Urban freight – a matter of concern for cities?

Assessing governance for sustainable freight in Norway

Rafael Rosales

Thesis for the degree of Philosophiae Doctor (PhD)
University of Bergen, Norway
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Abstract in English

Freight transport is vitally important to city life, yet it is not considered a 'matter of concern' by public authorities to the same degree as passenger transport. Freight creates several challenges for cities, including increased home deliveries, the coordination of the variety of stakeholders that operate freight transport, and the consequences of freight infrastructure both inside and beyond city limits. However, public freight governance is organised in a way that assumes that these challenges are mainly the responsibility of businesses. In order to handle these challenges, it is important that public authorities can nevertheless play a role in freight governance.

This thesis addresses this problem by assessing urban freight governance. It considers the following research question: "*What roles, current or potential, do urban authorities play in the governance of urban logistics?"* Through this question, this thesis illustrates the governance of urban logistics as an interplay between public authorities and businesses. Contributing to social science research on freight governance, this thesis considers this topic from three dimensions: governance structures, governance processes, and sustainability narratives. The thesis assesses who participates in freight governance, how they do so, and how they understand sustainable freight with the aim of understanding the barriers to sustainable freight governance and propose ways to overcome them.

The thesis makes use of an embedded case study, with four case cities and three dimensions of governance analysed in each city (structures, processes, and narratives). I analyse the freight governance systems in the Norwegian cities of Bergen, Oslo, Stavanger, and Trondheim through document analysis, key interviews, a survey, and a collaborative workshop. These methods, combined with perspectives from human geography, political science, and environmental humanities, provide inputs to freight research beyond engineering, technical, and economic perspectives. With these methods, the thesis shows how freight governance functions at an urban scale, including that public authorities play a passive role in it.

First, the thesis analyses the structures within which freight governance takes place in the three smaller cities. Paper 1 shows that responsibility for freight has been left to businesses and that organisational structures serve as barriers to freight governance. Public governance structures are not tasked with addressing freight challenges, and instead, responsibility for addressing them is tasked on an ad hoc basis. Public knowledge of freight is thus fragmented and implementation capacity is limited.

Secondly, the thesis outlines the networked, collaborative, and experimental processes of freight governance in all four cities. Paper 2 shows that freight governance is based on networked structures which are mainly led by business actors, resulting in few meeting places for businesses and public authorities. Urban authorities rely on these networks for freight knowledge, but they play a passive role in them as facilitators (or initiators) of freight governance processes. This results in the absence of freight in governance processes that are led by the authorities, meaning that the authorities are not playing a part in the development of long-term solutions.

Thirdly, the thesis considers research on transport and mobility to understand why sustainable mobility narratives differ for passenger and freight transport. Paper 3 finds that narratives of sustainable freight limit the realm of possibility for freight governance by reinforcing existing structures and processes. Freight narratives are dominated by a focus on decarbonisation and on limiting the consequences of freight in urban cores. This excludes other urban consequences of freight such as infrastructural sprawl, as well as other strategies to avoid freight challenges.

It is a challenge for urban authorities to play an active role in freight governance if they are not organised to consider it as a 'matter of concern.' An implication is that public freight governance is fragmented, which hinders governance processes where public authorities can take the lead whilst also reinforcing the focus on the *improve* strategy at the expense of the *shift* and *avoid* strategies. As Paper 4 shows, freight research and governance must also consider the urban implications of freight.

Sammendrag på norsk

Godstransport er av stor betydning for byliv, men behandles ikke som en «sak av betydning» av offentlige myndigheter i samme grad som persontransport. Godstransport skaper flere utfordringer for byer, inkludert økte hjemleveringer, koordineringen av de ulike aktørene som driver med godstransport og konsekvensene av godsinfrastruktur både innenfor og utenfor bygrensen. Imidlertid er offentlig styring av godstransport organisert på en måte som forutsetter at næringslivet har ansvaret for disse utfordringene. For å håndtere disse utfordringene er det imidlertid viktig at offentlige myndigheter kan spille en rolle i styringen av godstransport.

Denne avhandlingen adresserer denne problemstillingen ved å vurdere følgende forskningsspørsmål: «Hvilke nåværende og potensielle roller spiller urbane myndigheter i styringen av bylogistikk?» Med utgangspunkt i spørsmålet illustrerer avhandlingen at styringen av bylogistikk er et samspill mellom offentlige myndigheter og næringslivet. Avhandlingen bidrar til samfunnsvitenskapelig forskning på styringen av bylogistikk ved å vurdere tematikken ut ifra tre dimensjoner: styringsstrukturer, styringsprosesser og narrativer om bærekraft. Avhandlingen ser på hvem som deltar i styringen av godstransport, hvordan de gjør det og hvordan de forstår bærekraftig logistikk med sikte på å forstå barrierene til styringen av bærekraftig bylogistikk og foreslå måter å overkomme dem på.

Avhandlingen tar i bruk en innebygd casestudie med fire byer og tre styringsdimensjoner som analyseres i hver by (strukturer, prosesser og narrativer). Jeg analyserer styringen av godstransport i fire norske byer (Bergen, Oslo, Stavanger og Trondheim) ved bruk av dokumentanalyse, intervjuer, en spørreundersøkelse og et kollaborativt verksted. Sammen med perspektiver fra samfunnsgeografi, statsvitenskap og miljøhumanoria bidrar disse metodene til forskning om godstransport utover ingeniørfaglige, tekniske og økonomiske perspektiver. Totalt bidrar dette til at avhandlingen viser hvordan styringen av godstransport fungerer på urbant plan, samt at offentlige myndigheter spiller en passiv rolle i den.

Først analyserer avhandlingen strukturene der styringen av godstransport finner sted i de tre mindre byene. Artikkel 1 viser at ansvaret for logistikk har vært overlatt til næringslivet og at organisatoriske strukturer fungerer som en barriere for styringen av godstransport. Offentlige styringsstrukturer får ikke som oppgave å håndtere godsutfordringer og i stedet tildeles ansvaret på ad-hoc basis. Offentlig kunnskap om gods er dermed fragmentert og implementeringsevne er begrenset.

Avhandlingen skisserer deretter hvordan godsstyringsprosesser er nettverksbaserte, kollaborative og eksperimentelle. Artikkel 2 viser at styringen av godstransport baseres på nettverksstrukturer som hovedsakelig ledes av næringsaktører. Dette fører til få møteplasser for næringslivet og offentlige myndigheter. Urbane myndigheter er avhengige av disse nettverkene for å bygge opp kunnskap om gods, men de spiller en passiv rolle som tilretteleggere (eller initiativtakere) av styringsprosesser. Som konsekvens av dette er godstransport fraværende i styringsprosesser som ledes av myndighetene, noe som betyr at de ikke blir med i utviklingen av varige løsninger.

For det tredje tar avhandlingen i bruk forskning på transport og mobilitet for å forstå hvorfor narrativer om bærekraftig persontransport er forskjellige fra narrativer for godstransport. Artikkel 3 finner at narrativer for bærekraftig godstransport begrenser mulighetsrommet for styringen av godstransport ved å forsterke eksisterende strukturer og prosesser. Narrativer om godstransport domineres av et fokus på avkarbonisering og det å begrense konsekvensene av godstransport i bykjerner. Dette utelukker fokus på godsutfordringer som spredning av infrastruktur, samt andre strategier for å unngå godsutfordringer.

Det er utfordrende for urbane myndigheter å spille en aktiv rolle i styringen av godstransport hvis de ikke organiseres for å vurdere det som en «sak av betydning». En konsekvens er at styringen av godstransport er fragmentert, noe som hindrer styringsprosesser der offentlige myndigheter kan ta ledelsen samtidig som dette forsterker fokuset på strategien *forbedre* på bekostning av strategiene *flytte* og *unngå*. Som Artikkel 4 viser, må forskningen på og styringen av godstransport også vurdere andre urbane konsekvenser av godstransport.

Scientific environment

This research has been conducted at the Centre for Climate and Energy Transformation at the Faculty of Social Sciences, University of Bergen. The study was part of the research project *CityFreight*, led by Prof. Stein Wallace at the Norwegian School of Economics and Prof. Håvard Haarstad at the University of Bergen. It was funded by the Norwegian Research Council. Part of the funding for dissemination was granted by the Meltzer Foundation.

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List of Publications

Rosales, R. & Haarstad, H. (2022). 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 (Rosales 80% and Haarstad 20%)

Rosales, R. (Under review). Is it enough to enable freight? Modes of governance for urban logistics in Norway (submitted to *European Planning Studies*).

Rosales, R. (Submitted manuscript). Narratives for sustainable urban logistics (submitted to *Energy Research and Social Science*).

Haarstad, H., Rosales, R. & Shrestha, S. (2024). Freight logistics and the city. *Urban Studies*, *61*(1), 3-19. https://doi.org/10.1177/00420980231177265 (Haarstad 50%, Rosales 25%, Shrestha 25%).

Contents

1. Introduction

"It's hard for the municipality to regulate this because it's […] a battle for space."

This is how one of my informants summarised urban freight planning in Trondheim. The same statement could be said to apply to all cities, as our consumption habits lead to new trends in freight transport that influence the way we see and experience our cities. Behind this statement lie different conflicts, or battles, over space in cities. Freight transport is as important to city life as passenger transport, if not more, and yet public authorities know less about it than what is necessary for creating effective freight policy (Cui et al., 2015; Dablanc, 2007; Lindholm & Blinge, 2014). Before 2020, urban freight globally "represented up to 25 per cent of urban vehicles, took up to 40 per cent of motorized road space and contributed to up to 40 per cent of urban transport-related CO2 emissions and up to 50 per cent of main air pollutants (PM, NOx)" (ICLEI, 2022). In other words, freight contributes to traffic, greenhouse gas emissions, and local air pollution, and yet urban authorities do not usually know how to address it. As a result, urban development is influenced by freight without that necessarily being the authorities' intention.

Cities have become the context of analysis for many current societal processes of change, with climate urbanism and digitalisation being two examples where freight has been overlooked (Haarstad, Rosales, et al., 2024). In efforts to decarbonise the transport sector to meet global climate goals and control local pollution, public authorities have focussed on passenger transport (Akgün et al., 2019). This has often come at the expense of holistic transport planning, as the consequences of freight transport have not been addressed equally as those of passenger transport (Cui et al., 2015; Lindholm & Blinge, 2014). Instead, urban authorities were first concerned with the effects of sprawling freight infrastructure (e.g. terminals) and their contributions to traffic and road violations (Dablanc, 2007). Nowadays, the authorities' freight priorities have returned to urban cores, as 'dark stores' and other freight infrastructure fight for prime retail in city centres with other urban interests (Buldeo Rai et al., 2022; Kin et al., 2023). The one constant is that aspects such as the injustices involved in being a freight worker are overlooked (Lord et al., 2023).

During the COVID-19 pandemic, freight activities became more visible than before. Whilst most of the population was either recommended or forced to stay at home, those working with deliveries, waste transport, and public services were suddenly most exposed to the pandemic because their work was deemed essential. The pandemic contributed to increased deliveries, with food courier companies such as Deliveroo in the UK planning for 286% hikes in courier numbers in 2020 (Lord et al., 2023), but the sector that suddenly became visible during the times of restrictions continues to be painted as a sector to be kept 'behind the scenes.' As I show in Paper 3, urban authorities aim to shield their residents from encountering freight transport, either by physically limiting access to central areas or by limiting the entry time for freight vehicles. This leaves the private sector to find its own solutions for access and time restrictions, something which can even result in traffic violations so that goods can arrive at their destination (Dablanc, 2007).

Additionally, most transport research has used technological and economic perspectives through what has been called a 'technical-rational model' (Marsden & Reardon, 2017). This is particularly clear in freight research, where most proposed solutions have concerned economic efficiency and reducing 'nuisances' (Strale, 2019). Social science perspectives on the role of freight in cities have been missing, as well as perspectives on governance, power relations, and public policy (Fossheim & Andersen, 2022). Studies have centred on how urban authorities may promote or enforce shared driving of goods (consolidation), physical measures such as parking spaces, or even the shifting of goods to other modes of transport; smaller vehicles, low or zero-emission vehicles, or even cargo bikes (Browne et al., 2012; Otto et al., 2023). Meanwhile, perspectives on governance and other political aspects of freight have been missing (Fossheim & Andersen, 2022; Strale, 2019)

My PhD project has centred on public governance of urban logistics, attempting to go beyond considerations of the 'technical-rational' (Marsden & Reardon, 2017) aspects of freight transport and freight solutions, to considerations of governance structures, governance processes, and sustainability narratives relating to freight. I was interested in who takes part in freight governance and how they do so. Recent freight

research has shed light on the perspectives that a variety of freight stakeholders in smaller urban areas can provide public authorities (Bjørgen et al., 2021) and how these perspectives may be integrated into city planning (Bjørgen & Ryghaug, 2022). This has been an addition to existing research on urban logistics governance in megacities such as Paris and Rome (Buldeo Rai et al., 2023; Gatta & Marcucci, 2014). Similarly, this project has focused on how urban logistics governance operates in urban areas in Norway, which by global standards are small.

Most urban freight research considers how large urban areas address freight challenges, and although most Norwegian urban areas are small in a European or global context, the location of terminals within their borders resembles challenges in larger cities (Dablanc, 2007). Nonetheless, urban areas across the world share some of the same challenges, and the differences arise in how they may approach solutions to them. Norwegian cities like Bergen, Oslo, Stavanger, and Trondheim are more comparable to mid-size cities such as Bologna and their urban freight governance, which is entangled in a multilevel urban system (Rubini & Lucia, 2018), than metropolises like Rome and Paris. Existing research on medium-sized cities like Bologna provides insights that I have more easily been able to transfer to my smaller case cities.

Using Bergen, Oslo, Stavanger, and Trondheim as my four case cities, I consider freight governance through three dimensions: structures, processes, and narratives. To do this, I built on; 1) existing freight research that has highlighted knowledge gaps and institutional barriers to freight governance (Bjørgen & Ryghaug, 2022; Cui et al., 2015; Fossheim & Andersen, 2017; Lindholm & Blinge, 2014), 2) governance research that described different governance processes relevant to freight (Bjørgen et al., 2021; Bulkeley & Kern, 2006; Fossheim & Andersen, 2022; Hanssen & Hofstad, 2020), and 3) research on transport and sustainability that provides broader understandings of narratives for sustainable freight (Dryzek, 2021; Holden et al., 2020; Marsden & Reardon, 2017; Meadowcroft et al., 2019).

Given the dominance of technical and economic perspectives in freight research, I have drawn on the different strands of research included above to provide perspectives on the governance of freight broadly and the urban dimensions specifically. I have considered three dimensions of freight governance to understand how freight and the governance systems surrounding it operate. This has included perspectives on the interplay between private and public stakeholders in governance systems, and on the interplay between different understandings of governance and sustainability. Governance research varies in its conceptualisation and application of the concept and this project has attempted to exemplify the governance system that surrounds the policy sector of urban freight. I have sought to answer the call for more research on freight governance (Fossheim & Andersen, 2022) and highlight how freight is embedded in urban societal and policy systems.

Goods transport and the infrastructure necessary to enable it are inherently urban, as any consideration of freight in one area should consider consequences in its surroundings (Dablanc, 2007). Large terminals are usually located in poor neighbourhoods (Strale, 2019), and new consumption habits lead to considerations of cities 'operating' as freight systems (Haarstad, Rosales, et al., 2024). Urban authorities interact with differing groups of freight stakeholders, reorganise their administrations, and participate in international urban freight projects, yet freight is often described as fragmented, out of sight, and even forgotten. Urban logistics has not been what can be called a 'matter of concern,' a *thing* that is the product of gatherings as opposed to an *object* defined simply by inputs and outputs (Latour, 2004). Freight is treated as an essential activity and freight challenges are seen as a matter for businesses to solve. However, freight is embedded in urban processes and influences urban development, and thus it should be treated as a *matter of concern* by public authorities instead of as a *matter of fact* (see Latour, 2004).

In a review of current freight research, we argue that new challenges presented by urban freight have made it more urgent for public authorities to act (Haarstad, Rosales, et al., 2024). Only passenger mobility has been seen as the public domain (Strale, 2019), and many goals aimed at improving freight conditions have been

framed through changes in passenger transport (Akgün et al., 2019). Freight has also been framed as benefitting from changes in passenger transport, with a stronger focus on how to decarbonise freight and decrease road conflicts than on how to address the consumption trends that are causing increased freight transport.

The 'sustainability' of freight is not a new topic of research and earlier research has pointed to the social and environmental effects of freight (Anderson et al., 2005; Behrends et al., 2008; Dablanc, 2007). These effects have been explored over time, but mainly within the technical-rational model. Questions of who participates in freight governance, how they participate, and the solutions that are proposed for sustainable freight have missed social science contributions that consider governance systems and urban contexts (Fossheim & Andersen, 2022; Kin et al., 2023). 'Sustainable' freight cuts across urban concerns, including living environments, planning processes, and space. I place my research in this intersection, drawing on human geography, political science, and environmental humanities.

In this thesis, I explore freight governance through three dimensions (structures, processes, and narratives) and seek to provide perspectives outside the technical-rational model. Firstly, I explore public governance structures for freight, which are fragmented and cross-sector. Secondly, I consider governance processes, which are mainly led by the private sector in a mix of experimental and collaborative settings. Finally, I outline sustainability narratives for freight, which are reinforcing the technical-rational model by giving public authorities a passive role and technological and infrastructural solutions the most attention.

1.1 Research design and research questions

Given existing research on urban logistics and the call for more analysis of urban logistics governance and of smaller cities, this project has looked at urban logistics governance in Norway's four largest urban areas – Oslo, Bergen, Trondheim, and Stavanger. Primarily the focus has been on Bergen, Trondheim, and Stavanger, as these are smaller cities with fewer resources, less existing research focus, and less

administrative authority. This is because Oslo is not only Norway's capital, but also both a municipality and a county (regional authority), which allows it more authority over its infrastructure. Case selection in each of the articles is outlined in section 1.2.

Throughout this project I made use of an abductive research design (Blaikie, 2009, pp. 89–92), taking inspiration from existing theoretical and empirical discussions before designing my papers. In this way, I allowed myself the flexibility to reflect on initial data collection before making final decisions on what contribution each paper made to the academic debate. Urban logistics is a complex topic and I decided early on to focus on the structural and procedural challenges to urban logistics governance. This means that I do not directly address policy choices, but rather how they come about (within structures and through processes) and the justifications used (through narratives). Whilst the social and environmental challenges that surround urban logistics serve as a background for my research, they do not necessarily frame my research questions, the main one being:

What roles, current or potential, do urban authorities play in the governance of urban logistics?

This overarching question frames the three sets of research questions that are addressed in my papers:

1. What policy frameworks do Norwegian cities use when planning for urban logistics? What are the main challenges they face towards achieving sustainable logistics?
2. In what ways do urban authorities rely on different modes of governance in Norwegian urban logistics governance?
3. In what ways do public and business sustainability narratives portray different understandings of what sustainable urban logistics entails? How can public narratives of sustainable urban logistics contribute to solutions?

To answer these questions, I collected several types of data. My data comprised document data, semi-structured interviews, a survey, and a collaborative workshop.

Together, the data allowed for triangulation of results and provided perspectives from different scales, from the individual to the organisational. The interviews and the survey provided insights into what individuals thought of sustainable urban logistics, whilst the documents provided insights into how municipalities and businesses operationalise sustainability in the case of urban logistics. The workshop provided the perspectives of different groups of freight stakeholders, as well as serving as inspiration for further interviews. Data analysis is based on the three dimensions of governance, and this is detailed in Chapter 3.

Additionally, this PhD project was part of the CityFreight research project, a collaboration between the Norwegian School of Economics and the University of Bergen. The project sought to provide the authorities with evaluation tools for regulating freight transportation in smaller cities. Through close contact with project partners, primarily the City of Bergen, the project had a focus on the role of the authorities in addressing challenges such as the sharp rise in home deliveries. Due to the collaboration between the School and the University, the project sought to bring together different research perspectives to consider governance challenges, logistical modelling, and citizen perceptions. In this PhD project, I contribute mainly to the first work package: mapping governance challenges for sustainable city logistics.

1.2 Summary of papers

The papers in this thesis consider the governance of urban logistics in Norwegian cities, with a focus on governance *structures*, *processes*, and *narratives*. Paper 1 considers governance structures at the municipal and regional level; Paper 2 considers governance processes, and primarily the role public authorities play in them; and Paper 3 considers narratives as an influencing factor in governance systems. Paper 4 considers the place of urban freight in urban research and the different aspects of freight overlooked in policy and research. An overview of the papers and the research design is portrayed in Figure 1 below.

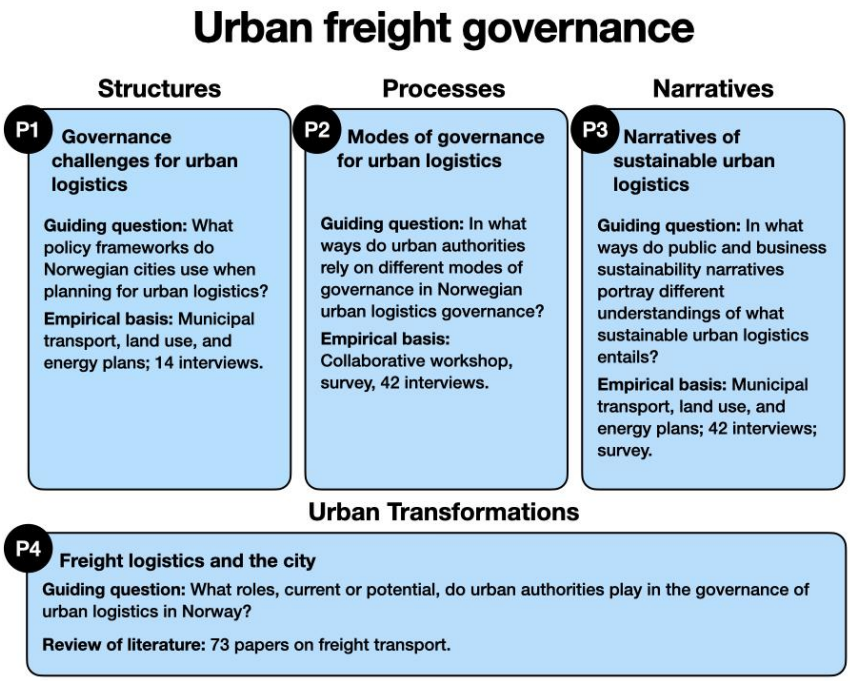

Figure 1. Overview of the thesis.

Paper 1: Governance challenges for urban logistics

In Paper 1 we argue that freight challenges have been overlooked in urban governance and that Norwegian municipalities experience the additional challenges of siloed governance structures. We find that this creates uncertainty as to who within municipal governance structures has responsibility for freight, that cities do not have many concrete goals or policy measures aimed at freight, and that structures in place to support sustainable transport prioritise passenger mobility, but not freight. It is based on analyses of interviews, document analysis, and participant observation in the cities of Bergen, Stavanger, and Trondheim, and how the municipal and regional administrations are structured in order to plan for and implement logistics policy. The city of Oslo was excluded from this study because there is more existing research on it than on the other cities, and because of the reasons outlined in 1.1.

Our analysis shows that municipal and regional structures are divided in a way that fragments knowledge of and responsibility for urban logistics. This fragmented

policymaking creates tensions both within the public sector and across the public and private sectors. Additionally, the limited capacity of existing municipal structures and their overlapping nature shows how urban logistics falls between gaps in these structures. We conclude that the underlying problem is that logistics is framed as a private concern and that we need to understand how urban governance actors operate in networked and collaborative processes. This is further addressed in Paper 2.

Paper 2: Modes of governance for urban logistics

Building on Paper 1, in Paper 2 I consider the different ways in which public authorities take part in urban logistics governance processes, analysing the extent to which they depend on each of four *modes* of governance. I argue that despite siloed governance structures, cities participate in urban logistics governance in several ways. By using urban logistics governance as an example of how public authorities may address a complex topic, in Paper 2 I use *governing by provision*, *governing by authority*, *governing through enabling*, and *self-governing* as an analytical framework for the interactions public authorities have with different stakeholders during network-based and collaborative processes. I conclude that public authorities rely on less conflicting modes of governance when addressing urban logistics, but that lessons learned from *governing through enabling* facilitate uptake of the other forms of governance.

Following a collaborative workshop with 28 participants and 28 interviews conducted after the workshop, I argue for public authorities to be more active or even assertive in both formal and informal logistics governance processes. Given the experimental and context-dependent basis of many freight governance processes, I conclude that this has provided learning opportunities for public authorities and simultaneously made it difficult to achieve more long-term changes. Experiments and pilots have provided the foundation for the establishment of long-term structures and processes, such as financing schemes and new regulations, or changes to municipal planning documents. However, public authorities are more reluctant to use *governing by authority* and *self-governing* than the situation appears to allow. I find that private

actors would like public authorities to adopt a more assertive role in freight governance processes and that the necessary knowledge is available to them.

Paper 3: Narratives of sustainable urban logistics

In Paper 3, I take a more abstract perspective to analyse the sustainability *narratives* of logistics stakeholders in my case cities. Building on an existing framework of 'grand narratives for sustainable mobility' in respect of the context of urban logistics in Norway, I question whether these narratives vary more across freight and passenger transport than claimed by the original authors. Instead of contributing to several transformative strategies, freight narratives reinforce the technical-rational model, with a passive role for public authorities in governance structures and processes. Through an analysis of documents and interviews, as well as the use of survey data, this paper concludes that sustainability narratives in the public and private sectors contribute to different prioritisations of transport strategies.

Although there is evidence of the use of all narratives across sectors, public authorities are more likely to approach sustainability through the strategy of avoiding transport generation, whilst companies are more likely to approach it through the strategy of improving transport fleets. However, I find that public authorities' sustainability focus is on passenger mobility, whilst public narratives for sustainable freight mainly reinforce the dominance of *electromobility* and the technical-rational model.

Paper 4: Freight logistics and the city

Paper 4 ties the contributions of the other three articles together by highlighting the dominance of the technical-rational model in transport research and its influence on freight. Going beyond the first three papers, this paper applies a critical review of existing freight literature to arrive at three areas for urban scholars to contribute to: 1) freight logistics and the future city, (2) justice of urban logistics and (3) new pathways for urban logistics sustainability transitions. In the paper, we argue that freight will have an increasingly visible role in processes of urban change, and that

urban scholars can provide perspectives on this role. We conclude that freight must be included in analyses of cities and urban change.

With Paper 4 we linked existing perspectives on freight with existing and upcoming urban perspectives, paving the way for our own and future research. Given that Paper 4 was written before I wrote Papers 1 and 3, I draw on the conclusions in this paper to highlight the dominance of the technical-rational model in freight governance. This paper concluded with several potential topics of research relating to freight, and in the rest of my project I contribute to unravelling some of those topics.

1.3 Structure of this framing introduction

In the rest of this framing introduction, I will delve into the different aspects of this study. Chapter 2 will outline the theoretical framework, which situates urban logistics within theoretical discussions on sustainable transport and urban governance. Chapter 3 describes the methods utilised, data collection, and analysis. Chapter 4 will then outline the conclusions drawn from the four papers and the larger discussions that this study contributes to.

2. Conceptualising sustainable urban logistics

During this PhD project, I have drawn on human geography, political science, and environmental humanities to analyse the governance of freight transport in Norwegian cities. This has required insights from these disciplines and their interpretations of the main concepts in my research. My PhD project displays my understanding of broad concepts such as sustainability and governance, applied thematically to urban freight in Norway. Juggling these concepts requires the use of some basic assumptions about them, as *sustainability* and *governance* are both broad concepts within different research fields. Both concepts have been subject to conceptual stretching, with different interpretations and practices across scholarly traditions such as those I draw on. In this chapter, I will map out my interpretation of these concepts and how I connect the two.

Urban freight in Norwegian cities, as my empirical context, has allowed me to interpret sustainability and governance, as well as urban perspectives of freight. I have considered the empirical challenges created by freight in terms of urban governance structures and processes, as well as how sustainability narratives influence these. I have explored urban freight through these three dimensions, considering that freight is part of the processes of urban change and has an influence on them. My focus has been on the roles of public authorities in these three dimensions of urban freight governance and how these roles have influenced efforts aimed at achieving sustainable urban freight in Norway.

In section 2.1 I draw on literature on sustainability and governance, starting from the broad concepts and narrowing down to literature on sustainability and urban governance. Section 2.2 introduces literature on transport, interlinking literature on sustainability and governance through a thematic lens, before section 2.3 narrows down specifically to freight transport. Finally, section 2.4 sets the scene for my PhD project by considering research from the Norwegian context that has addressed both governance and sustainability aspects of transport.

2.1 Sustainability and environmental governance

The notions of *sustainability* and *sustainable development* are continuously contested as different societal actors attempt to promote their interests (Hajer & Versteeg, 2005). These concepts have been the centre of grand debates about what to prioritise, with particular tensions between environmental concerns and socio-economic concerns (Stevenson, 2019). Sustainability has even been called a 'nodal discourse' around which discourses such as growth and development are clustered (Dryzek, 2021). As Meadowcroft and colleagues (2019, p. 2) describe it, "sustainable development frames discussion." Sustainability has made its way into policy and research through the three imperatives of sustainable development: satisfying human needs, ensuring social justice, and respecting environmental limits." (Holden et al., 2020). Thirty-six years after the publication of the seminar report *Our Common Future* (colloquially the Brundtland Report), sustainability and sustainable development are entrenched in several societal and academic debates.

Sustainable development emerged at a time when environment and development were increasingly considered in parallel (Meadowcroft et al., 2019), attempting to overcome the conflicts between environmental and economic values (Dryzek, 2021). Sustainability has become entrenched in environmental and climate governance across scales, from the urban to the international (Bulkeley & Betsill, 2005), and thirty years after *Our Common Future* it became embedded in the Sustainable Development Goals. More recently, the pattern of setting targets such as the SDGs and international climate targets has been criticised for operationalising sustainability through results-oriented, measurable progress (Dryzek, 2021; Haarstad, 2020; Jørgensen & Sørensen, 2022). I build on these perspectives to problematise what is not operationalised in these targets. Operationalisation of sustainability is also present in transport research in what is referred to as the technical-rational model (Marsden & Reardon, 2017), critiqued for limiting the scope of transport research.

As well as critiques on the centrality of metrics in sustainability discourses, different understandings of sustainability and sustainable development have been discussed in

academic debates. Just as sustainable development was conceived at the junction of debates on environment and development, there are now calls for the planet to be at the core of sustainability discourses (Stevenson, 2019). Discussions on sustainability have also given rise to the field of sustainability transitions, which this thesis touches upon. I part from sustainability transitions research in not sharing its innovation-based theoretical frameworks (Köhler et al., 2019). Instead, I agree with Langhelle and colleagues' (2019, p. 240) argument that "*both* politics and technology are crucial for a transition to a sustainable development trajectory." This builds on Dryzek's (2021, p. 6) argument that "most of the important things that happen to [the environment] are the subject of politics and the target of public policy." For these reasons, I refer to the dimensions of governance of sustainable freight and how different stakeholders conceptualise sustainability.

2.1.1 Governance – structures and processes

The politics of sustainable development are linked to environmental governance, a field affected by fragmentation, where solutions require the cooperation of a broad spectrum of societal actors and public institutions (McCormick, 2018). This is partly because governance is "broader than government, covering non-state actors," and it can even be referred to as "self-organizing, inter-organizational networks" (Rhodes, 1996, p. 659). Governance has been debated for several decades and has even been used to contrast to 'government' (Bulkeley, 2010; Pierre, 2016), but I instead consider the role of public authorities (government) within governance structures and processes. Like research on sustainability transitions, I see sustainability as something to be achieved with a plurality of actors across the public and private sectors (Köhler et al., 2019). With this perspective, my project delves into network governance, multilevel governance, and experimental governance to provide perspectives relevant to urban freight.

Rhodes (1996, p. 666) argued that when understanding governance as networks, a "key challenge for government is to enable these networks and to seek out new forms of co-operation." Yet governance can be understood both in terms of structures and processes. In structural terms, governance refers to political and economic institutions

designed to address problems, whilst in procedural terms, governance regards interactions between structures and instead focuses on the outcomes generated (Pierre & Peters, 2020). In this project, I understand governance in terms of both structures and processes. This allows for consideration of the roles of public authorities within these structures and processes.

Understood through structures, governance can refer to:

1. Hierarchies within vertically integrated State structures,
2. Markets as mechanisms that allocate resources,
3. And policy networks comprised of a variety of actors (Pierre & Peters, 2020).

Each of these understandings is used to address societal problems and they complement understandings of governance as process. In understanding governance as process, interactions among structures are analysed, but the application of *both* understandings of governance allows for analyses of the roles of the State within these structures (Pierre & Peters, 2020). Despite theoretical arguments that governance is used to explain *governing without government* (Rhodes, 1996), I adhere to the argument that governance can also refer to the continuum of actions by state and non-state actors (Bulkeley & Betsill, 2005). With this understanding, I perceive public authorities (state actors) as exactly that – actors within governance structures and processes. Governance structures for freight are mainly outlined in Paper 1 and governance processes are the focus of Paper 2.

At the urban and regional scale, governance has been used to analyse urban politics beyond formal structures, considering the coordination of resources across sectors and jurisdictions (Pierre, 2016) which could be understood as policy networks (Pierre & Peters, 2020). I use this link to analyse governance processes in networks. Literature on urban and regional governance has shown how governments at different scales operate within governance systems, including networks and hierarchies (Bulkeley & Betsill, 2005; Haarstad, 2016; Hofstad & Vedeld, 2021; Kern, 2019). Much of this literature draws on the literature on multi-level governance, which originally stemmed from studies on the European Union (Hooghe & Marks, 2003).

Multi-level governance can serve to explain how hierarchies and networks complement each other, differentiating between these as two types of governance. Hierarchical governance structures are categorised as *Type I*, whilst network-centric governance structures are categorised as *Type II* (Hooghe & Marks, 2003). Understanding multilevel governance both within hierarchies and networks has allowed me to analyse how urban authorities navigate governance landscapes, formally in Paper 1 and informally in Paper 2, as governance structures form part of formal and informal institutions (Healey, 2006). *Type II* multi-level governance broadens the scope of analysis beyond the formal, to include markets and policy networks, in what can also be referred to as polycentric governance (Hooghe & Marks, 2003). Polycentric and network governance contribute to an understanding of governance processes which is used in Paper 2.

Policy networks and polycentric governance gained increased attention from the 1990s and the rise of deregulation. The state was seen as being more dependent on different societal actors for policy approval and implementation (Pierre, 2016; E. Sørensen & Torfing, 2005), and these conceptualisations of governance allow for different understandings of how public authorities operate within governance structures. New governance perspectives help us to understand the role shift that public authorities underwent from coordinators and regulators to facilitators (Pierre, 2016).

This development has given rise to terms such as collaborative governance, "a type of governance in which public and private actors work collectively in distinctive ways, using particular processes, to establish laws and rules for the provision of public goods" (Ansell & Gash, 2007, p. 545), and also co-creation (Ansell & Torfing, 2021; Hofstad et al., 2022; E. Sørensen & Torfing, 2005; Vedeld et al., 2021). Governance as a concept has been used to explore different forms of policymaking, recalling Stoker's (1998) description of governance as "implied transparency and broader societal involvement." This description mirrors the calls for more collaborative and experimental governance which I refer to in Paper 2, except in my research I analyse

the interplay between public authorities and businesses, or as Pierre and Peters (2020) called it, the mutual dependence between networks and the State.

2.1.2 Urban governance – multilevel and network-based

Urban authorities and their role in broader governance systems have been the focus of large swathes of literature on environmental and climate governance, with the "role of local governance in driving transformation […] seen as an incubator of change spreading to higher levels of governance, or as an actor that through continuously working for incremental change may tip the system" (Amundsen et al., 2018). The roles of urban authorities have been considered in the different strands of governance literature hinted at above, ranging from their roles in networks to collaborative governance to experimental governance (Ansell & Gash, 2007; Bulkeley & Castán Broto, 2013; E. Sørensen & Torfing, 2005). Networked governance and its consequences are discussed in Paper 1, whilst the use of collaborative and experimental governance for freight is outlined in Paper 2.

Cities' role in climate governance has been examined both in terms of transnational networks (Bulkeley, 2013; Haarstad, 2016) and of governance networks within cities (Castán Broto, 2017), reflecting the idea that "governance takes place through processes and institutions operating at international, transnational, national and local scales" (Betsill & Bulkeley, 2002, p. 9). The potential to act within hierarchical and network structures has been outlined in the literature on polycentric urban climate governance (Ostrom, 2010; Vedeld et al., 2021), which in recent years has connected the literature on collaborative and experimental governance to map out the possibilities for urban authorities (Vedeld et al., 2021). Whilst collaborative governance is concerned with gathering different stakeholders (state and non-state) "in a collective decision-making process that is formal, consensus-oriented, and deliberative" (Ansell & Gash, 2007, p. 544), experimental governance arose from a desire to test initiatives "where existing rules concerning how to govern are limited" (Bulkeley & Castán Broto, 2013, p. 364).

The interaction between these types of governance is central to Paper 2, which refers to *modes* of governance. Cities' role in climate governance has been categorised through *modes* describing the approach urban authorities have to climate policies (Bulkeley & Kern, 2006). These modes were later described as roles – cities can act as 'regulator,' 'provider,' 'consumer,' and 'facilitator' (Hanssen & Hofstad, 2020). These roles are described as being equally important to achieving ambitious environmental and climate targets, but it appears that cities opt for acting as facilitators and consumers and less so as regulators or providers (Bulkeley & Kern, 2006). Together, the four modes help to explain how cities combine hierarchical and networked governance within their constraints (Hanssen & Hofstad, 2020). A high degree of facilitation in the form of experiments is in Paper 2 shown to serve as both an opportunity and a risk, as knowledge gained from experiments is not necessarily institutionalised.

This trend is in line with Pierre's (2016) analysis of urban authorities as coordinators, or even mobilisers of resources. Here, urban authorities facilitate others' work instead of providing public resources or regulating private actors as they used to. I argue that this reliance on facilitating the work of others what has contributed to the reliance on experiments and reinforced fragmented governance structures. This is particularly evident at an urban scale, as urban governance systems operate through vertical, horizontal and infrastructural processes (Haarstad, 2016). Such a system makes freight governance particularly complex, as it operates across scales and forms of governance. I have analysed this fragmentation with use of research on cross-functional cooperation (Bouckaert et al., 2010) and research on multilevel governance to exemplify how governance approaches are used to understand this cross-functional cooperation in the case of transport (Bache et al., 2015).

2.2 Sustainable urban transport

Discussions of sustainable transport entail questions ranging from congestion, emissions, and planning conflicts (Banister, 2008; Kennedy et al., 2005; May et al., 2006), but more recently there has been more emphasis on the social aspects of

sustainability in transport (Ryghaug et al., 2023). Holden and colleagues (2020, p. 2) argue that *narratives* of sustainable mobility "must address the three imperatives of sustainable development" with subsequent criteria to address these imperatives. This argument draws on thirty years of sustainable mobility narratives initiated from a 1992 EC Green Paper and *Our Common Future* (Holden et al., 2020). Research has shown that transport-related emissions have been addressed both in theory and in practice, with special attention given to passenger transport over the last two decades (May, 2013; Ryghaug et al., 2023). Passenger transport has been framed as *mobility*, with the aim of *sustainable mobility*. Despite claims that the latter term covers both passenger and freight transport (Holden et al., 2019), freight transport has received less attention from research on sustainable mobility than passenger transport (Schwanen, 2016).

The discussion on *sustainable mobility* has grown during the last three decades, with the coining of the sustainable mobility paradigm in 2008 (Banister, 2008). This paradigm questioned the definition of travel as derived demand and the perceived need to minimise the cost and time used. Instead, the *sustainable mobility paradigm* served as an opportunity to present the benefits of joint land use and transport planning (*Ibid*). Perceptions of derived demand, cost minimisation and time savings are also present in freight research, contributing to the technical-rational model that prevails in transport research (Marsden & Reardon, 2017). Ten years after the sustainable mobility paradigm was coined, sustainable mobility was concluded to have gone through four phases – each with a different approach as to how to achieve 'sustainability' (Holden et al., 2019). Like the authors of this review paper, this project uses the terms transport and mobility interchangeably, despite the passenger-centric focus of most *mobility* research.

The grand narratives of *electromobility*, *collective transport 2.0* and *low-mobility society* are reconsidered in Paper 3 with consideration of urban freight. The first is based on a strategy to improve transport technologies to reduce their negative effects, the second is based on a strategy to shift transport over from individual to collective modes of transport and thus reduce the number of vehicles on the roads, and the third

is based on a strategy to avoid the generation of transport entirely (Holden et al., 2020). These strategies are common in transport research and are referred to in the IPCC 6th Assessment Report as part of efforts to broaden research and policy discussions on sustainable transport (Jaramillo et al., 2022).

Whilst the three grand narratives were proposed to cover all transport, both passenger and freight, in Paper 3 I argue that differentiation between passenger and freight transport is reflected in the *grand narratives*, which appear to be better suited to passenger transport than freight. Frameworks such as the three grand narratives have contributed to research addressing the different challenges created by a growing transport sector, mainly reductions in emissions and traffic, with efforts centred on reducing private car use and car-centric communities (Kennedy et al., 2005). The *electromobility* narrative appears to dominate the transport sector, as even when the main strategy is not only to *improve* transport fleets, this strategy can come at the expense of the other two strategies (Remme et al., 2022).

Analyses of different approaches towards sustainable transport have paid special attention to cities (May, 2015; May et al., 2006; C. H. Sørensen et al., 2014). Growing urban populations have been used to argue that urban transport must be addressed to improve or maintain quality of life in urban areas (May et al., 2006). Transport affects other aspects of daily life, such as education and social inclusion, and it can contribute to climate change efforts (May, 2015). Due to these effects, urban authorities have developed different approaches, and it has become evident that transport cannot be governed by cities alone. At the European level, the European Commission has for the last 15 years led efforts to coordinate transport policy at a higher level (May, 2015). These efforts have encouraged research and development on Sustainable Urban Mobility Plans, which are intended to consider land use and transport planning in a more integrated manner (May, 2015; Rupprecht Consult et al., 2019), responding to earlier calls to do so (May et al., 2006).

Integrated land use and transport planning in respect of freight is considered in Paper 1, combining governance challenges and transport perspectives. Research interest in

urban transport seems to have come at the expense of non-urban or inter-urban transport research, particularly in the social sciences (Ryghaug et al., 2023). An analysis of research in transport geography concluded that this field has particularly restricted itself to analyses of urban transport and that it would benefit from interaction with other transport research, both within the discipline and with others (Schwanen, 2016). Nonetheless, social science research on transport has highlighted urban transport as being central to transport transitions, both in reducing greenhouse gas emissions and in reshaping communities away from car dependence. There has also been a growing call for more research beyond technical and economic perspectives (Marsden & Reardon, 2017).

We outline the need to consider freight in urban research on the same basis in Paper 4, as we see freight as being deeply ingrained in the urban fabric. Freight research is covered by the two claims made above – it has been dominated by technical and economic perspectives and analyses of urban freight have come at the expense of the non-urban or inter-urban. In my project I have sought to contribute to these research gaps with analyses of the structures, actors, and narratives involved in urban freight governance.

2.3 Governance of sustainable freight

Research on freight transport has considered freight governance without necessarily naming it (Cui et al., 2015; Lindholm & Blinge, 2014; Morel et al., 2020; Patier & Routhier, 2020). My PhD project answers the call for more research on the governance of urban logistics (Fossheim & Andersen, 2022) and builds on research that has concluded that urban authorities face knowledge gaps and coordination challenges when addressing urban logistics (Cui et al., 2015; Lindholm & Blinge, 2014; Nordtømme et al., 2015). These knowledge gaps are considered in Paper 1 alongside coordination challenges and other governance challenges in Norwegian cities. I contribute to the discussion by attempting to shift the perception that urban logistics concerns a relationship between freight businesses and customers

(Ambrosino et al., 2015; Fossheim & Andersen, 2017; Lindholm & Blinge, 2014), with consideration of public governance.

Just as mobility has become a priority for urban authorities, I argue that urban freight also must become so. Previous research has concluded that mobility policy has come at the expense of freight policy (Bjørgen, Seter, et al., 2019; Cui et al., 2015; Lindholm & Blinge, 2014; Patier & Routhier, 2020), and in my research, I have concluded that this is the case in several aspects of freight governance. I first consider this in Paper 1 with regard to governance structures, and then in Paper 3 with regard to sustainability narratives. Freight narratives centre on emissions reductions (the 'improve' strategy in the avoid-shift-improve framework (Jaramillo et al., 2022) and less so on shifting freight to less energy-intensive modes of transport or avoiding freight transport entirely. This brings to mind the conclusion by Remme and colleagues (2022) that the *improve* strategy can come at the expense of the other two.

Freight governance primarily operates through networks where public authorities have a role. As Quak and colleagues describe (2016), the "urban freight transport system is a complex compilation of technical and infrastructural systems and includes networks of interdependent stakeholders." Public authorities here have the opportunity to, as Calderon and colleagues (2022) conclude for sustainable planning generally, counter demands for faster and more efficient planning to ensure increased participation and deliberation. This would contribute to a break from the technical-rational dominance in freight research and provide consideration of the less understood consequences of freight, as discussed in Paper 4. In line with climate policy research, perspectives from social scientists outside of economics contribute with differing assumptions and time perspectives, "away from explaining obstacles to climate governance and towards conceptualizing and identifying factors and mechanisms that enable successful climate governance" (Boasson & Tatham, 2023). It is this change in research perspective that I hope to contribute to for freight specifically and sustainable transport generically.

Challenges such as the boom in home deliveries have made it evident how necessary it is for urban authorities to take an active role in urban freight planning (Buldeo Rai et al., 2023; Kin et al., 2023). It has become increasingly clear that urban logistics is not self-regulating, as has been the assumption, and that public authorities have a role in freight planning instead of trying to make it invisible (Patier & Routhier, 2020). A passive role by public authorities has led to more challenges, and a more involved role would ensure fewer goal conflicts (Cui et al., 2015; Lindholm & Blinge, 2014; Morel et al., 2020; Patier & Routhier, 2020). The passive role of public authorities is highlighted in Paper 2, where it becomes clear that public authorities rely on facilitating (*governing through enabling*) and acting as a consumer (*self-governing*).

Public authorities in Norway have maintained the mantra that logistics is primarily self-regulating and have not wanted to resort to the overarching use of authority. However, the nature of freight means that public authorities can take a more coordinating role. The networked and cross-border nature of freight means that it is a topic social scientists must consider beyond the urban, in line with Ryghaug and colleagues' (2023) call for research beyond urban transport. We also call for the effects of freight to be considered in terms of processes of urban change in Paper 4, seeking more systemic perspectives. I have considered the role of public governance of freight in a Norwegian context and have therefore contextualised my discussion within the Norwegian freight sector.

2.4 Sustainable transport in Norway

Urban freight governance is not a new topic of research in the Norwegian context, as there have been calls to increase collaboration both between business actors and across business and public sectors (Eidhammer et al., 2016). Norwegian researchers have considered different barriers to urban freight policy (Nordtømme et al., 2015), Norwegian municipalities and companies have participated in several experimentation and pilot projects (Ambrosino et al., 2015; Eidhammer et al., 2016), and the Norwegian Public Roads Administration has funded several research projects to consider the integration of freight into municipal planning (Jensen et al., 2020).

There is also the project that this PhD is a part of (CityFreight), described in section 1.1.

Norwegian cities have entered a European policy discussion and been part of research that has concluded that logistics needs to be integrated into urban planning and governance processes (Bjørgen, Seter, et al., 2019; Bjørgen & Ryghaug, 2022; Fossheim & Andersen, 2017; Shrestha & Haarstad, 2023). This research has argued for context-specific knowledge to build on existing research, which mainly considers megacities (Bjørgen, Bjerkan, et al., 2019; Bjørgen, Seter, et al., 2019). In my PhD I have drawn on this research and sought to further the focus on the governance of urban freight. I have considered Norwegian urban freight across three dimensions of governance: structures, processes, and narratives.

Freight governance in Norwegian cities exists within a context that is simultaneously hierarchical, networked, and experimental. Norwegian cities are part of multi-stakeholder state collaborations called Urban Growth Agreements, where land use and transport planning are to be integrated (Amundsen et al., 2018; Westskog et al., 2020). These governance structures cut across the hierarchical transport governance system and centre on an overarching goal: zero-growth of private car use in urban areas. This goal is expected to create coherence in land use and transport policy and contribute towards climate goals (Haarstad, Sareen, et al., 2023), but freight is exempt from this goal (Tønnesen et al., 2019). Urban Growth Agreements and the Zero Growth Goal are mentioned in Paper 1, as I outline governance structures for urban freight in Norway.

It has been suggested that freight could be included within the framework of the Urban Growth Agreements (Tønnesen et al., 2019) and this is mentioned in Paper 1. These agreements exist within public planning processes, however, so this would not change the fact that freight governance processes mainly take the form of cross-sector networks (Quak et al., 2016). Freight governance requires cooperation between public and private stakeholders (Bjørgen, Seter, et al., 2019) and this cooperation has taken the form of living labs and policy experiments (Browne et al., 2019; Cui et al.,

2015; Fossheim & Andersen, 2022; Rubini & Lucia, 2018). There are examples of these across Norwegian cities, outlined in Paper 2 as governance processes, and most of these are led by business stakeholders.

More broadly, these structures and processes hint at what Norwegian authorities view as sustainable freight. Norwegian authorities created arrangements like the Urban Growth Agreements as part of efforts to tackle greenhouse gas emissions, traffic, and pollution (Meld. St. 20 (2020-2021)). By excluding freight from the urban growth agreements, the Norwegian government is separating freight from governance structures and processes that are designed to promote sustainable transport in cities. Instead of taking the same approach to sustainable freight as that adopted for sustainable mobility, the Norwegian government is prioritising the challenges created by passenger cars (Tønnesen et al., 2019). I see that this is ingrained at the municipal level in narratives for sustainable transport, which I show in Paper 3.

The rise of q-commerce, proximity logistics, and several other innovations in urban freight mean that urban authorities elsewhere are playing an active role in logistics governance (Kin et al., 2023). Whilst the main examples are still derived from large cities, and in many cases ingrained in national (hierarchical) governance structures such as goals, Norwegian cities also have the opportunity to learn from them. Dablanc (2007) describes 'small cities' as those with populations under 100.000, and although the Norwegian cities I study are not all much larger, they do not face the challenges of small cities. Large cities are, like my case cities, struggling to find space for logistics infrastructure, and in many cases logistics operators have to bend the rules in order to get goods to their destinations (*Ibid*). This is the 'battle for space' that is described by one of my interviewees, entangled in Norwegian urban freight governance.

Together, the three dimensions of governance I have just described within the context of sustainable transport in Norway are intended to show that freight transport is intrinsically a part of sustainable transport and sustainable cities. Without sustainable freight, the transport sector as a whole cannot be said to be sustainable. Current

freight governance separates passenger and freight transport in any efforts designed to achieve sustainable mobility. In my thesis I have brought together governance and sustainability to show that freight cannot be understood separately from passenger transport. An understanding of freight in this way reinforces the existing technical-rational model for sustainable freight. It makes it difficult to have more sustainable urban freight that is not just technologically and financially sustainable. Freight must also contribute towards thriving, sustainable cities, and for these reasons, it cannot be treated as being invisible.

3. Methodology and data collection

My PhD project has been part of the CityFreight research project, a collaboration between researchers at the Norwegian School of Economics and the University of Bergen. As part of this project, I have gained insights into existing research on urban freight and have sought to contribute qualitative social science perspectives. The project sought to provide public authorities in smaller cities "with a toolbox for realistically evaluating major decisions that would make a city more energy efficient and sustainable in terms of freight transportation." My main contribution has been aimed at one of the project's tracks: mapping governance challenges for sustainable city logistics (Work Package 1). I took this track as the point of departure for my own project, considering what governance challenges for urban logistics exist in terms of first structures, then processes, and finally narratives. Each dimension of governance built on the previous one and data collection for each included lessons from previous data.

In this chapter I will outline my methodological approach, including research strategy, data collection, and methods analysis. This includes the selection of cases throughout my articles and for my overall thesis. I wanted to explore and understand freight governance systems, contextualising them in different cities, but also as part of a larger national framework which provides the same foundation. By linking research on sustainability, governance, and freight, I provide new empirical perspectives for freight research. As stated in 1.1, I followed an abductive research strategy, which provided me with understandings of freight governance, as opposed to causal explanations (Blaikie, 2009, p. 89). I sought to understand not just how freight governance operates in my case cities, but how it is understood by freight stakeholders. An abductive research strategy allowed me to start by discovering concepts and the motives of social actors before arriving at social scientific concepts that allow for further analysis (Blaikie, 2009, pp. 90–91).

3.1 Case study

This thesis is composed of an embedded, multiple-case design (Yin, 2018), with four case cities (Bergen, Oslo, Stavanger and Trondheim) and three dimensions of governance analysed across these cities (structures, processes, and narratives). These case cities provide insight into how cities may contextually address the challenges that come with increased urban freight transport, and the dimensions of governance, outlined in Chapter 2, allow for more in-depth analysis of the characteristics of governance systems. This design covers three research approaches across its stages; it is first exploratory, then descriptive, and finally explanatory (*Ibid*).

Together, the cities give an idea of the approaches that urban authorities adopt for solving urban freight challenges, and the cities have more similarities than differences. The cities of Bergen, Stavanger, and Trondheim are three medium-sized Norwegian cities, as well as coastal cities with historical city centres. They are also the main focus of the CityFreight project, which aims to contribute to existing research on urban logistics in Norway where the city of Oslo is often a case study.

I began my data collection with only the first three cities as cases in order to supplement existing data on the city of Oslo with data from these other cities, but also because these three cities share more similarities than with Oslo that I mention in 1.1 and 1.2. Comparison of governance structures in these cities was more feasible than in the city of Oslo, mainly because of its dual designation as a municipality and a regional authority, but I included the city of Oslo in the rest of my study. I made this decision because the governance processes and sustainability narratives shared more commonalities across the cities, partly because authorities in all four cities share experiences and in some cases are part of the same pilots or projects.

More importantly, this allowed for comparison between the three ‘small’ cities and the much larger Oslo metropolitan area. Some basic information about the four cities is provided in Table 1 below. It shows how much larger Oslo’s urban population is than in the other cases. It also shows that although Trondheim municipality has a greater population, the Stavanger-Sandnes conurbation is more populous than the

consecutive urban population in Trondheim. The three 'smaller' cities have more similar urban populations, but vary in geographical concentration. I use population data from 2022 because it is the most comparable data that is available from Statistics Norway.

Table 1 – Key data from case cities

Municipality	Municipal Population	Urban Population
Oslo	699 827	1 064 235
Bergen	286 930	267 117
Stavanger	144 699	231 693
Trondheim	210 496	194 860

Source: Statistics Norway (2023)

3.2 Data collection

Most data collection took place in or from the city of Bergen, partly due to access to resources and the time provided by project partners, but also because of the COVID-19 pandemic. The first 18 months of my PhD contract occurred in parallel with diverse restrictions, and as such data collection during this period was dependent on digital meetings and desk research. I therefore began my project with document analysis of municipal documents relevant to transport governance and a first round of mostly online interviews with key stakeholders from September 2020 to March 2021. Amongst the documents I analysed are municipal master plans, transport strategies, and energy and sustainability strategies (see Paper 1 for the full list). Simultaneously, I participated in several freight-related events during this exploratory phase of my project, learning about urban freight governance research and practice (see Table 4).

I outline all my data sources in Table 2 below, which included further interviews, participation in diverse events, in-depth document analysis, a survey of key stakeholders in all four cities, and a collaborative workshop with key stakeholders in Bergen. A total of 40 interviews were conducted in the three cities, some with more than one participant, and in papers 2 and 3 I drew on two more interviews held by

project partner Subina Shrestha with municipal authorities in Oslo. The interviews and meetings I participated in are outlined further in Table 3 below.

Table 2 – Overview of data sources

Data Type	Bergen	Stavanger	Trondheim	National
Interview	16 interviews with 6 city or regional planners, the chamber of commerce (2x), 9 organisations	8 interviews with 3 city or regional planners, the chamber of commerce (2x), 4 organisations	12 interviews with 3 city and 1 regional planners, the chamber of commerce (2x), 6 organisations	4 interviews with 3 national executives, 1 researcher
Event	5 conferences and 14 meetings (13 in-person and 6 virtual) on transport and logistics in Bergen	1 meeting on urban logistics in Stavanger	1 online workshop on urban logistics and 2 online conferences on transport and logistics	3 transport and logistics conferences (1 in person and 2 virtual) and 3 webinars
Document (Full reference available in papers 1 and 3)	Municipal master plan and topic strategies (transport and climate)	Municipal master plan and topic strategies (transport and climate)	Municipal master plan and topic strategies (transport and climate)	6 corporate sustainability strategies (or similar)
Survey	28 responses	13 responses	23 responses	19 responses
Workshop	34 participants (Full list available in Paper 2)			

In addition to the data material listed above, I have gathered evidence from virtual and in-person observation of 18 events (9 conferences, 2 online workshops, 2 webinars, and 5 project meetings). These are outlined in Table 4 below. I also participated in 6 research project meetings in the CityFreight project where the project partners provided an update of their work. The project's partners were the City of Bergen, the regional authority Vestland County, the Norwegian Public Roads Administration, the Bergen Chamber of Commerce, the Nordic Edge Foundation, and Sparebanken Vest. Contact with several interview participants in Bergen was made through these project partners.

The partners also held events such as a workshop on urban logistics in Bergen hosted by the Chamber of Commerce (see Table 4), and the City of Bergen held meetings with local freight companies (see Table 3). For interviews or meetings with more than

one participant the participants are shown in the first column. For this reason, the number of interviews does not match the number of people interviewed.

Table 3 - List of interviews and meetings

Role	Organisation	Type	Date
Advisor 1 Representative 1 Representative 1	Chamber of Commerce 1 Norwegian Truck Owner' Assoc. (NLF) Confed. of Norwegian Enterprise (NHO)	Interview	Dec 2020
Transport Advisor 1 Transport Advisor 2	Vestland County	Interview	Dec 2020
Planner	Stavanger Municipality	Interview	Dec 2020
Planner Advisor Advisor	Stavanger Municipality Rogaland County	Meeting	Jan 2021
Planner 1 (Mobility)	Bergen Municipality	Interview	Jan 2021
Business Advisor	Chamber of Commerce 2	Interview	Jan 2021
Business Advisor	Chamber of Commerce 3	Interview	Jan 2021
Executive	DHL Express	Interview	Jan 2021
Regional Advisor	Posten Midt	Interview	Jan 2021
CEO	City Centre Organisation 1	Interview	Feb 2021
Regional Manager	Schibsted Distribusjon	Interview	Feb 2021
Regional Manager	DB Schenker Midt	Interview	Feb 2021
Representative 2	Norwegian Truck Owners' Assoc. (NLF)	Interview	Feb 2021
Planner 1 (Land use)	Trondheim Municipality	Interview	Mar 2021
Transport Executive	Trøndelag County	Interview	Mar 2021
Planner 1 (Mobility)	Bergen Municipality	Meeting	Sep 2021
Planner 1 (Mobility)	Bergen Municipality	Meeting	Oct 2021
Planner 1 (Mobility)	Bergen Municipality	Meeting	Dec 2021
Planner 1 (Mobility)	Bergen Municipality	Meeting	Mar 2022
Planner 1 (Mobility) Planner 2 (Land use)	Bergen Municipality	Meeting	Sep 2022
Branch Manager	LUKS	Meeting	Sep 2022
Division Manager	Transport Workers' Union	Interview	Dec 2022
Board Member	Norwegian Cycling Association	Interview	Dec 2022
Planner	Norwegian Public Roads Admin. – West	Interview	Jan 2023
Project Leader	Norwegian Public Roads Administration	Interview	Jan 2023
Branch Manager	Sea cargo company	Meeting	Jan 2023
Researcher	Institute of Transport Economics	Interview	Jan 2023
Regional Manager	Posten Southwest	Interview	Jan 2023
Head of Development	Property developer 1	Interview	Jan 2023
CEO	Restaurant chain	Interview	Jan 2023
Division Manager	PostNord	Meeting	Jan 2023
CEO	Shopping Centre (Stavanger)	Interview	Jan 2023
Business Advisor	Chamber of Commerce 2	Interview	Jan 2023
Representative 2	Confed. of Norwegian Enterprise (NHO)	Interview	Jan 2023
Advisor	Stavanger Municipality	Interview	Jan 2023
Senior Advisor	Property developer 2	Interview	Jan 2023

Branch Manager	LUKS	Interview	Jan 2023
Branch Manager and Terminal Leader	Posten	Meeting	Jan 2023
Division Manager	Bergen region waste company	Interview	Jan 2023
Planner 2 (Land use)	Trondheim Municipality	Interview	Feb 2023
Planner 3 (Climate)	Trondheim Municipality	Interview	Feb 2023
Regional Advisor	Posten Midt	Interview	Feb 2023
Business Advisor	Chamber of Commerce 3	Interview	Feb 2023
CEO	Shopping Centre (Trondheim)	Interview	Feb 2023
Researcher	SINTEF	Interview	Feb 2023
Planner 1 (Mobility)	Bergen Municipality	Interview	Feb 2023
CEO	Freight forwarding company	Interview	Feb 2023
CEO	Rail cargo company	Meeting	Feb 2023
General Manager	Sea cargo company	Meeting	Feb 2023
Planner 3 (Waste)	Bergen Municipality	Interview	Feb 2023
CEO	Freight forwarding company	Meeting	Feb 2023
Head of Logistics Head of Transport	Food transport company	Meeting	Feb 2023
Head of Distribution Terminal Workers (2)	Food transport company	Meeting	Feb 2023
Advisor 1 Advisor 2	Chamber of Commerce 1	Interview	May 2023
Planner 2 (Land use)	Bergen Municipality	Interview	May 2023

After completing the first round of interviews, I sought to acquire the perspectives of a larger number of freight stakeholders from different stakeholder groups by conducting a survey. During my first round of interviews, I contacted a small number of public servants and a select number of interest organisations and large businesses. The survey was designed to provide data from a sample population that can be generalised for the entire population (Halperin & Heath, 2017), in this case urban freight stakeholders. In Figure 2 below I give some examples of freight stakeholders. We sought to understand what types of measures freight stakeholders prioritised, how they related to different key stakeholders, and how influential they considered themselves to be. I collaborated with PhD candidate Subina Shrestha on drafting the text, as we each had a set of questions. The first half of the survey (the questions I drafted for my project) is outlined in the Appendix section of Paper 2.

With the help of research assistant Sofie Jordheim, we distributed the survey by using a snowball effect, which is most suitable when the population is difficult to identify

(Blaikie, 2009). We first reached out to interest organisations representing diverse stakeholders, and due to a low response rate, we resorted to directly contacting these stakeholders by using any publicly available contact information. The survey was opened by 444 respondents, 73 of whom answered all of the questions in my section, with response rates per question varying from 65 to 81 respondents. Respondents from Oslo were considered in this survey for comparison between Norway's four largest urban areas. Although it was difficult to recruit responders for the survey, the process of recruitment served as a basis for recruitment to a subsequent workshop, and I use my survey data to triangulate conclusions drawn from interview and workshop data in Paper 2.

Table 4 – List of events attended

Event	Organiser	Type	Place	Date
Workshop on zero emission solutions for Bergen	Bergen Municipality	Webinar	Online	24.09.2020
Transport and logistics day 2020	Bergen Chamber of Commerce	Conference	Online	24.09.2020
Transport and Logistics 2020	NHO Logistikk og Transport	Conference	Online	19-20.10.20
Workshop on car free zones	CET	Conference	Bergen	20.10.2020
Workshop on sustainable urban logistics	Norwegian Public Roads Administration	Webinar	Online	09.12.2020
Lunch seminar on goods policy	Trøndelag County	Conference	Online	14.01.2021
Course on urban logistics for planners	Norwegian Public Roads Administration	Webinar	Online	22.01.2021
Mobility 2021	Institute of Transport Economics (TØI)	Conference	Online	16-17.02.21
VREF Conference on Urban Freight	Urban Freight Platform	Conference	Online	23-25.03.21
Transport and Logistics Day 2021	Bergen Chamber of Commerce	Conference	Bergen	02.09.2021
Logistics in Bergen in the future	Bergen Chamber of Commerce	Seminar	Bergen	15.09.2021
Breakfast seminar on goods policy	Trøndelag County	Conference	Online	13.01.2022
Mobility 2022	Institute of Transport Economics (TØI)	Conference	Oslo	23-24.05.22
Transport and logistics day 2022	Bergen Chamber of Commerce	Conference	Bergen	06.09.2022
Climate and space efficient goods transport	Norwegian Environment Agency	Webinar	Online	20.09.2022
Mobility 2023	Institute of Transport Economics (TØI)	Conference	Oslo	27-28.03.23

Parallel to the survey, I co-authored a critical review article led by my supervisor Håvard Haarstad and co-authored by PhD candidate Subina Shrestha (Paper 4). In this review article, we considered articles on freight research to analyse trends, and then articles which provided alternative perspectives of freight that could be relevant to urban studies. We centred on the dominance of the technical-rational model in transport research generally (Marsden & Reardon, 2017), and considered urban studies literature that could contribute to different perspectives on freight. Our article discussed three areas of study: (1) freight logistics and the future city, (2) justice of urban logistics and (3) new pathways for urban logistics sustainability transitions.

I drew on research and policy gaps indicated in existing literature, such as a lack of knowledge about freight among municipal authorities (Cui et al., 2015; Lindholm & Blinge, 2014; Patier & Routhier, 2020), to contribute to the critique of the technical rational model in the article and the third area of study. This contribution influenced the rest of my research, as I considered the technical-rational model in the rest of my data collection, including a workshop and further interviews. With this paper as a backdrop, I used the presence of the technical-rational model as part of my analytical framework, which I outline in 3.3 below.

Once the survey data had been collected, we used our new knowledge of the scale and breadth of freight networks to begin recruitment for a collaborative workshop on freight in Bergen. The choice of a collaborative workshop in Bergen built on existing research on collaborative freight processes in Norway (Bjørgen et al., 2021; Fossheim & Andersen, 2022), which had included processes in the other three case cities, but not Bergen. A collaborative workshop was intended to provide a meeting place for the different freight stakeholder groups (outlined below and visualised in Figure 2) and provide us with an understanding of conflicts and commonalities amongst these groups. We sought to understand what freight stakeholders regarded as being the future of urban freight in Bergen, what challenges they thought they faced in respect of achieving this future, and which stakeholders they regarded as being important in order to achieve this imaginary. I used these new understandings of stakeholders' roles in my analysis of freight governance processes (see Paper 2).

For the workshop, we used some of the contact details we had gathered from the survey and consulted with project partners in order to invite a representative sample of urban freight stakeholders from the Bergen area. This sampling method followed purposive sampling techniques (Blaikie, 2009), as we consulted members of the freight network as to whom they considered key to involve and drew on theoretical inspiration. Participants were selected from a mix of smaller and larger companies, with the aim being to gather 36 stakeholders. This was inspired by previous freight stakeholder workshops in Norway and an article written on them (Fossheim & Andersen, 2022) which concluded that a moderately integrated, restricted collaborative workshop allows for a balance of perceived influence among participants. This means that at larger events, public authorities perceive less influence, and at smaller events, it is businesses that perceive less influence (*Ibid*). We strove to organise a medium-sized event. Details on how participant groups were arranged are outlined in Paper 2.

Freight is a sector that comprises many stakeholders along supply chains, from *shippers* to *carriers* to *receivers*, and outside the supply chain you have *public authorities* and *consumers*. These are outlined in Figure 2 below, with examples. Due to the variety of freight stakeholders, we sought to include participants from each of the supply chain categories and from the authorities. We also drew on previous experiences where freight stakeholders had sought the inclusion of more stakeholder categories, including landowners, construction companies, and waste management companies (Trondheim Planning Office, 2018). A full description of workshop participants by category is available in Paper 2, and Figure 4 below shows the setting and displays the author as the facilitator of the meeting.

Supply Chain Stakeholders			External Stakeholders	
Shippers	**Carriers**	**Receivers**	**Consumers**	**Authorities**
Goods providers, suppliers (in some cases carriers are also shippers)	Logistics service providers, forwarders, one-man operators	Shopping centres, retailers, restaurants, hotels, public institutions	Citizens, businesses	Local, regional, and national

Figure 2. Examples of freight stakeholders by category (adapted from Bjørgen et al., 2019)

We took inspiration from research on sociotechnical imaginaries and collaborative processes (Andersen et al., 2022; Ansell & Gash, 2007), as well as the World Café methodology (Bisello et al., 2018), attempting to separate participants from any presumptions and encourage an open discussion on common perspectives. Workshop participants were asked to individually come up with three priorities for urban logistics in Bergen and then divided into pre-assigned groups, as described in Paper 2, where they were prompted to bring their priorities to the table. The researchers then facilitated a discussion on these individual priorities, the reasoning behind their priorities, and any challenges to achieving them. Figure 3 shows one of the posters with participants' priorities and Figure 4 shows the author prompting the initial discussion.

Following this, groups were individually prompted to arrive at a common vision for urban logistics in Bergen and then to share these visions in a plenary discussion. This plenary discussion was recorded and notes from the group discussions were kept for analysis. Our role as researchers was to deliberate, as we aimed to ensure a continued discussion where participants exposed their perspectives to each other with the aim of finding common ground. We then encouraged participants to discuss who would have a role in finding their common vision, including what their own (or their organisation's) role would be. With this, we sought to empower the participants to continue with similar cooperation of their own. During the plenary, participants mentioned, amongst other things, that researchers have a role in urban freight governance.

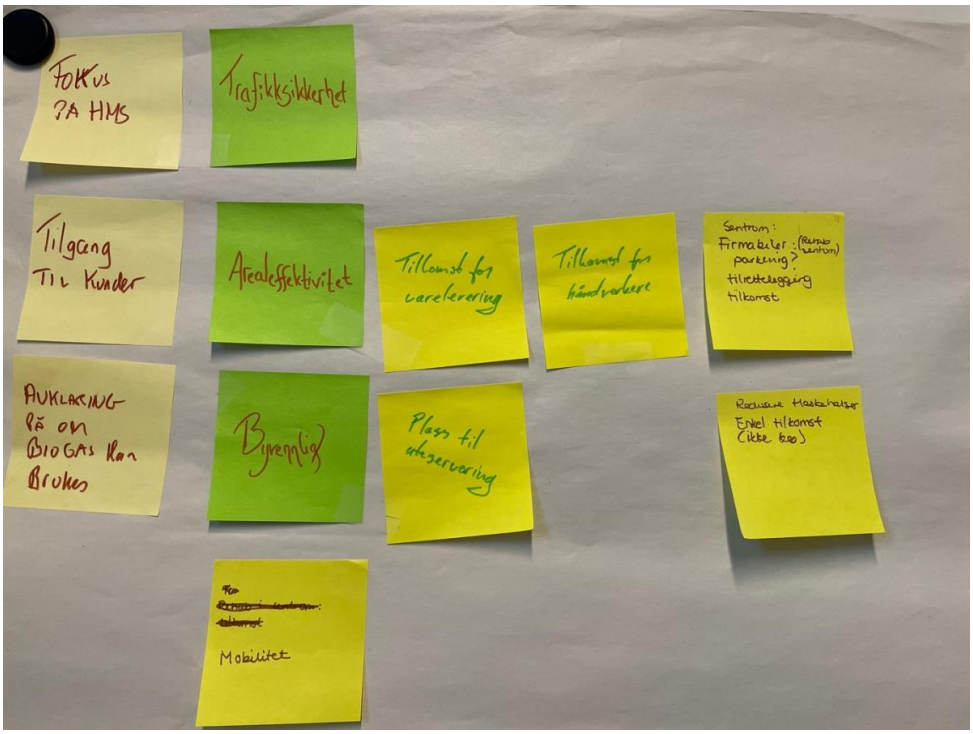

Figure 3. Example of workshop participants' priorities.

The planning process leading up to the workshop and the workshop itself led me to plan more interviews with a broader group of freight stakeholders from across the four case cities. This included different public servants in municipalities and in the Norwegian Public Roads Administration. I also sought to compensate for the underrepresentation of business stakeholders from certain categories at the workshop. These interviews took place in parallel with meetings with different freight stakeholders organised by a municipal planner in Bergen who was mapping the freight context in the city. I took notes from these meetings and considered general trends from the stakeholder groups that I could compare to my interview data.

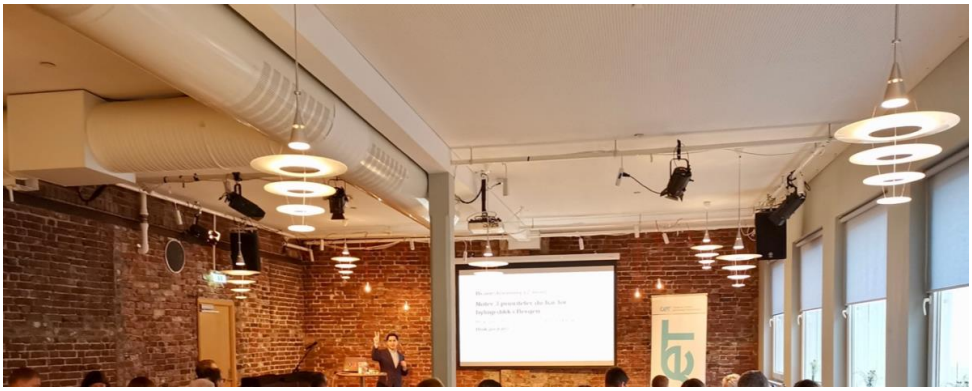

Figure 4. Workshop on the future of urban logistics in Bergen, 18 October 2022.

My second round of interviews allowed me to build on previous interviews, including in some cases second interviews with previous informants. Although the second interview guide (see Paper 2) was created in the immediate aftermath of the workshop, I also drew from experiences I had gathered during the entire project to ask questions that could contribute to my final research questions. I combined questions on governance processes and on sustainable freight in a way that contributed to answering my final two research questions. Respondents reported that they were happy to be heard, feeling that the interviews gave them an opportunity to voice their perspectives of freight governance, both in their respective cities and nationally. These perspectives made me see larger trends across the cities and few, but in some cases considerable, differences. For these reasons I do not compare as much between the cities in Papers 2 and 3, instead drawing on my data to outline patterns across the cities.

With 40 interviews in total and the meetings I participated in, I learned that the challenges faced by the case cities are quite similar to those faced by larger cities elsewhere in Europe (Dablanc, 2007). Despite these similarities, the approaches they can take to address them are not similar. Smaller cities have fewer administrative and financial resources, and in the three smaller case cities (Bergen, Stavanger, and Trondheim) the governance networks are much smaller than they would be in cities like Rome and Paris. I also learned that despite coordination and communication between the municipal administrations in the four cities, the freight governance

structures and processes are influenced by their respective participation (or lack of) in freight-related projects. I outline these influences in Chapter 4, and in papers 1 and 2.

3.3 Limitations in data collection

Throughout the CityFreight research project, one of the goals has been to map freight governance challenges. Part of this included mapping the different freight stakeholders. For these reasons, I combined different methods of data collection – document analysis, interviews, a survey, and a workshop - to learn more about the different stakeholders, who they were, how they participated in governance processes, and what their idea of sustainable logistics is. My combination of data collection methods attempted to represent an in-depth investigation of urban freight governance in Norway, but it did have its limitations.

Firstly, despite the use of several data collection methods, I believe there are still important perspectives that I was not able to gather. These include the perspectives of more receivers (e.g. restaurants, hotels, public institutions), waste management companies, construction companies, and smaller transport companies (i.e. food delivery companies). Some of these perspectives were successfully acquired by the survey, but unlike other stakeholder categories, I was not able to interview many from these. Most of my interview data is from public authorities, transport companies, and interest organisations which represent some of these other hard-to-contact groups. Through the interest organisations, I obtained indirect input from these stakeholder categories. This interview data and the survey allowed me to consider broader trends amongst all business stakeholders. The meetings I participated in together with a municipal planner in Bergen also provided the perspectives of stakeholders I was not able to reach myself.

Secondly, I have more interviews from Bergen than from the other case cities. This is in part due to the nature of the project, where I was given access to local freight networks through project partners and their contacts. It was also partly intentional, as there has been more research on urban freight in the other three cities and hence it

was beneficial to build knowledge on the local network for workshop recruitment. Despite attempts to gather a more balanced number of interviews in Stavanger and Trondheim, it was more difficult to reach freight stakeholders there and several contacts cancelled interview appointments. In the case of Oslo, data collection there was considered to be part of the analysis of larger trends in the Norwegian context, and so interviews centred on the other three cities.

Thirdly, the time constraints in the project meant that I chose to only analyse documents that were approved at the time of writing. This means that documents under development, such as new municipal master plans in Oslo and Trondheim, were not analysed. For these reasons, I chose to analyse three documents in each city, which meant that I was able to analyse at least one recent document in each. Together with the interviews, the documents allowed for triangulation of conclusions and generalisation of trends across the cities. The same is true for the business documents analysed, as I only collected documents that represented the year 2022, but compared these to interview data with the same or similar companies.

3.4 Data analysis

To analyse my data, I applied different qualitative methods of analysis throughout my project. Initially, I carried out a qualitative content analysis of my first set of documents and interviews, looking for *latent content* in this data (Halperin & Heath, 2017, p. 346). Through keyword searches and coding that I describe in Paper 1, at this stage I sought to explore in what contexts urban freight was mentioned and what types of solutions were proposed. This analysis was built on in the later parts of my research, including the workshop transcription, which I also analysed through qualitative content analysis along with my second set of interviews for triangulation. This is described in Paper 2.

After completing Paper 2, I returned to my second round of interviews and carried out a new document analysis by conducting a more in-depth discourse analysis. Here I focused more on textual meanings based on the grand narratives for sustainable

mobility (Holden et al., 2020), exploring how my combination of document and interview data constructed different categories (Halperin & Heath, 2017, p. 356). In my case, the categories were the sustainable mobility narratives. I outline the coding scheme I used for this analysis in Paper 3, and how I used my survey data for triangulation.

Given the prevalence of technical-rational research on transport (Marsden & Reardon, 2017), I sought to provide insight into the governance of freight transport with both public and business perspectives. Freight research tends to name the differences between public and business priorities, and I instead sought to delve deeper into these differences. Therefore, my qualitative content analysis provided insights into the context of urban freight governance (structures and processes) and the discourse analysis provided insights into the narratives in urban freight governance. These combined have given insights into both the formal and informal aspects of freight governance.

In line with Patsy Healey's (2006) interpretation of institutions, I considered these aspects of governance from a social constructivist, non-positivist perspective. With this interpretation, the research question becomes "an empirical inquiry into modes of governance manifest in a particular time and place," including both within the state and outside of it (Healey, 2006, p. 302). For this reason, I have analysed the three dimensions of governance with consideration of as many stakeholder perspectives as was feasible during the course of my project. I have gone in depth into freight governance, both through desk research that considered the formal aspects of freight governance, and through interactions with stakeholders in interviews and the workshop.

My research has looked at the 'invisible' aspects of freight governance – the aspects that maintain the current governance system. This is a system that has been assumed to be the domain of the private sector, and hence I have explored who is part of that system, how they participate, and what their perspectives are. By combining public and business perspectives, I was able to understand why freight governance is as

fragmented as it is. Instead of considering ‘best practices’ as is common in much freight research, I considered what is holding cities back from leading the way towards sustainable urban freight. This included lessons learned from previous attempts at ‘best practices,’ and also lessons that were forgotten.

4. Results and conclusions

"*Within the municipality, there are quite big and heavy walls between the different units*" – Informant.

Like the quote that I used at the start of this thesis, this quote illustrates a challenge that I have dealt with in my research. With the first quote, I drew attention to the "real world" challenge presented by freight governance – freight transport is necessary for thriving cities, but growing cities face 'battles' for space and have to make difficult choices. This latter quote draws attention to my empirical challenge: existing organisational structures are among the different governance challenges for urban logistics, and it is unclear what roles urban authorities play in freight governance. I have found that urban authorities play different roles in urban logistics governance that reinforce the existing governance challenges.

In this thesis, I have considered three different dimensions of urban logistics governance. I have examined how structures, processes, and narratives contribute to the governance of urban logistics, paying special attention to the roles played by public authorities at the urban level within each dimension. Together, the four papers that comprise the thesis build on the three dimensions, with the first three mainly addressing one dimension each. Paper 4 takes an overarching perspective and finds that urban logistics must be considered in analyses of urban change, where the three dimensions can play a role. This final chapter outlines the results of this thesis and arrives at conclusions based on each of the three dimensions of urban freight governance. These dimensions each target one of the research questions outlined in Chapter 1, and together they address the main question:

What roles, current or potential, do urban authorities play in the governance of urban logistics?

This chapter is structured according to the dimensions of urban logistics governance, as there are overlaps across the papers and sub-questions.

4.1 Governance structures of urban logistics

In order to understand how urban authorities address urban freight, I first analysed the structures within which public freight governance takes place to address the first research question: *What policy frameworks do Norwegian cities use when planning for urban logistics?* I conclude that governance structures in public administrations are not set up to handle logistics challenges. Freight-relevant structures are centred on passenger transport and logistics challenges are mainly addressed through technical and financial solutions. Municipal authorities are mainly tasked with regulating road access and providing loading zones or parking spaces, with most other challenges being regarded as a business concern. Responsibility for logistics challenges is thus unclear within public structures, and instead, individual bureaucrats are tasked with addressing it on an ad hoc basis. Structurally, public governance of urban freight is fragmented within municipalities and the broader public sector.

Public governance structures that address logistics challenges are primarily tasked with passenger transport, and knowledge of or resources to address logistics are limited. Because logistics is seen as a private concern, public governance structures only address passenger transport and not freight. As we saw in Paper 1, responsibility for logistics is fragmented across municipal and regional administrations. In all three cities studied (Bergen, Stavanger, and Trondheim), municipalities are being encouraged to lead whilst regional authorities take a supporting role. Trondheim is the only city where all transport planning has been consolidated, but like in the other two cities, freight policy is seen as being ‘new’ on the agenda.

Existing governance structures cement fragmentation of knowledge and limit implementation capacity. Whilst in Trondheim there have been several changes which it is too early to evaluate, Paper 2 showed that knowledge of urban logistics is not institutionalised in either static or new governance structures across all cities. Urban authorities rely on governance networks for knowledge of logistics and collaboration with businesses on a context-dependent basis.

Governance structures based on networks have resulted in few places where both public and business stakeholders may meet to contribute to freight solutions. I found that most networks fall outside public structures as a result of the public framing of freight as a private concern. Whilst Paper 1 concluded that structures for public governance are not organised with freight in mind, in Paper 2 I showed that urban authorities rely on networks and collaboration in the form of *governing through enabling*. However, there is untapped potential for municipalities, as much of the knowledge that is created through *enabling* is not institutionalised. Together, Papers 1 and 2 identify the gaps in existing governance structures and how freight either falls between these or is excluded from governance structures entirely.

My research is not the first to conclude that knowledge of freight governance is sparse or absent in urban authorities (Cui et al., 2015; Lindholm & Blinge, 2014), but my data shows that public authorities play a role in freight governance. Nonetheless, it is fragmented and passive. Knowledge of freight is divided across organisational barriers within municipalities and the broader public sector, and the lack of institutionalisation of new knowledge prevents long-term change to public freight governance. Norwegian cities have tackled their governance challenges similarly, with varying degrees of institutionalisation of knowledge. Whilst Trondheim has consolidated transport planning in one department, the other cities continue to separate planning and implementation of transport policy, and this becomes evident for freight.

4.2 Governance processes of urban logistics

Urban freight is a policy topic that is displayed in different governance processes, such as experiments, networks, and collaborative processes. My second research question, seen below, considered the roles public authorities play in these processes.

In what ways do urban authorities rely on different modes of governance in Norwegian urban logistics governance?

This thesis showed that freight governance structures influence governance processes and that the perception of freight as a matter for the business sector leads public authorities to take a passive role. Freight solutions are dependent on having committed actors who hold the necessary knowledge, but these actors do not receive significant support or follow-up. Without them, processes can halt because the knowledge they contribute is not institutionalised. This recalls experiences from other fields such as climate governance, with one major difference: climate governance processes are either limited or absent, whilst freight governance processes exist, but are dominated by powerful private actors. A continued passive role by public authorities allows private actors to drive the agenda and prevents good cross-sectorial dialogues.

Networks for freight governance are mainly business-led, meaning that collaboration processes between authorities and businesses are also led by businesses. Paper 2 builds on the conclusion in Paper 1, as I identify that freight governance processes are restrained by existing governance structures. I found that urban authorities take a passive role in urban freight governance by relying on their role as *enablers* of governance processes and the *provision* of the means to arrive at solutions. This is not just a possibility, but also a potential barrier to other governance processes. Urban authorities rely on enabling others without necessarily participating in governance processes themselves, and businesses perceive this as not taking responsibility for freight. For these reasons, as part of Paper 2, I arranged a collaborative workshop in Bergen, bringing public authorities and businesses together to discuss their roles in freight governance. During the workshop, I found that businesses had high expectations of public authorities and that they seek more cross-sector dialogue.

Freight governance processes are mostly controlled by business actors, as they initiate and control pilots and experiments, with the authorities often acting as bystanders. In Paper 2 I found that the case cities have participated in different policy experiments without much change to governance processes, except for Oslo and its Business for Climate forum. Even here, freight is but one of several topics and hence cross-sectorial dialogue on freight issues is not necessarily addressed. By providing

resources to different freight stakeholders or facilitating collaboration between them, public authorities are not necessarily partaking in governance processes and are therefore not involved in forming long-term solutions.

Freight governance processes mainly address time and context-dependent challenges without consideration of the *urban* aspect of freight – its consequences beyond city centres and city limits. All three dimensions of freight governance are affected by the dominance of the techno-rational model and this missing consideration of the urban. These two limitations are mirrored in the research literature, which we critique in Paper 4. To remedy this, we propose a shift towards integrating urban freight in the field of urban studies. In the meantime, the influence of the technical rational model is most clear in narratives for sustainable freight.

4.3 Narratives of sustainable urban logistics

Beyond the organisational aspects of freight governance, divergent narratives of sustainable freight create a limit to the realm of possibility by upholding existing governance structures and processes. I considered narratives to answer my third research question: *In what ways do public and business sustainability narratives portray different understandings of what sustainable urban logistics entails?* I conclude that freight narratives are dominated by *electromobility* and that public narratives reinforce this pattern. Public narratives of sustainable urban logistics focus on the decarbonisation of freight and on limiting freight's impact on urban cores, side-lining the consequences of freight across supply chains. Business narratives are narrower, centring on emissions without much reference to changing transport modes or reducing transport.

It appears that both sectors share imaginaries of the future of freight based on the technical-rational model, but diverge in their approach towards these. Urban authorities take a broader understanding of sustainable freight than businesses, and despite this, they play a passive role in their narratives of sustainable urban logistics. Just as passenger mobility has evolved to consider the three strategies (improve, shift,

and avoid) embodied in three grand narratives, freight narratives must move beyond improving fleets to reductions of transport – also outside urban cores. Paper 3 illustrates that the *electromobility* narrative dominates in the case of freight. This narrative, used by both the public and business sectors, is based on mainly technological solutions to reduce greenhouse gas emissions.

Meanwhile, narratives to shift freight to collective solutions or avoid freight generation are mostly absent. Instead, public narratives to *shift* or *avoid* transport are aimed at passenger transport or urban cores. By arranging a collaborative workshop, we tried to overcome the different prioritisations and arrive at a common foundation for collaboration towards sustainable freight in Bergen, which was analysed in Paper 2. Based on data in Paper 3, however, I find that public narratives for sustainable freight limit the scope of collaboration. Public freight narratives primarily look beyond electromobility when conceptualising sustainable freight in urban cores, and freight challenges outside urban cores are thus neglected.

This delimitation of what sustainable urban logistics entails can explain existing structures and processes, as we saw in the first two papers. Freight narratives are based on *electromobility* and on keeping freight out of sight. Authorities in all four case cities problematise the spatial consequences of freight in urban cores, and yet only Oslo and Trondheim consider that freight in urban peripheries must be placed near existing infrastructure. Additionally, I found that urban authorities give themselves a passive role in these narratives, which in turn influences their governance structures and how they approach governance processes. As discussed in Papers 1 and 2, existing structures and processes lead to a disconnect between urban authorities and freight businesses, where the businesses feel that they are leading freight governance and do not know who within urban authorities they can speak to.

Governance structures in the public sector are divided between short-term and long-term planning timelines in the case of freight, and these do not necessarily cooperate. Such structures reinforce *electromobility* and limit the realm of possibilities for sustainable freight, as infrastructural departments incentivise zero-emission vehicles

through parking spaces and charging stations, and planning departments embed these into long-term plans. This creates the risk of a lock-in for zero-emission freight that does not resolve any of the other challenges. As mentioned above, these governance structures then feed into freight governance processes, and together these make it difficult to diverge from *electromobility* in freight governance.

4.4 Contributions to the existing research literature

In this thesis I have combined perspectives from research on governance and sustainability in the broad sense, and from freight transport specifically, to question the roles of public authorities in freight governance. This extends also to their role in making freight visible across the three dimensions of governance that I have outlined. Literature on urban freight has in the past considered aspects of governance in order to arrive at sustainable solutions, yet interpretations of governance have typically addressed specific aspects of public or private governance or considered it without naming it (Cui et al., 2015; Lindholm & Blinge, 2014; Morel et al., 2020; Patier & Routhier, 2020). I have sought to illustrate the governance of urban logistics as an interplay between the public and private sectors, where the private sector has held the primary role. In this way, I have shifted attention to public authorities and their role in urban freight governance, contributing both to urban freight research and to governance research.

Drawing both on theoretical governance research and on research with empirics from freight and climate governance, I have shown how freight governance can be understood both in structural and procedural terms (see Pierre & Peters, 2020). The three dimensions of freight governance that I have outlined (*structures*, *processes*, and *narratives*) display the different roles that public authorities play in the governance of urban freight. Governance structures display the divisions of responsibility and the resources provided to urban freight, whilst governance processes display how these divisions of responsibility and resources are effectuated. Narratives in freight governance have served to understand why freight structures and

processes are as they are. Each of the dimensions helps to exemplify how freight governance operates.

As we saw in 4.1, public governance of urban freight is structurally fragmented. It is a challenge for urban authorities to take an active role in freight governance if they are not organised to consider it, and fragmentation in public governance structures consolidates this challenge. Paper 1 concludes that governance structures are organised around passenger transport and that freight falls across realms of responsibility. This conclusion builds on both organisational studies (Bouckaert et al., 2010) and freight research (Cui et al., 2015; Lindholm & Blinge, 2014).

It contributes to the understanding of fragmented governance systems and how these present themselves, reaffirming that fragmentation is a significant barrier to collaboration within the public sector (Bouckaert et al., 2010). Contextualised for freight, the conclusions in 4.1 show how fragmentation affects the governance of issues that require interplays between the public and private sectors. Our argument for more public governance of urban freight is in line with understandings of governance as not just 'governing without government,' but rather an understanding of governance systems where both state and non-state actors play a role.

The interplays between the public and private sectors were in 4.2 shown to be mainly led by the private sector, as public authorities participate passively in governance processes. In 4.2 I showed that collaboration and experimentation in freight governance draw parallels with climate governance, as freight governance processes can depend on particular stakeholders and their knowledge. I also showed that freight is yet another example where urban authorities rely on passive modes of governance (see Bulkeley & Kern, 2006).

By planning a collaborative workshop to understand the expectations of different stakeholders in freight governance processes, I contributed both to literature on polycentric governance (Hofstad & Vedeld, 2021; Vedeld et al., 2021) and to literature on cross-sector collaboration in the case of freight (Bjørgen et al., 2021; Fossheim & Andersen, 2022). The workshop provided perspectives on the perceived

role that different stakeholders have in the polycentric system of governance, which business stakeholders perceive as leading with little support from the authorities. This provides opportunities for public authorities to take more active roles in these systems.

Finally, 4.3 raised the discussion to a more abstract level, connecting research on freight governance to research understandings of sustainability. This connection included earlier conclusions that transport research is largely based on the technical-rational model (Marsden & Reardon, 2017) and was based on a framework of *grand narratives* for sustainable mobility (Holden et al., 2020). I introduced my research to a discussion of the grand narratives for sustainable mobility, arguing that more research on freight narratives is necessary in order to achieve sustainable *transport*.

Through analysis of interviews, document analysis, and a survey, I showed that freight narratives are dominated by *electromobility* and that they diverge from narratives of sustainable *passenger* mobility. This conclusion highlights the fact that the technical-rational model is not only present in research. It is also present in policy and in business narratives of sustainability. Meadowcroft and colleagues (2019) argued that sustainable development frames discussion, and my research concludes that sustainability narratives based on *electromobility* limit that discussion.

In 4.3 I also highlighted the absence of *urban* perspectives in urban freight research, which further narrows discussions of sustainable freight. Freight research has considered the spread of freight infrastructure across urban areas and within urban cores (Buldeo Rai et al., 2022; Dablanc, 2007; Fried & Goodchild, 2023; Tennøy et al., 2020), but the governance of freight has mainly addressed urban (particularly metropolitan) cores (e.g. Marcucci et al., 2017). Just as Ryghaug and colleagues (2023) called for transport research to expand its scope beyond urban cores, in Paper 4 we sketch an agenda for urban studies research that considers three lines of enquiry: (1) freight logistics and the future city, (2) justice of urban logistics and (3) new pathways for urban logistics sustainability transitions. In my PhD I have mainly

addressed this third line of enquiry, considering what we in Paper 4 refer to as alternative models for urban freight beyond efficiency and electrification strategies.

We found in Paper 4 that freight is deeply implicated in different policy areas and is linked to issues of power, justice, and politics in urban transformations. Nonetheless, these aspects of urban logistics are largely analysed separately. I have, through my data collection, gathered insights from stakeholders who are not usually considered in freight research, going in depth into their perspectives both in the form of workshop participation or interview responses. These perspectives provide insights into the power and politics of urban freight governance, which I have described through the three dimensions of governance. Although I have not outlined the power and justice aspects of urban freight governance explicitly, my analysis of freight governance structures and processes shows who participates and who does not. By describing public freight governance as being fragmented and polycentric, I have underlined the consequences of current freight governance systems.

Freight must be integrated within governance structures, governance processes, and grand narratives for sustainable mobility in a way that goes beyond improving freight fleets. Public authorities have a role to play in these dimensions of freight governance, and this thesis has shown how their roles in the dimensions interlink to influence the direction of sustainable urban freight. Freight must be made visible, both in governance systems and in practice. The main contributions of this thesis have been to add public governance perspectives to freight research and to use freight as an example of how public authorities operate within governance systems that are fragmented, networked, and polycentric.

We need more research on the interplay between the public and private sectors in freight governance, similar to that which exists in climate governance. The difference is that for freight, private interests have been allowed to lead, with public interests taking a back seat. In my research I have gone in-depth into the roles of both sectors in freight governance, making it clear that the goal should not be for public authorities to place freight out of sight. Instead, freight must become a matter of

concern for public authorities and be integrated into governance structures, with public leadership in governance processes, and narratives that go beyond electrification and car-free urban cores.

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RESEARCH ARTICLE

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Governance challenges for urban logistics: Lessons from three Norwegian cities

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Abstract

Achieving more sustainable urban freight transport is a key challenge for cities, especially with the rise of diverse urban delivery services. However, the governance of urban freight transport and urban logistics has typically been seen as the domain of the private sector. In this paper we argue for a reframing of urban logistics as a matter of concern for public authorities, and subsequently, we examine logistics as an urban governance challenge: how is urban logistics addressed by urban level authorities? The empirical basis for the paper is a study of three Norwegian cities—Bergen, Trondheim, and Stavanger—currently working to integrate logistics into their governance processes. These cities are currently piloting solutions, sharing experiences, and attempting to establish effective regulations and measures. Nonetheless, various institutional barriers are preventing the implementation of public governance processes for urban logistics. We emphasise the need for clarified responsibilities in the public sector and for reconciliation between different users of public space, including urban logistics actors. In conclusion, we point to key issues to be addressed by an emerging research literature on the governance of urban logistics for sustainability.

KEYWORDS
Norway, urban freight, urban governance, urban logistics

1 | INTRODUCTION

Cities across the world have adopted ambitious targets and strategies towards energy sustainability and reduced CO_2 emissions, and transport is widely recognized as key to achieving these. Transitioning towards a more energy-efficient urban transport sector requires the consideration of all aspects of transport, meaning both transport of people and urban freight transport. Both policy and research have mainly been aimed at transport of people, whilst transport of goods, services, and waste has received less attention by both policymakers and researchers outside of the fields of economics and logistics operations. This seems to have changed in recent years, in part due to the growth of urban deliveries and a focus on how to solve the congestion, emissions, and planning conflicts that uncontrolled freight into cities can present (Lindholm & Blinge, 2014; Patier & Routhier, 2020). In Europe, for example, a range of cities are applying the framework of Sustainable Urban Logistics Plans (SULPs) as a mechanism that contributes to the creation of relevant measures and interventions. SULPs and other similar frameworks are part of a growing body of policy innovation surrounding urban logistics that goes beyond business-based solutions.

This paper addresses the governance challenges that urban-level authorities face as they attempt to make urban logistics more

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sustainable. Logistics in cities has long been regarded as a matter for the private sector to resolve, understood as a relationship between freight operators and their customers (Ambrosino, 2015; Cui et al., 2015; Fossheim & Andersen, 2017; Lindholm & Blinge, 2014). Whilst the public sector has typically been made responsible for transport of people, the private sector has been left in charge of goods and services (Patier & Routhier, 2020). We know from existing research that cities face various types of challenges, barriers, and trade-offs when pursuing sustainability goals (May, 2015; May et al., 2006; Sørensen et al., 2014). Cities face various barriers towards policy implementation that have been considered both in terms of sustainable transport policy generally (Banister, 2004) and in terms of urban logistics policy specifically (Lindholm & Blinge, 2014; Morel et al., 2020; Nordtømme et al., 2015), and such studies often provide catalogues of possible types of barriers to implementation, such as institutional, social, cultural, and legal barriers.

Unlike most existing research, this paper examines logistics *as an urban governance challenge*. Our question is: what does urban logistics look like from the perspective of urban-level authorities? Urban logistics is challenging to integrate into existing institutional frameworks, plans and sustainability strategies for cities, as it does not fall neatly into existing sectors, planning streams, or competence areas. Research on urban governance highlights several common governance problems relevant to this issue. One such problem is the presence of institutional "silos" (Oseland, 2019), where responsibilities, institutional logics and norms are divided into discrete units, each addressing aspects of an overarching and complex problem (Beunen et al., 2017; Uittenbroek, 2016). Within the field of organisational studies, policy silos have been addressed through what is termed cross-functional cooperation (Bouckaert et al., 2010a; Jacobsen, 2017). Our point of departure is that, given this 'siloed' nature of urban governance, it is not clear either in urban governance processes or in existing research how to situate logistics and how to effectively govern for sustainable urban logistics.

The empirical basis for the paper is a study of three Norwegian cities—Bergen, Trondheim, and Stavanger—currently working to integrate logistics into their governance processes. Given that freight transport comprises 30% of all urban transport in Norway (Bjørgen, Seter, et al., 2019), it plays a significant role in reducing national transport emissions. All three cities have recently started integrating logistics into their governance structures, and are in the process of developing regulations, interventions, and networks between actors in both the public and private sectors. We have interviewed key governance actors in the three cities, reviewed plans and policy documents, and participated in urban logistics and mobility conferences to understand the existing governance structures in these cities and the prospects for incorporating urban logistics in them.

On this basis, we detail the challenges cities face when integrating logistics into their governance structures and how these are reconfigured to contribute to more sustainable urban logistics. At the most general level, we argue that the key issue is to reframe logistics as a 'matter of concern' (Latour, 2004) for public governance. We find that urban and regional actors are starting to integrate logistics in their governance processes but are facing various types of barriers. Institutional fragmentation creates a particular barrier towards effective governance of urban logistics. Institutional divisions of labour and legal questions are unresolved, and urban level authorities struggle to identify effective interventions and measures. Therefore, it is important to clarify responsibilities in the public sector, and to find ways to reconcile different interests, including those of urban logistics actors.

The article proceeds as follows. In Section 2, we provide an overview of relevant debates in research literature and policy, focusing on how urban governance frameworks can face institutional barriers. In Section 3, we provide an overview of transport governance in Norway in a multilevel governance perspective and justify the three case cities being studied, before we outline our methodological framework in Section 4. Section 5 contains our analysis of the current governance structures in the three case cities and of the intent to adapt these to urban logistics, whilst we in Section 6 conclude that there is a range of unaddressed issues in current policy agendas, including the limits and possibility for use of public authority and how to build trust and collaboration across sectors.

2 | LOGISTICS AS A CHALLENGE FOR URBAN GOVERNANCE

Urban logistics governance does not exist in a vacuum, it is embedded in broader changes in urban and multi-scalar governance structures playing out over the past decades. In general, public-sector governance has seen a shift towards networked, cross-sectorial, collaborative, and entrepreneurial forms of governance (Brenner, 2004; Harvey, 1989). There is now a broad discussion among governance scholars on how to understand and manoeuvre in the current governance landscape, and a widespread interest in various forms of collaborative governance (Torfing et al., 2019). This typically means drawing citizens into decision-making processes, but also relying on the private sector for planning and service delivery (Bouckaert et al., 2010b). In turn, public sector governance occurs in an increasingly complex landscape of actors, relationships, and distributed power relations.

For cities, the shift towards entrepreneurialism has long been criticized for downscaling welfare state instruments, which in turn has contributed to increasing social inequality and socio-spatial segregation in urban landscapes (Hall & Hubbard, 1996). At the same time, urban governance actors have been experimenting with various forms of collaborative governance within and beyond the city. They are using networks and cross-sectorial collaborations to manage a range of challenges, not least sustainability and climate challenges (Davidson et al., 2019). It is widely recognized that these issues require cooperation across and within spheres of governance. Yet this is complicated by the 'wickedness' of these problems, which means that the problem at hand is much larger and more complex than the narrow solutions available (Boswell & Mason, 2018; Castán Broto, 2017; Innes & Booher, 2016; Westskog et al., 2020).

A key part of the problem which we are seeing in logistics governance is that solutions are divided between governance actors in

ways that constrain effective implementation. As Betsill and Bulkeley (2002:15) put it, these spheres of urban governance are "splintered into competing bureaucratic and economic interests." Such splintering is what governance scholars have referred to as 'silos' within public institutions that separate functions and consequently resources (Bouckaert et al., 2010b), which become evident when public authorities attempt to address 'wicked' problems (Oseland, 2019). Even where there is political will for radical changes to policy, insufficient administrative capacity can limit the use of the tools and information available to achieve a desired outcome (Aall, 2012:88–89). As we return to in the analysis, insights from the literature illustrate how the structure of municipal governance institutions shapes how knowledge and competence of urban logistics are distributed.

In the field of transport research, there is ample literature on the barriers to effective governance for urban sustainability. Urban transport policy has been the focus of differing forms of policy integration, where the goal has been for various actors working on the same issue to collaborate within and across institutional levels (Kennedy et al., 2005; May, 2013; Stead, 2016). This has created more interdependence between those involved, but has also led to the involvement of more actors in policymaking processes (Stead, 2016). Such interdependence is in line with general trends in public sector governance discussed above. Policy integration in transport policy also encompasses the application of several parallel policy measures, for example in the form of policy packages, that together may contribute towards policy objectives (Westskog et al., 2020). This research reflects the discussions on functional silos and examples, such as policy packages, that are meant to contribute to overcoming these institutional barriers for urban transport governance.

Research on policy integration, and urban governance more broadly, has given less attention to transport of goods. This is even though transport of goods is vital for functioning cities and creates a host of social and environmental challenges (Kennedy et al., 2005). For the purposes of this article, urban logistics is defined in line with the European Commission as "the movement of goods, equipment and waste into, out from, within or through an urban area" (Fossheim et al., 2017). This definition of urban logistics is broad exactly because most freight transport "begins and terminates in urban areas, and often traverses several urban areas during longer distance journeys" (Cui et al., 2015:583).

Although there are surprisingly few studies of urban logistics governance, there is a growing field of research that recognizes how urban logistics interacts with mobility and other urban policy fields (Cui et al., 2015; Lindholm & Blinge, 2014; Morel et al., 2020; Patier & Routhier, 2020). In this work, coordination issues between administrative and political branches of authorities have been seen as one institutional barrier for urban logistics governance (Nordtømme et al., 2015). Other barriers are horizontal coordination with private stakeholders and vertical coordination between public authorities in collaborative processes (Cui et al., 2015). The existence of functional silos is also described in recent research as one of several barriers to urban transport governance (Cui et al., 2015; Lindholm & Blinge, 2014), yet the direct effect of these silos is not outlined. Lindholm and Blinge (2014) argue that barriers to implementation are often brushed aside and not considered sufficiently for them to be overcome. For the most part, this research describes how different cities distribute responsibility of urban logistics but does not analyse how institutional structures affect this distribution, or how relegating responsibility to the private sector affects public concern such as sustainability goals.

The literature illustrates that cities have taken a largely passive role in logistics governance, as they have traditionally prioritised personal mobility at the expense of urban logistics (Bjørgen, Seter, et al., 2019). Policy measures such as access restrictions, time restrictions, and regulation on emissions requirements are prevalent several places (Macharis & Kin, 2017), illustrating this mostly indirect role for the public sector. Typically, goods-related challenges have been left for the private sector to resolve (Patier & Routhier, 2020). Reviews of one urban logistics solution, urban consolidation projects, have concluded that most publicly supported pilots cease to exist once public funding is removed, and that public financial support must be accompanied by policy support so that private actors are incentivised to continue participation in these urban logistics projects (Allen et al., 2012; Lebeau et al., 2017; Stathopoulos et al., 2012). This literature finds three barriers to changing urban logistics: funding, policy support, and horizontal coordination between sectors and between actors in the private sector. Public authorities may be unaware of the existing regulation and enforcement capabilities within their mandate (Bjørgen, Seter, et al., 2019), and as a result private actors find it difficult to find the information that they need to contribute to policy formation (Morel et al., 2020).

Research in this area is important not just to fill gaps in the academic literature, but also to help the public sector overcome emerging challenges. There has until recent years been insufficient knowledge in policy circles of how to manage the challenges that growing freight transport creates, despite public interest in addressing them (Cui et al., 2015; Eidhammer et al., 2016; Lindholm & Blinge, 2014). This governance challenge has raised interest at the European level, and in recent years the European Union has promoted an approach to logistics governance that considers the entire transport chain, as well as incorporating urban freight into policies and plans (Eidhammer et al., 2016:82).

The European strategy for increased consideration of urban logistics includes funding more research on how to integrate urban logistics into broader plans for urban transport and mobility (European Commission, 2013), as well as piloting context-specific solutions. These have allowed for the evolution of Sustainable Urban Logistics Plans (SULPs) to supplement efforts with Sustainable Urban Mobility Plans (SUMPs) (Ambrosino, 2015). Whilst SUMPs are intended to integrate different modes of mobility into urban and transport planning, SULPs complement SUMPs by taking into consideration the variables that distinguish urban freight from passenger transport (Aifandopoulou & Xenou, 2019:11). Therefore, SULPs can serve as a basis for future revisions to SUMPs or be independent documents, depending on the local circumstances of each urban area (Aifandopoulou & Xenou, 2019; Ambrosino, 2015). Through this and similar frameworks, public authorities are considering different forms

of cooperation across functional silos in their urban governance structures, and research has suggested that smaller cities can benefit from pooling their efforts to govern both mobility and logistics (Rubini & Lucia, 2018).

Contributing to more sustainable urban logistics therefore requires that public authorities overcome fragmented organisational structures, clarify legal authorities, and create arenas for interaction between the relevant branches of public authorities and with the private sector. Based on this literature, we hold that coordinated approaches to the governance of urban logistics require attention to governance structures and to breaking down existing functional silos in the public sector, as has previously happened in transitions from transport to mobility of people. In the following, we empirically assess how these problems surface as public authorities enrol logistics into their governance structures.

3 | THE GOVERNANCE CONTEXT OF NORWAY

Norwegian urban logistics governance can be expected to be aligned with broader governance trends noted above, with a shift towards networked, entrepreneurial and collaborative governance. Of course, the Nordic welfare state structures have cushioned some of the socio-economic effects of state restructuring that have been witnessed elsewhere (Haarstad et al., 2021). Within the transport sector, Norwegian policy measures have until recently followed the same pattern as elsewhere in Europe; restructuring transport of people has been seen to reduce urban emissions and other unsustainable practices, and transport of goods has only in recent years been considered integrated into these efforts. Transport and land-use have become intertwined in multi-goal, multi-level contractual agreements initiated by the state focusing on personal mobility (Westskog et al., 2020). The three cities under focus were among the first in Norway to sign these agreements with the state, and yet as part of these agreements urban logistics is explicitly excluded from the main goal: that the urban areas affected shall acquire better traffic flows, reduced greenhouse gas emissions, reduced local air pollution, and less traffic noise. Instead, the target is for private car use to stagnate and for land use to become more efficient (Samferdselsdepartementet, 2020).

Even though the agreements do not address urban logistics directly, they are intended to accommodate logistics by improving overall traffic flows in urban areas (Bergen Urban Growth Agreement, 2019). Urban Growth Agreements, as they are called, have evolved over several years and existing ones have grown in geographic scope and in stakeholder involvement, with both the Ministry of Transport and Ministry of Local Government and Modernisation directly involved (Westskog et al., 2020). They have shown that complex topics within the transport sector require broad involvement and are an example of governance across levels of government, in addition to being evidence of cooperation across functional silos. Nonetheless, the Norwegian context draws parallel to debates elsewhere in Europe, where policies towards sustainable transport have focused on personal mobility at the expense of transport of goods (see Cui et al., 2015; Lindholm & Blinge, 2014; Patier & Routhier, 2020).

Urban Growth Agreements have shown how governance of the transport sector can function across scales and sectors, with a role for regional and national authorities in governance structures. For urban logistics, this is crucial because most freight transport begins and ends in urban areas but can result in long journeys across several urban areas (Rubini & Lucia, 2018). Coordination in governance structures must thus go beyond functional silos within municipal administrations and consider aspects of multilevel governance across vertical and horizontal spheres of governance (Bouckaert et al., 2010a; Jacobsen, 2017). If Urban Growth Agreements show the role of vertical coordination in transport governance, urban logistics requires the addition of horizontal governance in the form of coordination across functional silos in urban administrations and across sectors. Existing research on the governance of urban logistics has suggested that this horizontal coordination includes cooperation with local stakeholders, which requires incentives for private actors to cooperate (Bjørgen, Seter, et al., 2019; Macharis & Kin, 2017). Regional and national strategies in Norway allow for a hierarchy of approaches that, along with respective guidelines, facilitate knowledge-sharing, strengthen links between urban logistics and supply chains, and create arenas for dialogue (Bjørgen, Seter, et al., 2019), which must be complemented by considering how urban governance structures for urban logistics are operating.

This article investigates empirically how urban logistics is addressed in the cities being studied, and how different strategies and governance structures have contributed to these efforts. It builds on existing research on the governance of urban logistics and narrows down on barriers in the public sector such as functional silos to understand the effect that such silos have on efforts towards sustainable urban logistics.

4 | METHODS

Research on urban logistics in Norway draws parallels to the challenges faced by cities elsewhere, and as a result researchers recommend that cities improve cooperation across horizontal and vertical levels of governance. Among these recommendations are broader stakeholder involvement and the consideration of context-specific knowledge (Bjørgen, Bjerkan, & Hjelkrem, 2019; Bjørgen, Seter, et al., 2019; Fossheim et al., 2017; Nordtømme et al., 2015; Tennøy et al., 2020). The cities of Bergen, Trondheim, and Stavanger have participated in some research and experimentation projects, but whilst it appears that the cities of Trondheim and Stavanger have been active participants in these projects, it is unclear to what extent the city of Bergen has been so (see e.g., Ambrosino, 2015; Jensen, Fossheim, & Eidhammer, 2020). All three cities have in recent years altered their governance structures for urban transport and mobility because of nationally coordinated policy packages, centred around the reduction of private vehicle use and assuming that urban logistics will indirectly benefit from it. Questions remain as to how alterations around these governance structures have affected urban logistics.

Our article applies an explorative comparative analysis of three cases: Bergen, Stavanger, and Trondheim. Together with Oslo, these were the first four large cities (pop. over 100,000) to sign an Urban Growth Agreement with the Norwegian government that incorporated transport and land use policy. Oslo is excluded from the analysis because it is both a municipality and a Norwegian county, meaning that it has regional responsibilities and authority that the other three cities do not.

The paper builds on archival research and interviews with urban stakeholders that work with urban logistics to explore how they understand the policy process in these three cities. Together, these methods arrive at a focus on institutional fragmentation in the public sector, and therefore draw on theory on fragmentation and coordination in public administration. This research forms part of a project where some of the major stakeholders are partners and included in regular discussions of developments in the logistics sector.

4.1 | Data collection

Following an initial literature review of existing research on urban logistics and urban climate governance, this article is based on a process tracing analysis of the different plans and governance structures related to urban logistics in the three cases. This involves a document analysis of public documents, including municipal master plans, district plans for urban centres, transport strategies, and climate and environment strategies. The choice of documents was initiated by applying keyword searches (in Norwegian) of 'urban logistics', 'logistics', 'goods transport', 'goods' and 'business transport' on municipal websites and then by analysing equivalent documents in all three cities with consideration of the same keywords. Then we conducted semi-structured interviews with key stakeholders in both the public and private sectors to compare the approved plans and strategies to the understandings that different stakeholders have of them, as well as their perspective of how urban logistics is addressed in their local area.

A total of 14 interviews were carried out, distributed as displayed in Table 1. The business representatives work mostly in freight transport companies (e.g., parcel delivery, independent truck drivers, freight consolidators) and some also represent interest organisations, including organisations for city centre business owners. When considering whether to interview individual businesses or other actors, it was concluded that the overall interview data was already reaching saturation in similar types of responses that included representatives. Public representatives are mainly from planning, transport, and environmental departments in their respective administrations.All but two of the interviews were held virtually as video interviews (in large part due to pandemic concerns), with the remaining two being carried out as telephone interviews. The planners interviewed were selected based on authorship of documents related to urban logistics or participation in events or projects on the topic. As for the representatives of the private sector, these represent mostly larger transport businesses or local representatives of interest organisations who also represent smaller businesses, and these were contacted following a snowball technique or due to participation in previous urban logistics workshops.

TABLE 1 Interviews categorised by stakeholder type

Public ($n = 6$)	Authorities	Local level	3
		Regional level	3
Private ($n = 8$)	Organisation	Chamber of commerce	3
	Businesses	Local representative	4
		National representative	1
Total			14

Considering that most of these interviewees had participated in urban logistics workshops in the past, the interviews sought to explore whether these workshops had led to any changes in plans or governance structures. They focused on awareness of existing or proposed urban logistics plans, strategies, or projects, with special attention paid to public governance structures. Given that previous research on the governance of urban logistics has sought context-specific analysis, these interviews contribute to an understanding of how governance structures in specific contexts may adapt to include urban logistics in public governance. They provide perspectives for public administration as opposed to business-based solutions and build on existing literature both on urban logistics and on coordination in the public sector. Any interview quotes are translated by the authors from Norwegian. Smaller businesses will be contacted for a later stage of this project.

5 | EMERGING GOVERNANCE STRUCTURES FOR URBAN LOGISTICS

All three cities being studied have at one point partnered in research projects regarding urban logistics but differ in how they have addressed this policy area. It appears that urban logistics has received the most attention in the Trondheim area, where the city is incorporating it into its local plans and institutional responsibilities and where the regional authority has made urban logistics into a priority area within transport planning. The city is, amongst other things, learning from its participation in the NORSULP research project, which sought to aid cities in arriving at Sustainable Urban Logistics Plans (SULPs) (Jensen, Fossheim, & Eidhammer, 2020). Meanwhile, planners in both Bergen and Stavanger have hinted that urban logistics plans are being considered, but unlike in Trondheim the administrations in these two cities lack a political mandate to draft a SULP.

Urban logistics appears to be attracting the attention of the authorities in the three cities, but they differ in their planning for urban logistics and in their interactions with other governance actors. Whilst Trondheim and Bergen both address urban logistics through measures in their 'street use plans' for their city centres, the way in which these have been developed and the solutions that have been chosen, differ. Authorities in Trondheim considered experiences from stakeholder workshops that were part of the NORSULP project and developed an attached report focusing on urban freight (Trondheim

Office for City Planning, 2020a, 2020b), whereas in the process leading up to the plan in Bergen, goods deliveries are to be 'considered' and the preparations seek 'solutions that attend to the commercial sector's need for access' (own translation) (Bergen Urban Growth Agreement, 2019:9). Meanwhile, Stavanger does not have a street-use plan for its city centre. Instead, its municipal master plan has a section on transport and mobility and its district plan for the city centre includes a thematic plan on road transport that considers access for goods deliveries (Stavanger Kommune, 2019a, 2019b).

In all three cities our informants have suggested that plans or strategies for urban logistics will be developed. Authorities in Trondheim appear to be narrowing their attention around their street-use plan for 'Midtbyen', the historic city centre (Trondheim Office for City Planning, 2020b) and on a revised municipal master plan, whereas authorities in Stavanger have proposed ideas founded on the city's climate and environment plan, on its mobility strategy, and on a revised municipal master plan (Stavanger Kommune, 2018, 2019a, 2020). As in Trondheim, authorities in Bergen are preoccupied with a street-use plan for the city centre, and as in Stavanger some potential measures are already considered in the city's 'Green Strategy'—their climate and energy strategy (Bergen Kommune, 2015a, 2015b). Unlike in the other cities, any plans or strategies in Bergen have not yet undergone evaluation. For now, the authorities in Stavanger are considering a separate urban logistics plan whilst the authorities in Trondheim prefer an advisory strategy over a legally binding plan. The cities' existing plans and strategies are summarised in Table 2. Plans and strategies refer to politically approved municipal documents, where cities are constrained by their plans and aspire to meet the goals in their strategies. Measures refer to individual policy decisions meant to contribute to goals.

Regarding actual measures or trial measures, authorities in Trondheim underwent talks with national logistics company Posten to establish a consolidation centre for the municipality's own logistics operations already in 2015 (Ambrosino, 2015). Since then, PostenBring started a reverse consolidation pilot with waste recollection company Ragn-Sells, and logistics actor DB Schenker has proposed establishing a temporary consolidation centre near the city centre. However, authorities in Trondheim are seeking a long-term, scaled solution. For its part, Stavanger has worked in collaboration with the regional authority (Rogaland County Council) on a publicly initiated but privately run consolidation centre which for now has resulted in a common trans-shipment facility for two consolidators delivering in the city centre. Although Bergen does not have any projects directly addressing urban logistics, it seeks to create a zero-emissions zone initially in its city centre and to establish multi-mode 'mobility points' where localised logistics solutions are possible. Authorities in the other two cities have also considered these measures, which are more in line with more common business-based logistics solutions.

5.1 | Institutional barriers towards implementation of logistics governance structures

As noted in our literature discussion in Section 2, effective governance of urban logistics may be constrained by the governance structures of municipalities, which may not be accommodated to the challenges of logistics governance. In our cases, we see that despite the existence of several projects, plans, and potential strategies, implementation of these is limited by functional silos within the institutions of public authorities. Urban authorities see logistics as 'new' on the agenda and are typically unsure who should be responsible for it. As outlined in Figure 1 below, responsibility for urban logistics in each of the cities is divided across two departments or service areas (central column of the figure), each with several underlying offices or divisions (separated by commas in the boxes to the right). Common for the cities is the presence of an overarching planning department and an environmental department in the governance of urban logistics, where these are responsible for developing, for example, the municipal master plan and the climate plan or strategy. Implementation of measures is more likely to be an overlapping responsibility between departments, which leads to fragmentation as the underlying offices are assigned responsibility for implementing measures. As in earlier research on the governance of urban logistics, our data shows that the existing distribution of responsibilities leads to fragmented knowledge and implementation capacity. Our study shows how three cities are overcoming this fragmentation.

In all three cities there is a planning office responsible for developing the municipal master plan, and in Stavanger this office (Urban Development) is also responsible for the local Urban Growth Agreement, which private actors have named as important in finding synergies between mobility and logistics planning. Trondheim established an Office for Mobility and Transport in Spring 2021 to create such synergies by consolidating knowledge of transport and mobility, as well as to consolidate implementation capacity for urban logistics measures. However, in Trondheim the Urban Growth Agreement is the responsibility of the Environmental Office and in Bergen of the Office for Light Rail and Miljøløftet, meaning that transport-related

TABLE 2 Plans and measures for urban logistics in the case cities

	Bergen	Stavanger	Trondheim
Plans	Street use plan for city centre Climate & Energy Strategy	Municipal master plan District plan for the city centre Climate & environment plan	Street use plan for city centre with report on urban freight
Measures	Relocation of goods harbour to outside city Relocation of private consolidation centres Zero emissions zone	Public-led transhipment project	Private-led reverse consolidation experiment Public-led consolidation experiment

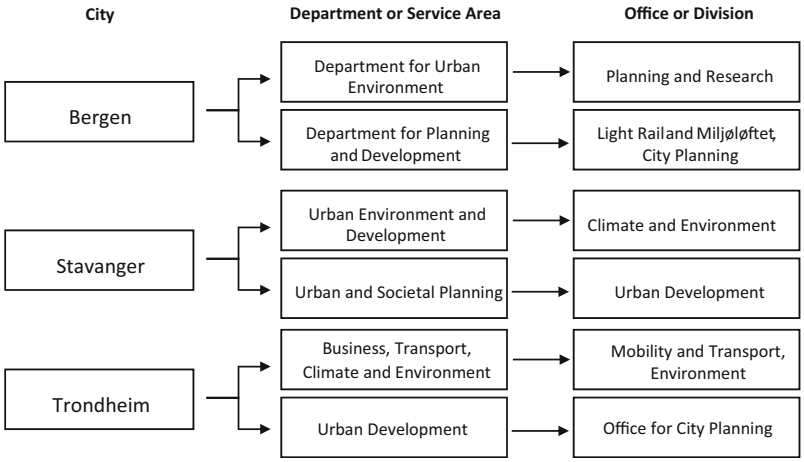

FIGURE 1 Fragmented responsibilities for urban logistics in the case cities (*Source:* Authors' elaboration)

knowledge and implementation authority is fragmented. Nonetheless, it is only in Bergen that the office responsible for the implementation of the local Urban Growth Agreement does not appear to be involved in efforts for formalised urban logistics planning.

As the most active city in logistics planning, Trondheim's efforts have become more coordinated since 2015. Trondheim's Office for City Planning has had logistics as a focus area in cooperation with the overarching Director for Urban Development (Trondheim Office for City Planning, 2020b). Our interviews with local logistics actors have however hinted that the Environmental Office, which oversaw the city's Urban Growth Agreement before the creation of the new Office for Mobility and Transport, has had strong influence in any logistics-related matters. Our interviews with local authorities revealed that the Environmental Office was in the past dependent on knowledge from the Office for City Planning, and that this is a reason for the new Office for Mobility and Transport to consolidate knowledge relevant for urban logistics (see Trondheim Kommune, 2021). Urban logistics has been seen as 'the most difficult topic for the city's street-use plan' and sustainable logistics 'has not been on the agenda at all.' Authorities in Trondheim sought to consolidate responsibility for logistics in this office and thus facilitate implementation of plans and measures, but in the year since the creation of this new office it appears that many employees have moved to positions outside the organisation. The Environmental Office thus continues to share the responsibility with the Office for City Planning, and this illustrates how restructuring of bureaucratic administrations (a potential governance solution) comes at a cost.

Within the municipality of Stavanger, the Office for Urban Development is mainly involved in a local consolidation project as the planning authority, with the support of the Office for Climate and Environment, which oversees implementation of measures in the city's Climate and Environment Plan along with others (Stavanger Kommune, 2018). There does not appear to be a wish to reorganise responsibilities in Stavanger, but the Office for Urban Development and the Office for Climate and Environment in Stavanger seem to cooperate in planning and implementing relevant measures, respectively. Our informants in Stavanger have sought out more knowledge of logistics to place more long-term considerations of logistics within municipal plans and to increase cooperation with the implementing bodies. Despite a shared responsibility for urban logistics, this fragmentation leaves fewer unanswered questions than in the third city, Bergen, where the responsibility for urban logistics is least clear.

Our informants in Bergen have explained how urban authorities do not seem to have the political mandate to initiate work towards an urban logistics plan or strategy, and that the topic is currently only considered when it affects planning of the local light rail. The Light Rail is a regional responsibility and locally administered by the Office for Light Rail and Miljøløftet (the office in charge of the local Urban Growth Agreement), and yet it is the office for Planning and Research (under the Department for Urban Environment) that is most engaged with urban logistics in Bergen. This is not to be confused with Bergen's Office for City Planning, as the former is mainly in charge of implementing policy measures whilst the latter oversees, for example the municipal master plan. For now, the intention is that urban logistics may be considered as part of a focus on mobility in the municipal master plan, as already is the case in the other two cities. Such a plan would require the Office for Planning and Research to cooperate with the Office for City Planning, likely with inputs from the Office for Light Rail and Miljøløftet. Planners in the Office for Planning and Research appear to be collaborating with the Office for City Planning to achieve long-term strategies for urban logistics, but in Bergen any such strategies require the consideration of decisions made at the regional and national levels of governance more than elsewhere.

Regional authorities have varying degrees of interest in urban logistics, with authorities in Vestland County (where Bergen is located) being unsure what role they should take. This stands in stark contrast to regional authorities in Trøndelag County (where Trondheim is located), as here the County Council has placed logistics as one of its priority areas within transport policy and seeks to contribute to knowledge of goods transport in the public sector

(Trøndelag Fylkeskommune, 2019). Trøndelag County Council have participated in urban logistics experiments in Trondheim through the Urban Growth Agreement but are also unsure what role the city's authorities should take. It appears that for the City of Trondheim, this feeling is mutual.

Lastly, authorities in Stavanger have cooperated directly with the regional Rogaland County authorities to establish a consolidation centre near the city centre. County authorities had taken the initiative for this project, meant to be funded by the business users and run as an independent company, and since then municipal authorities have been encouraged to take a more direct role towards a long-term solution (see also Jensen, Wessenberg, & Fossheim, 2020). Regional interest in urban logistics in both Stavanger and Trondheim was however spearheaded by individuals who have now left the regional authorities, whereas interest in urban logistics in Bergen is mainly grounded at the municipal level. Common for all three cities is that urban authorities appear more capable of taking direct ownership of urban logistics measures than regional authorities, but the case of Bergen shows that consideration of these two levels is not enough.

One of the greatest challenges in Bergen is that a lot of administrative focus in recent years has been on the location of freight terminals in the city (see Eidhammer et al., 2016). The locations of the city's main freight terminal and goods harbour, both now in the city centre, have been the focus of state reports from the Norwegian Public Road Authority and the Norwegian Railway Directorate (Jernbaneverket, 2015; Øvretvedt et al., 2018). As a result, these freight terminals and the city's Urban Growth Agreement have taken up most of the resources that could help address urban logistics challenges. Both in Stavanger and in Trondheim the regional authorities have taken a more active role in analysing goods flows and evaluating solutions for urban logistics, but in Bergen it has been the state that has provided the most analyses and taken the most influential decisions. The national government decided the future of the city's freight terminal counter to local authorities' recommendations (Gillesvik & Haga, 2019), and the city's goods harbour is being relocated outside of the city centre but also depends on national and regional investments. In addition to the fragmented municipal division of responsibility over urban logistics, Norwegian cities therefore face the challenge of unclear roles across levels of governance. Although there are signs of increased administrative capacity for urban logistics, the organisation of the administrations will likely yield different results across the three cities.

5.2 | Informal barriers to implementation of logistics governance structures

In all three cities there is a fragmented responsibility for urban logistics, as is described in cities elsewhere in the world, and this fragmentation appears to be side-lining logistics actors. Authorities and private actors in all three cities have a perception that urban logistics is included late in planning processes, and private actors do not feel that the authorities are being receptive of their opinions. Private actors report that the public sector has prioritised changes in personal mobility at the expense of urban logistics, and that this is creating tensions between different users of public space. This perception is based on the amount of attention that Urban Growth Agreements receive in the public sector and what the private sector sees as a focus on pedestrians, cyclists, and users of public transport at their expense. Fragmentation in public governance structures means many private actors do not know who to turn to, and many decide to lobby decision-makers directly to voice their priorities. It appears that for private actors, the existing administrative structures, and the absence of a place for urban logistics serves as a barrier to their direct influence, and this makes them lose the will to participate in policy processes.

Private actors in Bergen, Stavanger, and Trondheim participate in planning processes to varying degrees. Some larger businesses reach out to the authorities directly, in addition to being represented by interest organisations and chambers of commerce. Others reach out to political leaders instead of administrative bodies because the former are perceived to be more accessible and reactive. Several of the actors who directly participate in planning processes mention that the unclear responsibility for urban logistics—or fragmentation—in the public sector is what slows or even prevents participation in the first place. Some gave examples where municipal departments refer to each other when asked for information, leading to frustration and to a longer process. Private actors want to be involved early in planning processes and to feel that their views are being considered, because now they feel that other "road users" are being given all the attention. One informant even expressed a view that public authorities only involve them in planning processes to fulfil legal requirements of public participation, and that logistics actors are often 'presented a plan without solutions to choose from.' Others expressed that it is they who often take the initiative to be involved in planning processes. Additionally, private actors displayed a desire for a place to discuss solutions between each other and the authorities.

Local authorities, however, seek more knowledge on urban logistics before they can implement relevant measures. Our informant in Trøndelag County Council stressed the importance of pilots on urban logistics and of making private actors feel that their involvement is beneficial, arguing that 'the fleet will become greener regardless. The real question is efficiency.' Cooperation between public and private actors requires, in this view, that the public sector take a leading role in transitioning urban logistics. Trøndelag County Council is the most active public authority focusing on urban logistics, albeit through the Urban Growth Agreement for the Trondheim area. Regional authorities have worked alongside municipal authorities as part of this agreement that focuses on changes in personal mobility, and private actors claim that departments within the municipality as a result only concentrate on personal mobility. The Office for City Planning in Trondheim has had to engage with its transport planners and with the Environmental Office to ensure that urban logistics is tended to within municipal processes. Overall, the experiences of private actors reflect the existence of functional silos and of a need for more knowledge of urban logistics in public governance structures. Additionally, private

actors hint at a loss of influence as personal mobility remains at the core of urban transport policy.

6 | CONCLUSION

Transitioning towards a more energy-efficient urban transport sector requires the consideration of all aspects of transport. Logistics has largely been overlooked, but this is changing due to the growth of urban deliveries and a focus on congestion, emissions, and conflicts over public space (Lindholm & Blinge, 2014; Patier & Routhier, 2020). As cities are starting to deal with the challenge of logistics governance, we have argued that we need a better understanding of this challenge. This paper addresses the question of how different cities address urban logistics within their governance structures. We situate our research in existing literature on both broader governance trends, as well as work on urban governance more specifically. This research highlights a shift towards networked, entrepreneurial, and collaborative governance (Torfing et al., 2019), along with a concern for the 'siloed' (Aylett, 2011; Bouckaert et al., 2010a; Oseland, 2019) nature of governance structures and the resulting coordination challenges across policy sectors (Banister, 2004; Morel et al., 2020; Stead, 2016). In our study, we find Norwegian municipalities experience the challenges of siloed structures (visualised by Figure 1), which complicate the coordination of urban logistics governance.

Although the Norwegian context may be somewhat unique in terms of how its strong welfare state structures may have held back more radical governance reforms seen elsewhere, the general trends are similar. Our case studies in the Norwegian context identify these general tendencies, but we also pinpoint some specific challenges involved when urban logistics is enrolled in public governance processes and becomes part of the public policy-making agenda. Three of these specific challenges can be identified. First, it is unclear which municipal policy sector has, or should have, the mandate for urban logistics. As logistics shifts from being the responsibility of the private domain to being subject to public governance, public authorities must handle a new policy field that does not fit neatly into the pre-existing landscape of municipal departments, plans, and strategies. Several informants emphasised that logistics must be managed across sectors—but this also meant that it was unclear who has responsibility for it and ownership of the problems it generates. Our material (see Figure 1) shows how departments in charge of planning and of implementation of policy must cooperate to create both short-term and long-term logistics solutions. Cities do not yet have the institutional frameworks and policy tools required to transition towards sustainable urban logistics.

Second, although urban logistics is not entirely missing from existing plans and strategies in the cities being studied, these do not have many concrete goals or policy measures aimed at urban logistics. In the cases where specific logistics strategies or plans exist, these are largely without substance or measures. Most of these are physical measures in municipal plans, which fall under the realm of urban planning departments, meaning that environmental or transport regulations, or even municipal procurements, do not address unsustainable logistics practices. Logistics remains largely a private domain and it is unclear to policy makers what interventions or measures can significantly impact logistics in a sustainable direction that are in the purview of urban or regional authorities. Consolidation of operations typically comes up as a potential measure, but this is dependent upon the willingness of private companies. Low-emissions zones are another oft-discussed measure, but this is dependent upon changes to national regulations. Shortly put, authorities are unclear about how to govern urban logistics.

Third, the challenges of governing logistics are becoming increasingly pronounced and tense as the cities are increasingly prioritizing sustainable mobility. Cities have initiated efforts to reconcile tensions between users of public space, yet tensions appear higher than ever before, and logistics actors report being excluded and not listened to. If public authorities are to reduce tensions, real involvement will need to consider differing interests, and the public sector will need to reach an understanding with the private sector as to what sustainable urban logistics entails. Piloting of different solutions appears to have led to greater understanding of the needs of logistics actors, and such piloting will need to be joined by long-term strategies and measures. In a Norwegian context, this could include piloting and strategies within the framework of Urban Growth Agreements, or at the least in cooperation with departments in charge of these agreements.

With this, the paper aims to point a direction for a literature on the governance of urban logistics and contribute to a discussion on appropriate public policy interventions. Literature on the challenge of making logistics more sustainable has addressed the role of business-centred solutions (Allen et al., 2012; Browne et al., 2012; Cui et al., 2015; Lebeau et al., 2017; Lindholm & Blinge, 2014; Patier & Routhier, 2020; Quak et al., 2016; Stathopoulos et al., 2012) but it has not analysed the broader implications of how to structure governance processes in ways that equip cities to deal with emerging logistics challenges. As our investigation showed, there are a range of unaddressed issues, including the limits and possibility for use of public authority and how to build trust and collaboration.

We need to better understand how urban governance actors can use networked and collaborative governance spaces to make logistics more governable. At the most general level, then, the key issue is to reframe logistics as a 'matter of concern' (Latour, 2004) for public governance. The underlying problem seems to us to be that logistics is currently framed as a private concern, while personal mobility is framed in more public terms. Public prioritisation of personal mobility has therefore hindered a new framing of logistics. This is a process of crafting plans and strategies, as well as the competences of planners and politicians, the division of labour between public agencies, and defining effective interventions.

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Paper 4

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Freight logistics and the city

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Abstract

In this paper we argue that urban studies should consider freight logistics as an integral part of ongoing urban transformations. The movement of goods is increasingly shaping cities, and the implications for sustainability, liveability and justice are uncertain. Still, freight logistics has been largely overlooked in urban studies. This paper seeks to remedy this. First, we review current literature on freight logistics in cities, and find that it is broadly characterised by what has been called a 'technical-rational model'. Second, we situate urban logistics in social and political processes of urban change. Finally, we point to key areas for urban scholars to explore at the intersections between urban logistics and urban change to better understand the role of freight logistics in urban sustainability transformations.

Keywords

cities, planning, transport, urban logistics, urban studies

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摘要

在本文中，我们认为城市研究应该将货运物流作为持续城市转型的一个组成部分。货物的流动正在日益塑造城市，而其对可持续性、宜居性和公正的影响是不确定的。然而，在城市研究中，货运物流基本上被忽略了。本文试图对此进行补救。首先，我们查阅了目前关于城市货运物流的文献，发现其整体具有所谓的"技术理性模式"的特点。其次，我们将城市物流置于城市变革的社会和政治进程中。最后，我们指出了城市学者应该探索的，城市物流和城市变革的交集中的关键领域，以更好地理解货运物流在城市可持续性转型中的作用。

关键词

城市、规划、运输、城市物流、城市研究

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Introduction

The movement of goods is an essential basis for urban life. Without the flows of food, consumer goods and materials into and within cities, metropolises would not be viable. Despite this, urban logistics is often hidden in both social science analysis and policy agendas. Urban logistics thrives by being unnoticed, in the sense that an effective logistics operation is one that delivers goods to the recipient effectively and smoothly, without unnecessary costs, effort or disruption. As is often said about infrastructure, we only notice it when it breaks down. We assume it is unimportant, while it in fact is the opposite.

The proposition of this paper is that urban logistics should feature more prominently in urban studies, and in particular, in analyses of urban sustainability transformations. Although it may often be hidden, the movement of goods and the activities, material flows, financial flows, waste and human labour involved in it, play a significant role in shaping cities. Logistics operations are also shaped by the urban context – in fact, urban logistics can be seen as fundamentally about the effort of manoeuvring the spatial constraints of a city. This interaction between logistics on the one hand, and the urban on the other, is not only intellectually appealing, arguably it is also increasingly relevant for future sustainability, liveability and transport effectiveness. The COVID-19 pandemic transformed consumer behaviour, which combined with the exponential rise of e-commerce and online shopping, just-in-time delivery and new business models in logistics, as well as digitalisation and robotics in warehouses (for the industry narrative on these trends, see DHL, 2022). For urban scholars, these trends should be interesting for what they indicate about changing urban conditions – how are lives, livelihoods, the environment, mobility, consumption and spaces in the city altered as a result of such trends?

Surprisingly little research has been done in urban studies on the movement of goods (freight logistics) compared to the movement of people (mobility). This is in itself not a new proposition – there is a host of previous papers with variations of the claim that logistics receives unreasonably little attention compared to the movement of people (Behrends et al., 2008; Cui et al., 2015; Hesse and Rodrigue, 2004; Lindholm, 2013; van Duin and Quak, 2007; Woudsma, 2001), but

even in the work that does exist, there is little critical reflection on the relationship to the sphere of the urban or on how logistics shape urban sustainability transformations. In this sense, we are linking two interrelated claims about the relationship between freight logistics and the urban. Firstly, that the movement of freight in cities has received vastly less attention than the movement of people, and secondly, that most of the research that does exist on urban freight logistics is based on a 'technical-rational model' (Marsden and Reardon, 2017) that ignores the politics and the social of the urban domain.

In this paper, we outline key areas for exploration in the relationship between freight logistics and the city. The task is to move beyond the dominant technical-rational model in studies of logistics and open it up to analyses of politics, justice, sustainability, as well as urban problems related to governance, planning, spatial conflicts and more. Our contribution to this is to outline several critical avenues for research where these issues can be addressed by urban scholars. Specifically, we discuss three concrete areas: (1) freight logistics and the future city, (2) justice of urban logistics and (3) new pathways for urban logistics sustainability transitions. In conclusion, we discuss the implications of integrating concerns for freight logistics in urban studies, emphasising possibilities for drawing freight logistics into wider processes of sustainable urban transformation.

Beyond the 'technical-rational model' of logistics research

The relationship between the movement of goods on the one hand, and the cities and urban life on the other, is relatively clear as a matter of historical experience. Cities have to a large extent developed through the exchange and manufacturing of goods (Hesse, 2016). Nevertheless, the academic field of urban studies does not currently reflect the significance and relevance of freight logistics. In this section we will develop our two interrelated claims about the literature relevant to the freight–city relationship.

The first claim is that the movement of freight in cities has received vastly less attention than the movement of people. While urban mobility is a vast and growing field, urban studies scholars seem far less interested in the movement of goods. It has been stated repeatedly by other accounts, over a long period of time, that the movement of freight has received less attention than the movement of people (Behrends et al., 2008; Cui et al., 2015; Hesse and Rodrigue, 2004; Lindholm, 2013; Patier and Routhier, 2020; van Duin and Quak, 2007; Woudsma, 2001). Already in 2001, Woudsma, writing for *Urban Studies*, found that papers in the journal in the years prior had 'scant reference to the movement of goods' (Woudsma, 2001).

This is not just the case in the urban studies field but also in the broader planning and transport fields. Woudsma found that in the proceedings of major academic conferences on transport, such as the Transport Research Board Proceedings, only 3% of 1000 articles fell under the heading of freight transport. Hesse and Rodrigue (2004), examining textbooks and journals in regional science and geographical research, find that there is a slight increase in focus on logistics but conclude that 'logistics, as a geography, remains relatively unexplored' (Hesse and Rodrigue, 2004: 172). Lindholm and Behrends (2012) argue that there is a lack of systematic methodology for linking transport planning with land-use planning, in part because of the lack of attention paid to urban freight. Lack of attention is not just in academic research. It has been reflected in city authorities themselves – surveys have found that that more than half of European cities have no freight policy or

planning (Lindholm, 2013; Lindholm and Behrends, 2012).

Any suggestion as to why there is less focus on freight logistics is bound to be speculative. It has been suggested that logistics is widely considered to be a matter for the private sector rather than the public sector (Rosales and Haarstad, 2022), and therefore it may fall out of the scope of scholars of planning, policy, politics and governance. Another possible explanation may be that logistics operations thrive by being unnoticed, delivering goods smoothly and efficiently without unnecessary costs or disruption. Like infrastructure, it functions best in the background, as a context rather than visible object, and we only tend to be aware of its presence when it fails. Ballantyne (2013) found that freight transport is most often recognised in cities when stakeholders raise a complaint, for example regarding noise, safety and access restrictions.

Or perhaps freight logistics is simply less sexy than mobility? Mobility solutions can be spectacular and visually commanding in the urban landscape, can involve advanced architecture or green spaces, or be highly technological. In contrast, logistics solutions are typically conceived as a more efficiently organised value chain. This is perhaps less appealing to urban scholars, who may be more interested in interventions and solutions that more visibly reshape urban landscapes.

Our second claim about the literature relevant to the freight–city relationship is that while there is ample research on urban freight logistics, it is based on a 'technical-rational model' (Marsden and Reardon, 2017) that ignores fundamental issues at the heart of urban studies. The point here is that there is still a lot of research on freight logistics, in cities and beyond. Freight logistics is a significant and vibrant subfield of transport studies and management studies, as well as subject to significant industry-based research. Emphasis has been on multi-actor preferences using modelling tools such as Multi-Actor Multi-Criteria Analysis (Fredriksson et al., 2021; Lebeau et al., 2018), Agent-Based Modelling (Gatta et al., 2017; Le Pira et al., 2017) or Q-methodology (Van Duin et al., 2018). A quantitatively oriented review found a growing number of articles published in urban logistics, which touch on themes such as policy, innovation, sustainability and stakeholders (Neghabadi et al., 2019).

The aim of the broader research field, however, seems to be to solve problems for urban logistics, rather than to examine the links between logistics systems and the city. Cui et al. (2015) describe the main concern of research in the field as 'private-sector-led optimisation of performance'. The dominant narrative is one where cities are growing and there are new consumer and sustainability demands, which must then by resolved by improved understanding and optimisation of logistics operations of private operators. Here, logistics in cities is typically understood as a relationship between freight operators and their customers (Ambrosino et al., 2015; Cui et al., 2015; Fossheim and Andersen, 2017; Lindholm and Blinge, 2014). In Hesse's (2016) account, *The City as a Terminal*, logistics is performed by major corporations operating large-scale networks, achieving a 'dissociation from the city', in which cities primarily serve as receptacles for objects and delivery systems beyond the deliberate control of other urban actors. The aim of the operators is a sort of 'neutralisation' of the urban territory, to avoid having to make specific operational designs for specific urban contexts (Dablanc, 2007).

In this narrative, urban logistics is a challenge that can be resolved through technical and rational means. In the systematic review by Neghabadi et al. (2019), sustainability, policy and stakeholders are 'issues' that can

be subdivided into component parts and resolved by generating more 'precise' knowledge of each part. Several recent papers are ambitious when it comes to new technological innovations, and sketch models of 'logistics 4.0' (Winkelhaus and Grosse, 2020), 'smart logistics' (Ding et al., 2021) and blockchain applications in supply chains (Pournader et al., 2020).

The narrative aligns well with Marsden and Reardon's (2017) perspective of the wider governance of transport field, which they critique for its limited technical-rational perspective, restricting its scope to models, quantitative approaches and hypothetical conceptual developments. The technical-rational perspective aims to provide 'tools' for policy makers, but has less to say about the processes and systems of the urban in which those tools must find relevance. This means that it lacks a more substantive engagement with context, power relations and legitimacy – issues that are at the core of urban systems in the perspective of urban studies (Savy, 2016).

Some of these issues are addressed in studies that look at logistics from a public sector governance perspective (Rosales and Haarstad, 2022). This work has highlighted coordination problems between different types of authorities (Nordtømme et al., 2015) and between stakeholders and public actors (Bjørgen and Ryghaug, 2022). This work suggests that freight logistics tends to fall between silos in urban governance systems. In other words, urban governance systems are already set up to deal with public transport and land use planning, but not necessarily the specific challenges that emerge when urban logistics becomes a matter of public concern.

In most available perspectives on urban logistics, then, the urban is a receptacle for objects delivered through extensive value chains that cities themselves can do little to control, and otherwise is a silent and inert backdrop to complex logistics operations. It is simply the surface upon which logistics operations play out, and does not in itself actively shape those operations. We are not the first to point this out. Yet there is a need to develop a perspective on how the relationship between freight logistics and the urban can be understood, in a way that recognises the liveliness and vibrancy of the urban. As we make clear in the following section, freight logistics is in fact deeply embedded in shaping the contemporary city.

Situating freight logistics in the processes of urban change

The flows of goods in the city are deeply ingrained in the urban fabric. Making these flows efficient – the key objective of logistics practitioners and much of the academic work on the topic – is inherently a struggle with urban structures, actors and competing flows, mediated by material, social and political infrastructures. The purpose of this section is to illustrate how freight logistics is in fact deeply situated in social and political processes of urban change at multiple points. In doing so, we will highlight the relevance of existing literatures in and around urban studies, which have highlighted the social and political elements of related issues such as urban infrastructures (Guy, 1997; McFarlane and Rutherford, 2008), environmental and spatial justice in cities (Anguelovski et al., 2019), mobility justice (Nikolaeva et al., 2019; Verlinghieri and Schwanen, 2020), smart urbanism (Kitchin, 2014), cities as nodes in global networks of commodity chains, finance and social relations (Angelo and Wachsmuth, 2015; Broto et al., 2012) and more.

Although urban logistics systems may often be hidden, the movement of goods and the activities, material flows, financial flows, waste and human labour involved in it, play a significant role in shaping cities in ways

that resonate with analyses of the politics of water, electricity or road networks in cities (Guy, 1997; McFarlane and Rutherford, 2008). Each of these infrastructure types has its own history that can be examined, as Moss (2016) does illustratively in the case of Berlin's water system and underlines the social and political character of their constitution. We find work on the politics of urban infrastructure to be particularly instructive for opening a conceptual space around urban logistics. Both logistics and infrastructure are generated as derived demand, meaning that we do not build and maintain them for their own sake but because they help produce other things we need. They thrive in the background, physically and discursively, and a successful operation means that we are typically not aware of their presence, costs or politics.

What the work on infrastructures in urban studies does well is to disrupt the assumption that invisibility means that it is not important for the shape of urban forms. It recognises the 'mutual constitution or co-evolution' between infrastructure and the city, as well as 'the importance of specific configurations of agency in shaping their relations, and the inherently political nature' (McFarlane and Rutherford, 2008: 364). It can help us open the black box of urban freight systems for exploration, not just through the 'technical-rational model' (Marsden and Reardon, 2017), but for urbanists interested in the way the movement of goods shape cities and vice versa.

Freight logistics is deeply embedded in shaping the contemporary city, along multiple dimensions. For one thing, it shapes the spatial structure – a key driver of travel behaviour and car dependence in cities (Næss et al., 2011). Terminals are typically located outside of urban centres. Here one can often see large terminal buildings and associated road infrastructures where freight arrives by rail or by container trucks, before it is loaded onto delivery trucks that make their way into urban cores or suburban malls. Some cities have large harbour areas dedicated to the arrival, storage and reloading of containers arriving from across the sea – but increasingly, these areas are considered a waste of prime urban real estate and they become suburbanised or move even further away into the urban perimeters (Hesse, 2016) – in what has been called a 'logistics sprawl' (Tennøy et al., 2020; Yuan, 2021).

In suburban areas there is typically less conflict over space, and often the zoning ordinances are less strict. There is also less conflict with powerful economic forces and socio-economic groups. Research has found that warehouses are disproportionately situated in low-income and medium-income minority neighbourhoods (Yuan, 2021), meaning that these socio-economic groups suffer from externalities such as noise, increased traffic, air pollution and around-the-clock activities. This illustrates how the organisation of urban logistics is not simply an economic and management issue of optimisation, but also a deeply social and political question involving class and environmental justice. These are issues about which urban studies has a lot to say.

Allowing logistics operations to sprawl also places undesirable elements of the urban systems out of sight, while opening prime urban areas in urban cores for more profitable forms of development. Removing logistics terminals from urban cores is a key element of the shifting base of cities towards service economies, and is entangled in processes of urban renewal, gentrification, socio-cultural displacement. Urban studies scholars have suggested that the urban renewal processes may result in elite enclaves of environmental privilege (Anguelovski et al., 2019). We might see the pushing out of undesirable freight activities and infrastructures, traffic, pollution and aesthetically

unpleasing terminals, as part of this process. This underlines what urban scholars have pointed to regarding the political underpinning of aesthetics in hegemonic place-making strategies (Jones, 2009). The shift towards more complex supply chains also changes the relationship between the city and logistics – Lyster (2016) holds that cities are now less shaped by static objects and more through the networked flows of logistical systems.

Removing industrial-type activities out of cities has also enabled many cities to make claims of becoming 'green', since they now can develop low-mobility, compact forms of urbanisation inside their formal boundaries. But as Holgersen and Malm (2015) point out in the case of Malmø, the claim of being the 'world's greenest city' is actually a process of displacing industrial activities with high-consumption activities whose externalities are unaccounted for. We might question forms of environmental accounting that reward cities for moving polluting and emissions generating activities outside their boundaries. It may be that logistics sprawl is simply exporting and hiding environmental problems, while the underlying driver of the problems – consumption of goods produced elsewhere – persists. Making this process visible points to politically challenging questions of political accountability and geographies of responsibility for environmental issues that are inherently urban – yet are made to appear less so by the complexities of logistics systems.

Relocating logistics terminals and many logistics operations to urban perimeters intensifies the need for processes and infrastructures for transporting goods (back) into urban cores. There are complex and multi-layered distribution systems from terminals and distribution venues, using large trucks, perhaps rail, to suburban warehouses and costumers in and around urban cores. As these systems are typically privately organised, they are shaped to maximise the efficiency of individual companies and their costumer networks, rather than, say, overarching concerns of regional planning, liveability and sustainability. There is an ongoing struggle between private and public interests over this issue, concerning the establishment of 'consolidation centres' for freight, where competing operators would be forced or enticed by subsidies to have joint terminals that facilitate collaboration around shared infrastructure, land use and even shared last mile delivery services (Giampoldaki et al., 2021). Cities have experimented with or established such consolidation centres in order to minimise consequences of logistics operations, but it also opens challenging political, bureaucratic and legal questions that urban authorities struggle to cope with (Cui et al., 2015).

The geographical organisation of freight systems not only has implications for urban peripheries and suburban areas, but also for the urban cores that they are intended to serve. The multiple networks of delivery services generate significant amounts of traffic, straining urban infrastructures and environments. Reliable data on freight traffic in cities is typically not available, but a while ago Dablanc (2007) found that goods movements represent between 20% and 30% of vehicle kilometres travelled in a city. It is safe to say that logistics represents a significant portion of traffic in cities, with a corresponding share of liability for congestion, pollution, emissions, and endangerment of others. Sprawling logistics, moving terminals to urban perimeters, has likely, in combination with increased demand, exacerbated these issues (although the picture is complicated, see Trent and Joubert, 2022). Logistics sprawl can deepen automobility dependence by locking in urban activities around road infrastructures and reliance on 'hard' transport infrastructures, making the shift to softer and more diverse forms of mobility

more difficult (Macharis and Kin, 2017; Næss et al., 2011).

If we shift our analytical gaze to the street level and look for traces of these complex logistics networks there, we typically see the last-mile or second-to-last-mile services. This has been particularly visible in the recent years owing to internet-induced changes in consumer behaviour and the convenience and traceability of e-commerce (Buldeo Rai and Dablanc, 2023). Possibly the most visible feature of the logistics systems in urban cores is the large trucks of major operators such as DHL, FedEx or Amazon, that idle on curbs while packages are delivered to a nearby store or resident. Here they enter into the daily contestation over use of street space with other users of urban space – pedestrians, other cars and especially cyclists. These sorts of conflicts, and perhaps bicycle activism in particular, have revealed the everyday forms of conflict, contestation and uses of power in urban space (Verlinghieri and Schwanen, 2020).

The presence of the delivery truck in urban space makes visible the human element of urban logistics. The hurried delivery worker reveals – finally – that there is embodied labour engaged in these complicated logistics networks. The last mile represents a significant cost relative to the total journey of a particular delivery, partly because it is labour intensive (Macharis and Kin, 2017). Ongoing transformations of the logistics sector have altered conditions for workers drastically. Jobs in freight activities such as warehouses and on docks have been relatively stable and unionised, which changed dramatically with liberalisation and the introduction of 'lean' management from the 1980s and onwards (Moody, 1997). In the past decade, logistics – through suburbanisation of warehouses, new technologies and new precarious forms of labour – has been 'transformed in ways that have disoriented both workers and trade union leaders' (Moody, 2019: 80). The rise of the 'gig economy' has exacerbated worker precariousness further, and is possibly creating a new urban precariat. Last-mile delivery operations like Deliveroo, Foodora, Uber Eats, Just Eat and the like have struggled to legally define delivery workers as self-employed and therefore not entitled to minimum wages or benefits (Woodcock and Graham, 2019). Last-mile delivery is, in turn, an arena for struggles over road space as well as worker rights in cities (Altenried, 2019).

Finally, urban logistics also plays into the material constitution of urban space. If we look for traces of logistics operations in the physical urban landscape, they may be well hidden – but the traces are everywhere. Access for deliveries is a central preoccupation for logistics actors, and urban logistics can be seen as fundamentally about the effort of manoeuvring the spatial constraints of a city. Terminals need proper road networks connected to them. In smaller cities or in historical cores, narrow streets and protected buildings can create challenges for deliveries. Malls and box stores have separate entrances, typically in the back, for delivery trucks, and these entrances demand sufficient road space, which can infringe on street space available for parks or public spaces. In certain areas of the city deliveries are only possible or legal at particular times of the day, which can infringe on both business operations and employment conditions. Warehouses and terminals not only occupy land in cities or suburban areas, but also occupy significant parts of the city's wider transport infrastructure.

In this way, logistics operations are built into the material fabric of the city and take part in structuring its flows and relationships. As the work on politics of urban infrastructure highlights (McFarlane and Rutherford, 2008), this is always a particular type of structuring which has specific effects. Once built, urban space facilitates certain

types of logistics rather than others, enables a particular type of consumption, and helps create a particular type of city. It creates certain barriers and opportunities for making freight logistics more sustainable and just, while constraining other opportunities – illustrating the conflicting goals and interests in planning for sustainability (Gil Solá et al., 2018). Precisely how this occurs in different urban contexts would need further analysis, but as existing literature on urban transport systems illustrates, transport systems can serve to 'lock in' existing – typically high-carbon – modes of transport (Haarstad et al., 2022). Freight systems, with their terminals and road connections, trucks, delivery boxes and other material artefacts, can serve as strong drivers of lock-in.

By downplaying the movement of things in the city, urban scholars are missing an opportunity to account for a key factor of ongoing urban transformations. We have argued that there are conceptual affinities between urban logistics and the work on urban infrastructures, in the sense that they are often relegated to background issues, while they play a significant role in shaping urban dynamics. As urban systems, they also have fundamental political effects, which are hidden by the technical-rational model applied in the economic and engineering domains of knowledge generation. We pointed to some of the interlinkages between urban logistics and other critical work as well – work on urban renewal, gentrification and mobility justice – which create various bridges to urban studies. While this is obviously not an exhaustive overview of themes in urban studies that can inform a critical analysis of urban logistics, it intends to open urban logistics as a field of inquiry in urban studies. Following on from this, we will now outline key research pathways at the intersection of urban logistics and urban studies.

Key issues for research at the urban logistics/urban studies intersection

Freight logistics appear to be integrated in two fundamental processes of change that we are seeing the contours of at present: climate urbanism and digitalisation. First, cities are addressing the climate challenge by expanding the terrain for climate-related action, and this action increasingly includes multiple infrastructure systems underpinning urban development (Bulkeley, 2021). Urban consumption, infrastructure provision and transport are increasingly framed in terms of resilience, decarbonisation and adaptation (Derickson, 2018). As a mode of governance, this 'climate urbanism' gravitates around carbon accounting and climate hazards, which, in a neoliberal context and an urgency framing, has uncertain and underexplored justice implications (Long and Rice, 2019).

The other fundamental process of urban change is digitalisation. The shift to digital infrastructures, or the 'pervasive and ubiquitous computing and digitally instrumented devices built into the very fabric of urban environments' (Kitchin, 2014: 2) has profound implications for work life and urban life (Sareen and Haarstad, 2021). It is also reshaping the context for urban freight logistics. We see the contours of this reflected in, for example, the literature on platform urbanism, which assesses the implications of the platform organisation of urban activities such as mobility, hospitality and food delivery. Platform urbanism illustrates how digitalisation disrupts established power relations and creates new ones, particularly through the control of data (Söderström and Mermet, 2020; Stehlin et al., 2020). Here again, the implications for justice are uncertain and underexplored.

These fundamental processes of urban change – climate transition and digitalisation – are widely recognised, not least by the logistics industry itself (DHL, 2022). All actors involved are engaging in a form of 'anticipatory governance' (Guston, 2014), attempting the seemingly impossible task of forecasting and managing unpredictable developments and technological innovations under conditions of unclear responsibilities and mandates. Urban scholars have a critical role to play in clarifying the stakes. We will suggest that we can do so along these three lines of enquiry: (1) freight logistics and the future city, (2) justice of urban logistics and (3) new pathways for urban logistics sustainability transitions.

Freight logistics and the future city

It has been written about future mobility that 'code is the new concrete' (see Stehlin et al., 2020). In the discourses surrounding the future of urban freight logistics there is certainly a strong assumption that the ongoing processes of digitalisation and automation, coupled with greater consumer demand for faster, cheaper and more sustainable deliveries, will shape the future of the sector. New and old actors are experimenting with digital and more material solutions, as well as new business models connecting them. 'Proximity logistics' is rethinking and localising supply chains, placing terminals closer to city centres and to the goods' destination (Buldeo Rai et al., 2022). Home deliveries on e-scooters, community drop-off boxes, in-car deliveries, self-driving vehicles and delivery drones, in combination with rising e-commerce, q-commerce and home office flexibility, is likely to reshape the relationship between freight logistics and the city. It is not the primary role of urban studies to make predictions about these trends, but rather to offer analysis and critique of ongoing, emergent and uncertain processes of change. In turn, urban scholarship should explore how these emergent trajectories will influence the city and urban flows and what the socio-political implications will be.

One thing is the matter of material flows. If there is a shift from car-based commuting and physical shopping to digital work, e-commerce and home deliveries, how does this restructure the flows of materials throughout the city, the development of urban infrastructures and the experience of urban life? What new types of urban infrastructures will the disruption of existing flows engender, and what sorts of 'splintering' effects and socio-technical dynamics will these infrastructures in turn generate? Covid illustrated that radically new tech-mediated practices are available, but also that the opportunity to make use of them is very unevenly distributed and that physical-material forms of interaction are persistent (Florida et al., 2021).

Commentators on digital, smart and platformed cities concur that as these technologies develop in urban spaces under neoliberal forms of governance, there is a shift from public to private control and management of infrastructure and urban space in general. A central question is who controls the data, and who writes the code that shapes urban flows and extracts value from urban economies (Kitchin, 2014; Söderström and Mermet, 2020)? How do these flows play into existing inequalities and differences in cities, that is, what are the new splintering effects? Guma (2019) argues, in the context of Nairobi, that platform urbanism strengthens the role of private enterprises, ignores local needs and networks and potentially fragments access to services. Alternatively, Odendaal (2022: 22) argues that platforms are vulnerable to 'insurgent practices' and 'allow for context-specific problem solving and mobilization'. In any case, little of this work is on freight logistics specifically, so there are additional

uncertainties in how these dynamics translate into the movement of goods.

In terms of physical land use and built form, we may be witnessing a reversal of the suburbanisation of logistics operations taking place some years ago (Hesse, 2016), and instead see a greater degree of localisation of logistics operations driven by consumer demand for immediacy, facilitated by flexible networks of start-ups and agile companies (Buldeo Rai et al., 2022). Urban planners may struggle to adapt, as the delivery routes and terminal locations alter, and retail in physical stores changes (Dablanc, 2007). The relationship between producer and consumer might be less mediated by the physical retail stores, which in turn disrupts the production of urban space.

The turn to logistics 4.0 (Winkelhaus and Grosse, 2020) points to how logistics operations are increasingly being intertwined with digital technologies and use of data across the entire value chain. As such, the lines between virtual space and the physical urban space get blurred, thus contributing to the rise of algorithmic governance in cities (Rodrigues, 2016). Digitalisation and algorithmic governance have already emerged as a matter of concern for cities, as these require renegotiation of the relationship between state and various private interests and politicises the access to, and interpretation of, related data for deciding on public space allocation (Docherty et al., 2018). How will local planners and decision-makers continue to work strategically to attract particular types of retail business to particular locations in order to shape urban space in public interest, when this retail business is replaced by algorithm-driven commerce controlled by distant and de-contextualised platform-based enterprises?

If code is indeed the new concrete, then who writes and controls this code matters a great deal for cities. However, in cities real concrete still exists. Algorithmic power is necessarily mutually constituted with the more physically tangible materialities of urban space. So while we take seriously these new disruptive forces in freight logistics in the city, the key question is how they co-evolve with other types of urban infrastructures to shape urban futures.

Justice in the networks of urban freight logistics

Stephen Goldsmith, former deputy mayor of New York City, has suggested, with Neil Kleiman, that 'cities should act more like Amazon to serve their citizens' (Goldsmith and Kleiman, 2018: np). They suggest that the seamless and friction-free experience of the ideal Amazon delivery should be the model for how cities deliver services to their citizens. The image of Amazon-like governance of cities, and this reframing of citizens as consumers of public services, may bring quite different connotations to critical urban scholars (see Graham et al., 2019), and actually illustrate the profound justice implications of how logistics networks are managed. This phenomenon may also illustrate how the concentration of transactions through singular platforms enable an enormous extraction of control and wealth. The seamlessness is arguably a result of an effort to conceal the actual frictions, in terms of extraction, resources, labour and emissions, that go into producing the moment when an Amazon package is delivered at the doorstep of an urban resident.

There is need for urban critical scholarship in revealing the injustices and struggles along the commodity chains of urban freight logistics. There are multiple dimensions to this. Digitalisation and platformism appear closely linked to the 'gig' organisation of the economy and control of labour by means of digital technology with potentially detrimental effects for workers and organised labour. Moody (1997) has long documented the

effects of lean management on labour. Digitalisation and platformisation have further added to the workplace demands, fragmentation and individualisation of conditions for workers. Gig labour is 'typically short, temporary, precarious and unpredictable' (Woodcock and Graham, 2019: 9). Many of the delivery platforms are based on such gig labour, since their 'employees' are actually independent contractors without the worker protection, benefits or ability to organise enjoyed by most hired workers. This means that additional costs and risks associated with deliveries are offset to the worker (Lord et al., 2023). This has resulted in court battles in many countries, as well as efforts by unions to get contractors organised and granted status as employees. For critical studies of urban logistics, it is relevant to assess the extent to which logistics operations are underpinned by forms of organisation that exploit workers and undermine the powerbases of organised labour.

Urban scholarship can also unravel this idea of logistics as a friction-free experience by examining the broader commodity chains and metabolistic processes through which goods delivered on the doorstep of an urban resident are produced. To fully comprehend the justice implications of urban logistics it is necessary to move beyond 'methodological cityism' (Angelo and Wachsmuth, 2015), and recognise that urban points of consumption are nodes in complex chains of commodities spanning the globe. This framing implicates, for example, resource extraction, child labour and environmental degradation in the Global South, as well as embedded carbon, into the products consumed in the metropolises of the world. Urban scholars can contest this narrative of friction-free delivery and foreground the flows and chains enabling urban logistics.

There are myriad other justice implications in emerging urban logistics systems – new forms of urban spatial inequalities and gentrification, access and control over data and lack of democratic control are some. Our point is that urban logistics needs urban scholarship, and vice versa. Within this sector are, we would argue, fundamental urban justice questions for the future.

New pathways for urban logistics sustainability transitions

Sustainability appears to be a key driver of change in urban logistics, at least at a strategic or rhetorical level. The question is whether the industrial strategies to respond to the sustainability imperative actually produce transformative change towards sustainability in urban systems. Much of the existing research literature, and known industry strategies, focus on sustainability as making the delivery systems more efficient, shifting to electric vehicles, consolidating deliveries in fewer vehicles and using micro-depots (Strale, 2019) while planning and governance perspectives add emphasis on land-use and pollution (Cui et al., 2015; Lindholm and Blinge, 2014). In the literature there is a widespread assumption that these technologically driven innovations will create greener urban logistics systems. For urban studies, however, it is important to adopt a broader and more systemic perspective on the pathways to sustainability of urban freight logistics.

In such a broad perspective, some of the sustainability assumptions of the logistics sector might be questioned. Making logistics operations more efficient and electric may be profitable and relatively simple interventions from the perspective of the industry, but may actually increase the flow of goods and the number of deliveries and in turn generate more traffic and put additional strain on urban infrastructures. For example, delivery workers have, partly in order to meet higher demands of effectiveness, started using

electric scooters, which use more energy and appliance waste (Lord et al., 2023), and generate significant conflict with people using softer (and more sustainable) forms of mobility (Sareen et al., 2021).

New logistics services are also predicated on ever-growing demand and on stimulating that demand further, without questioning the underlying scarcities of resources and urban space. The rise of individual deliveries and gig economy of logistics is actually driving increased consumption, energy use and waste generation. As McLeod and Curtis (2020) suggest, we need to ask questions of how and why freight trips are generated, and what proactive planning and policy approaches can change the way we consume and move goods in the city. Since demand for delivery is derived demand, reduced need for the movement of goods in cities means that we must also question more fundamentally the patterns of consumption in cities and the broader systemic transformations that are necessary (Aurigi and Odendaal, 2021).

Work on sustainable urban mobility seems to have progressed significantly further than the more limited sustainability perspectives in urban logistics. Organisation of logistics is still thought of in individualised terms (with consolidation centres possibly as a lone exception), while mobility thinking abounds with real and imagined models of public forms of organisation, sharing and commoning (Nikolaeva et al., 2019). But cities and municipalities are increasingly extending the scope of their planning mechanisms to freight logistics (Shrestha and Haarstad, 2023). This may enable public and democratic forces, to a greater extent, to align developments in the sector with public interest. What alternative models for public and shared urban logistics organisations are possible? How do we 'common' urban logistics? This could involve forced consolidation of deliveries, zero-emission zones in cities, a minimum number of deliveries per trip or other measures we have yet to imagine. The platform organisation of logistics services may perhaps also open up for various forms of 'crowd logistics' (Lord et al., 2023), where deliveries can be integrated with the daily movements of people – can we imagine ride sharing for packages? There is ample conceptual work here in sharing, debating and critiquing emergent models for enrolling urban logistics in urban sustainability transitions.

Conclusions

With this paper we hope to convince scholars of urban studies of the importance of drawing urban freight logistics into analyses of cities and urban change. It is sorely needed, because most of the existing work on this sector is limited by a technical-rational model, which considerably constrains the analytical imagination. After discussing this literature, we situated urban logistics in social and political processes of urban change. Our aim here was to illustrate that freight logistics is deeply implicated in areas that urban scholars are already interested in and relevant to approaches they use to understand those areas – such as the politics of urban infrastructure, environmental and spatial justice, gentrification, urban metabolism, smart urbanism, anticipatory governance, among others (Angelo and Wachsmuth, 2015; Anguelovski et al., 2019; Broto et al., 2012; Kitchin, 2014; McFarlane and Rutherford, 2008).

Most important, of course, is how urban logistics is enrolled in thinking, research and analysis on urban transformations in the future. We argue that with ongoing processes of transformation affecting cities, urban logistics will play an even larger role in processes of urban change. Urban scholars have a critical role to play here, and we have suggested three lines of inquiry in which urban scholarship can contribute

important analyses. Obviously, these are not exhaustive.

Beyond these specific areas, our general assertion is that the system of urban logistics, with its various technologies, practices, discourses, resource flows and infrastructures, constitutes an overlooked element of urban systems. It does not operate in abstract space but is mutually constituted with wider urban systems (Cui et al., 2015). Any attempt at urban sustainability transformations needs to account for the organised movement of things. Material flows are constitutive of urban space, and vice versa. It is up to urban scholars to make evident the links to the issues that we have competence and interest to say something about, namely issues of power, justice and politics in urban transformations. While others labour to make freight logistics as smooth and hidden as possible in urban space, it is arguably the task of critical urban studies to do the opposite. We should unmask the tensions and frictions that the movement of things generate. Our contribution to the anticipatory governance of this sector can be to make clear that these frictions cannot simply be avoided – increasing consumption and higher expectations of timely and convenient deliveries to growing number of urban residents have significant political and social implications.

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