility undermines their ability to even begin dialogue. "If we don't know what platforms are operating in the city, or how many deliveries they make, how can we make rules that apply to them?" one planner asked (Interviewee M1).

5.3. Spatial Conflicts and Public Realm Use

The presence of couriers in public spaces, particularly near transport nodes like Odenplan and Medborgarplatsen, has emerged as a visible marker of DFDP activity. These locations function as informal hubs where couriers wait for orders, rest, or seek shelter. As one official from Stockholm's Department of Traffic noted, "We see groups of couriers at Odenplan. There's tension with other users of the space—residents, tourists, businesses. But they have nowhere else to go" (Interviewee M6).

Interviewees described how these informal uses create "freeloading" behavior: DFDPs benefit from city infrastructure without contributing to its upkeep. "You can't just convert a sidewalk into your logistics hub," said a planner at Stockholm's Municipality; "restaurants have to pay if they want a table on the street. But these platforms? They use benches and curb space for free" (Interviewee M6).

A parking investigator at Stockholm Municipality explained the contrast: "If you're a café and want to place two tables on the pedestrian path, you need a permit and you pay for that. But platforms? They just use public space like it's theirs" (Interviewee M2).

Couriers rely on benches, plazas, and malls as de facto break areas—spaces not designed as workplaces. A planner in Malmö City emphasized: "We don't build coffee spots for Ikea staff. So why should we design public space for gig couriers?" Yet, the reliance of gig workers on informal infrastructure underlines a form of infrastructural dependency that is neither acknowledged nor compensated for. A public space strategist in Stockholm added: "We see it happening, but it's not within anyone's formal responsibility. It falls between departments" (Interviewee M4).

Ethnographic fieldwork conducted in central Stockholm—particularly in Odenplan, Kungsholmen, and Södermalm—revealed the everyday spatial practices of gig couriers and the emergence of informal logistical infrastructures. Couriers frequently park mopeds under bridges, on sidewalks, and in front of storefronts (Figure 1). These areas, although not legally designated for delivery operations, have become de facto waiting zones, creating spatial friction with pedestrians, businesses, and local residents.

One of the most prominent hubs is Odenplan, which has evolved into a "nesting ground" for food delivery workers. The area's high density of restaurants makes it a hotspot for pickups, while its central location ensures consistent order flow. Couriers from platforms like Wolt, Foodora, and Uber Eats were regularly seen parking in rows—often along pedestrian walkways or clustered under bridges—turning public transit-adjacent areas into informal logistics zones (Figure 2).

Photographs captured during fieldwork show mopeds wrapped in protective plastic, tightly lined along building façades and beneath highway overpasses (Figure 1). These parking practices are not coordinated by any public authority or platform but result from the workers' need for convenience, proximity to restaurants, and shelter from the weather. While not overtly illegal, these uses blur the line between tolerated occupation and public nuisance. According to a planner at Stockholm Municipality (Interviewee M9), many residents expressed discomfort with these informal gatherings, particularly in areas with already limited pedestrian space.



Figure 1. Delivery mopeds parked under a bridge in Stockholm.



Figure 2. Delivery bicycles and mopeds parked along bicycle and pedestrian paths in Stockholm.

Fieldwork revealed a lack of dedicated infrastructure for gig workers in Stockholm—no official parking, rest areas, or shelters—despite their essential role in urban food logistics. Couriers often improvise, using benches, mall entryways, or outlets, which adds pressure to shared public spaces and fuels spatial conflict. A notable exception is the Foodora Rider Hub, mentioned positively by several couriers (e.g., Interviewee G12). The hub offers rest, basic amenities, and shelter, and was described as a “very nice place.” However, its limited capacity and uniqueness only highlight the lack of adequate solutions. Expanding such spaces—through public, private, or hybrid initiatives—could ease strain on public areas and promote more equitable integration of gig work into urban life. Currently, most couriers still depend on improvised, informal solutions.

5.4. Infrastructural Adaptation: Platform Responsibilities and Governance Challenges

Stockholm's current urban infrastructure is ill-equipped to accommodate the logistical demands of DFDPs. Bike lanes are often too narrow for larger delivery vehicles. Zoning regulations do not anticipate dark kitchens or mixed-use logistical spaces. As one urban planner at Stockholm Municipality put it: "We're still planning for a city of restaurants and shops. Not a city of delivery nodes and mobile kitchens" (Interviewee M1).

Planners also described being caught between long-term visions of livability and immediate logistical pressures. "We talk about 15-minute cities and reclaiming space for people, but the curb is full of mopeds and vans," said a transport official; "it's like the city is serving two masters" (Interviewee M8).

Malmö and Gothenburg have launched pilot programs to experiment with infrastructure for last-mile delivery, such as cooled parcel lockers and micromobility hubs. Gothenburg's Nordstan Mobility Hotel offers battery-swapping and storage services, reducing fossil fueled delivery in central areas. One micromobility coordinator in Gothenburg described it as a logistical service "offering space, power, and repair in one place" (Interviewee M5).

However, even promising initiatives face barriers. A freight strategist in Gothenburg noted: "These systems still rely on voluntary collaboration. We can't compel platforms to join, and we lack national guidance" (Interviewee M10).

Couriers working for DFDPs face precarious working conditions that intersect directly with urban infrastructure. Many are classified as "self-employed" and are hired through intermediaries such as Frilans Finans or Invoicery Business that invoice the DFDP company for worked hours and pay delivery workers after subtracting intermediary costs. Others are hired on short contracts by Foodora Logistics AB, Foodora's own workforce management company. The term "self-employed" is a newly emerging workforce category in Sweden that remains legally undefined and has emerged because of legal flexibilities due to deregulations of labor laws in Sweden (Westregård, 2025). A representative from a civil society organization observed: "It's outsourcing within outsourcing. The platforms avoid responsibility, and the workers are left to figure things out on their own" (Interviewee C1).

Couriers reported relying on public benches, malls, or even stairwells for rest and protection from weather. One courier interviewed explained: "There's no base, no break. We go where the app sends us, and we wait wherever we can" (Interviewee G6). During fieldwork, we observed gig workers park their moped on bicycle paths to rest in the public parks, or stop on the bicycle path to talk with colleagues (Figure 3).

These patterns reinforce infrastructural inequality. Public space becomes a substitute for private infrastructure, but without coordination or care. As a Malmö food inspector explained: "This is a food system that depends on the streets—on the public realm—but no one is responsible for maintaining it" (Interviewee M8). Some municipal staff recognized the gap but questioned whether public space should accommodate labor needs. This reflects a tension between the informality of platform work and the expectations of formal spatial planning.



Figure 3. Delivery workers parking or stopping on bicycle paths to take a pause.

5.5. Emergent Municipal Strategies and Anticipatory Governance

Despite these challenges, municipalities are beginning to experiment with governance approaches to better manage DFDPs. Stockholm is implementing new regulations on curb space and piloting mobility hubs. Gothenburg is considering integrating DFDPs into broader logistics partnerships. Malmö is testing food-sharing schemes and sustainable last-mile pilots within its innovation platform.

These efforts reflect early-stage anticipatory governance, where cities begin to prepare for future socio-technical developments rather than merely react to them. Yet, many of these strategies are isolated and lack institutional anchoring. They often emerge from temporary projects, specific departments, or individual civil servants, rather than through coordinated, long-term planning strategies.

Interviewees frequently pointed out the fragmentation of municipal structures as a key limitation. A food inspector in Malmö remarked: “We talk to transport. We talk to planning. But there’s no unit for platforms. No single door to enter” (Interviewee M8). This fragmentation hinders the development of coherent responses, leading to inconsistent policies and unclear responsibilities.

Some cities are exploring public–private dialogue with DFDPs, though trust is limited. One planner at Stockholm Municipality noted: “Some platforms are open to collaboration. Others are opaque. It depends on the business model—and the pressure they feel” (Interviewee M9). Where collaboration does occur, it is often informal and not linked to enforceable outcomes.

A key lesson from these strategies is the need for integrated planning. Platforms affect multiple systems—mobility, labor, food access—but are often addressed in isolation. As the regulatory gap widens, municipalities must build institutional capacity to govern platforms not just as digital services, but as infrastructural actors embedded in the everyday fabric of the city.

Embedding platform governance into anticipatory governance frameworks means going beyond one-off pilot projects. It requires cross-sectoral collaboration, national–municipal coordination, and legal reforms that create clear responsibilities and rights for all actors—including gig workers. Cities will also need to develop tools for managing hybrid infrastructures, supporting informal uses of public space, and ensuring that infrastructural burdens and benefits are more equitably distributed.

In this context, anticipatory governance is not only about forecasting future challenges—it is about redesigning governance systems to accommodate, regulate, and shape rapidly evolving urban technologies. The future of platformized urban food systems depends not only on technological innovation but on institutional imagination and political will.

Together, these findings demonstrate that DFDPs not only disrupt but increasingly define the spatial and infrastructural logic of the city. Their informal infrastructures, operational opacity, and policy evasiveness challenge traditional governance—and demand a shift from reactive regulation to strategic integration within the urban planning domain.

6. Discussion

The findings underscore that DFDPs are not peripheral actors but central to the reconfiguration of urban infrastructure, labor, and governance. This section discusses the empirical results from Stockholm, Gothenburg, and Malmö.

6.1. Hybrid Food Infrastructures and the Governance Gap

The empirical data points to the reliance of DFDPs on what can be understood as hybrid food spaces and infrastructures (as described in Fodor, 2021): physical systems like kitchens, fulfillment centers, micro mobility vehicles, and informal rest zones, tightly interwoven with digital infrastructures that manage ordering, tracking, algorithmic labor coordination, and dynamic pricing. These assemblages do not operate within conventional regulatory frameworks or urban planning structures within the city organization.

Instead, they form what Fodor (2021) describe as “hybrid urban food environments”—configurations that blur the lines between public and private, digital, and material, consumption and production. As our empirical material shows, this hybridity manifests through ghost kitchens situated in industrial zones or economically deprived urban areas, mopeds parked informally in green areas, and couriers using benches or malls as temporary resting stations. Moreover, Fodor (2021) emphasizes that the governance of these infrastructures is equally hybrid: While platforms coordinate labor and logistics algorithmically, they externalize many spatial and social costs to public space and municipal systems. The logistical rhythms of food delivery—dictated by app interfaces, peak-time algorithms, and dynamic demand—interact with street-level realities in unregulated ways. This results in new pressures on bike lanes, pedestrian zones, and transit nodes, particularly in multifunctional central spaces. These hybrid infrastructures challenge the conventional boundaries of urban planning (Andersson et al., 2022). They are infrastructural in function but informal in regulation, often escaping the visibility of planners and policymakers. While delivery platforms profit from the flexibility and invisibility of these systems, their operation relies on the availability of public infrastructure that has not been designed—or governed—with platform labor in mind. Understanding DFDPs through the lens of hybrid food infrastructures allows us to recognize how digitalization restructures not only consumption but also the very spatial and infrastructural logic of urban food systems. These tensions are particularly of high importance in Stockholm, a city that has explicitly committed to goals of accessibility, climate-neutral mobility and city logistics, and spatial equity—outlined in strategic visions such as the Accessibility Strategy and Vision 2040—Stockholm of Opportunities—which emphasize reducing car dependency, strengthening local neighborhoods, and creating a more inclusive urban environment (Stockholm Chamber of Commerce, 2023). Yet, municipal authorities face increasing difficulties in governing the infrastructural impacts of DFDPs. Dark kitchens—facilities that prepare food exclusively for delivery without serving customers on-site—are often located in industrial and commercial zones, altering local transport patterns. The clustering of food delivery couriers at transit hubs, along with conflicts over their use of bike lanes, highlights emerging tensions between platform operations and existing urban infrastructure, as also shown in other studies (Fuentes et al., 2022; George & Tomer, 2022a; Heidenstrøm & Hebrok, 2022). Municipal departments—from traffic and planning to food inspection and public space management—struggle with fragmented responsibilities for the impacts of DFDPs on urban life, insufficient legal tools, and limited data access (Rosales & Haarstad, 2023; Secchi et al., 2024).

An overview of these interconnected challenges and policy gaps is presented in Table 2, which summarizes the dynamics and governance barriers we observed across key themes—from hybrid infrastructures and platform logistics to labor precarity and municipal fragmentation.

6.2. Digital Food Provisioning and Platformized Urban Space

DFDPs have introduced new spatial actors into cities—most visibly, gig workers—whose presence now marks the everyday experience of urban life in places like Stockholm. These workers are deeply embedded in the rhythms of the city, using bike lanes, parking spaces, and sidewalks, and shaping how public infrastructure is accessed and appropriated. As one urban planner from Stockholm Municipality observed, “They are even creating informal parking or gathering spots out of places that were never meant for such uses” (Interviewee M6). Through their movements, pauses, and routines, gig workers are creating new spatial assemblages—dynamic, improvised infrastructures that have emerged without formal planning but are now central to platform-mediated food delivery. These spatial formations reproduce what Graham and

Table 2. DFDP impacts and urban governance themes.

Theme	Observed Dynamics	Governance Challenges
Hybrid Infrastructures	Informal parking hubs, rest zones under bridges, gig worker mobility tools vary by availability	Lack of zoning, absence of support infrastructure, no regulation of vehicle types
Platformized Logistics	Distributed fulfillment centers, fragmented courier networks	Difficulty in coordination; uneven distribution of impacts
Public Space Conflicts	Informal use of benches, plazas, and sidewalks for waiting and parking	Platforms not required to pay or permit, uneven treatment compared to brick-and-mortar
Data Opacity	No data-sharing requirements; invisible flows of goods	Limited municipal capacity for anticipatory planning
Labor Precarity	Informal, outsourced employment, workers responsible for infrastructure	Cities lack jurisdiction over labor models, mismatch between spatial and labor policy
Emergent Municipal Responses	Pilot programs, mobility hubs, cross-department talks	Fragmented responsibilities; siloed departments, informal governance structures

Marvin (2002) described as splintering urbanism, where infrastructure development favors consumption zones while the logistical and social burdens of provision are externalized to less privileged or multifunctional urban areas. In Stockholm, while food is delivered to affluent neighborhoods, the couriers' presence, noise, and infrastructural strain are often concentrated in busy central zones or overlooked public spaces. These workers rely on informal arrangements—sheltering under bridges, resting in mall entryways, or parking in green areas, which creates various tensions with the original purposes of these structures. The absence of designated rest infrastructure not only reflects a planning blind spot, but also reinforces infrastructural inequality.

DFDPs in Stockholm thus act not only as logistics providers but also exhibit a spatial agency that materially reshapes the city. Interviews with municipal officials reveal growing frustration that DFDPs exploit public infrastructure—benches, curbs, bike lanes—without contributing to its upkeep or regulation. For platform companies, this usage is framed as incidental or external to their operations, a byproduct of gig workers' individual choices. But the cumulative effects are unmistakable: clusters of mopeds near restaurant zones, informal courier hubs under bridges, and sidewalk congestion near delivery hotspots. These practices align with what Shapiro (2021) terms infrastructural surplus—the value platforms derive by embedding their operations within the urban landscape while displacing infrastructural costs onto workers and municipalities. Shapiro identifies two mechanisms: reformatting, where public space is repurposed as logistical infrastructure, and transactional exclusion, where gig workers absorb the full cost of vehicles, phones, charging, and waiting space. Both are visible in Stockholm, where couriers contribute with additional unpaid labor and own devices, and cities struggle to manage spatial conflicts and regulatory gaps. Civil society actors point to the inconsistency: Restaurants must apply and pay for permits to place tables on sidewalks, while platforms operate logistics functions on the same pavements without formal arrangements. This lack of parity reflects deeper institutional limitations in planning frameworks that were not designed for platform economies.

Malmö and Gothenburg have started experimenting with integrated approaches, like food policy councils and logistics partnerships, but these remain fragmented. In Stockholm, informal arrangements dominate, risking the quiet privatization of public infrastructure by platforms. Fieldwork shows that improvised courier hubs often spark resident resistance, underscoring the need for equitable planning that balances worker, resident, and city needs. Regulating platforms requires recognizing their role in reshaping urban space—and holding them accountable.

6.3. Informal Urban Systems and the Rise of Hybrid Infrastructure

A key finding is the emergence of hybrid infrastructures—informal, mobile assemblages of people, vehicles, and public space shaped by gig workers' daily practices. Unlike traditional logistics hubs, they evolve dynamically, reflecting the needs of a labor force often ignored in planning. In Stockholm, this includes couriers resting under bridges, waiting near malls and transport hubs, and charging e-bikes at public sockets.

Gig workers create infrastructure through improvisation, using bikes, mopeds, and e-scooters chosen for affordability over regulation. Workers manage maintenance, fueling, and parking themselves, with little support from platforms or cities. These practices form urban phenomena—highly visible in places like Odenplan and Medborgarplatsen, yet largely invisible to institutions.

These hybrid infrastructures are not just functional—they are precarious. Lacking rest areas, toilets, shelter, or legal parking, gig workers support the city without being accommodated. While restaurants pay to use public space, DFDPs shift such costs onto workers who rely on benches and sidewalks. This paradox—essential labor in overlooked spaces—highlights a gap in how infrastructure is governed today.

Theoretically, these infrastructures reveal the entanglement of material systems, labor geographies, and digital coordination. They challenge the idea of infrastructure as fixed and centralized, urging planners to rethink how infrastructural actors are defined and supported.

As Stockholm confronts DFDP growth, recognizing these informal systems is vital. They expose how cities serve—or fail—a mobile, precarious workforce. Hybrid infrastructures reflect both the adaptability of platform urbanism and the vulnerabilities it creates. Comparing Stockholm with Gothenburg and Malmö provides insights into potential governance pathways (Table 3). Malmö's inclusion of platforms in developing a mission-based food policy strategy and Gothenburg's Mobility Hotel suggest more proactive, anticipatory responses. Stockholm's interventions remain largely reactive.

6.4. Linking Theory to Practice

The study uses spatial inequality, platform urbanism, and anticipatory governance to examine how DFDPs reshape infrastructure, labor geographies, and governance (see Table 4). These frameworks help interpret the findings and inform future planning.

Rather than a clear center–periphery divide, DFDPs have nonlinear spatial effects. While serving affluent areas, courier activity—parking, resting, clustering—concentrates in mixed-income or high-traffic zones like Odenplan and Medborgarplatsen. These public spaces, not designed for logistics, become informal hubs, creating tensions among urban users.

Table 3. Comparative insights: Stockholm and other major Swedish cities.

City	Key DFDP Challenges	Promising Practices	Policy Learnings
Stockholm	Informal hubs, lack of data, siloed departments	Moped parking ban, curb space reallocation for deliveries, updated traffic and street use regulations for DFDP-related mobility management	Improve coordination, build anticipatory governance capacity
Gothenburg	Fragmented actors, low platform transparency	Nordstan Mobility Hotel for repair and charging of delivery vehicles, freight integration forums for coordination between DFDPs and logistics actors, sustainable delivery support	Integrate platforms into logistics planning
Malmö	Limited courier infrastructure, focus on pilot projects	Innovation procurement for sustainability-aligned platforms (e.g., local and organic food delivery), engagement through food-sharing networks, participatory planning platforms for urban innovation	Build formal channels for DFDP dialogue and cross-sector action

This complexity extends conventional understandings of spatial inequality. It highlights how public infrastructure is co-opted in uneven ways—with more visible and vulnerable forms of labor, such as gig work, relying heavily on unregulated and unsupported urban space. The appropriation of public benches, sidewalks, and bike lanes reveals not only the gaps in municipal regulation but also the urban invisibility of the very workforce that enables platform convenience.

Platform urbanism, in this light, reveals how DFDPs act as infrastructural actors without formal accountability. They repurpose public infrastructure—benches, curbs, pedestrian zones—into logistical assets, while remaining legally distant. This aligns with research in cities like Barcelona and Berlin, where informal infrastructures (such as courier hubs and gig worker clusters) have also emerged around transit zones and food delivery corridors, often outpacing municipal regulatory adaptation (Caprotti et al., 2022; Van Doorn, 2017)

Meanwhile, anticipatory governance appears to be underdeveloped. While pilot projects exist—like Stockholm’s moped ban, Gothenburg’s mobility hotel, or Malmö’s food-sharing programs—these efforts are piecemeal and disconnected, often lacking long-term institutional anchoring.

Table 4. Linking theory to empirical insights.

Theoretical Lens	Analytical Focus	Empirical Illustrations
Spatial Inequality	Who benefits and who bears infrastructural burdens	Delivery benefits in affluent areas; pressure on public space, bike lanes, and green areas elsewhere
Platform Urbanism	How DFDPs reconfigure governance and spatial norms	Emergence of informal infrastructures in public spaces; unregulated appropriation of urban amenities
Anticipatory Governance	How municipalities respond (or fail to respond) to platform transformations	Isolated pilot projects, lack of coordination, and fragmented oversight across departments

These theoretical lenses make visible the interplay between mobile labor, digital coordination, and underregulated urban systems. They also provide a starting point for designing policies that are more inclusive, forward-looking, and spatially responsive.

To effectively govern digital food provisioning, cities like Stockholm must move beyond fragmented, reactive responses and adopt coordinated, cross-sectoral governance approaches. This includes formally recognizing hybrid infrastructures, integrating gig workers into urban planning considerations, and embedding DFDPs into environmental zones and mobility strategies to decrease emissions and congestion in inner city areas. Moreover, detailed plans indicate places for dark stores and dark kitchens and clarify in what category they are included, for example whether they are considered warehouses or shops.

Anticipatory governance offers a compelling framework: Rather than managing disruptions after they emerge, cities can co-shape platform-mediated urban futures through collaboration, institutional foresight, and adaptive policy tools. In doing so, Stockholm can shift from containment to design—planning not only for operational efficiency, but also for social fairness and spatial inclusion.

Stockholm's experience with DFDPs illustrates the stakes of contemporary platform urbanism. Comparative insights from Malmö, Gothenburg, and international cases underline the urgent need for integrated, inclusive urban governance—one capable of managing the evolving spatial, infrastructural, and labor dimensions of digital food systems while promoting infrastructural justice.

7. Conclusion: Reclaiming Urban Futures in the Platform Age

This study has examined how DFDPs are reshaping the infrastructural and spatial dynamics of Stockholm. Anchored in the theoretical lenses of spatial inequality, platform urbanism, and anticipatory governance, it has traced how DFDPs influence not only food logistics but also urban labor, mobility, and the everyday use of public space. By focusing on Stockholm, Malmö, and Gothenburg as empirical cases, and drawing on interviews, field observations, and policy analysis, the study has surfaced the multiple ways in which platform economies challenge the governance capacities of cities.

DFDPs are central to urban transformation, repurposing public space for logistics and creating hybrid infrastructures built on informal labor and mobility. They shift operational costs onto workers and cities. In Stockholm, informal courier hubs around places like Odenplan and Medborgarplatsen show how public infrastructure is used without formal support. Gig workers depend on benches, malls, and sidewalks to work—highlighting both reliance on and exclusion from urban infrastructure.

Despite some pilot efforts, municipal responses remain fragmented due to data opacity, unclear mandates, and the hybrid nature of DFDPs. While platforms scale quickly, public authorities struggle to adapt tools, strategies, and institutions. This gap fuels infrastructural tensions and poses broader challenges for equity, sustainability, and democratic urban development.

To address these challenges, urban governance must shift from reactive containment to proactive and inclusive planning. DFDPs must be treated not simply as digital service providers, but as infrastructural actors whose operations shape the urban environment. This calls for:

- Embedding platform governance into city-wide freight, mobility, and food system strategies;
- Creating regulatory frameworks that include data-sharing obligations and public space accountability;
- Developing infrastructure that meets the needs of gig workers—such as rest areas, parking zones, and logistics hubs;
- Coordinating municipal and national policies to better regulate platform labor and mitigate precarity.

Our findings show that urban food policies must address digital platforms as part of the food system—by regulating labor conditions, ensuring data access, and integrating platform logistics into sustainable planning. This research supports anticipatory policymaking, including courier hubs, data-sharing rules, and inclusive logistics zoning. It also informs debates on labor rights and digital infrastructure, with implications for public space and urban quality of life. Commercially, it offers guidance for more socially responsible platform operations.

Grounded in data from Stockholm, Malmö, and Gothenburg, the study could be expanded through cross-city comparisons to explore how different governance systems shape DFDP responses. Future research should continue engaging directly with platform workers and communities—participatory design is key to equitable infrastructure.

Planning for DFDPs is not just logistical but political. As platforms embed in city life, their responsibilities must become visible and accountable. Recognizing DFDPs as infrastructure enables more just, inclusive, and resilient urban governance.

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Supplementary Material

Supplementary material for this article is available online in the format provided by the authors (unedited).

References

- Agyeman, J. (2022). *Introducing just sustainabilities: Policy, planning, and practice*. Zed Books.
- Andersson, E., Grimm, N. B., Lewis, J. A., Redman, C. L., Barthel, S., Colding, J., & Elmqvist, T. (2022). Urban climate resilience through hybrid infrastructure. *Current Opinion in Environmental Sustainability*, 55, Article 101158.
- Barbour, L. R., Woods, J. L., & Brimblecombe, J. K. (2023). Local government policy to facilitate healthy and sustainable diets and the broader policy hierarchy: Insights from Milan Urban Food Policy Pact cities. *Health Research Policy and Systems*, 21(1), Article 35.
- Barns, S. (2019). *Platform urbanism: Negotiating platform ecosystems in connected cities*. Springer Nature.
- Bissell, D. (2020). Affective platform urbanism: Changing habits of digital on-demand consumption. *Geoforum*, 115, 102–110.

- Bissell, D. (2023). Negative urbanism: Unknowability, illegibility and ambivalence in the platform city. *City*, 27(1/2), 56–75.
- Caprotti, F., Chang, I.-C. C., & Joss, S. (2022). Beyond the smart city: A typology of platform urbanism. *Urban Transformations*, 4(1), Article 4.
- Dal Gobbo, A., Forno, F., & Magnani, N. (2022). Making “good food” more practicable? The reconfiguration of alternative food provisioning in the online world. *Sustainable Production and Consumption*, 29, 862–871.
- Davies, R., & Reid, K. (2024). Supporting each other: Older adults’ experiences empowering food security and social inclusion in rural and food desert communities. *Appetite*, 198, Article 107353.
- Donaldson, A. (2022). Digital from farm to fork: Infrastructures of quality and control in food supply chains. *Journal of Rural Studies*, 91, 228–235.
- Elldér, E. (2024). Built environment and the evolution of the “15-minute city”: A 25-year longitudinal study of 200 Swedish cities. *Cities*, 149, Article 104942.
- European Parliament, & Council of the European Union. (2024). *Directive (EU) 2024/2831 on improving working conditions in platform work*.
- Fernandez, M. A., & Raine, K. D. (2021). Digital food retail: Public health opportunities. *Nutrients*, 13(11), Article 3789.
- Fodor, K. (2021). The hybridization of food spaces: Changing spatial logics in urban food systems and prospects for sustainable diets. *The International Journal of Sociology of Agriculture and Food*, 27(1), 102–118.
- Friedman, G. (2014). Workers without employers: Shadow corporations and the rise of the gig economy. *Review of Keynesian Economics*, 2(2), 171–188.
- Fuentes, C., Samsioe, E., & Östrup Backe, J. (2022). Online food shopping reinvented: Developing digitally enabled coping strategies in times of crisis. *The International Review of Retail, Distribution and Consumer Research*, 32(2), 130–150.
- George, C., & Tomer, A. (2022b). *The potential—and pitfalls—of the digitalization of America’s food system*. Brookings Institution. <https://www.brookings.edu/articles/the-potential-and-pitfalls-of-the-digitalization-of-americas-food-system>
- George, C., & Tomer, A. (2022b). *Delivering to deserts: New data reveals the geography of digital access to food in the US*. Brookings Institution. <https://www.brookings.edu/articles/delivering-to-deserts-new-data-reveals-the-geography-of-digital-access-to-food-in-the-us>
- Ghirlanda, P. (2024). First rule: Keep pedalling. Co-theorising with food-delivery workers how to make digital platforms capability-enhancing. *Journal of Human Development and Capabilities*, 26(1), 59–86.
- Graham, S., & Marvin, S. (2002). *Splintering urbanism: Networked infrastructures, technological mobilities and the urban condition*. Routledge.
- Granheim, S. I., Løvhaug, A. L., Terragni, L., Torheim, L. E., & Thurston, M. (2022). Mapping the digital food environment: A systematic scoping review. *Obesity Reviews*, 23(1), Article e13356.
- Hardaker, S. (2021). Platform economy: (Dis-)embeddedness processes in urban spaces. *Urban Transformations*, 3, Article 12.
- Heidenstrøm, N., & Hebrok, M. (2022). Towards realizing the sustainability potential within digital food provisioning platforms: The case of meal box schemes and online grocery shopping in Norway. *Sustainable Production and Consumption*, 29, 831–850.
- Huws, U. (2020). The algorithm and the city: Platform labour and the urban environment. *Work Organisation, Labour & Globalisation*, 14(1), 7–14.
- International Panel of Experts on Sustainable Food Systems. (2017). *Unravelling the food–health nexus: Addressing practices, political economy, and power relations to build healthier food systems*.

- Janatabadi, F., Newing, A., & Ermagun, A. (2024). Social and spatial inequalities of contemporary food deserts: A compound of store and online access to food in the United Kingdom. *Applied Geography*, 163, Article 103184.
- Karvonen, A., Cook, M., & Haarstad, H. (2020). Urban planning and the smart city: Projects, practices and politics. *Urban Planning*, 5(1), 65–68.
- Lee, A., Mackenzie, A., Smith, G. J., & Box, P. (2020). Mapping platform urbanism: Charting the nuance of the platform pivot. *Urban Planning*, 5(1), 116–128.
- Lee, B.-Y. (2024). Understanding justice in the platform economy: A qualitative case study of platform-based food delivery work. *Journal of Industrial Relations*, 66(2), 291–315.
- Lee, D. J. (2018). *Delivering justice: Food delivery cyclists in New York City* [Unpublished doctoral dissertation]. City University of New York.
- Li, C., Miroso, M., & Bremer, P. (2020). Review of online food delivery platforms and their impacts on sustainability. *Sustainability*, 12(14), Article 5528.
- Löfven, S., & Bucht, S.-E. (2016). *En livsmedelsstrategi för Sverige—fler jobb och hållbar tillväxt i hela landet*. Regeringskansliet. <https://www.regeringen.se/rattsliga-dokument/proposition/2017/01/prop.-201617104>
- Meemken, E.-M., Bellemare, M. F., Reardon, T., & Vargas, C. M. (2022). Research and policy for the food-delivery revolution. *Science*, 377(6608), 810–813.
- Michellini, L., Principato, L., & Iasevoli, G. (2018). Understanding food sharing models to tackle sustainability challenges. *Ecological Economics*, 145, 205–217.
- Milan Urban Food Policy Pact, 2015.
- Moragues-Faus, A., & Battersby, J. (2021). Urban food policies for a sustainable and just future: Concepts and tools for a renewed agenda. *Food Policy*, 103, Article 102124.
- Muiderman, K., Vervoort, J., Gupta, A., Norbert-Munns, R. P., Veeger, M., Muzammil, M., & Driessen, P. (2023). Is anticipatory governance opening up or closing down future possibilities? Findings from diverse contexts in the Global South. *Global Environmental Change*, 81, Article 102694.
- Nica-Avram, G., Harvey, J., Smith, G., Smith, A., & Goulding, J. (2021). Identifying food insecurity in food sharing networks via machine learning. *Journal of Business Research*, 131, 469–484.
- Oncini, F., Bozzini, E., Forno, F., & Magnani, N. (2020). Towards food platforms? An analysis of online food provisioning services in Italy. *Geoforum*, 114, 172–180.
- Przybylinski, S. (2023). Spatial justice. In J. Ohlsson & S. Przybylinski (Eds.), *Theorising justice: A primer for social scientists* (pp. 191–204). Bristol University Press.
- Regeringskansliet. (2025). *Livsmedelsstrategin 2.0*.
- Riordan, T., Robinson, R. N., & Hoffstaedter, G. (2023). Seeking justice beyond the platform economy: Migrant workers navigating precarious lives. *Journal of Sustainable Tourism*, 31(12), 2734–2751.
- Rosales, R., & Haarstad, H. (2023). Governance challenges for urban logistics: Lessons from three Norwegian cities. *Environmental Policy and Governance*, 33(3), 221–231.
- Saldaña, J. (2021). *The coding manual for qualitative researchers*. Sage.
- Samsioe, E., & Fuentes, C. (2022). Digitalizing shopping routines: Re-organizing household practices to enable sustainable food provisioning. *Sustainable Production and Consumption*, 29, 807–819.
- Schneider, T., & Eli, K. (2023). The digital labor of ethical food consumption: A new research agenda for studying everyday food digitalization. *Agriculture and Human Values*, 40(2), 489–500.
- Secchi, M., Tomassoni, F., & Allegratti, G. (2024). Local best practices: Urban governance and the ongoing platformization process. In S. Mezzadra, N. Cuppini, M. Frapporti, & M. Pirone (Eds.), *Capitalism in the platform age: Emerging assemblages of labour and welfare in urban spaces* (pp. 305–331). Springer.

- Shapiro, A. (2021). Platform urbanism and infrastructural surplus. In J. Meijerink, G. Jansen, & V. Daskalova (Eds.), *Platform economy puzzles* (pp. 101–122). Edward Elgar Publishing.
- Soja, E. W. (2013). *Seeking spatial justice*. University of Minnesota Press.
- Srnicek, N. (2017). *Platform capitalism*. Wiley.
- Stehrenberger, A., & Schneider, T. (2023). “At first, I was only a subscriber”: Re-mediating food citizens’ solidarity practices through digital technologies. *Frontiers in Sustainable Food Systems*, 7, Article 1214354.
- Stockholm Chamber of Commerce. (2023). *Making Stockholm closer. Assessing the 15-minute city concept to strengthen local urban life*.
- Suali, A. S., Srai, J. S., & Tsolakis, N. (2024). The role of digital platforms in e-commerce food supply chain resilience under exogenous disruptions. *Supply Chain Management: An International Journal*, 29(3), 573–601.
- Trafikkontoret Stockholms Stad. (2022). *Cykelstaden—En del av framkomlighetsstrategin*.
- van der Laan, L. N., & Orcholska, O. (2022). Effects of digital just-in-time nudges on healthy food choice—A field experiment. *Food Quality and Preference*, 98, Article 104535.
- Van Doorn, N. (2017). Platform labor: On the gendered and racialized exploitation of low-income service work in the ‘on-demand’ economy. *Information, Communication & Society*, 20(6), 898–914.
- Vandaele, K. (2022). Protesting couriers seeking ‘algorithmic justice’ and alternatives. In I. Nes (Eds.), *The Routledge handbook of the gig economy* (pp. 205–219). Routledge.
- Värzaru, A. A. (2024). Unveiling digital transformation: A catalyst for enhancing food security and achieving sustainable development goals at the European Union level. *Foods*, 13(8), Article 1226.
- Westregård, A. (2025). *Digitala daglönare i gig-ekonomin—En rättsvetenskaplig studie av arbetstagarbegreppet*.
- Zanetta, L. D. A., Hakim, M. P., Gastaldi, G. B., Seabra, L. M. A. J., Rolim, P. M., Nascimento, L. G. P., Medeiros, C. O., & da Cunha, D. T. (2021). The use of food delivery apps during the Covid-19 pandemic in Brazil: The role of solidarity, perceived risk, and regional aspects. *Food Research International*, 149, Article 110671.

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