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Astrid Bjørgen

Integration of Goods Movement in City Planning:

Understanding Stakeholder Engagement

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NTNU
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Science and Technology
Thesis for the degree of
Philosophiae Doctor
Faculty of Architecture and Design
Department of Architecture and Planning

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Trondheim, September 2021

Norwegian University of Science and Technology
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Integration of Goods Movement in City Planning:
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E du Nord

*Det e ikkje alltid det går
Sånn som du hadde tenkt
Det e ikkje alltid du når
Den ferga du kunne ha trengt*

Abstract

Cities need goods for their citizens and activities, movement of goods is crucial for making cities liveable and attractive, and movement demands space. Due to urbanization and increased densification, space is becoming a scarce resource, particularly in city centers. Additionally, changing societal and technological trends impact how space is utilized for urban freight. For example, e-commerce implies a change in consumer behavior, both in shopping and in travelling, which in turn necessitates changes in logistics solutions in the final step of the supply chain, the last mile.

The thesis focus on the integration of goods movement in city planning. Integration of urban freight into transport planning policies and city plans requires sufficient understanding of the interaction between freight flows and the urban environment, as well as an understanding of how to integrate freight stakeholders' interest in planning to **facilitate and manage the integration**. A multifaceted approach is therefore needed to initiate the process of integration.

Goods movement and personal mobility are closely linked through their use of the same infrastructure and space. Both are subject to the creation of common solutions for achieving goals relating to climate, congestion, and capacity. While passenger transport has received considerable attention from researchers and policymakers, less attention has been given to urban freight transport. This is partly because cities lack sufficient resources to tackle challenges in urban freight, and because until recently the negative effects were less visible, logistics is not considered an important topic in city planning. Thus, freight stakeholders are seldom represented and do not participate in public planning processes at the local level.

Through my research with interviews, focus group seminars, online survey, and participant observations I have demonstrated that cities need to adjust the public planning processes and city logistics measures to match the local context. Regarding stakeholder engagement, the research showed that collaboration, negotiation, and consensus-building are viable strategies to overcome the complexity and often conflicting interests within urban freight. Further, the research revealed the successful city logistics policies depends on recognizing and understanding the complexity of logistics chains, the concerns of different actors, and urban freight transportation problems. Local authorities will benefit from working jointly with private stakeholders towards developing strategies for policy integration.

My research has contributed to the field in identifying that involving stakeholders is an important way to improve the integration of goods movement in city planning. Further research on the integration of goods movement in city planning should continue to expand the scope from city logistics to considering the whole urban mobility system, including both goods movement and personal mobility. The integration has to consider planning and management towards increased flexibility in both infrastructure capacity and network capacity for passenger and goods transport, with the purpose to improve the collective use of urban spaces. Shaping spaces according to local needs and supporting communities by rethinking the use of urban areas may be low-hanging fruit in practical planning.

Transportation planning in urban areas should to a larger degree highlight the relationships between consumer behavior, travel behavior and the performance of urban logistics as these relationships will impact mobility in urban communities, city planning, and the possibility of multifunctional use of urban space in the years to come.

Preface

This thesis is submitted to the Norwegian University of Science and Technology (NTNU) for fulfilment of the requirements for the degree of philosophiae doctor (PhD).

This doctoral work has been performed at the Department of Architecture and Planning, Faculty of Architecture and Design, Trondheim with Professor Yngve Frøyen as main supervisor. Co-supervisors' have been Associate Professor, Kelly Pitera, Department of Civil and Environmental Engineering (NTNU) and Professor Cathy Macharis, Vrije Universiteit Brussel, the department of Mobility, Logistics Automotive Technology (MOBI).

The PhD project has been linked to the national research project NORSULP (Sustainable Urban Logistics Plans in Norway) which was co-financed by The Research Council of Norway and the Norwegian Public Road Administration (the Urban Logistics Program).

The main task in the NORSULP project was to develop a guideline for local municipalities for sustainable urban logistics planning. Included in the NORSULP project were two doctoral scholarships with the aim to increase the knowledge gap in urban freight transport. This thesis is one of them and contributes to research about stakeholder engagement and public planning processes.

Acknowledgements

I have fulfilled a project I never planned to do. But suddenly the opportunity appeared. Through the NORSULP project I was given the opportunity to merge my practical experience with theory, into this thesis. Thanks to all for support and motivations. I would not have been able to do it by myself.

Thanks to the Research Council of Norway (NFR) and Norwegian Public Roads Administration (NPRA) for funding. That made it possible to be a student again after several years at SINTEF. Particularly, thanks to Toril Presttun (NPRA), the Urban Logistics Program, who made this scholarship possible.

My supervisors Yngve Frøyen and Kelly Pitera guided me through the process, with helpful input to the structure of the thesis. Your support and co-working have been more important than you expectedly think yourself. I hope the multidisciplinary approach we have developed together through this process is a reliable platform for further cooperation. The committee, Laetitia Dablang, Maria Oscott and Helge Hillnhütter for your interest in my work, critical review of the thesis and valuable feedback.

Cathy Macharis, the professor from Brussels who I met for the first time in 2010 in a conference in Gothenburg, also became my co-supervisor. The way you gave advice all through, especially the evening in Washington D.C. at TRB 2018, was important. Your enthusiasm and inspiring input helped me to see the red line and motivated me to go on. You have challenged me and shared your wisdom in a remarkably kind way. Being a part of your MOBI team, spring 2019 in Brussels, was a bonus.

The working environment, the projects and my colleagues make most of the days enjoyable at SINTEF. Roar and Unn Karin organized this possibility and have been available to answer all kind of questions. Thanks to Kristin and Odd for academic inspiration and interesting co-working. I send my thanks to the Valle Foundation that made it possible to join the Urban Freight Lab, led by Anne Goodchild and Edward McCormack, at the University of Washington, fall semester 2019.

Dialog and cooperation with the stakeholders, transport companies, the Logistics Association of Mid-Norway and of course Trygve, made it easier and more interesting to connect theory to the real-world. Meetings and workshops in cooperation with the local authorities in the nine cities taking part in the NORSULP project have been constructive and supportive. Thanks to the NORSULP team, together we made the first guideline for urban logistics planning at local level.

Randi, our Master in Bodø, "Cooperation among stakeholders in Henningsvær", in 1992, was a good start of the academic career. 'Steinan Trening & Trivsel', has delivered frequently activities, challenging me both mentally and physically. I could not have done this without you inspiring ladies, and outdoor activities. Thanks to Jorunn for your convincing words: "You have to give it a try!"

Finally, thanks to my family. Jørgen, Vegard and Erlend for your smiles and funny supportive snaps on "Family5". You are open minded boys who let me do what I want to. Torfinn, my husband. Whatever, ideas and errors, you are standing behind me. A great cook, kind, and patient. I am grateful you used the opportunity to join me for the period in Seattle. Together we gathered experiences from everyday life abroad, to bring along in the heart for further respect and love.

Trondheim, August 2021

Astrid Bjørgen

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Part II: Papers

- Paper 1: Bjørgen, A., Seter, H., Kristiansen, T. & Pitera, K. (2019). The potential for coordinated logistics planning at the local level: A Norwegian in-depth study of public and private stakeholders. *Journal of Transport Geography*, 76 (4), 34–41.
<https://doi.org/10.1016/j.jtrangeo.2019.02.010>
- Paper 2: Bjerkan, K. Y., Bjørgen Sund, A. & Nordtømme, M. E. (2014). Stakeholder responses to measures green and efficient urban freight. *Research in Transport Business and Management*, 11, 32–42. <https://doi.org/10.1016/j.rtbm.2014.05.001>
- Paper 3: Bjørgen, A., Bjerkan, K. Y. & Hjelkrem, O. A. (2019). E-groceries: Sustainable last mile distribution in city planning. *Research in Transportation Economics*.
<https://doi.org/10.1016/j.retrec.2019.100805>
- Paper 4: Bjørgen, A., Fossheim, K. & Macharis, C. (2021). How to build stakeholder participation in collaborative urban freight planning. *Cities*, 112, 103149.
<https://doi.org/10.1016/j.cities.2021.103149>

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Part I

Overview

1. Introduction

1.1 Motivation

Mobility systems are important in a world economy working towards global goals for the climate and the environment (United Nations, 2017; United Nations, 2015), and are essential for developing sustainable cities (European Commission, 2019). Goods are a crucial part of making livable and attractive cities (Banister, 2011). Goods movement and personal mobility are becoming more and more closely linked given the use of the same infrastructure and creation of common solutions for achieving goals relating to climate, congestion and capacity (Banister, 2019; United Nations, 2016a). Joint actions regarding people and goods in the urban mobility sector are beneficial for meeting climate and sustainable development goals. It has been estimated that by 2050, two-thirds of the world's population will live in cities compared with 55% today (United Nations, 2018; United Nations, 2016b). Coping with such growth requires an understanding of personal and goods mobility needs, and of interactions between personal travel and goods movement, as well as the ability to plan accordingly (Foltýnová et al., 2018). While passenger transport has received considerable attention from researchers and policymakers, less attention has been paid to urban freight transport (Gatta et al., 2017; Browne et al., 2012).

To achieve a sustainable transportation system, local authorities need to be aware of the different stakeholders and activities involved, as well as their potential impacts (Ballantyne and Lindholm, 2014). Incorporating urban freight into transport planning policies and city plans requires detailed studies of the interaction between freight flows and the urban environment, as well as how to integrate freight stakeholders' interest in planning (Browne et al., 2019a; Sanchez-Diaz and Browne, 2018; Macharis and Keseru, 2018; Banister, 2008). While public participation is often mandatory, for example according to Norwegian planning legislation (Ministry of Local Government and Modernisation, 2008), such participation generally does not extend to stakeholders' involvement in freight planning practice (Cui et al., 2015; Lindholm, 2013). Furthermore, the EU's working document titled *A Call to Action on Urban Logistics* (European Commission, 2013a) highlights the lack of coordination among actors in the logistics supply chain and insufficient dialogue between city authorities and private actors who operate in the urban context as one of the main challenges in urban freight. This implies that there is a need to consider stakeholder engagement to be able to integrate goods movement into city planning.

In the thesis my understanding of city planning follows Fainstein (2020), who states that urban (city) planning designs and regulates the uses of space, focusing on the physical form, economic functions, and social impacts of the urban environment and on the location of different activities within it. However, my work also rests on a broader understanding of city planning. City planning should also incorporate the element of time to allow dynamic and flexible use of urban space, as well as the necessary sequences in a spatial planning process (Holsen, 2017; Taylor, 2010). Further, I find it useful to recognize how city planning is a technical profession, and an academic discipline. It draws upon engineering, architectural, and social and political concerns, involving political will and public participation. Urban planning concerns itself with both the development of open land and the revitalization of existing parts of the city, thereby involving objectives, data collection and analysis, forecasting, design, strategic thinking, and public consultation. Such a broad understanding underscores the need for a multidisciplinary approach, to study the role of stakeholder engagement in integrating goods movement in city planning.

Due to urbanization and increased densification, space is becoming a scarce resource in cities. Additionally, changing societal and technological trends impact how urban space is utilized for urban freight. For example, increased e-commerce implies a change in consumer behavior, both in shopping and in travelling, which in turn necessitates changes in logistics solutions in the final step of the supply chain (Browne et al., 2019a). This trend shift due to online shopping reinforces the need to integrate goods movement into urban mobility and city planning (Dablanc, 2019), the need for knowledge about the stakeholders, and the need to engage them in urban planning (Macharis and Kin, 2017; Kin et al., 2017a). Future governance and policy recommendations for creating successful implementations towards a sustainable transport system (Heitz and Dablanc, 2019) need to take into consideration that public policymaking takes a long time, whereas entrepreneurs often are hasty in their decision-making due to having shorter time lines (Hull, 2008).

The concept of Sustainable Urban Mobility Plans (SUMP) integrates functional areas and considers the perspectives of multiple stakeholders to allow cities to achieve the goals relating to the EU's proposed sustainable urban mobility plans (Okraszewska et al., 2018; European Commission, 2013b). Although freight plays an important part in city dynamics, most of the SUMP currently being developed do not include detailed plans or guidelines on how to accommodate urban freight into city plans (Sanchez-Diaz and Browne, 2018). However, two approaches to planning for urban freight transport have been identified: (1) integrating urban freight into SUMP or other existing local plans (Fossheim et al., 2017), and (2) developing a separate Sustainable Urban Logistics Plan (SULP) (Ambrosino et al., 2015). However, this can be challenging, given that local authorities' planning capacity and knowledge regarding goods movement is often limited. Additionally, urban planners often lack information about how to involve freight stakeholders into city planning and how to include the topic into policymaking (Bjerkan et al., 2014; Lindholm, 2013).

As stated by Banister (2008), mobility for people and freight is crucial to achieve sustainable and well-functioning cities. Urban mobility is confronted with complex problems rooted in different societal domains and governance levels, and involves a number of actors with dissimilar perspectives, norms and values (Loorbach, 2010). One of the challenges of mobility planning is to handle these complexities and plan for the integration of all users in attractive and livable cities. Thus, a focus on **collaborative urban freight planning is needed, both to highlight the need for the integration of goods movement into local planning processes and to provide knowledge about how the integration can be achieved.** Integration of goods movement into spatial planning in urban areas could help local authorities to have a better understanding of the role of logistics and freight in the urban context and to provide operational responses to deal with urban freight organizations (Ducret et al., 2016; Hesse, 2010). To achieve sustainable mobility, the arenas that need to be integrated are efficient last mile logistics, land use and spatial planning aimed towards the dynamic use of urban space, and stakeholders' engagement in planning. This integration is **explored in this thesis.**

1.2 Objective

The objective of this thesis is to investigate the integration of goods movement in city planning. This requires **understanding stakeholders' engagement to facilitate and manage the integration.**

In the past, the study of freight in the urban context has been neglected by transport geographers and planners (Rodrigue, 2006), even though services and freight transport account for 30% of the total transport (vehicle km) in urban areas (Ministry of Transport and Communication, 2017), and up to 50%

of emission of pollutants due to transport in cities (MDS Transmodal, 2012; Dablanc, 2008; Dablanc, 2007). In recent years, freight has gained increased attention among urban planners in large cities (Cui et al., 2015), but in Norway knowledge about goods movement is still at an immature stage and is largely underdeveloped compared with in other parts of Europe (Fossheim and Andersen, 2017). Emerging attention paid to sustainability and climate-related action, in addition to the impact on goods movement due to e-commerce and delivery solutions (Cárdenas et al., 2017; Visser et al., 2014) calls for increased knowledge about freight and logistics in urban mobility contexts.

1.3 Structure of the thesis

To achieve the overall objective, four studies were conducted, and they are documented through four separate research papers. Table 1 present an overview of the research questions addressed to answer the overall objective and the connection to the research papers.

Table 1: The structure of the thesis.

Research question addressed in the thesis	Paper title	Study objective
What is the current level of knowledge and attitude towards the urban logistics among involved stakeholders?	(1) The potential for coordinated logistics planning at the local level. A Norwegian in-depth study of public and private stakeholders	Map the stakeholders in urban freight and identify the state of practice towards coordinated logistics planning.
What benefits can be identified from freight stakeholders' engagement in planning processes?	(2) Stakeholder responses to measures for green and efficient urban freight	Explore benefits that can be identified from engaging stakeholders in planning processes.
What is the level of interaction between goods movement and personal mobility in urban space?	(3) E-groceries; Sustainable last mile distribution in city planning	Understand the interaction between online shopping, consumer behavior, last mile distribution and how it impacts the city planning.
How can freight and logistics stakeholders be better integrated in city planning?	(4) How to build stakeholder participation in collaborative urban freight planning	Identify criteria that determine successful stakeholder participation in collaborative freight planning as a part of city planning.

The full text of the papers can be found in Part II. Part I of this thesis describes the theoretical base, the state of the art, and research questions addressed in the papers. This is followed up with a discussion and presentation of the contributions from the PhD study, and I conclude by identifying topics for future research.

The following papers are included as part of the thesis:

- **Paper 1:** Bjørgen, A., Seter, H., Kristensen, T. & Pitera, K. (2019). The potential for coordinated logistics planning at the local level: A Norwegian in-depth study of public and private stakeholders. *Journal of Transport Geography*, 76 (4), 34–41. <https://doi.org/10.1016/j.jtrangeo.2019.02.010>

The work was largely done in the years 2016 and 2017, and the first draft of the paper was presented at the 2nd VREF Conference on Urban Freight, in Gothenburg, Sweden, in October 2016 (then titled “Plan for the future - sharing urban space”). After two review processes it was accepted for publication in early 2019. Paper 1 is mainly authored by me. I was responsible for the literature study of urban freight transport, the stakeholders, and the Norwegian planning regime, while the interviews were a joint effort within a larger research project. I was responsible for analyzing the data set and writing the paper.

- **Paper 2:** Bjerkan, K. Y., Bjørgen Sund, A. & Nordtømme, M. E. (2014). Stakeholder responses to measures green and efficient urban freight. *Research in Transport Business and Management*, 11, 32–42. <https://doi.org/10.1016/j.rtbm.2014.05.001>

The study presented in this paper was conducted in the years 2012 and 2013, and I presented it at WCTR (World Conference on Transport Research) in Rio de Janeiro, Brazil, in 2013. After minor revisions, the paper was accepted for publication in 2014. As a co-author, I contributed to the collection and analysis of the data, writing of the paper in addition to developing the idea behind the common ground components.

- **Paper 3:** Bjørgen, A., Bjerkan, K. Y. & Hjelkrem, O. A. (2019). E-groceries: Sustainable last mile distribution in city planning. *Research in Transportation Economics*, <https://doi.org/10.1016/j.retrec.2019.100805>

I first presented the study at the “Nectar Cluster 2” workshop during the Policy and Environment Conference at Molde University College, Norway, in October 2018. The main idea behind the study reported in Paper 3 was developed by me. The data set was collected through a survey using social media, and co-author Bjerkan had the main responsibility for analyzing the data. After the workshop in Molde, where the first draft of the findings was presented, I interpreted the findings in a city planning context and finalized the paper in late 2019, for publication.

- **Paper 4:** Bjørgen, A., Fossheim, K. & Macharis, C. (2021). How to build stakeholder participation in collaborative urban freight planning. *Cities* 112, 103149, <https://doi.org/10.1016/j.cities.2021.103149>

The work was mainly done in 2018 and the first draft of the paper was presented at the 3rd VREF Conference on Urban Freight, in Gothenburg, in October 2018, then titled “Designing urban space and managing flows – the importance of freight for livable cities.” The work was invited for submission to a special issue in the journal *Cities*, on the topic “The growing importance of freight for city planning and design.” The idea behind Paper 4 was developed jointly by me and co-author Fossheim, with input from co-author Macharis. Through a collaborative effort, both I and Fossheim collected the data, analyzed the data set, and wrote the paper.

For Papers 1, 3 and 4, I had the main responsibility for preparing the papers for submission, managing the review process, and considering the comments and suggestions of the co-authors.

The work for this doctoral thesis has been linked to the national research project NORSULP (Sustainable Urban Logistics Plans in Norway).¹ The Research Council of Norway and the Norwegian Public Road Administration have supported the NORSULP project. Nine Norwegian cities have been involved in NORSULP through interviews, seminars, and workshops. Papers 1 and 4 are closely linked to NORSULP, mainly through data collection. Paper 2 presents a summary of the research project “Green Urban Distribution in Oslo” (the project “Grønn bydistribusjon i Oslo”, GBO),² for which the project owner was Oslo Municipality. The GBO project was funded by the Regional Research Foundation, the Capital region.

¹ www.toi.no/norsulp

² www.sintef.no/gbo

1.4 Scope and limitations

In line with my understanding of city planning based on Fainstein (2020) this thesis has an integrated, multidisciplinary approach that interfaces the fields of engineering, social science and economy through the inclusion of the topics supply chain management, infrastructure, urban design, and planning. Ducret et al. (2016) argue that geography and spatial studies have always taken a backseat compared with studies of the economy, management, political science, and transportation engineering sciences (Macharis and Melo, 2011; Hesse, 2010; Ogden, 1992). Bringing urban analysis and spatial studies closer to urban logistics could help to reorganize logistics more efficiently and finally meet urban logistics challenges (Ducret et al., 2016). Thus, the aim of this thesis is to contribute to the integration of the field of freight and logistics in the urban planning arena.

During my research, I did not find a universal definition of sustainable transport. However, in this thesis I use the United Nations' understanding: "Sustainable transport is the provision of services and infrastructure for the mobility of people and goods-advancing economic and social development to benefit today's and future generations-in a manner that is safe, affordable, accessible, efficient, and resilient, while minimizing carbon and other emissions and environmental impacts" (United Nations, 2016a).

For the purpose of the thesis a broad definition of urban freight was chosen: Urban freight transport is defined as all movements of goods (as distinct from people) into, out of, through or within the urban area made by light or heavy goods vehicles (Ballantyne et al., 2013; MDS Transmodal, 2012). Additionally, I apply several concepts that are described by multiple terminologies but that are taken to mean the same within this field of research. The terminologies include the following:

- Urban freight, city logistics, and goods movements in cities
- Urban area, urban space, and urban landscape
- Urban planning and city planning.

In general, studying urban freight requires data which is further discussed in chapter 5. To quantify goods movements on last mile distribution, there is a need for data related to for instance items, vehicles, load factor, routing, time use and available area.

2. Background and literature review

Based on existing literature, this chapter introduces the field of goods movement in cities. The theoretical base summarizes current research focuses (i.e. the state of the art) and the need for research in the field (i.e. gaps in knowledge).

2.1 The challenge of goods movement in cities

The ways that people and goods move across urban areas are being reshaped by population growth and aging, the desire for livable cities, the need for infrastructure resilience, and changes in land use patterns. Urbanization leads to an increasing need to develop cities that are environmentally and social sustainable, functional, and support the well-being of their inhabitants (Macharis and Keseru, 2018). Transportation policies in cities are changing from planning for passenger travel by private cars to planning for accessibility and mobility of people and movement of goods (Sumantran et al., 2017; Newman and Kenworthy, 2015; Cui et al., 2015; Banister, 2011). This changing paradigm in mobility planning, and the fact that urban freight accounts for an increasing share of traffic (Holguín-Veras et al., 2018), requires attention among urban planners and improved understanding of the link between urban freight and cities (Cui et al., 2015; Russo and Comi, 2012). However, goods movement has largely been neglected in the urban context, even though local pollution (nitrogen oxides, particulate matter, noise, and dust), traffic safety, congestion, parking, and lack of space, which distribution traffic contributes to, are challenges within urban transport systems (Rodrigue, 2006). While for most local authorities the interest in city logistics has traditionally been low, it is now increasing (Lindholm, 2013; van Duin and Quak, 2007) due to the described challenges cities will face in the coming years and to the need to address freight transport in cities' decision-making processes (Lindholm, 2012).

Goods movement in cities has several issues that add to the above-described complexity. Private and public stakeholders contribute to a city's logistics system. Additionally, various public authorities are involved, representing different departments ranging from the local city level to the national level and even the international level. In addition, private stakeholders such as logistics providers, terminal operators, receivers, and end consumers are involved (Morfoulaki et al., 2016; Morfoulaki et al., 2015). City logistics is executed on the basis of the same infrastructure as personal mobility, thus potentially contributing to conflicting situations. All of these aspects add to a complex landscape, indicating that there is a need to work together to explore measures and solutions that match the local context (Kin et al., 2017b; Nordtømme et al., 2015; Bjerkan et al., 2014). There does not exist a "one size fits all" solution. Each city or community needs to map local barriers and challenges to goods movement and personal mobility within its own urban area.

2.1.1 The urban area

The urban area is the meeting point and the potential point of conflict for users of the city. It is the meeting point for private stakeholders with business objectives relating to the delivery of freight in the public space. Urban freight distribution occurs between the local or the regional terminal and the final destination, the end consumer which can be both individuals, businesses or institutions (Cherrett et al., 2012). Freight distribution is one of the principal users of urban space and is a central element in the complexity of mobility and accessibility planning within in urban space. An efficient freight distribution system is required, as it plays a significant role in the competitiveness of an urban area, and in itself it is an important element and activity in the urban economy, both in terms of the revenue it generates and the employment levels it supports (MDS Transmodal, 2012). To share space and time

efficiently, city administrators have to implement measures to mitigate the negative effects of freight transport such as increasing traffic volume, congestion, noise, and pollution (Macharis and Kin, 2017). An improved understanding of urban freight would help planners to cater better for freight and logistics activities in the urban area through improved design and use of facilities and infrastructure.

2.1.2 Stakeholders

In scholarly research, a stakeholder is an actor or a group of actors that affects or is affected by the phenomenon under study (Phillips et al., 2003; Banville et al., 1998; Freeman, 1984). Researchers typically identify carriers, receivers, and local authorities as the most relevant stakeholders in the urban distribution chain (Lindholm, 2012; Stathopoulos et al., 2012; Russo and Comi, 2010a). City logistics involves stakeholders that represent both private and public interests, often with conflicting goals (Macharis et al., 2014).

Municipal authorities, which represent public stakeholders, are responsible for transport infrastructure systems, law and enforcement, and governing policies at respective municipal levels. Local authorities consist of a range of departments with different and potentially conflicting goals, rationalities, and motivations. Local authorities include not only transport and planning departments, but also labor inspection agencies, food safety authorities, agencies for planning and building services, and police and parking agencies, as well as local, regional, and national maintenance departments. According to Russo and Comi (2010a) the main objective of local authorities is to make cities function for visitors and residents, while minimizing the negative effects of transport. Their role is to define the policy scenarios within which private stakeholders can operate (Stathopoulos et al., 2012), and to facilitate measures and policies that benefit the city both economically and environmentally (Taniguchi and Tamagawa, 2005). This includes the need to plan accordingly in order to achieve the preferred behavior of the various groups of stakeholders within the city population (Foltýnová et al., 2018). However, research shows great variation in the degree to which local authorities consider urban distribution a public responsibility (Sanchez-Diaz and Browne, 2018).

In urban logistics, private stakeholders constitute a highly diverse group, consisting of carriers, receivers and end consumers (Russo and Comi, 2010a). Private stakeholders vary in terms of their numbers, economy, and influence, but their general purpose is profit growth and competitiveness. In the case of freight carriers, these objective can be supported by minimizing transportation costs and maximizing sales revenues (Taniguchi and Tamagawa, 2005). Consequently, carriers seek to collect and deliver goods as efficiently as possible by optimizing load capacity, co-loading, and delivery routes. This is also reflected in the literature, which primarily relates carrier challenges to the planning of pick-up and delivery, vehicle routing, and operational costs (Stathopoulos et al., 2011). The primary concern of receivers in urban freight distribution is keeping personnel expenses and transport costs low and to secure appropriate staff to handle designated tasks. Further, various actors are directly influenced by urban freight transport, although their involvement is always indirect (Cui et al., 2015; Bjerkan et al., 2014). Such actors, include citizens, workers, shoppers, tourists, vehicle manufacturers, real estate developers and property owners (Russo and Comi, 2010b), who typically are not strongly organized in a cooperative way.

Local authorities can introduce measures aimed at urban distribution, which can facilitate private and public involvement alike, stimulate interest and commitment to industrialist measures, and provide financial and legal counselling (Browne et al., 2012). Although measures developed and introduced by local authorities have been included in studies of urban distribution, few studies to date have

investigated the reasoning, reflection, and handling of these measures by local authorities. Further, with respect to investigating local authorities' interaction with other stakeholders in the design of such measures, Stathopoulos et al. (2012) stress that local authorities tend to ignore the nature of logistics in the design of measures and do not treat private stakeholders as partners. Presumably, this is related to cultures and traditions within public agencies' thinking that this is of private concern. This in turn influences what problems to prioritize and what solutions to choose, and consequently which problems can represent significant barriers to succeeding with measures directed towards urban distribution (Lindholm, 2012). Even though measures in freight transport could be a subject for discussions in an overall mobility perspectives, freight stakeholders' engagement are rarely included in mobility planning processes (Dablanc and Rodrigue, 2017; Cui et al., 2015).

Due to lack of coordination and cooperation within the private sector itself, inefficiency is a challenge to improved sustainable city distribution (Macharis and Kin, 2017). While private stakeholders aim for profit often with a short time horizon, public municipalities' goals focus on externalities and how to plan for a livable urban community in the long run. Hence, planning to avoid potential conflicts between stakeholder interests calls for open dialogue to which all stakeholders can contribute (Hensher and Brewer, 2001). In complex areas, such as urban freight transport, joint strategies cannot be achieved without collaboration (Gray and Wood, 1991) and consensus planning (Innes and Booher, 2010; Innes and Booher, 1999). Within the field of urban freight transport public-private understanding, collaboration and partnership is necessary to propose a balanced view of stakeholder interests and to include all relevant actors and stakeholders to achieve sustainable urban freight transport (Crainic et al., 2004).

2.1.3 Changes in the *last mile* distribution

The final part of the supply chain is commonly referred to as the last mile (Gevaers et al., 2011). The last mile is essential, and expensive: the most difficult and costly mile of all is estimated to be between 25% and 50% of total supply chain transportation costs (McCrea, 2016). The cost varies according to congestion, size of shipments, vehicle load factor, empty running, and inaccessible and unavailable loading zones (Morganti et al., 2014; Gevaers et al., 2011). Last mile distribution is enabled by the sidewalks and streets built in cities. In Seattle, one of the fastest growing cities in the USA,³ 87% of buildings in Greater Downtown rely solely on the curb for freight access (Goodchild and Ivanov, 2018). These buildings have no off-street parking or loading bays. Thus, urban design and infrastructure are influencing how to handle the last mile delivery.

Continued growth in e-commerce is challenging the mobility system, including last mile distribution. Furthermore, the online shopping trend is increasing the demand for last mile services and changing delivery solutions, as well as transforming consumers' travel patterns (Bjerkkan et al., 2020; Comi and Nuzzolo, 2016). Consumer preferences regarding shopping accessibility and the demand for urban freight are changed by e-commerce, home deliveries and express deliveries (Wang et al., 2014). The e-commerce trend is generating an increased number of last mile services due to fragmented delivery systems and higher delivery frequencies of smaller orders (Henriksson et al., 2018). The changes in behavior by business and private consumers are leading to growing numbers of smaller vehicles being used in urban supply chain and competing for space and time (Browne et al., 2017; Cherrett et al., 2012). New logistics network designs and consumer-based economies are challenging traffic flows,

³ <https://www.theurbanist.org/2019/07/01/seattle-pushing-750000-with-steady-growth/>

environments and road safety (Hesse, 2016; Cherrett et al., 2012), and placing greater pressure on urban land use in areas with growing populations (Cárdenas et al., 2017; Gatta et al., 2017).

Visser and Lanzendorf (2004) argue that home deliveries have a large impact on freight transport, as they lead to a deeper penetration of freight activities into residential areas and produce large return flows as a result of failed delivery attempts and returns from receivers (Visser et al., 2014). The impact of e-commerce on the quality of places and space in cities is an example of the interaction between people and goods movement. Knowledge about this at the local level, including e-retailers and on-demand delivery platforms is necessary to uphold the values the cities represent to people and to maintain social interaction (Banister, 2019; Banister, 2011).

2.2 Planning processes at the local level

In general, national planning systems are structures that support the modern state and its form of democracy (Pløger, 2001), with the aim of efficient and sustainable land use with citizen participation across governance levels as one of the core principles. In normative planning theory there are two main approaches to spatial planning and detailed zoning. First, having a comprehensive viewpoint when integrating environmental, social and functional aspects is often referred to as rational comprehensive planning (Faludi, 2000). However, comprehensive planning at the local level is a complex and extensive task, as it should include a wide spectrum of considerations. Limited resources, lack of knowledge and fragmented responsibilities have an impact on the possibilities to plan according to the ideal model. The second approach to spatial planning and detailed zoning is to coordinate sectorial interests and plans involving different municipalities through the municipal planning strategy and, in the case of Norway, the municipal master plan and the land-use element of the municipal master plan (Falleth and Saglie, 2011). In general, the planning legislation comprises several tools that support the management of land in the face of individual, public, and corporate interest. The planning hierarchy is one such tool and ensures consistency in planning from the general level to the detailed level. Another tool is the statutory securing of citizen participation.

In Norway, participation in planning is enshrined in the Planning and Building Act (Ministry of Local Government and Modernisation, 2008) and citizen participation is given a high priority in terms of general rules for consultations, publicity and information to ensure transparency, predictability and the participation of all affected parties (Ringholm et al., 2018; Ministry of Local Government and Modernisation, 2008). As early as in the 1985 version of the Act, the Ministry of Environment emphasized that “for the planning, it is an advantage that views can be identified as early as possible, avoiding the process coming to a standstill because vital points of view are presented too late in the process” (Ministry of Climate and Environment, 1985). Since the revision of the Act in 2008, the level of citizen participation has been strengthened with guidelines for participation and tools for developing solutions adapted to local needs (Vedeld et al., 2015; Ministry of Local Government and Modernisation, 2014).

Land (space) and time are often scarce resources. Integrated transportation and land use planning is aimed at allocating land to members of society and for societal activities, but also regulates time through the distribution of access. This is most certainly accompanied with conflicting purposes and interests (Browne, 2020). In Norway, cities are responsible for municipal planning processes and ensuring their compliance with national planning and building legislation with the purpose of creating attractive, livable and competitive communities, in which sustainable urban mobility is considered important (Ministry of Local Government and Modernisation, 2008). The role of public authorities is

relatively strong at the local level, and to a large extent the local authorities are responsible for city and mobility planning, and thus responsible for facilitating urban freight transport (Cui et al., 2015). In several European cities local authorities have been aware of freight transport as one of the primary users of the urban space, and are working on developing SULPs (Ambrosino et al., 2015). Hence, there is a need for increased knowledge about policy and regulation instruments (Browne et al., 2019a).

To incorporate the principle of public involvement from the beginning of the planning process, local authorities need to open up the topic for debate and to prepare for public participation as part of the planning process (Lindenau and Böhler-Baedeker, 2014; Amdam, 2011). The concept of stakeholder involvement in decision-making has different labels, such as stakeholder collaboration, public participation, citizen participation, and stakeholder management. Arnstein's classic article on citizen participation (Arnstein, 1969) provides a valuable framework for considering whether those who participate in collaborative urban freight planning are given power to affect the outcome. The ladder of participation consists of eight steps or levels, from non-participation at the bottom level to citizen control at the top, and describes citizens' transitions from being informed to becoming involved in decision-making and given real power to affect the outcome of the planning process (Ringholm et al., 2018; Arnstein, 1969). Arnstein (1969) argues that when analyzing levels of participation, three questions need to be considered: (1) Who should be involved and given the possibility to participate? (2) How much influence and authority should stakeholders have? (3) How will stakeholders' input form the decision-making process? The idea of categorizing levels of participation may be useful, as it allows a participatory approach to be used regarding a city's ability to cope with the involvement of different stakeholders or citizens and thus, the local context for each city.

Stakeholder theory emphasizes that each stakeholder must relate to other participants within the supply chain or the urban distribution chain (Stathopoulos et al., 2012; Hensher and Brewer, 2001). Participation in planning processes entails the integration of stakeholders, groups, or citizens, also in policy decisions. This is a collaborative approach in line with the conclusions of Lindholm (2010), that by including all relevant stakeholders in the planning process one secures acceptance for policies and practices. Additionally, such an approach acknowledges that stakeholders must engage in a negotiation process to seek mutually acceptable outcomes (Kin et al., 2017b; Cui et al., 2015), directly connected to Arnstein's ladder (Arnstein, 1969) and the ability to climb the "steps." Consensus orientation negotiation and willingness to implement joint solutions are examples of participation whereby stakeholders engage at higher levels on the ladder, namely Level 5 (placation) and Level 7 (delegated power) (Arnstein, 1969. p. 217). However, planning processes that secure involvement and participation are both costly and time-consuming. In addition, the landscape of potential stakeholders may be both unknown and uncoordinated, and therefore it may be difficult to reach out to such stakeholders and to involve them.

As planning can be initiated by both public and private actors, the role of the market and industry has increased the influence of private stakeholders in the planning system and practical planning. While local zoning plans in Norway have been traditionally predominately devised by public authorities, approximately 90% of urban zoning plans are initiated by private developers within urban projects (Falleth et al., 2010). However, this does not seem to have influenced how urban planners take logistics and freight into account or the impacts of involvement and participation in the public planning process.

With regard to a collaborative planning process, van Duin and Quak (2007) argue for a cooperative and integrated approach, including national and regional government, and private businesses, in addition

to the commitment of all involved stakeholders and those stakeholders' involvement in the early stages of the process (van Duin et al., 2010). This is necessary because urban freight policies might only succeed if they are supported by the freight carriers and their organizations, the local business groups, and the local residents (Macharis et al., 2014; Dablanc, 2011). To ensure higher levels of user acceptance of plans, there needs to be a transparent approach to the planning process that involves relevant actors in both the development and implementation of their plans (Morfoulaki et al., 2015; Amdam, 2011). Thus, successful implementation of urban freight depends on the comprehension and acceptance of users involved in the implementation process (Heitz and Dablanc, 2019; Banister, 2011).

National and regional planning serve to influence local municipal planning processes (Ministry of Local Government and Modernisation, 2012) by providing general guidelines and frameworks to support local planners and developers for the transportation of goods and for infrastructure systems in cities. As an example, local authorities are responsible for administering national-level guidelines relating to the design of urban streets and sidewalks (Ministry of Local Government and Modernisation, 2008). Within these designs, there is an emphasis on universal designs, such as those relating to smooth surfaces and curb access. Even though it is not the initial purpose of these measures, as a secondary effect they facilitate easier deliveries. It is also the local authorities' commitment to provide signposts and surveillance to ensure the availability of spaces designated for deliveries, which increases pressure on the need to monitor parking restrictions, enforce regulations, and to sanction violations.

However, the authors of a Norwegian study note that the national guidelines in city transport (Norwegian Public Roads Administration, 2014) do not directly address the use of urban space where the handling of freight has an impact on other street users or where delivery issues arise (Pitera et al., 2017). From a case study conducted in Trondheim, Norway, Pitera et al. (2017) found few or no discussions on freight deliveries during the planning, design, and construction of a large building, lack of coordination among the authorities, - with the private stakeholders, and lack of knowledge about urban freight. The absence of a dedicated freight policy and dedicated personnel resources, as well as lack of coordination amongst departments and authorities led to poor infrastructure design. Furthermore, the lack of a good delivery solution in the vicinity of the building lead to the continuation of the problematic and potentially dangerous environment (Pitera et al., 2017).

2.3 Current research focuses and gaps in knowledge

Goods movement is an important component in the field of urban mobility. Considering the environmental impact from transport, there is an increasing focus on transport challenges related to urban freight transport and city logistics (Sanchez-Diaz and Browne, 2018; Foltýnová et al., 2018; Kin et al., 2017b; Ducret et al., 2016). In order to change the way we use the urban space, the priorities for policymakers and city planners are often linked to transformations resulting from planning for people's mobility (i.e., the way people move), which currently is at the expense of infrastructure for private motorized vehicles (Banister, 2019). An understanding of goods movement may help city planners to facilitate freight activity in the context of urban mobility, through improved design, dynamic use of infrastructure, and a mix of policy tools. At the city level, it is necessary to find sustainable solutions that can contribute to the development of an integrated and future-oriented mobility system, and a more systematic and comprehensive approach to improve urban logistics and address the above-mentioned challenges.

More research is needed to accomplish this. Some of the identified gaps in relevant knowledge are as follows:

- A challenge in urban freight transport is to identify the stakeholders, their needs, and interests. Urban freight is a complex field involving public authorities at different governmental levels, private stakeholders within the supply chain, and actors indirectly affected by freight but not directly involved, all of which interface the urban public space. To understand fully the need for planning for urban freight and the integration of goods movement, it is necessary to map the current level of knowledge and attitude towards urban logistics by involved stakeholders. This, in turn, requires a better understanding of the complexity, all of the stakeholders interacting in the urban space, and how to include the stakeholders in decision-making processes.
- Policies that do not consider the local context and the complex interactions within the urban freight system may yield suboptimal outcomes based on inaccurate projections of the likely effects. Based on local stakeholder mapping, it is necessary to explore the urban freight system's challenges and barriers. This includes how to involve freight stakeholders, and how to take into consideration the local context for developing policies, solutions and implement measures.
- Social and technological trends are impacting urban freight. Trends in e-commerce and home deliveries have had a large impact on both the transport system and the balance between individual travel and urban logistics (Dablanc, 2019; Visser et al., 2014), and they underscore the need for the integration of goods movement in city planning and urban planning strategies. To create and maintain urban space, local authorities must take into account the impact of online shopping in public planning. This requires knowledge of the transformative effects of e-commerce on city planning, specifically the impact on the last mile services and changes in individual consumers and their travel behavior.
- Stakeholder engagement is crucial for advancing towards efficient urban freight. While local authorities have begun to acknowledge freight transport more often, collaborative processes involving freight stakeholders are needed to manage the integration of goods movement into city planning. As freight stakeholders rarely participate in decision-making processes at the local level (Ballantyne and Lindholm, 2014), more research is needed on how to involve and engage the freight stakeholders effectively.

Addressing the above-described knowledge gaps would have the potential to help decision-makers, planners, and designers to have a better understanding and address in a better way the trade-offs and conflicts between the users of shared urban spaces. However, more work is required to understand the lack of knowledge about freight issues, who to engage in planning processes, and how to build user participation in collaborative urban freight planning. This in turn means that local authorities need knowledge about the complexity of urban freight, and comprehension of how laws and regulations affect present systems. Additionally, measures to facilitate increased user participation and engagement could be a way to investigate the next step to integrate freight stakeholders' interests into city planning, for instance as highlighted by the European Commission (2021).

3. Study objectives and methodology

In this chapter, I present the research questions for the PhD project. The questions are designed to address the challenges identified in Chapter 2 and summarized in Section 2.4. The knowledge gap identified within the literature are overlapping and interface several fields within the context of city planning as defined in chapter 1.1. In my research the studied fields are the engineering focus in city planning and infrastructure, the economic focus on goods movement and supply chain, and the social science focus on stakeholders' engagement. Thus, the research needed to answer the overall objective in this thesis requires a multidisciplinary approach as illustrated in Figure 1. This is in line with the European Commission (2021), who identifies collaborative and interdisciplinary planning approach as success main factors when planning mobility systems. The circles represent each field studied, and the overlap represents the core focus of this thesis: How are freight stakeholders specifically involved in planning for goods movement as part of city planning? As stated in Section 1.2, the overall objective of the thesis is to investigate the integration of goods movement in city planning. This requires sufficient understanding of how freight stakeholder engagement can facilitate and manage such integration.

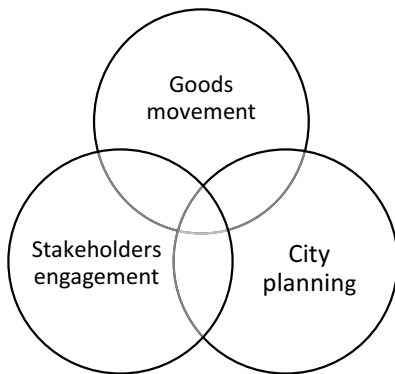


Figure 1. The interfaces and the multidisciplinary approach used in the research.

From the resources available during the research, four research questions (RQs) were formulated to structure and detail the work needed to address the research objective, while considering the challenges presented in Chapter 2. I explore the topic area in two main ways; (1) by understanding the complexity of urban freight transport, including interactions among stakeholders involved and stakeholder engagement in urban planning, in a participatory way; (2) by reflecting on the topic within the Norwegian context.

Figure 2, which shows the complexity of urban freight transport, was inspired by an article on systems thinking within logistics systems (Wehner, 2018). Systems thinking is used to see the elements of the whole and consider the interconnection between the elements to understand how and possibly why elements are related. It is a means with which to understand and analyze complexity by sketching the elements, their relationships, and formulating proposals for how to deal with and manage the complexity (Lindskog, 2012).

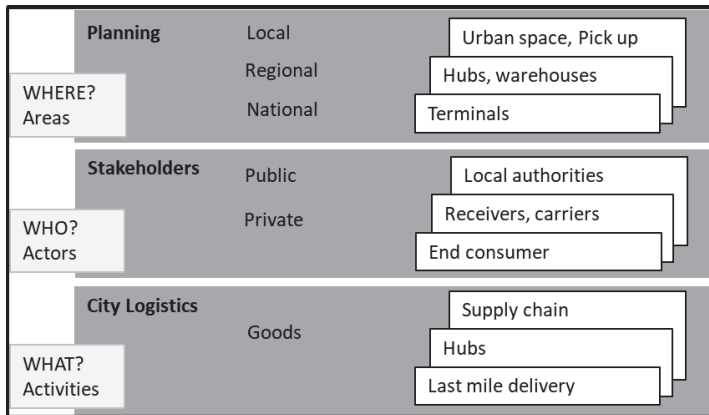


Figure 2. The complexity of and interconnections within urban freight.

Figure 2 highlights the interconnection in urban freight, following the structure of the activities (what), actors (who), and areas in the urban freight system. The aim of Figure 2 is to illustrate the complexity around several dimensions both vertically and horizontally. It is not a representation of the complete urban freight continuous situation. Examples related to actors, areas, and activities (shown in the white boxes) are particularly emphasized in this thesis. Different actors have different perceptions and goals and interpret situations differently. Thus, the conceptual framework shown in Figure 2 can be used to clarify the relationship and to gain a better understanding of how to manage the integration of goods movement in city planning.

3.1 Research questions

The research questions (RQs) addressed in this thesis are as follows:

RQ1: What is the current level of knowledge and attitude towards the urban logistics among involved stakeholders?

RQ2: What benefits can be identified from freight stakeholders' engagement in planning processes?

RQ3: What is the level of interaction between goods movement and personal mobility in urban space?

RQ4: How can freight and logistics stakeholders be better integrated in city planning?

The first research question (RQ1) focuses on the need to gain insights into stakeholders' experience and knowledge of the current situation in urban logistics and the state of practice within urban freight, and to gather their perspectives on participation in logistics planning at the local level. Based on the study and the findings presented in Paper 1, the second research question (RQ2) aims to give insights into what benefits can be identified from engaging freight stakeholders planning processes through an evaluation of potential measures in urban freight distribution. As people and goods use the same urban space, the need for common planning to utilize infrastructure capacity led to RQ3, which focuses on the interaction between goods movement and personal mobility and in the urban landscape. RQ3 is addressed using knowledge obtained about how e-commerce and home delivery changes the organization of urban logistics and individual's travel and consumer behavior. Finally, building on the research used to address RQs 1–3, the fourth research question (RQ4) is used to explore how to integrate freight and logistics stakeholders by engagement and user participation in city planning.

The four RQs were formulated to obtain knowledge about freight and logistics in local planning processes, the stakeholders' engagement, and the integration of goods movement in city planning. Together, they form a set of questions that helped me to fulfil the main study objective. The research questions are addressed within the four papers listed in Section 1.3 and that make up Part II of this thesis.

3.2 Research design, methods, and the data set

In this section I briefly present the research design, the methods and the data set used for the studies reported in Papers 1–4. For a full account, please see the method sections in each of the papers in Part II of the thesis. A research design represents the logic that links the data to be collected and the conclusions to be drawn to the initial questions of a study; it ensures coherence and is often seen as an action plan for getting from the questions to the conclusions (Rowley, 2002).

Explorative, descriptive, and explanatory approaches were used to answer the research questions using different types of methods for gathering data. With the objective of changing or improving ongoing practice, interviews were conducted with different stakeholders during the research to gain insights into the studied topic and to establish a basic understanding of the stakeholders' situation. An overview of the type of studies, methods applied, and analytical approach relating to each of the four papers is provided in Table 2.

Table 2. An overview of Papers 1–4.

Paper	Objective	Type of study	Method	Analytical approach
1	Map the stakeholders in urban freight and identify the state of practice towards coordinated logistics planning	Exploratory study	Literature review and document study Interviews (20) with public and private stakeholders from Norwegian cities	Categorize the data by each stakeholder group
2	Explore benefits that can be identified from engaging stakeholders in planning processes	Exploratory study	Pilot interviews with stakeholders representing carriers, receivers, and local authorities. Focus group seminar with 15 stakeholders	SWOT analysis to identify systematically the strengths, weakness, opportunities, and threats related to implementation of specified measures
3	Understand the interaction between online shopping, consumer behavior, last mile distribution and how it impacts the city planning.	Explanatory study	Survey design and statistical analysis Online survey (n = 270)	Categorize and compare of the participants according to household, utilization of the services, and travel behavior
4	Identify criteria that determine successful stakeholder participation in collaborative freight planning as a part of city planning	Exploratory study	Interviews with stakeholders Participant observations	Descriptive analyses of the interviews and observations Comparison of ongoing processes in the studied cities

Five data sets were used, as shown in Table 3. Data Sets 1 and 5 were collected as part of the national research project NORSULP (2016–2019). Data Sets 2 and 3 were collected within the regional project “Green Urban Distribution in Oslo” (2012–2014). Data set 4 was obtained from an internal project completed in 2018 and designed to gain insights into how trends in e-commerce and home delivery affect consumer and travel patterns.

Table 3. The five data sets.

Data Set	Method	Sample	Objectives	Paper #
1	Semi-structured interviews	20 representatives in 3 Norwegian cities	Insights and understanding of logistic planning at the local level	1, 4
2	Pilot interviews	Stakeholder representatives in Oslo	Basic understanding of the research topic and need for knowledge about stakeholder engagement	2, 4
3	Focus group seminars	15 stakeholder representatives in Oslo	Input to specific measures and to provide an arena for discussion	2
4	Online survey	270 survey responses	Knowledge of consumer and travel behavior due to online shopping and home delivery	3
5	Participant observation	7 Norwegian cities	Compare ongoing processes to test theoretical criteria for participation in collaborative planning	4

3.2.1 Literature review

As a starting point, a literature review was performed to identify the state of the art within urban freight and logistics, stakeholder involvement, and public planning at the local level. To gain a better understanding and gather details about the Norwegian planning process, the literature review was followed up by a document study of planning and legislation at the municipal level. As a qualitative research method, document analysis is an efficient and cost-effective way to obtain empirical data, and knowledge and understanding about a research topic. It often requires data selection, instead of data collection (Bowen, 2009).

3.2.2 Interviews

RQ1 was designed to gain a better understanding of the current situation of freight stakeholders' engagement and how goods movement are treated in public planning at the local level. To acquire knowledge of the stakeholders, deeper insights into the freight topic, and to provide a better answer to RQ1, data were collected by interviewing public and private stakeholders in three Norwegian cities. The focus was on the stakeholders' expectations regarding their contributions to an urban logistics planning process and their perspectives on participation in urban public logistics planning.

To initiate the interview process, an interview guide was developed based on the state of the art of urban freight. The guide was structured to address two main research purposes: (1) to identify existing goals and policies concerning urban freight and (2) to reveal attitudes concerning the developments of logistics plans. Interviews are considered suitable for gathering experiences and information about a topic on which there is limited knowledge (Yin, 1998). A document analysis complemented the interviews, specifically by revealing input with which to generate questions for the guide (Bowen, 2009). According to Bogner et al. (2009), exploratory expert interviews should be conducted as openly as possible and structured in advance along a central dimension of the planned conversation with reference to a topic guide or an interview guide, as in my case. A total of 20 semi-structured interviews were conducted with representatives of experts from the stakeholder groups, including public authorities, carriers, and receivers (Data Set 1). The interviews were led by the interviewers, and it has been acknowledged that discussions and answers are likely to be influenced by the interaction between interviewees and interviewers, including their interview strategies (Meuser and Nagel, 2009). Additionally, an interview situation allows for the capture of individual stakeholder's subjective reflections (Tjora, 2012).

The interview method is intended to establish an in-depth understanding of study participants' experiences and the meaning of their interactions for a particular action, process or event (Broom, 2005). It should be noted that in my research for this thesis, the selection of the stakeholder group resulted in some participants in the community being unrepresented in the study, such as end consumers, property owners, real estate developers, citizens, and tourists. Thus, the study could have missed important information perspectives. Hence, awareness of this issue regarding selection should be taken into consideration when evaluating the study findings.

3.2.3 Focus groups

The purpose of the focus group seminars was to obtain knowledge and understanding of the freight stakeholders' reactions to the implementation of specified measures, and, through research and practice, to show how the role of stakeholders was crucial in the implementation of measures for efficient freight. Potential conflicts between stakeholder interests call for open dialogue and a discussion arena where each stakeholder must relate to other participants in the urban distribution chain (Hensher and Brewer, 2001). The focus group method is defined as an interview with several people on a specific topic or issue (Bryman, 2016). The original idea behind focus groups or the focused interview was that people who are known to have had certain experiences can be interviewed about those experiences in a relatively unstructured way (Merton et al., 1956). Thus, the defined focus group method contains elements of two methods: (1) the group interview, in which several people discuss a number of topics, and (2) a focused interview, in which interviewees are selected because they are known to have been involved in the particular topic and have experience with urban freight. This is in line with the purpose of the focus group seminars, as invited stakeholders should be able to give input to specific measures while attending the arena for discussion.

The focus group seminars are characterized by give-and-take interactions, which often led to spontaneous responses from the participants. To address RQ2, focus group seminars were used in order to learn through discussions among various stakeholders (Morgan, 1996). The informal discussion atmosphere in the seminars, in which one group member responds to another, provides insights from experts without disrupting the underlying normative group assumptions (Berg, 2004). Such group interactions were important for the research for this thesis with respect to the objective of exploring the benefits derived from engaging stakeholders in the planning process.

To prepare for the focus group seminars, pilot interviews were held with representatives of the three stakeholders' groups, namely public authorities, carriers, and receivers (Data Set 2). The purpose of the pilot interviews was to gain insights into the stakeholders' operations, challenges, and problem areas regarding urban distribution in Oslo. The interviews established mutual trust and revealed the individual stakeholder groups' freedom of action and competence that did not take other stakeholders into consideration. The group dynamics in the focus group seminars were intended to encourage the participants to speak freely and completely about behaviors, attitudes and opinions within urban freight (Krueger, 2014).

Peek and Fothergill (2009) outline several strategies for recruiting participants for focus groups. Following experience gained from the pilot interviews, the strategy key informant recruitment was used. The recruited participants and representatives of the stakeholder group were knowledgeable on the subject of urban freight and were well informed about urban transport in general. The key informant participants were invited to the focus group seminars, which were divided into two sessions

of discussions to give input on two specific measures (Data Set 3). In the first session the various stakeholder groups were assembled separately to discuss prerequisites and needs related to potential measures for green and efficient urban freight. The measures discussed were (1) a mobile depot and (2) night and evening deliveries. In the second discussion session, the stakeholder groups each presented their evaluations and then all stakeholders were invited to discuss each other's inputs. Using the key informant recruitment strategy meant that participants representing other interests were not invited to the seminar. Consequently, those interests were left out of the discussion and the decision-making process. With the key informant strategy, representativeness can be a challenge when deciding who to engage and how to engage them. However, during the research for this thesis the focus groups were not purposely chosen as a representative sample of a population. Rather, the recruited groups were defined in relation to the conceptual framework (Macnaghten and Myers, 2004) and their interaction made a positive contribution to the group dynamics (Krueger, 2014).

The focus group seminars were facilitated by a representative of the research team. In order to develop trustworthy cohesion through orderly debate (Krueger, 2014; Revans, 2011), an interview guide with a few general and open questions was developed to guide the focus group sessions. As a combined researcher and facilitator, I found it challenging to ensure good levels of participation among the stakeholders throughout the seminars. A facilitator's role is to stimulate reflections, to avoid intervention among the participants, and to co-ordinate conflicting claims to secure stakeholder input (Hensher and Brewer, 2001). In my case, being both a researcher and a facilitator tested the balance between involvement and not being intrusive (Bryman, 2016). This process through the two focus group sessions contributed to the establishment of a dialogue between the stakeholders.

To study the participatory process, I looked at the ways in which the participants collectively made sense of the urban freight phenomenon. Moreover, I probably ended up with a more realistic accounts of the stakeholders' opinions and attitudes because they were forced to think about and possibly revise their views in interaction with other stakeholders. To involve the participants in a structured and active way and to systematize input from the focus group seminars, the stakeholders were asked to perform a SWOT analysis - a tool for identifying strength, weakness, opportunities, and threats - and were briefly informed that the data they supplied would form a good platform for the next step of the implementation process for city logistics solutions.

As I was part of the interview process, I had to be aware of the degree to which I influenced the process through asking questions, interacting and taking part in discussions, and hence affecting the outcome. Being active as a facilitator is a way of not losing control over the process and to continually stimulate the participants' engagement. The overall objective in engaging stakeholders in the interview process was to try to reach a consensus on measures that were both effective and accepted by the stakeholder groups. The collaborative process around developing solutions and implementing measures identified how the specific measures were expected to influence stakeholders. Beyond the evaluations of the particular measures, the participation process yielded valuable knowledge about how to involve stakeholders in urban freight planning, as well as the benefits of stakeholder engagement when adjusting measures to the local context. The focus group seminars could have benefited from greater stakeholder diversity in terms of size and segment, though each stakeholder group was both aware of and acknowledged the needs and orientation of other stakeholder groups. Additionally, the degree of transferability and external validity (Berg, 2004) of the findings to other contexts might have been increased by the diversity among the study participants.

3.2.4 Case study research design

To address explanatory research questions, a case study research design is considered suitable (Berg, 2004). A case study may be described as an intensive analysis of an individual, a group, a community, or of some other unit in order to make a generalizations about a larger sample (Rowley, 2002). The method is used to understand in-depth a real-life phenomenon within its context (Yin, 2017). The use of a case study research design to answer RQ3 was related to the aim to understand the impact of online shopping and home delivery services on personal travel patterns, how it affects consumers' behavior, and how individual changes influence the last mile distribution. To address RQ3, e-grocery was used as a case to explore the interaction between goods movement and personal mobility, and its consequences for the urban landscape.

Within the case study, an online survey was developed to gain data on consumers' travel and shopping behavior. The survey was designed around two main sections. The first section focused on how respondents used services for home delivery of groceries and the importance of different aspects for the use of those services. The second section of the survey explored the relationship between home delivery on one hand, and travel and consumer behavior on the other hand. The survey design was largely based on established question batteries from national travel surveys and categorized in three sections: (1) household characteristics, (2) familiarity with and use of home delivery services, and (3) travel behavior. The survey questions focused on time used for purchases in a physical store, frequency of shopping, and behavior on travels to buy groceries. The online survey was distributed in fall 2018, mainly through social media and press releases. The survey generated 270 responses (Data Set 4), which were used as a source of empirical data, ultimately with the aim of enabling local authorities to plan and implement measures for goods movement in cities.

The study sample was categorized and compared with respect to household, utilization of the services and travel behavior. A more detailed description of the study sample is given in Paper 3. A descriptive comparison of the sample with the general population showed skewness towards women and resourcefulness in terms of social and economic capital representativity as being employed, with university degree, and with high household income. However, the study reported in Paper 3 only provided a preliminary exploration. By expanding both the scope and designing more comprehensive approaches, with more sophisticated data analyses and greater sample representativity more knowledge will appear (Yin, 2009; Bowen, 2009; Berg, 2004).

3.2.5 Participant observation

Stakeholders who perceived benefits from participation in urban freight planning were identified through observations at workshops held in seven Norwegian cities. Participant observations in collaborative arenas as workshops, provided information on how theoretical criteria for collaborative planning were practiced within the area of urban freight. Identification of how the stakeholder representatives preferred to participate and how they experienced the then current situation was accomplished through the observations. Previously collected data (Data Set 1) from interviews with participating actors were used to guide the preparation for the workshops and to supplement the observations. To complete the exploratory study, fieldwork and data collection were undertaken within participant observations of the full-day collaborative workshops in respective cities (Data Set 5) before defining a research question, as suggested by Berg (2004).

The local authorities were responsible for deciding which stakeholders to invite to the workshops, how to organize the workshops, and whether to link the workshop activities to other ongoing local processes. In addition to the public authorities, private actors were invited to discuss their perspectives and to place urban freight and logistics on the agenda. The workshops were designed around two main parts. The first part focused on present-day situations, barriers, and challenges, while the second part was mainly a discussion among the participants about how to improve the situation and how to overcome the challenges. The workshops were organized with prepared presentations from different stakeholder groups and followed up with discussions in smaller groups.

Doing qualitative research with participant observation as a method gives possibilities to attend settings where the participant observer can immerse themselves in a group for a period of time, observe behavior and conversations, and ask questions (Bryman, 2016). Being a part of a social setting enables the observer to come closer to the study participants and, to a larger degree, to be able to see the context through others' eyes, in addition to learn the freight-related language and terminology, which is important to penetrate their culture (Bryman, 2016).

In contrast to the focus group seminars, the workshops were managed by professional facilitators accessed by the Norwegian Public Road Administration⁴. Observing the stakeholders' presence and interactions while taking part in the workshops might have influenced the settings. However, my dual role as researcher and participant observer enabled me to engage in in-depth discussions in each workshop. The observations of the participants' behavior, listening to which questions were being asked and by whom, and observing the interaction between participants in smaller groups supported the data collection. I made field notes of the observations in accordance with the predefined theoretical criteria needed to examine the collaborative urban freight arenas.

My role as a researcher when making participant observations might have impacted the interactions and discussions in the workshops and the participants' decision-making through that process (Bryman, 2016). The workshops were not recorded in any way other than in the form of notes from each discussion, which after the workshop were structured and categorized in accordance with the predefined theoretical criteria. The subjective interpretation of the content of the discussions might have been a weakness and thus influenced the data collection. In the discussion settings, I remained silent for the most part but occasionally asked some follow-up questions. However, participating mainly as a passive observer helped to avoid bias in the findings, as well as to establish credibility and strengthen the reliability of Data Set 5.

When taking part in the workshops as an observer, the following questions were raised by me during the observations of the management and the facilitation of the participation process due to the representativeness of the stakeholders at the local workshops: Which stakeholders were invited? Which stakeholders were hard to reach and why? Who among those invited was not present? However, given the explorative nature of the study, I did not seek to generalize findings for this thesis, but rather sought a deeper understanding of how criteria for collaborative planning can be seen as a valuable tool and means of understanding how to build stakeholder participation in collaborative urban freight planning.

⁴ Project owner of the research program on Urban logistics
<https://www.vegvesen.no/en/professional/focus-areas/research-and-development/ongoing-projects/urban-logistics>

3.3 Reflection on the methods

Using a combination of methods during the study of the same phenomenon as a means of triangulation allows for the corroboration of findings across data sets and thus reduces the impact of any potential bias in that study (Patton, 2005). By triangulating the data, the qualitative research for this thesis drew upon multiple sources of evidence to seek convergence and corroboration through various methods, including document analysis, interviews, focus group seminars, and participant observation (Bowen, 2009; Yin, 1998). For this research different types of methods were used to gather data for the explorative studies documented in Papers 1, 2 and 4. Findings from previous stages affected the choice of methods for the next step. Using a combination of methods with supportive findings improved the data collection process, thus I was able to utilize knowledge from the previous stages. The data collection process towards increased involvement of the stakeholders is shown in Figure 3.

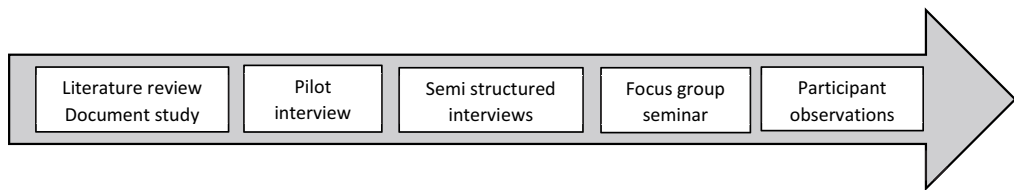


Figure 3. The data collection process.

Workshops were used to obtain knowledge in specific cities. Being able to observe the participants of the workshops gave valuable knowledge to further develop the local stakeholders' engagement. Other possible arenas for the involvement of stakeholders in city planning could be collaborative events such as projects meetings in related ongoing processes or arenas with possibilities for inviting new businesses as start-ups and "new players."

For improving the studies of stakeholder's engagement, in-depth interviews with relevant actors could have been held prior to the local workshops. The information might have provided support for the previous findings, gained knowledge about the local context and informed further research on barriers to the integration of goods movement in planning on local level. For further integration of goods movement in city planning improved collaborative processes should pay attention to private stakeholders' operational needs to ensure that their participation in the planning process would be considered worth their time.

Some methodological issues with the papers deserve further attention. In paper 1 the results are based on a relatively small sample, with interviews with in total 20 stakeholders. Specifically, the number of private stakeholders merely includes 7 representatives. A small sample can be sufficient to provide valuable and relevant information about how to integrate a new topic across different regimes of city planning. In such approaches, referred to as purposive sampling (Berg, 2004), the researcher applies her familiarity with a specific domain and actors to select a sample with relevant attributes and characteristics. The interviewees were sampled from different stakeholder group and actively recruited to include those with different background, interests, and responsibilities in the public and private sector. Additionally, the selected cities represented different levels of engagement in urban transport through respective city program and faces different challenges in terms of city development.

Paper 2 was a result of a participatory and cooperative process among public and private stakeholders involved in urban freight in Oslo. A list of potential measures was generated by a review of best practices in European cities. Location, security solutions, implementation barriers, cost, ownership,

predictability, and potential profit were among parameters that influenced the measure analyses and the choice of the selected measures. Due to the time limit of the project only two measures could be introduced and qualitatively evaluated, but the measures were not actually implemented. In this study, the mobile depot considered a preliminary release of a consolidation centre in Oslo, which was a main concern among the private stakeholders that selected this specific measure to be evaluated.

Paper 3 is based on results from an explanatory survey about consumer behavior related to e-groceries. The paper discusses the connection between consumer behavior, urban freight distribution and the impacts on city planning and the use of urban space. The results provide a preliminary exploration on a topic with limited existing data. However, the sample is skewed with an overrepresentation of respondents with a university degree, producing uncertainty around the generalization beyond the sample. The sample corresponds, however, with Bjerkan et al. (2020) which shows that users of e-commerce are highly educated, have a higher household income than the general population and mainly resides in cities and neighboring communities.

4. Overview of the four papers

In this chapter I briefly describe the studies and their findings. Four related research question were answered through Papers 1–4, as summarized in Table 4. The key findings from the papers are discussed in more detail in Chapter 5.

Table 4. A brief summary of the four research topics covered in Papers 1–4.

Paper	Research question addressed in the thesis	Paper title	Research topic in the paper
1	What is the current level of knowledge and attitude towards the urban logistics among involved stakeholders?	The potential for coordinated logistics planning at the local level. A Norwegian in-depth study of public and private stakeholders	Stakeholders' expectations towards coordinated logistics planning. Stakeholders' perspectives on participation in coordinated logistics planning.
2	What benefits can be identified from freight stakeholders' engagement in planning processes?	Stakeholder responses to measures for green and efficient urban freight	How do relevant stakeholders evaluate potential measures for facilitating green and efficient urban distribution?
3	What is the level of interaction between goods movement and personal mobility in urban space?	E-groceries; Sustainable last mile distribution in city planning	Impact of home delivery on last mile distribution and potential strategies to integrate this trend in city planning.
4	How can freight and logistics stakeholders be better integrated in city planning?	How to build stakeholder participation in collaborative urban freight planning	Identify criteria that determine successful stakeholder participation in collaborative urban freight planning. Link the criteria to the ladder of participation to explore the power to affect the outcome.

4.1 Stakeholders' attitude towards urban logistics

RQ1: What is the current level of knowledge and attitude towards the urban logistics among involved stakeholders?

Paper 1 gives a picture of the urban freight landscape and its complexity. The stakeholders involved in urban logistics (Figure 4), add complexity to planning logistics activities because each group of stakeholders tends to act differently.



Figure 4. Examples of stakeholders involved in urban freight.

As identified in the interviews reported in Paper 1 and supported by the literature review, private stakeholders, namely carriers and receivers, seek to optimize their own value chain and focus less on what would be beneficial for the local community. According to the mapped state of practice, the role of the local authorities is normally to act on behalf of the society or on behalf of the community as a whole. To achieve this, they need legal and regulative instruments, planning tools, and backing by

political power, to balance the various interests. The interviews indicated that local authorities appeared to lack resources dedicated to urban freight and have poor capacity in planning and policymaking regarding goods movement. Attitudes among local authorities often reflect how they see optimization of freight distribution as a private concern. Furthermore, fragmented responsibilities and unclear roles in urban freight contribute to the fact that typically they do not acknowledge their own influence or potential influence in achieving efficient freight transport.

A key finding of the research for Paper 1 is that to a large degree both freight and logistics are an ignored topic in urban planning. The topic is not an integrated part of public planning processes in Norway and the investigation revealed that urban logistics was not properly integrated into urban transport and economic development strategies. From the interviews, it was evident that the private stakeholders were not involved in public logistics planning, even though goods movement is an important part of the mobility system in cities. At best, private stakeholders were consulted at the end of the planning process. The findings show that there are no overall strategies for including issues of freight and city logistics in planning in the studied cities, although public authorities are concerned with issues related to urbanization and sustainability that indirectly affect freight movements and deliveries. There is no official legislation at municipal level, and freight plans rarely exist.

The private stakeholders were positive towards participating in public logistics planning, and they hoped for the formation of an arena in which dialogue and meetings would be held to become more aware of reciprocal and common user needs. On the one hand, the private stakeholders were more reserved in their expectations towards coordinated planning than were the representatives of the public authorities, while on the other hand, they found the planning process time-consuming, and they experienced delivery solutions as inefficient and unpredictable. The research findings show that the implemented delivery solutions were based on consensus among local authorities alone and were not in harmony with the wishes or needs of private stakeholders.

According to the conclusions presented in Paper 1, there is no coordinated planning and few dedicated resources within the public sector at local level. However, the findings indicate that there is potential for coordinated logistic planning at the local level if stakeholders are made more aware of each other's interests and roles, as well as challenges and barriers in the urban freight system. Furthermore, in order to address goods movement in decision-making processes and to integrate the topic in urban planning a more systematic and comprehensive approach is needed at the city level. This includes mapping relevant stakeholders and addressing their needs when urban logistic plans are developed.

4.2 Benefit of freight stakeholders' engagement

RQ2: What benefits can be identified from freight stakeholders' engagement in planning processes?

Paper 2 presents the results of a study of how stakeholders evaluated potential measures in urban freight distribution. The purpose of the study was to examine the benefits of engaging stakeholders in such processes. The selected measures included a mobile depot, and night and evening deliveries, both of which were aimed to improve the utilization of street areas and effectiveness related to time. The objective of the collaborative planning process was to consider the consequences of suboptimal outcomes, whereby stakeholders aim to maximize their own situation without taking other aspects and interests into consideration. In addition to establishing mutual trust and confidence, the findings from the pilot interviews contributed with an understanding of each stakeholder's operations, challenges, and problem areas regarding urban distribution.

The collaborative process around developing solutions and implementing the two measures (a mobile depot, and night and evening deliveries) identified how the specific measures influenced stakeholders. The stakeholders were involved in early phases of the collaborative process through interviews and focus group seminars with two sessions of discussions. Beyond the evaluations of particular measures, the collaborative process gave valuable knowledge about how to involve stakeholders in urban freight planning and the benefits of stakeholder engagement when adjusting measures to the local context. The investigation of the participation process revealed that each stakeholder group's freedom of action, competence and action plans did not take other stakeholder groups into consideration. The identified overall benefit of engaging in the planning process is commitment and positive attitudes towards solving problems presented by freight stakeholders.

The findings from the participation process showed that when stakeholders took a more active part in the process, the outcome was more likely to be both more effective and more acceptable to stakeholders. Following the study participants' discussions on prerequisites and needs related to the two measures (i.e., a mobile depot, and night and evening deliveries), the process examined in Paper 2 shows the importance of establishing an arena for collaboration. The focus group seminars encouraged the stakeholders to become more aware of each other's needs and interests, and they allowed for adjustment of measures to local needs. Such an approach could be feasible when developing policies for planning and designing measures in urban freight, and there is a need to take into account the complex interaction of different stakeholders.

The research process itself showed that stakeholders' involvement is crucial and that the interviews prior to the seminars revealed that their involvement represented an untapped resource in urban freight planning. By involving the stakeholders early in the planning process and establishing a platform for collaboration, the ability to reach common grounds was strengthened and the number of suboptimal solutions were reduced as participants were given opportunity to consider the consequences of suboptimal outcomes early in the process. The added value of including such reflections on "transformation experiments" lies in a more systematic account of experimentation as a driver of transformations (Sengers et al., 2019).

To achieve positive collaboration with private freight stakeholders, public authorities should have more knowledge of the complexity of urban freight, as well as the obstacles and facilitators to the implementation of relevant measures. In the collaborative process examined during the research for Paper 2, which allowed for modification to potential measures and supportive mechanisms to accommodate prominent obstacles, the potential for reaching a common ground reflects the collaboration between public and private stakeholders.

Figure 5 shows different scenarios for how, as measures, a mobile depot and night and evening deliveries influenced the different stakeholder groups. The circles shown for each stakeholder group include nine examples of parameters, such as environment, health and safety, operational costs, green profile, and investments, which are affected by implementation measures in urban freight. These parameters were considered within the SWOT analysis, a tool for identifying strength, weakness, opportunities, and threats. The size of the parameters refers to their relative importance (weight) to each stakeholder group, and their color indicates whether the potential measure is expected to have a negative value (red), positive value (green), or no value at all (yellow) for the stakeholders. These values are termed "value expectations" and illustrate the input from the SWOT analysis as systematized input from the focus group seminars related to the implementation of the two measures.

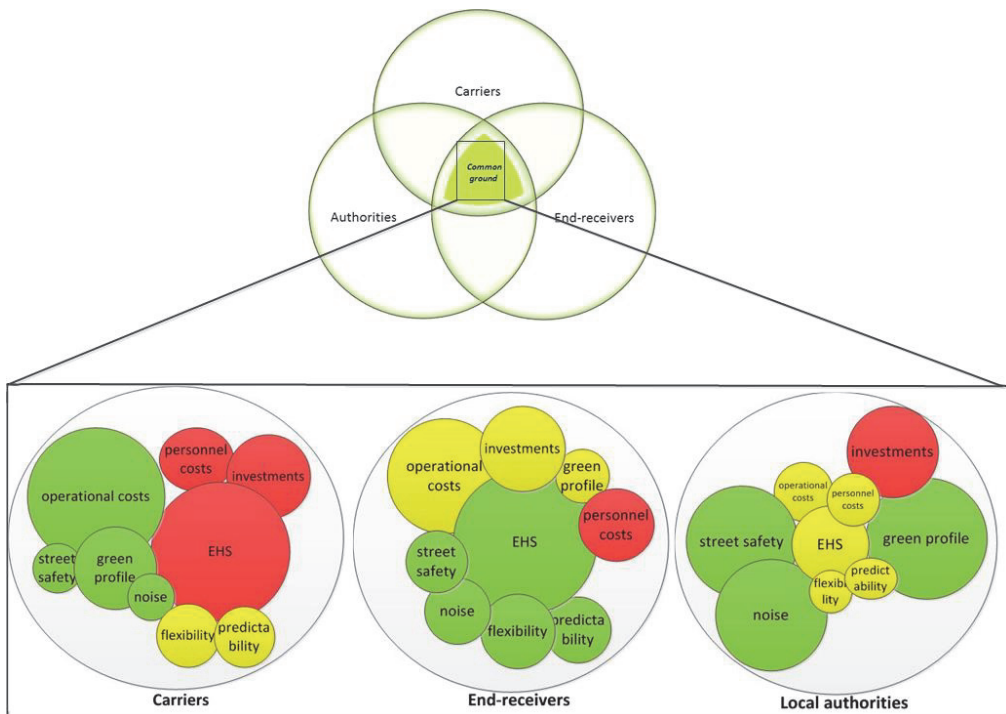


Figure 5. Common ground components of parameters and value expectations.

In Figure 5, reaching common ground reflects the collaboration between public and private stakeholder and illustrates the overlap of positive and negative values that potential measures might have for individual stakeholders. The overall benefit identified from engaging in the planning process was more commitment and positive attitudes by local authorities towards solving problems presented by the freight stakeholders. In city site planning in Norway, user participation is governed by planning legislation but there is not a tradition of engaging private stakeholders in urban freight planning. This points to the need to consider how to engage private stakeholders in urban freight planning, and freight stakeholders in city planning, and inspired me to address RQ4.

4.3 Interaction of goods movement and personal mobility

In moving away from the topic of stakeholder involvement as discussed in Papers 1 and 2, the objective of the study presented in Paper 3 was to gain insights into the sustainability of e-groceries by exploring how home deliveries of groceries influence the travel and consumption habits of city residents. The deliveries are presented as an example of the potential connection between goods movement and personal mobility. Furthermore, the insights are drawn into the discussion of how city municipalities can integrate the transformative effects of e-commerce into city planning, specifically the impact on last mile services and changes in individual consumer and travel behavior, and contributes to address the third research question:

RQ3: What is the level of interaction between goods movement and personal mobility in urban space?

The potential interaction between goods movement and personal mobility in urban space was investigated through a survey of Norwegian users of home delivery services. The data set consisted of 270 survey responses, and a descriptive comparison with the general population in Norway was done.

The findings from the survey provided local authorities an idea of what to expect from increased online shopping and how trends of e-groceries and home deliveries could be incorporated into city planning. In total, 70% of the participants had used a service for home delivery of food and groceries more than once. For those who had not used such services, most prominent reasons included home delivery not being available where respondents lived and poor delivery quality. 64% of the participants who used home delivery services made fewer visits to physical stores than before, and 34% believed that their travel habits had changed after starting e-grocery shopping. The travel changes were most often related to reduced car use, increased walking, and increased use of bicycles and public transport. The finding suggests that e-grocery shopping is associated with more environmentally friendly personal travel modes. Further, the findings showed that household travel and consumption patterns were sensitive to variables such as population density, car ownership, age group structure, and household characteristics.

Although the study sample was relatively small and there was sample skewness, the findings indicated that the availability of home delivery had an impact on consumer and travel behavior. The most important motivations for using home delivery services for groceries were to save time and reduce stress levels and time spent on planning. The survey findings revealed that aspects that made an impact on the sustainability of online shopping were fewer visits to stores, changes in vehicle movements, different home delivery solutions, changes in the way leisure time were spent, and changes in the mode of travel used to pick up groceries.

The key contribution of Paper 3 is a framework for understanding interactions between urban logistics and last mile distribution, consumer and travel behavior, and urban space, shown in Figure 6.

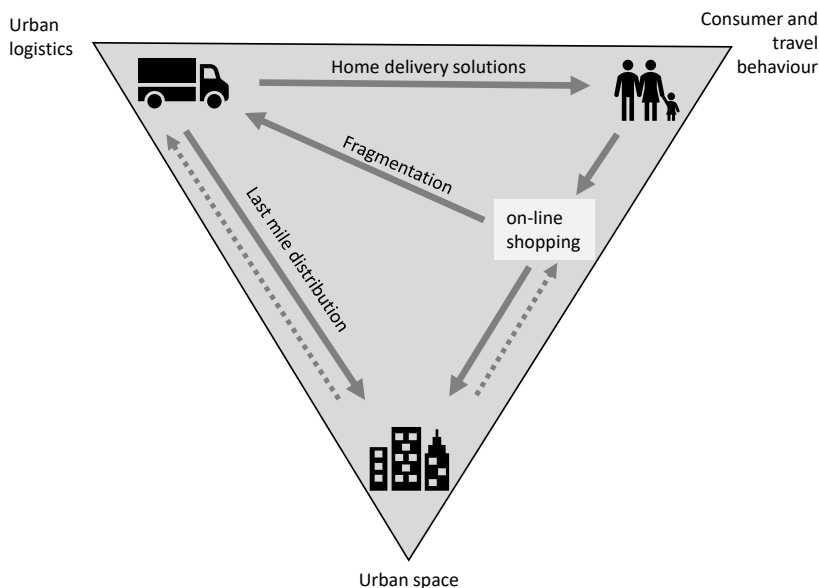


Figure 6. A framework for understanding the interactions within urban mobility.

The framework in Figure 6 shows how on-line shopping contributes to fragmentation of the urban logistics system and increased demand for last mile delivery services. This results in a transformation that involves a move from traditional shopping where the end consumer does the shopping activities in the urban space, towards on-line shopping demanding home delivery solutions. The transformation

impacts the use of the transport infrastructure, the public space, the traditional urban freight distribution system and the consumer and travel behavior. It also impacts the interface between urban logistics and shopping trips. Traditionally, the last mile distribution is carried out by logistics service providers to end receiver in form of e.g., stores, and shopping trips are done by the end consumer. With online shopping, the end receiver is to a large extent the end consumer. Thus, the last mile distribution is moved away from the urban space and shopping areas to residential and living communities.

Within the research design, the study reported in Paper 3 provides a preliminary exploration of the interaction between goods movement and personal travel. The example of the e-grocery study shows how the structure of e-commerce impacts the relationship between consumption, travel behavior and freight transport. The combined findings from Papers 1, 2 and 3 contribute to a new understanding of how changes in last mile distribution interact with individual behavior, and further add complexity among stakeholders involved in the urban mobility system. This adds emphasis to the importance of developing a knowledge exchange platform for how social and technological trends impact urban freight and mobility, which in turn enables authorities to plan and to some extent implement adapted measures for the local context.

4.4 Integrating the freight and logistics stakeholders into city planning

In normative planning theory there are two main approaches to spatial planning and detailed zoning. Taking a comprehensive perspective when integrating environmental, social and functional aspects is often referred to as rational comprehensive planning (Faludi, 2000). At the local level, comprehensive planning is a complex and extensive task, including a wide spectrum of considerations. Limited resources, lack of knowledge and fragmented responsibilities often reduce possibilities to plan according to this ideal model (Bjørngen et al., 2019). Land (space) and time are often scarce resources impacting urban freight practices. Transportation and land use planning aims for allocating land to different groups in society and for societal activities such as recreation, walking, biking, and shopping. Integrated transport and land use planning, however, also regulates time through the distribution of access to space (roads, parking etc). This is accompanied by conflicting purposes and interests (Browne, 2020).

Given the complexities of urban freight transport with multiple stakeholders involved, often with competing interests, the collaborative planning process approach acknowledges that stakeholders must engage in a negotiation process to seek mutually acceptable outcomes. Integrated urban development requires planning methods that are adaptable, robust and responsive, while focusing on stakeholder participation (Lindenau and Böhler-Baedeker, 2014) and balancing conflicting interests and ideas (Raynor et al., 2018). However, to date, little research has been done on how collaborative urban freight areas can be made to cater for different stakeholders. As stated in Paper 1, further research should focus on private stakeholders' operational needs to ensure that their participation in the planning process is considered worth their time. In order to fill the knowledge gap in how the needs and requirements of different stakeholders are negotiated in the planning process, different criteria to ensure participation in collaborative urban freight arenas were studied and the findings then linked to Arnstein's ladder of participation (1969). Thus, the final research question addressed was:

RQ4: How can freight and logistics stakeholders be better integrated in city planning?

To answer RQ4, a descriptive analysis of the findings reported in Papers 1 and 2 was performed. The analysis, along with prior planning meetings with representatives of local authorities to prepare and

frame local collaborative workshops, provided additional data for further analysis. The collected data from sources such as the document study of planning and legislation at the municipal level and interviews conducted for the studies reported in Papers 1 and 2 both guided and supplemented the observations and were supportive data for answering RQ4. In response to the discussions in the workshops, some criteria that may determine successful stakeholder participation in collaborative urban freight planning are identified in Paper 4. The identification was done by observing the stakeholder's presence and interaction when taking part in the full-day workshops.

The analyses revealed that industry stakeholders perceived benefits from participating and being included in the local planning processes. They appreciated being invited to the workshops and given the opportunity to present their own experiences of the then current situation. During the workshops, the stakeholders presented both challenges and barriers that they considered important to deal with in public planning processes in the future. The private stakeholders acknowledged that the workshops were a step in the right direction towards further cooperation and coordination among stakeholders. They saw this an important step that would help in the evaluation of the solutions and make it easier to achieve local improvements. The private stakeholders were engaged and made several suggestions for improvements, most of which were related to better coordination along the urban delivery chain. Representatives from the local authorities were more negative than the private stakeholders in the discussion and focused more on barriers created by rules and regulations. However, they expressed that user and stakeholder participation generally contributed to better planning procedures, improved anchoring of the approved plans, and smoother implementation of new solutions.

The criteria most often mentioned in the discussions were the production of knowledge, establishment of an arena, well-organized management, and consensus-building. Additionally, during observations, the criterion political and planning anchorage, which is rarely put into practice, was revealed as important for the participation of private stakeholders in collaborative planning. The participants expressed that political support created an impression of political interest in their work, thus providing them with an incentive to increase their level of participation. Political support and planning anchorage seemed particularly important for private stakeholders' participation in collaborative processes in order to be able to follow up implemented specific measures. The findings reported in Paper 4 point to the importance of stakeholders being involved early in the planning process. This was important regarding both the acceptance of the decision-making process and the implementation of the measures. Based on this finding, it is concluded in Paper 4 that earlier integration of freight considerations is required to ensure sustainable freight systems in the urban environment and to improve the planning processes at the local level.

The benefits of taking part in planning processes were expressed from both the private side and the public side. The private stakeholders were given insights into the public planning processes, while the public authorities gained insights into private stakeholders' needs, roles, and interests. Ultimately, this generated increased willingness on both sides to continue the process and to "climb the steps on the ladder of participation". To clarify whether the collaborative participatory planning provides the participants with sufficient power or influence to affect the planning outcome, we have linked the ladder of participation to the criteria for collaborative planning.

The connections between each of the nine identified criteria in paper 4 and their position on the ladder of participation are presented in Figure 7. Through knowledge and consensus-building, the analysis

revealed that stakeholders achieved the fifth step on the ladder of participation. The higher on the ladder, the deeper the level of the citizens participation, or in this case stakeholder participation.

No	Criteria for citizens' participation	The ladder of participation (step level) Based on (Arnstein, 1969)
9	Aim to implement joint solutions	Delegated power (7)
8	Reduce power imbalances	Partnership (6)
7	Be consensus-oriented	Placation (5)
6	Produce knowledge, learning and information	Consultation (4)
5	Impose time restrictions	Informing (3)
4	Generate well-defined and acceptable tasks	Informing (3)
3	Establish leadership and well-organized management	Informing (3)
2	Ensure commitment and keep participants interested	Informing (3)
1	Ensure inclusion of all relevant participants	Informing (3)

Figure 7. The criteria put into practice for collaborative planning connected to the participation ladder.

The participated stakeholders acknowledged that the workshops were a crucial step for further cooperation and coordination among the stakeholders and could help when evaluating solutions and implementing measures to execute local improvements more easily. To some extent, it can be claimed that the seven cities in the study were representative of the first stage of the process of integrating goods movement and freight stakeholders' interests into city planning.

4.5 Summary

A number of contributions to the research literature on urban freight and public planning have been made through answering the four research questions. As described in Chapter 1, limited attention has been paid to goods movement compared with personal mobility. I have shown that this is partly because *cities lack sufficient resources* to tackle challenges in urban freight and the fact that to a large extent logistics is not considered an important topic in city planning. Additionally, local authorities often *lack knowledge about urban freight issues* and there is *lack of data* about goods movement. Finally, I have found that freight usually is *not an integrated part of the public planning processes* and freight actors are seldom represented and do not participate public planning processes at the local level (Bjørngen et al., 2019b).

In the absence of cooperation among the public and private stakeholders, it is challenging to implement sustainable long-term solutions for urban logistics problems, which are likely to increase as cities grow and become increasingly denser. My findings support earlier claims that goods movement should be given higher priority on the local urban planning agenda (Cui et al., 2015; Ballantyne et al., 2013).

When preparing for stakeholder participation, the findings from the focus group seminars and the participation observation study suggest that the local context and characteristics of each city influences how criteria for collaborative planning in urban freight can be seen as valuable tools and means with which to build stakeholder participation. Knowledge about the local context, its freight issues and related complexities, as well as how existing laws and regulations affect the planning practice, are crucial steps to integrate freight stakeholders' interests in a better way in city planning (Bjørngen et al., 2021; Bjerkan et al., 2014).

Through my doctoral research I have been able to demonstrate that cities evidently need to adjust their planning processes and city logistics measures to the local context, which in turn requires a clear understanding of the city's needs or the region's needs. Nonetheless, local authorities would benefit from working jointly with stakeholders towards developing strategies for policy integration to promote knowledge sharing between different actors, among city authorities and transfer knowledge across a wider region. Due to the integration of land use and transportation planning, and the connection of city logistics and the supply chain (Bjørger et al., 2019a), it is important to incorporate goods movement in city planning and to connect the local planning process to both the regional and national levels. As an example, local authorities in Norway have a regulative role to facilitate locations and space for terminals, warehouses, hubs and pick-up points (Ministry of Local Government and Modernisation, 2008), which may play a cardinal role in the supply chain and the possibility to plan for an efficient *last mile* distribution. Similarly, the national government's rules for electric vehicles impact the local authorities possibilities to regulate public space in order to achieve zero emissions city logistics towards 2030 (Ministry of Transport and Communication, 2017).

From the findings reported in Papers 3 an urban mobility perspective including both people and goods is preferable to a narrow city logistics perspective. Based on those findings, the scope of my discussion was expanded to account for the whole urban mobility system which are presented in the next chapter. This allowed for including discussions on how online shopping impact the relationship between individual travel, consumer behavior and urban logistics, and the need to understand interactions of this type within urban mobility when studying urban freight and urban logistics as important pieces of city planning.

5. Discussion

The research objective of this doctoral thesis was to investigate the integration of goods movement in city planning. Facilitating and managing such an integration requires sufficient understanding of stakeholder engagement as described in the introduction of Chapter 3. The research objective was addressed in four related research questions, which I have answered through the papers included in Part II of this thesis. The research begun by identifying the stakeholders' attitude towards urban logistics (Paper 1), where stakeholders' needs, and roles were examined. I then moved forward to consider the benefit of freight stakeholders' engagement (Paper 2), and the interaction of goods movement and personal mobility (Paper 3). These findings contributed to the work in Paper 4, where my attention was directed towards integrating the freight and logistics stakeholders in city planning. The implications of this approach are discussed further in Section 5.2.

5.1 Public participation

The movement of goods has a critical function in societies, but also negative impacts on climate and the environment (Foltýnová et al., 2018). Therefore, there is a need to develop combinations of policies (policy mix) to curb negative consequences in terms of congestion, noise, local and global emissions, road damage and accidents. The Norwegian Planning and Building Act (1985), which is traditionally adapted to land use planning and the focus on regulation and control of land use, motivates city planning to include local policy in general and to ensure political will and participation related to regional and national policies. Norway has a planning system that emphasizes citizen participation and is thus a suitable context for investigating how the scope of participation in planning can be broadened to include private stakeholders (i.e. industry) in cases where they are the affected actors rather than citizens. Greater collaboration between the industry and governing authorities has been identified as factor that could contribute to higher acceptance of and support of freight transport regulations (Bjørger et al., 2021). Hence, there is a need for increased knowledge about the way policy and regulation instruments may influence the stakeholders and the freight system in urban centers (Browne et al., 2019a). Pilots and trial projects have increasingly been used as a collaborative effort in city planning as means to experiment with policies and new methods to develop urban spaces (Bjørger and Ryghaug, 2021).

To integrate freight into urban planning and development, transport planning policies and city plans requires detailed studies of the interaction between freight flows, the urban environment, and the stakeholders involved. Exploring both the demand side and the supply side of urban freight, as well as knowledge about new policies and incentives is essential. This is required for successfully governing the transformation of urban freight as evident changes in consumption patterns, ICT and platform solutions and more sustainable freight operations (Macharis and Kin, 2017; Russo and Comi, 2016). The requirements and impacts of urban freight, as well as how to integrate freight stakeholders' interests into city planning processes needs investigating (Browne et al., 2019b; Sanchez-Diaz and Browne, 2018). Planning and designing viable and effective measures that enable environmentally friendly and effective freight distribution in city centers requires knowledge about how to better organize transport services in urban spaces to successfully promote efficient use of infrastructure, public space and transport capacity to achieve CO₂ free city distribution within 2030 (Ministry of Transport and Communication, 2017).

The previous paragraph can be exemplified through the City of Oslo and its development of an extensive climate and energy strategy for a climate friendly and livable city (Oslo municipality, 2016). Car free city life was an important policy supported by including parking restrictions and toll ring, foundation of the strategy, mostly focusing on mobility for people, reduced car use and the greening of urban spaces (Oslo municipality, 2019). A side effect of these policies was more available space also for city logistics. However, the local authorities struggled to involve stakeholders and logistics issues in these endeavors, developing effective city logistics solutions in available space. This was due to lack of data about the stakeholders, the activities and space needed. Despite low private car use, stores and households still needs goods and services delivered, and demand nearby delivery solutions developed in collaboration with the involved stakeholders.

The research for this thesis was structured to *identify* relevant stakeholders, how to *involve* them, and how *collaboration* ideally should occur in urban logistics planning, namely when stakeholders take part in local policy development to adapt potential measures to local context with trends, restrictions, and regulations. Overall, the research revealed that stakeholders' involvement is crucial and represents an untapped resource in urban freight planning. Establishing an *arena* for networking and knowledge exchange is needed to prepare for stakeholder *participation early in the public planning process*. Establishing such an arena is also an important tool for acceptance and successful implementation of new mobility solutions.

I have shown, in this thesis, that stakeholders are inclined to *support active partnerships* with a multilevel approach for building trust, and predictability, and for participating in collaborative urban freight planning. Within urban freight transport, cross-sector collaborations have different labels, e.g., freight quality partnerships, logistics living labs and freight networks. The organization of these collaborations depend mainly on their purpose, whether relating to formulation of policy, consultations and pool resources or joint service delivery (Quak et al., 2016). Cooperative approaches seem to be able to foster such necessary partnerships between private and public stakeholders. However, balancing top-down and bottom-up approaches, and considering long and short time horizons is challenging, due to local planning processes and potentially conflicting aims. In addition, *political anchoring* is important to prepare for consensus-building in collaborative processes among stakeholders that often have competing interests when the evaluation of measures and development of policy mixes is essential.

There is increasing awareness in Norwegian cities that goods movement matters and that it is needed to develop livable and sustainable communities. From a local authority perspective, this implies that all goods movements should be included in the public planning process. To integrate potential strategies in city planning, local authorities need knowledge about the complexity of urban freight systems. Insights into urban logistics and freight transport, particularly the stakeholders in the supply chain and the connections between the local, regional and national dimensions, are needed for early involvement in the planning processes (Bjørngen et al., 2019b; Browne et al., 2019b). Stakeholder engagement and increased cooperation among private and public stakeholders may secure the development of comprehensive policy mixes adjusted to the local context. My research demonstrated that involving stakeholders is one way to improve the integration of goods movement in city planning.

Regarding stakeholder engagement, this research has showed that collaboration, negotiation, and consensus-building are viable strategies to overcome the complexity and often conflicting interests within urban freight. Additionally, the research revealed that successful city logistics policies depend

on recognizing and understanding the complexity of logistics chains, the concerns of different actors and urban freight transportation problems (Bjørngen et al., 2021; Lindenau and Böhler-Baedeker, 2014; Russo and Comi, 2010b). "Zero emission zones" and "Car free city life" exemplify the need for collaborative planning and negotiations among stakeholders involved, to support governance towards sustainable city planning integrated with local policies in general (Oslo municipality, 2020b). These policies raise important issues related to the under-recognition of freight in city planning, since the movement of goods has a critical function in societies.

As stated in paper 1 local authorities often lack sufficient data about goods movement, which is supported by the observation in paper 3 mentioning that "presumably data about e-commerce are proprietary." Data about goods movement for quantifying urban freight is a prerequisite for engaging stakeholders and participation in collaborative city planning. This brings up some important points about the challenges within urban freight and the need for data, as data and modelling are key elements to integrate goods movement in city planning. Local authorities need reliable data about logistics and freight issues, the stakeholders, the supply chain, and the multilevel governance in order to devise potential strategies and policies integrated in city planning. Due to the tracking systems of logistics service providers, a lot of data about vehicles and items are available. However, there is a lack of standards for collecting data across logistics services providers. Thus, the next step should be to explore what kind of information that is needed is needed to support urban planning and transport system management. Examples might be data about who operates in the urban space, when, and how loading zones are used for delivery.

5.2 Planning for people and goods

Based on the analyses presented in Papers 1–4, the scope of the discussion was expanded from focusing only on "city logistics" to focusing on "urban mobility." Planning for urban mobility should include both personal and goods movements, which impact and interact with each other, as described in Paper 3 (Bjørngen et al., 2019a). Through the study reported in Paper 3, it has become evident that mobility research should be more open to address the entirety of mobility systems, logistical practices, energy cultures, and the ways in which everyday mobility practices are embedded in larger sociotechnical systems that are complex and interdependent. Also, consideration should be given to the way regulative measures combat climate change, urbanization and global migration impact the demand for mobility as a whole including city logistics and freight (Sheller, 2018).

Users and actors in cities share the same spaces and urban infrastructures. Thus, in order to develop attractive and sustainable cities there is a need for more integrated mobility planning that incorporates goods and passenger alike (Rai et al., 2017; Russo and Comi, 2016; Banister, 2008). Examples of changing trends that impact urban mobility and city planning are densification, logistics sprawl, shared personal mobility, e-commerce, micro-mobility, and increased digitalization (e.g. on-demand information). Such trends impact land use and mobility demand, and the integration of land-use and transportation planning. These trends also suggest a connection between goods movement and personal mobility, of which there are few traces in research or governance and policy practices. The next step to aid cities and environments is acquiring knowledge about new ways to govern, regulating, and organizing urban logistics, with measures and tools across time, space and the organization of practice that are adjusted to the local context.

As described in chapter 2.1.3 urban logistics and consumer preferences is shaped by a range of factors. Home delivery services, cargo delivery in residential areas, in combination with smaller households,

smaller residences with less storage capacity, changes in car ownership and individual travel behavior and private consumption are examples that impact goods movement, city planning and transport systems, as stated in Paper 3 and supported by Goodchild et al. (2019).

Knowledge about the interaction between mobility of goods and people should be a key issue for integrated planning in urban areas and to engage stakeholders and actors. Figure 8 illustrates a wider approach to urban mobility planning and presents a comprehensive structure for involving actors and corresponding activities in public planning processes.

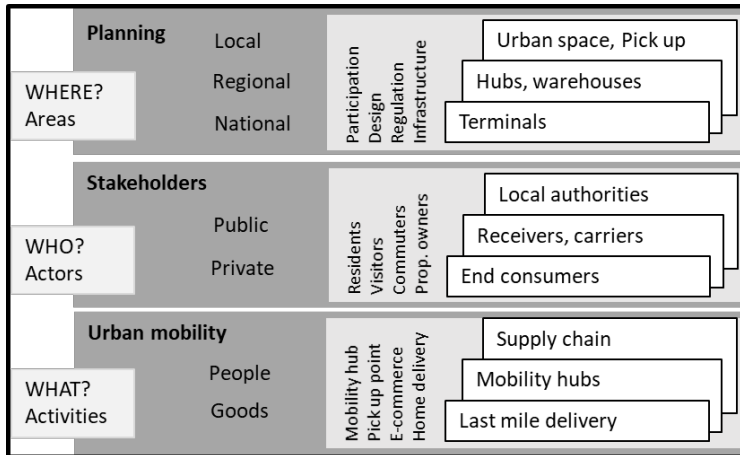


Figure 8. The complexity and interconnection within urban mobility.

Figure 8 is based on Figure 2 (Chapter 3), but the scope is expanded from a city logistics perspective to a focus on urban mobility for people and goods. Added to Figure 2 are examples of topics within activities, actors, and areas on the respective levels in the pale grey boxes, which should be considered within urban mobility planning. Residents, visitors, commuters, and property owners are examples of actors who take part in the urban environment and must be included in an urban mobility perspective. Mobility hubs and pick-up points are considered important activities in planning mobility for both people and goods. Additionally, the expanded scope touches upon issues such as participation, design, regulation, and infrastructure when developing urban space, local distribution centers, pick up points and managing hubs arranged for combined personal and goods purposes.

The interconnections between elements in Figure 8 increase the complexity, the competition for space, and potential conflicts between users, and may put further pressure on the availability of urban space. For example, in the last decade, e-commerce has begun to rapidly change the retail and logistics sector, and more households depend on online shopping and home deliveries. This transformation and the trend of digitalization impacts the organization of freight and challenges the traditional urban freight system (Macharis and Kin, 2017). Fragmented delivery system, higher frequency of smaller orders and an increase in return and failed deliveries are aspects influencing the need for reorganizing of the urban freight system. With inner-city shopping districts, suburban malls and online platforms, present-day consumers have gradually gained a larger variety of options to choose from. However, each option comes with its own flows of passenger and freight transport.

Despite the interconnectedness with other domains such as urban logistics, travel behaviors and consumer preferences such as visits to physical stores, travel mode and leisure activities, very little research has been done on the transformative effects of e-commerce as illustrated in Figure 9.

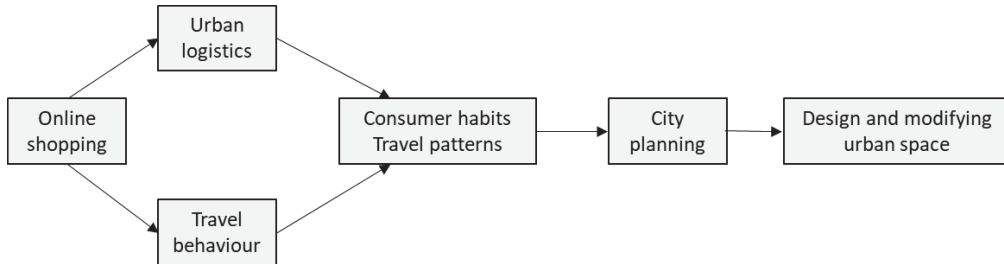


Figure 9. Transformative effects of e-commerce.

The impacts due to online shopping contributes to increase of traffic, the number of commercial vehicles and a pressure on urban space. The number of light goods vehicles in larger Norwegian cities increasing of the expense of private cars illustrates this point (Oslo municipality, 2020a). In addition, this trend is expected to continue due to advances of ICT, new digital platforms and changes in consumption patterns (Comi and Nuzzolo, 2016). These transformative effects and their implications for city planning need increased attention for developing innovative tools for designing and modifying urban space for future city development. These tools should also take into account the changing consumer culture and considering people's increasing awareness of the environment.

Urbanization requires efficient use of infrastructures and urban spaces. Given the complexity of city logistics, understanding how changes in urban logistics affect the mobility of people and goods, as well as how urban logistics impacts the utilization of urban space and availability of mobility, an integrated approach to study urban mobility is necessary. An integrated approach should involve stakeholders in all phases of the planning process to reduce conflicts and to unveil the complexity and consequences of potential measures for stakeholders when creating shared mobility solutions. To ensure attractive and livable cities, local authorities need to find flexible and sustainable solutions that facilitate shared use by cyclists, pedestrians, and public transportation, and pay attention to other actors' needs. This points to the importance of integrating planning for soft mobility modes and urban freight. A raised awareness and understanding of urban freight within city administrations would help to deal with these challenges. To ensure user acceptance, development of future mobility plan should follow a transparent approach which involves all relevant actors.

Zero growth in car traffic is an important goal in Norwegian transportation planning (Ministry of Transport and Communication, 2017), but as a goal it does not include commercial vehicles and freight distribution. Rather, it aims for all growth in passenger transport in specific larger urban areas of Norway to be accommodated by public transport, cycling and walking. In Oslo, the freight transport with light goods vehicles, small vans and trucks represent about 30% of all emissions from road traffic, and projections show that this type of transport activity may increase the next decade (Oslo municipality, 2020a). Therefore, the supply side of the urban freight market which is increasingly characterized by small and independent transport businesses, challenge the established practices and organizational structures of freight. The practices of these small and independent actors and their relationship with freight forwarders and larger firms should be explored to a larger extent. These trips

are neither included in zero growth policies, which highlights the need for a wider approach to urban mobility planning including both goods and people. This allows for planning interconnections within the urban environment and addressing the demand and the supply side of urban freight transport.

To prepare for new mobility trends and prevent unwanted effects such as inefficiency and user conflicts, local authorities need knowledge about the interaction between urban logistics and individuals' shopping and travel behavior. To improve urban mobility planning, local municipalities have begun to adopt a number of strategies, including connected and shared e-services, mobility on demand, car sharing and restrictions to reduce car ownership, the use of alternative fuels, and facilitation of city logistics systems. Mobility hubs could be a potential strategy to serve individual and business needs. Mobility hubs may include charging facilities for personal needs and pick-up points that can replace home delivery. A further strategy that might be important in future mobility and city planning is increased focus on travels with combined travel chain. Despite the development of such endeavors, there is still a long way to go before freight and logistics are well integrated in urban mobility thinking and in city planning.

5.3 Further research

This thesis has emphasized the need for collaborative planning in urban freight and has identified a set of criteria for building stakeholder participation. Additionally, I have demonstrated the need for a shift in focus towards comprehensive urban mobility, in line with the expression "planning for people and goods." A natural extension of the current state-of-research would be to investigate whether the same criteria for participation are valid for collaborative planning of urban mobility.

Further research should continue the integration of goods movement in city planning to expand the scope from city logistics to considering the whole urban mobility system. Such integration will have to consider planning and management towards increased flexibility in both infrastructure capacity and network capacity for passenger and goods transport, with the purpose of improving the collective use of urban spaces. Shaping spaces according to local needs and supporting communities by rethinking the use of urban areas may be low-hanging fruits in practical planning. Thus, as in Norway through the 2008 Planning and Building Act (Ministry of Local Government and Modernisation, 2008), local authorities have a crucial role in planning and managing areas for hubs and logistics activities, as well as the administration of local regulations combined with facilitating soft mobility modes. By overcoming fragmentation and by integrating more urban mobility players (including citizens), while ensuring accessible multimodal mobility, it may be possible to increase social inclusion and equality and support livable and competitive cities.

Furthermore, future studies could focus more on stakeholders that are not involved in urban freight, but who are directly or indirectly affected by freight distribution, such as citizens, visitors, or end consumers. This issue is even more important when expanding the scope from city logistics to urban mobility for people and goods. Another important research area would be to gain in-depth understandings of local contexts and geographies in particular cities, for example by highlighting the complexity of the challenges that cities are facing and their possibilities with respect to integrate logistics into urban mobility planning.

Based on the findings of my research, I suggest that transportation planning in urban areas should to a larger degree highlight the relationships between consumer behavior, travel behavior and the performance of urban logistics. The study reported in Paper 3 was explanatory, with a relatively small sample. To gain further insights into individuals' consumer and travel behavior, an expanded study

collecting more data could be conducted. Such a study would contribute to a broader understanding of the stakeholders' situation and the interaction between personal mobility and goods movement. Additionally, stakeholder cooperation and collaboration related to innovative solutions for people and freight (using the same infrastructure and dealing with the same capacity) would be interesting avenues for future studies. These relationships will impact mobility in urban communities, city planning, and the possibility of multifunctional use of urban space in the years to come.

Due to the evolving nature of current trends such as e-commerce, the transformation of urban logistics distribution and shopping trips, where the end receiver segment intersects with the end consumer segment, the map of actors will change. The common ground components of parameters and value expectations will therefore demand accurate and detailed data to plan for a changing future. Further research should study how to merge data from different companies, how to overcome barriers for cooperation, and how to develop reliable information about urban freight and the connection to individual behavior. Another direction for further research would be to study the transferability of the research in this thesis. One way to do so could be to conduct studies with larger samples. Another way could be to compare cities or regions with converging or diverging planning approaches, governance, and policy practices. My research mainly targets city planning in Norway, where user participation is governed by planning legislation. By examining other countries with other requirements for public participation, it would be interesting to compare the level of private stakeholders' engagement and potentially why it varies. The level of engagement among participants may impact the complex landscape of the urban mobility system. Thus, knowledge about this complexity, who is affected, and how changes may unveil the interconnection influence the creation of sustainable solutions in the urban environment worldwide.

6. Conclusion

Urbanization, densification, and technological development are creating new challenges for developing mobility systems in urban areas and city centers. The share of people living in cities is growing rapidly and expected to increase to 66% by 2050 (United Nations, 2018). Future city planning which ensures mobility for people and goods requires local leadership and active partnerships between national and city governments, as well as improved coordination between public authorities and private stakeholders.

Technology advances (e.g. e-commerce, autonomous vehicles) and the reorganization of existing economic activities (e.g. the sharing economy) have profound effects not only on how we live, but also on urban form and development, which in turn impact the layout of cities and the places where we spend our time. While large urban areas are likely to feel potential impacts first, significant disruption is expected in urban and suburban communities alike, changing how people move around their neighborhoods and local areas. Such disruption would present both opportunities and challenges to new city development and urban mobility planning.

The conclusion of my research is in line with the shared mobility principles for livable cities, which were launched by an expert group in urban mobility⁵ in 2017. The first four principles (out of ten) are listed as follows: (1) plan cities and mobility together, (2) focus on moving people, not cars, (3) encourage efficient use of space and assets, and (4) engage stakeholders in decision-making. The four principles are stated as valued principles for sustainable, collaborative, and innovative mobility solutions.

City planning with upgraded knowledge about urban logistics and goods movement can improve last mile logistics and create streets that are accessible to everyone and all relevant modes, thereby supporting efficient utilization of urban space and shared infrastructure capacity. Using policy tools to integrate and strengthen links between transport planning and land use is a prerequisite for developing livable cities that ensure mobility for people and goods alike. However, this requires a number of questions to be addressed, such as: What governance, planning and regulation mix do cities need to design and implement local mobility policies effectively? How should cities prepare for stakeholder engagement in public planning processes and decision-making to build effective private–public effective partnerships? With respect to the city logistics issues, how will the demand for parking change? Should we plan for more pick-up and drop-off zones? What about the need for delivery and storage of groceries and goods? All those questions indicate that there are several topics that need further investigation. This dissertation represents one step towards producing knowledge which supports an integrated approach to urban mobility planning for cities in the future.

⁵ www.sharedmobilityprinciples.org

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Part II

Papers

PAPER I

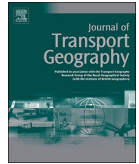
The potential for coordinated logistics planning at the local level: A Norwegian in-depth study of public and private stakeholders.

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The potential for coordinated logistics planning at the local level: A Norwegian in-depth study of public and private stakeholders

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ABSTRACT

Transport is strongly linked to cities and affected by planning related to their future. Trends such as population growth and aging, liveable cities, infrastructure resilience, and changes in land use patterns are reshaping how people and goods move across urban areas. In Norway, local authorities are primarily responsible for facilitating these trends by incorporating related issues into their planning processes. In contrast to personal travel, freight transport and logistics have been neglected by local authorities in urban planning. Thus, in order to address freight transport in decision-making processes, local authorities need to have an increased understanding of urban freight and to pay more attention to freight transport and city logistics. The aim of the paper is to understand the potential for coordinated logistics planning at the local level. Interviews were held with representatives of public authorities and private stakeholders within the logistics supply chain in three Norwegian cities. It is necessary for local authorities to understand stakeholders' operations, perspectives, and attitudes in order to ensure that their involvement in urban planning will be constructive. The findings show that there are no overall strategies for urban freight or city logistics in the studied cities, although public authorities are concerned with issues related to urbanisation and sustainability that indirectly affect freight deliveries. Furthermore, there is poor capacity in planning and policymaking regarding freight. Local authorities comprise a number of fragmented departments and appear to lack resources dedicated to urban freight. However, such authorities realise the need for their contribution in the process of establishing urban logistics plans.

1. Introduction

Growing demands for transportation are a challenge in terms of both logistical performance and the associated impacts on the environment. While passenger transport has received considerable attention from both researchers and policymakers, less attention has been paid to urban freight transport (Browne et al., 2012; Gatta et al., 2017). For example, Rodrigue (2006) argues that transport geographers have neglected freight in the urban context, even though local pollution (NO_x, PM, noise, and dust), traffic safety, congestion, parking, and lack of space for deliveries pose challenges freight transport. In Norway, freight transport accounts for 30% of the total transport in urban areas (Ministry of Transport and Communication, 2017), and is likely to increase due to e-commerce and increased numbers of deliveries direct to homes (Cardenas et al., 2017; Visser et al., 2014).

Although freight transport has gained increased attention among urban planners in large cities (Cui et al., 2015), interest in city logistics solutions is currently at a low level in most local authorities (Van Duin

and Quak, 2007). This calls for improved understanding of the link between urban freight and cities (Cui et al., 2015), which in turn implies there is a need for providing more efficient and higher quality services, reducing traffic congestion, and increased levels of local governance (Ambrosino et al., 2015). Hence, cities need to address freight transport in their decision-making processes. Local authorities have fragmented knowledge of stakeholders in urban freight and of potential measures for making urban freight green and efficient (Bjerkkan et al., 2014; Lindholm, 2013). Towards this need, a number of European cities have started to develop Sustainable Urban Logistics Plans (SULPs) to facilitate urban logistics (Ambrosino et al., 2015). The Sulp framework, which covers freight strategies, action plans, or elements in mobility plans, can be used to identify the current situation and define the strategic context, vision, targets, and objectives with respect to planning. SULPs may be an appropriate tool for local authorities to involve and interact with stakeholders in order to improve conditions for local freight delivery. This potential is in line with stakeholder consultation and collaboration as a key element in urban

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freight planning (Cui et al., 2015; Lindenau and Böhler-Baedeker, 2014; Stathopoulos et al., 2012). However, there has been limited previous research on stakeholder roles, particularly concerning the authorities' role in urban freight planning (Ballantyne et al., 2013; Lindholm, 2012; Sund et al., 2016).

The EU's working document titled *A Call to Action on Urban Logistics* (European Commission, 2013a) highlights three main challenges in urban logistics: (1) lack of focus and strategy, and only a few cities with someone in authority responsible for urban logistics; (2) lack of co-ordination among actors in the logistics supply chain and in many situations insufficient dialogue between city authorities and private actors who operate in the urban context; and (3) lack of data and information about urban logistics, which makes it difficult to improve operational efficiency and long-term planning. A more systematic and comprehensive approach is needed at the city level to improve urban logistics planning and to address the above-mentioned challenges. This includes mapping the needs of relevant stakeholders so that they can be addressed when urban logistic plans are developed.

The aim of this paper is to understand the potential for coordinated logistics planning at the local level, which in turn implies answering the following research questions:

1. What are stakeholders' expectations towards coordinated logistics planning?
2. What are stakeholders' perspectives on participation in coordinated logistics planning?

In this paper, the term 'planning' refers to public planning, and the two questions are addressed through the results of interviews with relevant stakeholders in three selected cities in Norway: Bodø, Trondheim, and Drammen. These cities have different characteristics including local priorities, size, needs and impacts of freight mobility. The paper starts with a description of the complexity of urban freight including the supply chain. In urban areas with several stakeholders' spaces have multiple uses and often conflicting interests for their use. Thereafter, we describe the methodology and data, followed by our results and discussion. Lastly, we present our conclusions, as well as some recommendations and suggestions for further research.

2. The complexity of urban freight

Freight distribution is one of the principal users of urban space and is a central element in the complexity of mobility and accessibility planning. In recent decades there has been a tremendous change in freight distribution and logistics, which in turn has affected urban and suburban areas. The shift to containers that carry goods over long distances, globalisation of production, just-in-time production, and intermodality have all had considerable implications for transport demand (Cidell, 2011; Hesse and Rodrigue, 2004). Additionally, we have observed the fragmentation and dispersal of freight flows due to e-commerce, smaller shops, and an increased logistics sprawl whereby terminals have been located farther away from city centres and there have been increases in the numbers of last mile deliveries (Allen and Browne, 2010; Cherrett et al., 2012; Morfoulaki et al., 2016). Urban development and land use are being transformed by new supply chain organisations, logistics network designs, and consumer-based economies through modern logistics (Goodchild and Ivanov, 2018; Goodchild et al., 2018; Hesse, 2016). Suburban areas are attractive for freight activity, specifically warehousing because of the availability of 'low cost land' and transportation infrastructures that connect to more complex systems of regional and national flows (Dablan et al., 2014; Dablan and Rakotonarivo, 2010; Rodrigue et al., 2016).

Understanding the implications of the above-described trends is crucial both for developing liveable cities and for facilitating urban planning and land use (United Nations, 2018). Local municipalities have begun to adopt a number of strategies for improved mobility and

urban development, such as increased passenger transport with soft modes, car-free spaces, car sharing and reduced car ownership, the use of renewable fuels, and facilitation of city logistics systems (City of Oslo, 2015; Ministry of Transport and Communication, 2017). However, concepts focused on the reduction of both motorized vehicles and space for them within the urban landscape can be problematic with respect to urban freight deliveries, as there are currently few realistic alternatives to the use of vans or trucks. In addition, stakeholders within urban supply chains seek to optimise their own value chains and are less focused on solutions that would be beneficial for the local community as a whole (Bjerkan et al., 2014; Cui et al., 2015; Kin et al., 2017; Nordtømme et al., 2015). A recent Norwegian study reported few or no discussions of freight deliveries during the planning, design, and construction of a large building, lack of coordination among the city authorities and with the private stakeholders, and lack of knowledge about the impacts for urban freight (Pitera et al., 2017). From these observations, it is apparent that the process of developing and implementing sustainable urban logistics in city planning is needed yet demanding.

The application of Sustainable Urban Mobility Plans (SUMP) (European Commission, 2013b), can be seen as an attempt to address some of the above-described issues. A SUMP is defined as a strategic plan aimed at mobility in cities and their surroundings (Ambrosino et al., 2015). The development and implementation of a SUMP requires an integrated approach that combines cooperation, coordination, and consultation between different levels of authorities. Following the principle of public involvement from the beginning of the planning process, it is necessary for authorities to open up the topic for debate and to prepare for public participation as part of the planning process (Lindenau and Böhler-Baedeker, 2014). To ensure higher levels of user acceptance of plans, public authorities need to follow a transparent approach that involves relevant actors in both the development and implementation of their plans (Morfoulaki et al., 2015). Van Duin and Quak (2007) argue for a focus on a cooperative approach, including both government and private parties.

Practitioners' involvement is of key importance for initiating actions to improve the current situation (Cui et al., 2015; Lindenau and Böhler-Baedeker, 2014). Through attempts at creating a framework and methodology for identifying key actors, and in recognition of the needs and logistics processes for individual cities, such as the Enclose Project (Ambrosino et al., 2015), Fossheim and Andersen (2017) conclude that local authorities should develop Sustainable Urban Logistics Plans (SULPs) for integration into cities' SUMP. In Norway, there is growing interest in developing SULPs, and a number of industry representatives have described an urgent need to implement urban logistics plans (Spurkeland and Andersen, 2014) to understand why freight is important to the city and the region, examine the challenges of moving freight and to develop solutions to address challenges.

3. Stakeholders in urban freight

The most relevant stakeholders involved in urban freight are classified as *authorities*, *carriers*, and *receivers* (Lindholm, 2012, 2013), as shown in Fig. 1. *Authorities* are responsible for transport infrastructure systems, law and enforcement, and governing policies at three levels: local, regional, and national. In this paper, the term 'local authorities' refers to city-level administration and to a large extent defines the spaces in which public and private actors can act (Stathopoulos et al., 2011). In Norway, local authorities have a number of concerns, including making the city attractive for residents, visitors, and businesses, and minimising the negative effects of transport, while simultaneously trying to strike a balance between private and public objectives (Bjerkan et al., 2014; Browne et al., 2012; Stathopoulos et al., 2012).

Carriers have been identified traditionally as private stakeholders in logistics (Ogden, 1992). Carriers are responsible for transport from the distribution terminals and aim to collect and deliver goods as efficiently



Fig. 1. Stakeholders in urban freight, with examples.

as possible by optimising load capacity, co-loading, and delivery routes (Stathopoulos et al., 2012). *Receivers* are the final link in the supply chain, and their main task is related to commissioning and receiving deliveries. Receivers form a complex group that responds to the demands of end consumers (Bjerkkan et al., 2014; Stathopoulos et al., 2012).

Public stakeholders play a key role in logistical performance and by minimising the environmental impacts of freight transport. A key barrier to coordinated urban logistics planning is that different actors within local authorities vary in their degree of awareness of their potential influence. This is due to their fragmented responsibilities and unclear roles in urban freight (Ballantyne et al., 2013; Lindholm, 2012). Different departments within city-level administration, such as agencies for planning and building, the police, parking agencies, labour inspection authorities, and food safety authorities, often represent conflicting goals and motivations, (Hull, 2008). Attitudes among local authorities often reflect the perception that optimisation of urban distribution is a private concern (Lindholm, 2012; Lindholm and Behrends, 2012). However, public stakeholders have considerable potential to influence when and how freight is distributed in urban contexts through, for example, initiating a SULP process.

Private stakeholders in urban logistics are a highly diverse group. For example, carriers include small, independent transport companies or one-man transport operators who collect and distribute goods either for their own organisation or for bigger companies, as well as freight forwarders that collect goods for larger deliveries prior to distribution (Cherrett et al., 2012; Hesse, 2016; Kim et al., 2018). Due to the importance of supply chain integration and increased outsourcing of logistics to third parties, logistics service providers (LSPs) form a growing group of private stakeholders in addition to the carriers (Fabbe-Costes et al., 2008). In the literature, there is a strong focus on how carriers and LSPs can increase economic profits, wherein the main issues typically addressed are load capacity, co-loading by planning pick-up and delivery, and vehicle routing (Bjerkkan et al., 2014; Goodchild and Ivanov, 2018; Stathopoulos et al., 2012).

Receivers can operate as small independent firms or form part of a large retailer chain. In city centres, the receivers may be stores located in streets or shopping malls, retailers, restaurants, hotels, or public institutions (Bjerkkan et al., 2014). The variation suggests that different receivers can influence and be influenced differently by policy measures concerning urban distribution (Ballantyne et al., 2013). In addition, a number of actors are directly influenced by urban freight transport, although their involvement is always indirect (Bjerkkan et al., 2014; Cui et al., 2015). Citizens, workers, shoppers, tourists, vehicle manufacturers, and property owners, to name a few (Russo and Comi, 2010). Traditionally, such stakeholders have not participated in transportation planning but their interests should be considered by the public authorities within mobility planning processes, even though their roles and responsibilities are not clearly understood (Kin et al., 2017; Lindenaу and Böhler-Baedeker, 2014; Österle et al., 2015).

4. The Norwegian context

Norway as a whole has maintained steady economic growth since the 1970s and the per capita income in the country is among the highest in the world (Statistics Norway, 2018). In addition, the rise of a neo-liberal and pro-business ideology (Sager, 2011) has emphasised deregulation and encouraged private investment within urban development. Norway is characterised by a rather dispersed population and low-density urban areas, but the Government has shown a clear commitment to sustainable development through its multilateral agendas. The ongoing demographic trends in Norway are partly marked by immigration, the concentration of population in larger cities, reduced household size, and an increasing elderly population (Ministry of Climate and Environment, 2018).

The Norwegian context on local level is similar in many respects to that of a number of other European countries, with a community structure dominated by small to medium-sized cities and urban agglomerations. However, it has some distinctive characteristics with respect to the organisation of urban freight, with small independent carriers operating for larger freight forwarders and logistics companies. Public authorities are relatively strong at the local level, and to a large extent they are responsible for city and mobility planning, and thus responsible for facilitating urban freight transport.

National and regional planning only serves to influence local municipal planning processes (Ministry of Local Government and Modernisation, 2012) by providing general guidelines and frameworks for the transportation of goods and for infrastructure systems in cities. The Planning and Building Act is among local authorities instrument to safeguard public interests, manage land use policy, and instruct the local authorities in the development of both a municipal master plan with a 16-year horizon and an updated action programme every four years (Ministry of Local Government and Modernisation, 2008). For example, the Norwegian Public Road Administration (NPRA) has links to local municipalities and city administrations through its responsibility for public roads. The NPRA and other governmental bodies have developed handbooks and guidelines to support local planners and developers (Norwegian Public Roads Administration, 2014). However, the guidelines do not directly address the use of urban spaces where the handling of freight has an impact on other street users or where delivery issues arise (Pitera et al., 2017).

Commitment to the principles of sustainability has forced local planning authorities to adopt different tools to reduce urban expansion and logistics sprawl, and to facilitate public transport, cycling, and walking. The National Transport Plan which sets forth the Norwegian Government's transport goals and strategies in a long-term perspective, has motivated local authorities in major cities to develop local transport plans, but mainly focus on passengers. (Ministry of Transport and Communication, 2017). The largest cities in Norway receive national funding through city agreements with the national government, which are intended to stabilise or reduce private car vehicle miles travelled. The agreements finance infrastructure for bicycles, pedestrians, and public transport, and discourage the use of private cars through regulations and fiscal tools (Ministry of Climate and Environment, 2018;

Ministry of Transport and Communication, 2017). However, these agreements do not seem to encourage integrated mobility planning that incorporates goods and passengers alike, which is a prerequisite for developing attractive and sustainable cities (Banister, 2008; Rai et al., 2017; Russo and Comi, 2016).

5. Methodology

The aim of this paper is to provide an understanding of the potential for coordinated logistics planning at the local level, by gaining insights in the stakeholder's expectations and their perspectives on participation in urban logistics planning. In order to get this insight, interviews were conducted with stakeholders from three distinct Norwegian cities: Bodø, Trondheim, and Drammen. The three cities are among a total of nine cities currently participating in an ongoing national research project – Norsulp¹ – on facilitating strategies for mobility and urban development through developing guidance for the establishment of urban logistics plans in Norway. Since less consideration has been given to freight in the urban context to date, including in Norway, these cities represent the first stage of a process of integrating logistics and stakeholder participation in urban planning. The data were derived from semi-structured interviews with representatives from the three stakeholder groups described in Section 3 (see Table 1 for an overview).

Semi-structured interviews are considered suitable for gathering experiences and information about a topic for which there is limited knowledge (Thagaard, 2009). They are also appropriate because they allow for the capture of individual stakeholder's subjective reflections (Tjora, 2012). In the studied cities, semi-structured interviews also enabled individual stakeholder's expectations towards coordinated urban logistics to be recorded. All interviews were based on an interview guide that focused on stakeholders' expectations regarding their contributions to an urban logistics planning process. The guide had two main purposes: (1) to identify existing goals and policies concerning urban freight, and (2) to reveal attitudes concerning the development of logistics plans. Initial contact with the interviewees was established through the Norsulp project. The interviewees were sampled from the stakeholder groups and were actively recruited to include those with different backgrounds in the public and private sectors. Since the public stakeholder groups had different responsibilities, interviewees from all three public authority levels were included (i.e. local, regional, and national).

A total of 20 individual interviews were conducted during spring 2016, including more or less equal numbers of stakeholders from the three cities. Each interview lasted no longer than 1 h. In addition to the interviewees' responses, additional materials such as plans, and project proposals were collected and analysed. Of the 20 interviews, 13 represented public authorities, of which 10 were at the local level, mainly from the city planning departments and the climate and energy departments. In addition, representatives from parking, operation, and maintenance were interviewed. Three interviews were conducted with representatives from national and regional authorities, all of whom were employed at different levels in the NPRA. The interviewees from the public sector represented a large variety of interests and responsibilities, but they all worked with topics related to city development and urban transport. The private stakeholder group was subdivided into carriers and receivers. The representatives in the carrier's group were from one company in each city (two freight forwarders and a one-man transport operator) and from an interest organisation representing hauliers (Norwegian Hauliers' Association). The representatives of receivers were from a shoe store, a restaurant, and a discount store, one in each of the three cities. All interviews were made anonymous. Summaries of the interviews were categorised by stakeholder group and used to interpret the interviewees' statements. The selected cities, seen

Table 1

Interviews classified by stakeholder groups.

Stakeholder groups		Interviewees	
Public (n = 13)	Authorities	Local level	10
		National and/or regional level	3
	Private (n = 7)	Carriers	–
Receivers		–	3
Total			20

in Table 2, represent different levels of engagement in urban transport through their respective city programme and face different challenges in terms of city development. Relevant initiatives in the three cities mainly focus on passenger transport and city development, and do not include any specific freight topics.

Smart City Bodø was recently established to develop a new city area following relocation of the city's airport *Bodø Kommune, 2016*). Also, the newly established Living City Drammen focuses on 'city growth with quality' towards the city's 225 years jubilee in 2036 (*Drammen Kommune, 2018*). Greener Trondheim, which has been ongoing since 2008, is a partnership that engages public stakeholders with a focus on passenger transport and comprises a city agreement with the national government. Trondheim is investing NOK 15 billion in roads and facilities for pedestrian, cyclists, and public transport in the period 2010–2025, with the aim of reducing greenhouse gas emissions, congestion, traffic noise, and the number of traffic accidents by ensuring better traffic management and increasing the share of transport on foot or by bicycle, bus, or tram (*Lee and Berthelsen, 2016; Trondheim Kommune, 2017*).

6. Results and discussion

The interviews were used to understand the potential for coordinated logistics planning at the local level by investigating the stakeholder's expectations and their perspectives on participation in such planning.

6.1. Stakeholders' expectations

6.1.1. Public stakeholders

6.1.1.1. Strategy and policy plans. Interviewees from the local authorities were generally in agreement in their perceptions that urban freight lacked a unified strategy within the city administration. During the interviews, the topic of urban logistics plans generated enthusiastic responses among the interviewees, but they also reported that they had experienced urban freight as a challenging issue in the absence of an evident, coordinated strategy. Responsible bodies involved with urban freight occasionally had conflicting goals, which in turn caused problems in administration, regulation, and enforcement. This finding was not surprising, because urban freight policies include many domains and means that relevant city administration personnel can be found at several levels or in a number of departments. The interviews revealed that local authorities had implemented a number of strategies and actions that prioritised passenger transport, road safety, and street use. The strategies did not include urban freight deliveries. The lack of strategies for urban freight, along with a fragmented organisational structure made it difficult to coordinate issues on urban freight within and between the different departments.

A further indication of the complexity in urban freight planning was reflected in different interviewees' references to a variety of key policy documents or instruments for urban freight at the local level. Some interviewees mentioned the municipal master plan anchored in the Planning and Building Act (*Ministry of Local Government and Modernisation, 2008*) while others emphasised city development plans, which are more informal in character. The interviewees also

¹ www.norsulp.no

Table 2
Characteristics of the selected cities.

City ^a	2017			Estimated population growth 2017–2040 (%)	Relevant city programme
	Number of residents	Area of urban settlements (km ²)	Density (residents/km ²)		
Bodo	40,705	14.12	2883	17	Smart City Bodo
Drammen	116,446	51.23	2273	19	Living City Drammen
Trondheim	180,557	57.32	3150	14	Greener Trondheim

^a <https://www.ssb.no/en/statbank/table/04859/tableViewLayout1/?rxid=3be78431-53a7-435a-9b40-01d97603f9c8>

emphasised various thematic plans that they regarded as relevant for urban freight, as well as experiences that illustrated the complexity in the hierarchy of plans at city level. Given that freight planning responsibilities are divided across various departments within the local authorities, individuals within administration often lack an overview of the entire landscape of regulation and enforcement at city level and the different actors' scope for action.

6.1.1.2. Attention to urban freight in public planning. The interviewees stated that urban delivery situations were in general treated on a case-to-case basis in public planning, which meant that there was not much continuity or uniformity between different cities. Issues were not necessarily given thorough, holistic consideration, thus making it difficult for comprehensive solutions to be found. Actors with particular agendas can influence different stages of the planning process, resulting in suboptimal solutions for other actors who are directly influenced. One example is the construction of loading zones and goods reception. The city administrations have central responsibility for localising loading zones, but the agreed solutions are not necessarily easy to find when there are many conflicting interests within an urban area. One respondent stated that it was difficult to administer building applications because the economic interests were usually a main concern for the developer and property owner, and a loading zone inside the building did not generate money. Hence, the developer preferred freight deliveries to be made in a loading zone outside the building instead, which in turn could conflict with activities on the streets and pavements, such as cycling and walking. However, the interviewees rarely considered the impact of freight in their daily planning activities. This was mainly due to their lack of knowledge and experience about urban freight, but also the lack of involvement of private stakeholders, in, for example, the development and implementation of delivery solutions.

6.1.1.3. Connections between local and regional levels and the national level. The interviews with the representatives of regional and national authorities revealed they were mainly concerned about national plans and regulations such as the National Transport Plan or Vision Zero in road safety,² as well as requirements necessary to implement various EU directives. The national regulations generate framework conditions and indirectly influence the performance of urban freight, but do not necessarily provide guidance on how urban freight should be managed in practice. The interviewees highlighted that national and regional authorities functioned as consultative bodies that involved regional and county roads, while the local authorities' focus was on urban transport. The overlap between strategies and planning at regional and national levels is limited and regional authorities do not have jurisdiction over local urban freight issues, nor do they have a general interest in them. However, according to the representatives of supply chains and terminals located outside the city centres, there was a need to improve the link between local and regional planning with respect to integrating land use and transportation.

² Vision Zero in road safety is a multinational project with the goal that no one shall be killed or seriously injured while using the road transport system.

6.1.1.4. Ownership and coordination. The interviews revealed that the public authorities are particularly enthusiastic about developing logistics plans that increase the expertise and diversity of knowledge within the city administrations and improve coordination between different departments involved in questions concerning urban freight. Interviewees who represented authorities were particularly in agreement that the planning process should have strong internal support at the local authority level and should be strongly anchored politically. This finding is in accordance with the SULP guidelines, which state that all relevant departments within city administration should be included in the process (Ambrosino et al., 2015). The included departments are likely to vary between cities, because the organisation of urban freight issues varies considerably between cities. Thus, fostering ownership of the process is critical, since many different departments are involved, which means that local authorities can easily fail to pay attention to competing issues. The representatives of public authorities expressed optimism that an urban logistics planning process could result in better coordination between departments and lead to a platform of knowledge and better practices for urban freight deliveries.

6.1.2. Private stakeholders

6.1.2.1. Early involvement. All of the private stakeholders considered that being involved in the planning process at an early stage was very important. A number of interviewees pointed out that single measures that had been implemented by public authorities, often as a result of demands related to environmental concerns, can have adverse effect on urban freight. In many cases private stakeholders should have been consulted on such policy measures. For example, carriers might have faced large economic costs when new requirements were introduced concerning the technical performance of trucks. The predictability of policies and regulations is critical for this stakeholder group, so that investments in operations can be adjusted according to political decisions. The representatives of the carriers were aware that they would need to adhere to any implemented political measures.

From the interviews, it could be deduced that private stakeholders' main interest is in reducing their own expenses. Inefficient operations are costly and private stakeholders therefore focus mainly on economic and efficiency issues. Typically, when considering changes to operations, carriers test potential delivery solutions on a small scale but without coordinating with other actor groups. Carriers and receivers are aware that their interests may compete with the interests of other stakeholders and sometimes compete with the interests of others within the same stakeholder group. Such conflicts of interest may complicate planning processes. If given an opportunity, carriers and receivers are often eager to work with city authorities on concrete plans to identify problems at an early stage and to work co-operatively to implement solutions, as this enables them to see the direct benefits of their involvement. If an urban logistics plan addresses the needs of private stakeholders, the active development of such a plan may lead to increased private stakeholder involvement in the public planning process.

6.1.2.2. Best practice in practical solutions. Drivers face numerous practical challenges when making deliveries, such as uneven surfaces and insufficient space for manoeuvring, loading, and unloading goods. The interviewees mentioned shopping malls were an increasing concern

for drivers, particularly when the lack of a common loading zone meant that drivers had to wait in a queue to deliver goods directly to individual stores. The representatives of carriers were particularly hopeful that being involved in public planning processes could lead to better practical solutions at street level for the drivers. Additionally, increased transparency among the stakeholders is important to gain trust for cooperation in the last mile logistics.

The results of the interviews indicated that the receivers were generally less concerned about measures related to urban freight than were the carriers. The receivers did not appear to care about urban freight as long as goods arrived at the agreed time and were not exposed to the challenges that both the carriers and other impacted stakeholders experienced. Additionally, they were of the opinion that what happened on the streets was outside the scope of their responsibility, but rather a public responsibility. However, some individual strategies, such as increased focus on local commodities and the use of electric vehicles, were mentioned by both carriers and receivers as relevant for future urban freight solutions.

6.2. Stakeholders' perspectives on participation

The process of establishing an urban logistics plan should help local authorities in Norway to facilitate dialogue and find solutions in coordination with public and private stakeholders in order to overcome any challenges and barriers to urban logistics planning. Based on the analysis of the 20 interviews in the Norwegian context, important aspects of preparations for an urban logistics planning process should include identifying: (1) which stakeholders to involve, (2) the complexity and challenges regarding urban freight, (3) the consequences of suboptimal outcomes for all stakeholders, and (4) the connection between the supply chain and last mile deliveries.

The main reasons why the interviewed stakeholders wanted to participate in a logistics planning process at the local level are listed in Table 3. Overall, private stakeholders were positive towards participating in an urban logistics planning process, but they were more reserved in their expectations than were the representatives of the public authorities. Private stakeholders found the planning process time-consuming. In addition, they experienced delivery solutions as inefficient and unpredictable, often because the implemented solutions were based on consensus among local authorities alone and were not in harmony with the wishes of private stakeholders. To facilitate the connection between the supply chain and the last mile, it is necessary to include the regional perspective in logistics planning, yet the interviewees indicated that focusing too much on a regional perspective in urban freight plans seemed to shift the emphasis from urban issues to heavy goods vehicles and long-haul transport.

7. Conclusions

7.1. The potential for coordinated logistics planning

The purpose of our study was to understand the potential for coordinated logistics planning at the local level in Norway. Based on the findings, we conclude that there is *no coordinated planning* and few

dedicated resources for urban freight at the local level. Urban logistics is not properly integrated into urban transport and economic development strategies, and freight plans rarely exist at the city level. Despite the key role of urban freight in the local economy, none of the cities have a clearly identified official responsible for freight. However, the research revealed both an expected benefit of the development of urban logistics plans as well as enthusiasm for such plans. The majority of the urban logistics operations are carried out for and by private actors, who operate regularly but without a dialogue with city authorities. In the absence of cooperation among the public and private stakeholders, it is not possible to implement long-term solutions for urban logistics problems, which are likely to increase as cities grow and become increasingly dense. In addition, the trend in e-commerce and home deliveries has a large impact on both the transport system and the balance between individual travel and urban logistics (Visser et al., 2014). These findings support earlier claims that urban freight transport should be given higher priority on the local agenda (Ballantyne et al., 2013; Cui et al., 2015).

The results of the studies provide insights into how cities are currently dealing with the lack of focus and strategy in urban logistics, as well as the lack of coordination among actors in the supply chain and among public and private stakeholders in urban freight. For example, they show that the cities lack sufficient resources to tackle the challenges in urban freight. The described processes, which were part of the research strategy to organise workshops for all concerned actors, are by itself already a benchmark for the kind of participation settings to put in place. To our knowledge, this paper is one of the first attempts to analyse such practices in cities. Furthermore, the results contribute knowledge about how to involve the stakeholder in urban logistics planning. As was explained in Sections 2 and 3, we proposed to follow a structured way to identify and invite the stakeholders to be included. This approach was very much appreciated by the participants.

A national approach to enabling uniform local approaches could develop *guidelines* with an overall vision for urban freight and guide the local authorities to initiate collaboration with relevant stakeholders (Fossheim and Andersen, 2017). When local planning processes are derived from national guidelines the possibilities for *knowledge sharing* among cities increase. However, it is equally important to map stakeholders' expectations in each city, as a step to establish a collaborative urban logistics planning process in which stakeholders are consulted (Ballantyne et al., 2013). It is evident that cities need to adjust the process and measures to the local context, which in turn requires a clear understanding of a city or region's needs. Local authorities should jointly work with stakeholders on city region strategies for policy integration in order to transfer knowledge across a wider region to reduce complexity, and to achieve transport solutions that are more sustainable in cities than at present (Fossheim and Andersen, 2017; Hull, 2008).

Based on the findings, we conclude that there is both a need and a potential for the development of logistics plans in Norwegian cities, since all of the interviewees had a *positive attitude* towards being involved in and contributing to coordinated logistics planning. The study indicated that urban logistics planning may increase the level of attention paid to freight transport at the local level. Additionally, they

Table 3

Reasons for stakeholders wishes to participate in logistics planning at the local level.

Public stakeholders	Private stakeholders
<ul style="list-style-type: none"> ● Opportunity to take ownership of the process ● Increased expertise and knowledge ● Better coordination within local authorities ● Belief that guidelines will facilitate predictability and transparency among cities ● Develop best practice and practical solutions ● Transfer of knowledge between cities ● Integration of logistics into mobility plans 	<ul style="list-style-type: none"> ● Gain knowledge of the planning process ● Early involvement and given input ● Require cooperation in the supply chain and the last mile ● Expectations of less stakeholder conflict ● Expectations of higher predictability ● Private stakeholder involvement may facilitate decision-making support and suitable solutions

hoped for the formation of an arena in which dialogue and meetings would be held in order to help the involved stakeholders to be aware of reciprocal and common user needs regarding urban freight.

7.2. Recommendations

It is in the common interest of local authorities and businesses to optimise city logistics, yet far too often they operate in isolation, without the necessary cooperation and agreement. Through bringing together the local actors as part of a collaborative planning process, meaningful plans for action can be developed. In turn, that would help to establish a generic decision-making framework, anchored in the cities' planning systems, which would facilitate meaningful interactions between the various stakeholders. To be effective, the vision needs to be integrated with other urban policies, clearly articulated, and shared by all stakeholders, in addition to be tailored to the individual cities' local context (Civitas, 2015; Macário and Marques, 2008). In urban and regional planning, it is the local levels ideas and processes that may be most meaningfully expressed and operationalised due to a potential appeal to unaccustomed decision-makers. Because matters of significance are neither too trivial to be of interest, nor too remote to be outside their orbit of influence (Fagence, 1977). Nevertheless, due to the integration of both land use and transportation planning and the link between city logistics and the supply chain through terminals, it is important to incorporate urban freight transport and connect the planning process to regional level. Regional transport strategies and plans may contribute to develop a hierarchy of approaches to reduce impacts of freight (Cui et al., 2015; Fosheim and Andersen, 2017; Hull, 2008).

By increasing coordination and competence among the public authorities at various levels and by developing national guidelines, it is likely that predictability in day-to-day operations would be improved for all actors through increased transparency concerning how urban freight deliveries are handled within city administrations. Increased knowledge is required to understand the complexity of urban freight, how laws and regulations affect present systems, and to understand some of the trade-offs and conflicts between users of shared urban spaces. Furthermore, an understanding of the planning hierarchy is needed to involve the private stakeholders at appropriate early stages in the planning process and to improve coordination between public and private stakeholders (Österle et al., 2015). Local authorities currently focus their attention and resources on passenger transport, leaving few dedicated resources for freight. The important role played by logistics in the city economy can illustrate the large potential for working with logistics stakeholders to improve urban freight efficiency, to reduce costs, and to eliminate other negative impacts.

7.3. Further research

There is a lack of predictability in the supply chain and suboptimal solutions are found daily among the private stakeholders. The private stakeholders are to a large degree uncoordinated and their operations are characterised by ad hoc solutions. Therefore, the stakeholders themselves call for involvement in the public planning process. All these differences result in the need for a general, centralized guidelines that can be adapted for local condition. Not only fixed meetings but also arenas with possibilities to invite new businesses as start-ups and new players.

Once relevant stakeholders have been identified, the next step would be to involve and engage them in an improved collaborative process towards an urban logistics plan (Bjørgen et al., 2018). Further research should therefore pay attention to private stakeholders' operational needs in order to ensure that their participation in the planning process would be considered worth their time. Additionally, a more thorough mapping of small and medium-sized enterprises (SMEs) should be considered in order to involve SMEs and gain knowledge

about their current situation and their future needs for participation in urban logistics planning processes. Moreover, it is important for local authorities to be specific about both how collaboration should occur and how to ensure that private stakeholders are engaged from the outset of the process. The research findings presented in this paper give some indications to how to engage stakeholders, but more knowledge is needed. Possible arenas for the involvement of the stakeholders in planning could be collaborative events, such as workshops for gathering knowledge in dedicated cities (Innes and Booher, 2010; Innes and Booher, 2015; Raynor et al., 2018). Furthermore, local information can be compiled and used to develop the national guidelines to deal with the complexity of urban freight, and at the same time give input to each city's challenges and possibilities with respect to logistics planning.

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PAPER II

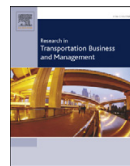
Stakeholder responses to measures green and efficient urban freight.

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Stakeholder responses to measures green and efficient urban freight



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ABSTRACT

The project *Green Urban Distribution* aims at identifying and demonstrating green and efficient solutions for urban freight distribution through improved organization, service innovation and the application of technology. The successful introduction of such solutions depends on the acceptability and receptivity of involved stakeholders. Stakeholders in this case include carriers, end-receivers and local authorities. This paper presents stakeholder evaluations of two specific measures aimed at increasing the utilization of street areas, night and evening deliveries: mobile depots allow for the reallocation of land, whereas night and evening deliveries promote urban goods distribution in periods with low traffic and disperse distribution activities across 24 hours. The findings of the paper lead to the development of a theoretical representation of particular collaborative processes in urban freight, as well as an aide in the practical organization and approach to measure implementation.

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1. Introduction

The distribution of goods is an important prerequisite for living cities with a concentrated population and a competitive business sector. Goods distribution is crucial for the economic system in distributing goods to retailers, commercial establishments, offices and homes. However, urban freight distribution is characterized by challenges related to lack of coordination between actors in the logistics chain, inaccessible and unavailable loading zones, ineffective stock receipts and ad-hoc events requiring improvised solutions. As this paper only deals with freight the concept of urban distribution means urban freight distribution.

Developing more efficient and environmentally friendly urban goods distribution depends on increased knowledge and cooperation between private business and authorities. The project *Green Urban Distribution* aims at identifying and demonstrating green and efficient solutions for urban goods distribution through improved organization, service innovation and the application of technology. The project is funded by The Regional Research Fund in Norway, and the Environment Department of the city of Oslo is the project owner. The project is carried out in collaboration with central transport businesses, goods owners, transport organizations, vehicle and technology suppliers, the Norwegian Public Roads Administration and research institutions. The main purpose of the project is to develop green and efficient distribution

solutions in the city center of Oslo, aiming at i) improved utilization of street areas, ii) improved time utilization, and iii) utilization of technology such as energy efficient vehicles and unmanned stock receipts.

The successful introduction of such solutions, however, depends on the acceptability and receptivity of involved stakeholders. It is important to recognize and adequately understand the concerns of different stakeholders in order to successfully implement city logistics policies (Stathopoulos, Valeri, Marcucci, Nuzzolo, & Comi, 2011). One of the most important predictors of a measure's feasibility is its consequences to each involved stakeholder. Stakeholders will adhere to a measure only if it will not inflict any negative consequences upon them (Rogers, 1983), or if positive consequences outweigh negative ones. Further, negative consequences are typically more important to stakeholder evaluations than the measure's effectiveness (Schuitema & Steg, 2005). Particularly important to the introduction of measures in urban distribution is the complexity of logistics chains. Policies that do not take into account complex interactions within the chain may yield suboptimal outcomes based on inaccurate projections of the likely effects (Hensher & Puckett, 2004:3).

Few studies explicitly document stakeholder perspectives on measures for urban freight transport. In contrast to for instance public transport, authorities have typically not acknowledged their own potential influence in achieving efficient freight transport (Lindholm, 2012). Along with other factors, this has caused a vacuum in urban freight allowing for uncoordinated activities characterized by lack of cooperation between actors. Managed and determined stakeholder involvement is therefore crucial for advancing towards efficient urban freight, and is likely to represent an untapped resource more in urban freight than other transport areas. Additionally, urban freight represents

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far greater potential in tackling environmental challenges as it is a leading cause of both noise and local pollution in urban areas.

Hence, the effective introduction of solutions identified in the *Green Urban Distribution* project heavily depends on the ability to comply with the needs and prerequisites of stakeholders in the urban logistics chain. The study presented in this paper will provide a basis for designing viable and effective measures in order to achieve more environmentally-friendly and effective freight distribution in the city center of Oslo. This paper asks *how do relevant stakeholders evaluate potential measures for facilitating green and efficient urban distribution?* More specifically, this paper presents stakeholder responses to one measure aimed at improving utilization of street areas and one measure aimed at improving time utilization: i) mobile depots, and ii) night and evening deliveries. As they allow for the reallocation of land, mobile depots are intended to improve the utilization of streets in urban areas. Night and evening deliveries are expected to promote urban goods distribution in periods with low traffic and disperse distribution activities across 24 h. These measures are selected because they answer to the project's objective of focusing on improved street area and time utilization, and have been piloted in several other cities. Stakeholder responses are categorized as *facilitators* or *obstacles* for implementing measures for green, efficient freight.

2. Investigating stakeholder responses

Research and practice show the role of stakeholders to be crucial in implementing measures for green and efficient freight. The importance of stakeholder involvement in decision making is recognized in a variety of research fields, although appearing with different labels such as stakeholder collaboration, public participation, citizen participation and stakeholder management to mention some. They all revolve around the increasingly acknowledged input of stakeholders and are particularly prominent within computing and engineering (Xiao, Zeng, Allen, Rosen, & Mistree, 2005), infrastructure planning (Li, Ng, & Skitmore, 2013; Rawson & Hooper, 2012) (Rawson & Hooper, 2012), public relation management (Trapp, 2014), production design and development (Ahmad, Kyratsis, & Holmes, 2012; Nishino, Iino, Tsuji, Kageyama, & Ueda, 2011), health policy (Rosenberg-Yungera, Thorsteinsdóttir, Daarc, & Martind, 2012), program evaluation (Brandon, 1998), environmental preservation and ecological development (Beierle, 2002; Reed, 2008).

Stakeholders play no lesser part in the field of transport, and in complex areas such as urban freight transport joint strategies cannot be achieved without collaboration (Gray & Wood, 1991). Not attending to the interests and perspectives of stakeholders often leads to poor performance, failure or disaster (Bryson, Patton, & Bowman, 2011). Conflicts between stakeholder interests call for open dialogue to which all stakeholders can contribute (Hensher & Brewer, 2001). Public-private understanding, collaboration and partnership is necessary in order to achieve sustainable urban freight transport (Crainic, Ricciardi, & Storchi, 2004), and, in particular, long-term public-private partnerships can have positive effects on outcomes for both groups (Lindholm & Browne, 2013). Both stakeholder theory, multi-actor multi criteria analysis (MAMCA) and action learning theory have been applied to understand and analyze the role and input of stakeholders in strategic processes within the transport domain.

Stakeholder theory is a theory of organizational management and ethic, but critically examines the ends of cooperative activity and the means of achieving these more than other theories of strategic management (Phillips, Freeman, & Wicks, 2003). Stakeholder theory emphasizes that each stakeholder must relate to other participants within the supply chain, or the urban distribution chain (Hensher & Brewer, 2001).

Ballantyne, Lindholm, and Whiteing (2013) argue, however, that such approaches are not necessarily appropriate for urban freight transport, as they tend to focus on stakeholders in a single organization,

that they take a “business-oriented stance”, and that public stakeholders are given less importance. Within the field of urban freight transport, they propose a more balanced view of stakeholder interests and to include *all* actors and stakeholders relevant to the particular problem area.

Multi-actor multi criteria analysis (MAMCA) explicitly includes stakeholder perspectives in evaluating transport measures with reference to stakeholder objectives. MAMCA is a stepwise methodology in which stakeholders and their key objectives are identified and weighted (Macharis, Turckin, & Lebeau, 2012). Indicators are then constructed for each criterion in the evaluation, before an evaluation matrix is used for ranking alternatives according to their strengths and weaknesses.

The action learning approach emphasizes learning through a collaborative process between different stakeholders where the outcome is both a normative development as well as strategy development towards intended change (“learning through action”) (Hensher & Brewer, 2001). The ultimate objective is problem solving in terms of successful strategy formulation and implementation.

The approach in the present study rests on notions from all the above understandings, as it acknowledges the importance of collaboration between several stakeholder groups. This paper, however, is less explicit in comparing or ranking criteria and alternatives, and does not aim at reaching specific strategy formulation. The results presented in this paper rather represent the first efforts in a collaborative process aimed at reaching common ground for measure implementation.

3. Stakeholders in urban distribution

Stakeholder perspectives are rarely emphasized in studies on urban distribution measures. Preliminary results from on-going projects are scarcely reported, and the majority of projects are concerned with demonstrating solutions for improved urban distribution rather than documenting stakeholder evaluations. Consequently, existing knowledge on stakeholder perspectives is limited. In line with this, one purpose of this paper is to present stakeholder needs and concerns upon implementation of measures for green freight distribution. These are cardinal for identifying potential facilitators and obstacles in the practical deployment of urban freight policies.

A stakeholder is an actor or a group of actors which affects or is affected by the phenomenon under study (see also Banville, Landry, Martel, & Boulaire, 1998; Freeman, 1984; Munda, 2004). Among stakeholders traditionally identified in logistics are receivers, carriers and forwarders (Ogden, 1992), but recent research also emphasizes the involvement of policy makers, decision makers and local authorities (Lindholm, 2012; Russo & Comi, 2010; Stathopoulos et al., 2011).

Research typically identifies carriers, end-receivers and local authorities as the most relevant stakeholders in the *urban* distribution chain (Lindholm, 2012; Russo & Comi, 2010; Stathopoulos et al., 2011). Recent research argues, however, for a distinction between stakeholders and actors. Based on 74 interviews with local authorities and freight stakeholders in five Northern European countries, Ballantyne et al. differentiate between i) those who directly affect issues in urban freight (actors) and those who have an indirect interest in urban freight (stakeholders). They conclude that *stakeholders are all that have an interest in the system of urban freight transport (individuals, groups of people, organizations, companies, etc.); whereas actors are those that have a direct influence on the system. Therefore, all actors are stakeholders, but not all stakeholders are actors* (Ballantyne et al., 2013:98). Although this is both acknowledged and recognized in this paper, such a distinction is not made in the following.

Carriers, end-receivers and local authorities are also considered vital for the introduction of measures in the city of Oslo, and are the main focus of this study. The end-receiver group refers to the last link of the distribution chain, and end-consumers are thus omitted. In theory, the end-receiver could also be the end-consumer, particularly in relation to e-commerce and home deliveries. However, this is not the case here. The city center of Oslo largely consists of retailers and offices and

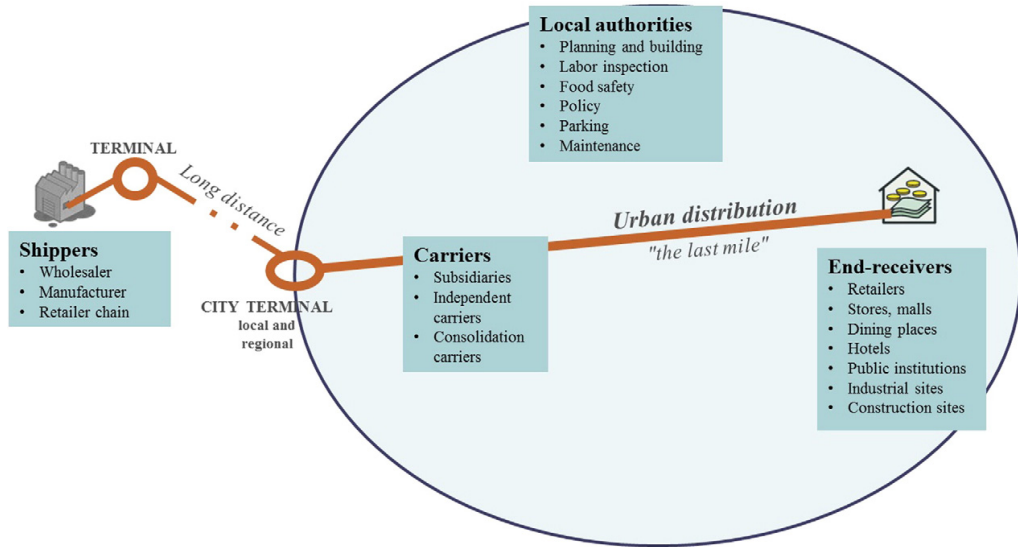


Fig. 1. Stakeholders in the urban distribution chain.

to a very little extent permanent residents. The end-consumer therefore becomes less relevant to study in relation to the selected measures.

Fig. 1 shows stakeholders and their interrelations in the urban distribution chain, whereof three groups are explicitly included in this study. As most measures for achieving green and efficient urban distribution are directed at carriers, the majority of research involving stakeholders focuses on this group. Hence, there is more available knowledge regarding carrier responses to potential measures, and their needs and prerequisites related to urban distribution policies. Although acknowledged as important stakeholders, end-receivers and local authorities have received less attention.

3.1. Carriers

Freight carriers are heterogeneous and not easily defined. Whereas some carriers are subsidiaries of wholesaler companies distributing own products to retailers, others are independent carriers providing third-party logistics. Yet others are consolidation carriers facilitating transport services between customers (transport users) and smaller transport providers. Consequently, size, economy and influence vary significantly between carriers, but their general purpose is to collect, transport and deliver goods commissioned by manufacturers, wholesalers and receivers. The objective of freight carriers is profit growth, which they seek to achieve by minimizing transportation costs and maximizing sales (Taniguchi & Tamagawa, 2005). Consequently, carriers seek to collect and deliver goods as efficiently as possible by optimizing load capacity, co-loading and delivery routes. This is also reflected in the literature, which primarily relates carrier challenges to the planning of pick-up and delivery, vehicle routing and operational costs (Stathopoulos et al., 2011).

3.2. End-receivers

End-receivers are a complex group, but in general receivers of goods respond to the demands of the final consumers (Stathopoulos et al., 2011). Some end-receivers are retailers or companies operating stores and dining places, but they also include hotels, public institutions and other business requiring regular deliveries. End-receivers could further be industrial or construction sites depending on the delivery of goods

and materials to maintain production. End-receivers vary both in turnover and number of employees, whether they are part of a larger retailer chain or operate independently. Some are located in streets, others at shopping malls. These variations suggest that different end-receivers can influence and be influenced differently by measures directed at urban distribution.

End-receivers are the final link in the logistics chain, and their main tasks are related to commissioning and receiving deliveries. Commissions can be made to wholesalers, manufacturers or departments within own organization, but end-receivers are in most cases responsible for being present and receiving deliveries themselves. The primary concern of end-receivers in urban distribution is keeping personnel expenses low and securing staff appropriate to handle designated tasks, e.g. receiving goods.

3.3. Local authorities

Although they to a varying degree are aware of their potential influence (Lindholm, 2012), local authorities can influence both when and how urban distribution is performed. However, local authorities consist of a range of departments with different and potentially conflicting goals, rationalities and motivations. Local authorities can among others include labor inspection agencies, food safety authorities, agencies for planning and building services, police and parking agencies as well as local, regional and federal maintenance departments. Combined, these actors represent a multifaceted influence.

The heterogeneity of local authorities suggests great variations in terms of tasks and responsibilities, but one of the responsibilities of local authorities is to facilitate green and efficient urban freight transport. Their role is to define the policy scenario within which private stakeholders operate (Stathopoulos, Valeri, & Marucci, 2012:36) and to revitalize the city both economically and environmentally (Taniguchi & Tamagawa, 2005:3064). Research shows, however, great variation in the degree to which local authorities consider urban distribution a public responsibility. A study among 94 Swedish municipalities found that local authorities commonly consider urban distribution a non-public issue and that the transport industry itself is responsible for optimizing urban distribution (Lindholm, 2012:142). Dablanc (2007) argues that local authorities are aware that they should control goods transport

activities because of their impact on the urban environment, but that most authorities do not know how.

As the degree to which local authorities consider urban distribution a public matter varies, so do their perceptions of problems and goals related to green and efficient urban distribution. According to Russo and Comi (2010) the main objective of local authorities is to make cities attractive to visitors and residents, while minimizing negative effects of transport. Hence, local authorities can introduce measures aimed at urban distribution which can facilitate private and public involvement alike, stimulate interest and commitment to industrialist measures and provide financial and legal counseling (Browne, Allen, Nemoto, Patier, & Visser, 2012).

Although measures developed and introduced by local authorities are included in studies of urban distribution, studies rarely investigate the reasoning, reflection and handling of these measures by local authorities. Further, research is less devoted to investigating the local authorities' interaction with other stakeholders in the design of such measures. Stathopoulos et al. (2012:36) stress that local authorities tend to ignore the nature of logistics in the design of measures and treat other stakeholders as opponents rather than partners. This is presumably related to cultures and traditions within public agencies which influence what problems to prioritize and what solutions to choose, and which consequently can represent significant barriers for succeeding with measures directed towards urban distribution (Lindholm, 2012).

4. Stakeholders and measures for urban freight

Mobile depots are one of several possible solutions for improving land use and providing a more optimal utilization of city streets. Mobile depots are typically placed within a specified geographical area allowing nearby end-receivers to collect their deliveries at their own convenience. The primary objective lies in opportunities for reallocating land. There is limited research on advantages and disadvantages of mobile depots to stakeholders, but certain studies investigate stakeholder assessments of measures with similar objectives. For instance, mobile depots might represent a downscaled version of an urban consolidation or distribution center. Research shows that consolidation in so-called distribution platforms is associated with reduced delivery time, reduced stress and increased working conditions for drivers.¹ They depend, however, on the commitments of all involved stakeholders, and the involvement of these in early stages of the decision process (van Duin, Quak, & Muñuzuri, 2010). For instance, the SUGAR² project shows that successful implementation depends on the high participation of retailers and suppliers alike.

In a study among logistics stakeholders Stathopoulos et al. (2012) found that carriers are more negative to urban distribution centers than other stakeholders. However, there is limited research on stakeholder evaluations of mobile depots or other measures for improved utilization of street areas. A recent study surveyed end-receivers' support of twelve different policy measures (Stathopoulos et al., 2012), and found that end-receivers were fairly positive towards urban distribution centers and so-called pick-up points for last mile transport, which resemble mobile depots. On the other hand, carriers are found to be more negative to such measures. Another study has examined the effects of an urban consolidation center more directed against retailers (van Rooijen & Quak, 2010), but has yet to report explicit stakeholder evaluations.

Several projects also aim at reducing the impact of freight transport by use of *delivery time windows*. Such windows only allow deliveries in inner cities during a particular period of time, such as evenings and/or nights. The objective of such measures is to disperse urban traffic across

24 h and promote deliveries outside peak traffic, facilitating traffic flow and reduced congestion.

Stakeholder perspectives on night and evening deliveries are more documented in existing research than perspectives on mobile depots. Carriers perceive several advantages with night and evening deliveries. For one, carriers already try to avoid peak hour deliveries because they are considered inefficient, unpredictable and involving greater fuel consumption (Vilain & Wolfrom, 2001). Night deliveries involve shorter and more reliable travelling time and do not require vehicle alterations (Allen et al., 2003). This results in reduced delay and increased efficiency.³ Additionally, studies have shown night and evening deliveries to increase loading capacity,⁴ increase travel speeds and reduce service/delivery time (Holguín-Veras et al., 2012). To carriers disadvantages are primarily associated with increased personnel costs, and noise regulations have proved challenging to carriers in several European cities (Quak & Koster, 2006): night deliveries might inflict higher costs for silent vehicles and loading equipment.⁵

An off-hour delivery trial conducted in New York showed that the receivers are key decision makers in the logistics chain, and that the ability of carriers to unilaterally change their delivery times is very limited (Holguín-Veras et al., 2012). End-receivers are primarily concerned with deliveries being made during opening hours (Russo & Comi, 2010), which to a certain degree would conflict with night and evening deliveries. Thus disadvantages associated with night and evening deliveries are more prominent in this group. Despite reduced traffic and congestion improving the environment surrounding their business^{6,7} end-receivers are less positive towards measures which require behavioral change and alternations in their business operation (Stathopoulos et al., 2012). In a Dutch study, end-receivers claimed that they would continue regular deliveries despite time-window restriction in order to reveal whether restrictions are in fact monitored (Quak & de Koster, 2007). The main reason for their resistance towards night deliveries lies in perceived increased risks and exposure to crime for both personnel and goods. Additionally, night deliveries are expected to involve wage increases as someone will have to be present to receive and validate deliveries.⁸ End-receivers further expect increases in operating costs, equipment and wage increases from night and evening deliveries to exceed potential fees from making deliveries outside designated time-windows (Holguín-Veras, 2008).

Studies of urban distribution rarely include local authorities. Several projects on urban distribution refer to aspects of measures which are typically relevant to local authorities, but without making an explicit connection. For instance, end-receivers involved in the ELCIDIS project stated that the introduction of night deliveries did not result in increased noise levels compared to day-time traffic. Noise could in part be expected to concern local authorities responsible for the welfare of inner city residents. Similar findings were reported by the CIVITAS MIRACLE project. Additionally, the C-LIEGE project found that night deliveries involve a more optimal use of public space, which is particularly important as there exists little available urban land for logistics activities (Dablanc, 2007:281).

5. Methods

The purpose of this paper is to present stakeholder perceptions and assessments of mobile depots, and night and evening deliveries. These form the basis for identifying potential facilitators and obstacles for implementation.

³ CIVITAS: Cleaner and Better Transport in Cities, www.civitas-initiatives.org.

⁴ CIVITAS: Cleaner and Better Transport in Cities, www.civitas-initiatives.org.

⁵ C-LIEGE: Clean last mile transport and logistics management, www.c-liege.eu.

⁶ ELCIDIS: Electric Vehicle Distribution Systems, www.elcidis.org.

⁷ CIVITAS: Cleaner and Better Transport in Cities, www.civitas-initiatives.org.

⁸ C-LIEGE: Clean last mile transport and logistics management, www.c-liege.eu. CIVITAS: Cleaner and Better Transport in Cities, www.civitas-initiatives.org.

¹ ELCIDIS: Electric Vehicle Distribution Systems, www.elcidis.org.

² SUGAR: Sustainable Urban Goods Logistics Achieved by Regional and Local Policies, www.sugarlogistics.eu.

5.1. Pilot interviews

First, pilot interviews were performed with representatives from all groups. The purpose of the pilot interviews was to establish a basic understanding of the stakeholders' operations, challenges and problem areas regarding urban distribution in Oslo, and to establish mutual trust and confidence. The interviews further illustrated the individual stakeholder groups' freedom of action, competence, and action plans not taking other stakeholders into consideration. The interviews confirmed that stakeholder groups identified in existing research also were relevant to the case of Oslo.

5.2. Focus group seminar

Representatives from included stakeholders were invited to a focus group seminar. The intention of the seminar was to gather input on the specific measures, as well as to provide an arena for debate and discussion in which potential conflicts and clashes of interest between stakeholders could be brought to the fore. In particular, the seminar aimed at demonstrating ways in which needs, challenges and latitudes are influenced by the positions and premises of other stakeholders. The focus group seminar was not, however, intended to discuss solutions for economic viability in the selected measures. The main focus was to gather stakeholder input for further evaluation and demonstration of measures appropriate for the Oslo context, which in turn enlightens preconditions for economic sustainability in the most suitable approaches (Bakås, Bjerkan, Sund, & Nordtømme, 2014).

A total of 15 stakeholder representatives participated: four representatives from carriers, four representatives from end-receivers and seven representatives from local authorities. The carrier group consisted of representatives from two large carriers, as well as representatives from two large interest groups. End-receivers represented a large retailer chain, one trade association and one goods delivery interest group. Local authorities were represented by national and regional levels of the Norwegian Public Roads Administrations, as well as five representatives from the Municipality of Oslo. Municipality representatives in this project were responsible for transport planning, parking, traffic safety, universal design, road maintenance, environmental issues and investments.

Whereas the local authorities group consisted of a fairly representative delegation, the other stakeholder groups were more dominated by actors with large market shares and dominant positions in urban freight. The seminar could have benefited from greater stakeholder diversity in terms of size and segment, allowing more representative measure analyses. Being large actors, however, the attending stakeholder representatives comprised a section of the transport and retail industries with high potential impact should these measures be implemented. Their size and position might further increase the transferability of results to other contexts, as representatives are more similar to corresponding actors in other countries even more dominated by large actors.

There were two sessions of focus group discussions. In the first session, the individual stakeholder groups were assembled separately to discuss prerequisites and needs related to the potential introduction of mobile depots, night and evening deliveries. Stathopoulos et al. (2011) argue that separate stakeholder discussions allow for a more uninhibited description of problems and issues without the presence of adversaries. Stakeholder groups were provided with documents explaining the purpose and functioning of the measures, which were presented to stakeholders as described in Table 1. They were then presented with an empty matrix for SWOT analysis, which they filled out according to the discussions laid out in each group. Measure definitions are based on a review of best practices on European cities (Roche-Cerasi, 2012). The measure definitions were deliberately generic. That means that detailed characteristics on location, depot density, security solutions and other practical issues were omitted from the

Table 1

Definition of included measures.

Mobile depots	Here, mobile depots are defined as containers placed on strategic points within a given geographical area. Goods to end-receivers located within the area are delivered in the same depot. The depots arrive from consolidation centers where goods have been collected, organized and transported to the depot area in the early morning. Goods are available to end-receivers for a certain period of time, for example until noon, when traffic is low. End-receivers are responsible themselves for collecting own deliveries before the depot is removed. End-receivers are also free to return packaging waste by loading it into the emptied depot.
Night and evening deliveries	Night and evening deliveries are implemented by restrictions or other incentives to reduce delivery vehicles' access to urban areas during daytime. Here, night and evening deliveries are defined as deliveries performed between 6 pm and 6 am, but no particular time window within this period is specified.

definitions. This should avoid predispositions towards the concepts themselves and facilitate a positive climate for discussion.

In discussing prerequisites for implementation, each stakeholder group was well aware of and recognized the needs and orientations of other stakeholder groups. Stakeholders thus incorporated the anticipated preferences of others into their own measure analyses.

In the second session stakeholder groups presented their individual evaluations, before all stakeholders were invited to discuss each other's inputs. Both sessions were facilitated and guided by a representative of the research team, in order to develop trustworthy cohesion through orderly debate (Revans, 2011). The facilitators' role is to deal with conflicting claims against each other and to co-ordinate these claims to secure stakeholder input (Hensher & Brewer, 2001). The purpose of the second session was to make stakeholders aware of the views and perspectives of others, as well as building a mutual understanding of problem descriptions and potential measures among stakeholders.

5.3. SWOT analysis

In order to systematize inputs, stakeholders were asked to perform SWOT analyses. SWOT analysis as applied here is a tool for identifying strengths, weaknesses, opportunities and threats related to the implementation of specified measures (see Table 2). For instance, a potential strength with mobile depots is the increasable flexibility they represent to stakeholders, whereas a potential weakness relates to the increased workload for carriers. In relation to external factors, opportunities are for instance found in public subsidies. Threats exist for instance in laws and regulations, such as noise regulations hampering night deliveries.

Each stakeholder group developed SWOT matrixes which described their views on the measures. The method of SWOT analysis cannot be traced back to a single publication and is not the result of an identifiable academic contribution. Rather, SWOT analysis has emerged as a commonplace business procedure without any documented epistemology. However, a common perception is that SWOT analysis is a strategic planning method which involves identifying internal and external factors that are favorable or unfavorable to the implementation of included measures. Despite different approaches and applications of SWOT, all advocates maintain a clear distinction between external factors (threats and opportunities) and internal viewpoints (strengths and weaknesses) (Hill & Westbrook, 1997:47).

Although normally applied to strategic business planning, SWOT analysis could also prove beneficial in assessing the potential of transport policy measures. Good performances are the result of correct interaction between stakeholders and their internal or external environment (Houben, Lenie, & Vanhoof, 1999:125). In a study similar to this, Franzén and Blinge (2007) performed a SWOT analysis to evaluate stakeholder perception of night deliveries. They argue that SWOT

Table 2
Description of SWOT analysis.

Strengths	Characteristics of the measure that give it an advantage compared to other measures	Internal
Weaknesses	Characteristics that place the measure at a disadvantage relative to other measures	
Opportunities	External chances to reach the objectives of the measure	External
Threats	External elements that could endanger the implementation of the measure	

analysis is appropriate to illustrate qualitative data which represents the interpretations and experiences of different actors.

In the following descriptions of the included stakeholders' SWOT analysis, internal and external factors are not treated separately. Firstly, stakeholders had trouble with clearly understanding differences between threats and weaknesses on one hand and strengths and opportunities on the other. Thus, their discussions revolved more around what they considered to be positive and negative attributes related to each measure. Secondly, it has proved difficult to make an empirical distinction between internal and external factors. As stakeholder functions and operations in urban logistics are characterized by interaction and cooperation, it is difficult to define an influential factor as either internal or external. An internal factor of one stakeholder might very well represent an external factor to another. As such, the descriptions below do not refer specific components of the SWOT analysis, but rather to factors which by the stakeholders are presented as *facilitators* (strengths and opportunities) or *obstacles* (threats and weaknesses) to successful measure implementation.

The SWOT analysis approach proved difficult to understand for involved stakeholders. It could also prove more appropriate if investigating stakeholder groups separately, as the empirical distinction between internal and external factors would be clearer. In a multi-stakeholder evaluation, however, this study has proved the SWOT analysis not suited to reflect the complex interaction between stakeholders in urban freight.

6. Results

6.1. Evaluations of mobile depots

6.1.1. Facilitators

To the *carriers* an obvious benefit of mobile depots would be reduced fuel costs as more transport would be performed in periods with little or no congestion, but this is not particularly emphasized in focus group discussions. Carriers expect, however, improvements in EHS (environment, health, safety) as drivers are relieved from making doorstep deliveries of potentially heavy goods. Such obstacles would, however, be transferred to end-receivers.⁹

The primary benefit to *end-receivers* is related to increased flexibility: end-receivers can collect their deliveries when time and work load allows it, according to the operation of their business. This is expected to reduce noise and disturbance to visitors or customers. Mobile depots further represent a more efficient strategy for handling and organizing goods into a single delivery and make it easier to dispose of packaging waste.

Local authorities consider mobile depots an opportunity to strengthen existing policies in restricting day-time access to the city center. They expect mobile depots to contribute to reduced congestion and emission concentrations, and consider mobile depots useful alternatives when adequate, individual stock receipts are not an option. Additionally, mobile depots allow the reallocation of land from parking spaces to spaces for placement of depots, and might provide local authorities with an

incentive to allow freight transport in public transit lanes and pedestrian streets outside periods with high traffic volumes.

6.1.2. Obstacles

One of the stakeholders' main objections to mobile depots is that these are inadequate measures in covering the main share of urban freight transport. Mobile depots are perceived as relevant only to carriers of certain types of small goods: carriers of large or heavy goods depend on making doorstep deliveries, and delivering fresh foods, refrigerated and/or frozen products involves specific storage requirements. Thus, mobile depots are merely considered a contribution to more efficient freight in certain segments. Carriers additionally voice three main concerns. Firstly, their acceptance of mobile depots rests heavily upon business models. They expect a cost increase of 20% as a result of increased consolidation, which they are not willing to cover themselves. Secondly, they stress that additional consolidation places increased strain on the value chain and reduces the flexibility of the individual carrier. Longer delivery schedules and careful planning of shipments to end-receivers make express deliveries less feasible. Thirdly, carriers worry that the introduction of mobile depots leads to unintended changes in the freight market. They are concerned that a new, unregulated market for the transport of goods between depots and end-receivers will emerge, with actors who do not necessarily comply with existing norms and protocols for urban distribution.

As mentioned, *end-receivers* expect increased workloads which will possibly conflict with existing work environment norms if mobile depots are introduced. Secondly, end-receivers fear the challenging last mile transport of goods from the depot in an urban environment, typically requiring surpassing road blockages from road maintenance and particular weather conditions, tram tracks and traffic. Thirdly, they raise the issue of safety and delivery security. The safety of goods and personnel might be compromised both in the depot and during transport to the end-receiver, and they emphasize that mobile depots should allow each end-receiver access only to his or her goods. Finally, end-receivers worry that the combined inconveniences of mobile depots will contribute to distortion of competition in favor of large, suburban shopping malls and put the ideal of living cities at risk.

The most prominent obstacle raised by *local authorities* is related to land use. Mobile depots require designated spaces, and as city center streets are already crowded with a variety of road users, local authorities need to decide what road users to prioritize and whose space to reduce for the benefit of mobile depots. Secondly, local authorities worry about complaints regarding the design of mobile depots and anticipate complaints regarding the depots' contribution to the esthetical environment. Thirdly, mobile depots would require increased road maintenance to ensure safe and unhindered transport from depots to end-receivers, particularly during winter time. Local authorities must take into account the design of streets and sidewalks with additional emphasis on universal design, smooth surfaces and immersed curbstones. It will also fall on local authorities to provide signposts and surveillance for assuring the availability of spaces designated for depots, with increased pressure for monitoring parking restrictions and regulations and sanctioning violations. Finally, local authorities express concerns regarding structural changes occurring as a result of mobile depots deliveries in urban areas. Firstly, they worry that the inconvenience associated with depots on behalf of end-receivers will cause business to relocate outside the city center and compromise goals of a living city.

⁹ The Norwegian Labor Inspection Authority advises against carrying goods across a distance longer than 20 meters and carrying goods of more than 25 kilos (<http://www.arbeidstilsynet.no/artikkel.html?tid=78627>).

Additionally, local authorities repeatedly stress that deliveries to mobile depots must *replace* the existing delivery regime. They have little faith in mobile depots replacing all deliveries and believe the introduction of mobile depots will create two sets of delivery regimes: the existing regime which requires regulation of spontaneous (ordinary) deliveries, and the regulated regime for mobile depots.

6.2. Evaluations of night and evening deliveries

6.2.1. Facilitators

As opposed to discussions of mobile depots, *carriers* are generally positive towards night and evening deliveries. The main reason is the potential for cost reductions. Night and evening deliveries allow for distributing terminal management, operations and deliveries across a 24 hour period, which enhances the utilization of vehicle capacity, contributes to more time efficient deliveries, more accessible street areas and increased percentage filling with more deliveries per trip. Deliveries outside heavy traffic are anticipated to provide drivers with a more stable and calm working environment, and to significantly contribute to reduced fuel consumption. In total, carriers expect savings from continuous operation to exceed increased salary expenses related to shift work, and are thus willing to increase tariffs in order to facilitate night and evening deliveries. Additionally, carriers consider *key contracts* potentially helpful to the introduction of night and evening deliveries. Key contracts are legal documents specifying arrangements of deliveries made when the end-receiver is not present. Carriers are equipped with keys or codes to the receipt, while end-receivers have 24 hours to control and validate deliveries. Key contracts are most suited for carriers with regular routes and large deliveries. The Norwegian lock system SLUS is also mentioned as an alternative to key contracts. SLUS is a security system for unmanned stock receipts which allows carriers to make pick-ups and deliveries without the end-receiver being present.¹⁰

End-receivers are also more positive towards night and evening deliveries. Primarily, they will benefit from a more evenly distributed workload, and emphasize opportunities to do stock replacements in periods with otherwise low activity. Less noise and disturbance during opening hours create a more inviting atmosphere to existing and potential customers, and might contribute to increased competitiveness. Secondly, end-receivers appreciate technological approaches to facilitating night and evening deliveries. They already actively engage in key contracts, and are favorable to other solutions which render the presence of staff unnecessary. Thirdly, night and evening deliveries are considered an opportunity to place incentives on the retailer chain as a whole. End-receivers believe deliveries within retailer chains could be more organized and coordinated, contributing to more time and cost efficient goods distribution in urban areas.

One of the primary policy goals of *local authorities* is to reduce local pollution. More evenly distributed traffic is expected to produce less congestion and less pollution, and in particular the reduction of heavy duty vehicles in peak hours could contribute to keeping emission levels below limit values. Additionally, distributing traffic more evenly across 24 h increases the utilization of land and city areas. Local authorities expect removing delivery vehicles from daytime traffic to reduce conflicts with pedestrians and public transport and improve safety, accessibility and efficiency for other road users and other traffic. Such improvements might encourage travel by foot, bike or public transport. Thirdly, public authorities encourage noise reduction requirements to reduce disturbance, and stress that confining deliveries between 6 pm and 12 pm would significantly reduce noise complaints. Finally, they suggest that night and evening deliveries might increase the general safety by increasing activity and the presence of sober persons in city streets.

6.2.2. Obstacles

Carriers mainly raise three objections towards night and evening deliveries. Their primary concern is EHS, and carriers are unsure of what reaction they might face from labor organizations. This is above all related to working hour inconveniences and regulations, driving and resting regulations, fear of robbery, theft and violence. Their second concern is delivery predictability: end-receivers might not be willing to or be prevented from showing up. If key contracts are involved, difficulties related to keys, codes and access might prevent carriers from making deliveries. Finally, carriers believe that consolidation might prove challenging if not all end-receivers welcome night deliveries, which would require the development of two distinct consolidation and delivery regimes.

In terms of EHS, *end-receivers* are faced with similar issues as carriers. Unless fully automated solutions are installed, night and evening deliveries will require staff being available at inconvenient times. Again concerns are related to demands of labor organizations, legal aspects surrounding work contracts and safety issues related to night work. Additionally, end-receivers stress that night and/or evening deliveries must be punctual and predictable to keep working hour inconveniences to a minimum. Finally, end-receivers stress that not all buildings and premises are suitable for technological solutions (e.g. lock systems), which makes night and evening deliveries inevitably related to increased staff presence for some end-receivers.

To *local authorities*, the greatest obstacles towards night and evening deliveries are potential conflicts with goals of a living city: local authorities wish to facilitate a viable city center involving both business activities and permanent residents. On one hand, such conflicts are related to noise disturbance to neighboring environments, and local authorities expect difficulties with getting approval for night or evening deliveries in residential areas. On the other hand, night and evening deliveries could be a threat to the living city if they are so inconvenient to end-receivers that they relocate outside the city center. The second obstacle identified by local authorities is related to land use: successful night and evening deliveries require signposts with particular traffic and parking regulations applying to particular periods and particular areas. As different road users compete for the same space, delivery spaces are typically in conflict with parking spaces. Third, local authorities emphasize that night and evening deliveries would require around-the-clock maintenance, and that lack of loading bays might cause delivery vehicles to obstruct road maintenance. Finally, local authorities stress that the successful implementation of night and evening deliveries depends on the documented legality of activities and their consequences, such as night work and noise levels.

7. Concluding discussion

The purpose of this study has been to collect inputs from relevant stakeholders on measures for more sustainable urban distribution: mobile depots and night and evening deliveries (see Tables 3 and 4). The study shows that stakeholders are in general skeptical to the introduction of mobile depots, and that this skepticism particularly rests on the inability of mobile depots to encompass the majority of urban deliveries. Mobile depots would further require significant alterations of the organization of logistics, particularly among carriers and end-receivers. Physical inconveniences experienced by carriers today are expected transferred to end-receivers. Local authorities are concerned with the contribution of mobile depots to the esthetical environment, and stress the importance of deliveries to mobile depots replacing existing deliveries.

Night and evening deliveries were described more positively by all stakeholders. To carriers this results from opportunities to distribute operations across longer periods of time with consequent savings from a more efficient logistics system. Similar expectations are found among end-receivers who already seek to establish key contracts and who will be able to reduce noise and disturbance during opening hours. Local authorities are primarily concerned with noise disturbance

¹⁰ See also www.slus.no.

Table 3
Evaluation summary of mobile depots.

	Facilitators	Obstacles
Carriers	<ul style="list-style-type: none"> • EHS improvements • Reduced fuel consumption 	<ul style="list-style-type: none"> • Relevant to small share of urban distribution • Business model • Additional consolidation • New, unregulated market • EHS, increased work load • Last mile transport • Safety and delivery security • Distortion of competition
End-receivers	<ul style="list-style-type: none"> • Increased flexibility • Less noise and disturbance to customers • One, single delivery 	<ul style="list-style-type: none"> • Land use conflict with other road users • Design of depots • Increased maintenance • Relocation of business • Two delivery regimes
Local authorities	<ul style="list-style-type: none"> • Support existing policies • Reduced congestion and emission levels • Alternative to individual stock receipts • Reallocate land from parking • Allow freight transport in public transit lanes and pedestrian streets 	

related to night deliveries in particular, but emphasize opportunities for improving conditions for other road users when day time deliveries are reduced to a minimum.

If a measure for implementation based on the stakeholder evaluations of this study should be prioritized, night and evening deliveries appear more appropriate than mobile depots. The introduction of night and evening deliveries will depend on a clarification of working hours and other EHS regulations. Further, a regulatory framework for night and evening deliveries should adhere to laws and regulations, and governing principles established. Among other things, requirements of silent vehicles and loading equipment should be specified, and routines for handling complaints and violations established. Regulations must also specify responsibilities related to the use of (preferably standardized) key contracts or other measures rendering the presence of end-receivers unnecessary. To accommodate end-receivers unable to facilitate unmanned stock receipts, delivery contracts should be as specific and predictable as possible to ensure a cost-efficient organization of work. Regulations should further specify the commitments and responsibilities of each individual stakeholder, including carriers and end-receivers not making night and evening deliveries. As stressed by local authorities, introduced measures should encourage a *shift* in delivery strategies rather than supplementing existing strategies. Consequently, facilitating night and evening deliveries should take into account the combined organization of night and day-time deliveries and aim at a coherent delivery regime incorporating the needs and premises related to both delivery strategies.

Although stakeholders present mobile depots deliveries as less preferable than night and evening deliveries, similar practices have proved efficient across Europe. One reason for the skepticism against mobile depots might however rest on mobile depots being less familiar to stakeholders than night and evening deliveries. Research shows that the acceptability of transport policies increases with increasing knowledge, familiarity and experience with a measure (Bies, Tripp, & Neale, 1993; Gaunt, Rye, & Allen, 2007; Tretvik, 2006). Consequently, future introduction of mobile depots heavily depends on increasing

stakeholders' scheme perceptions, but also detailed clarifications of responsibilities, commitments and business models.

One of the obstacles related to mobile depots could also stem from stakeholder perceptions of own roles. By taking into consideration the needs and premises of other stakeholder groups, each stakeholder will have to redefine its role and approach to urban freight transport. This is a general challenge with introducing new solutions: each stakeholder will have to revise its role in the logistics chain. For instance, as last mile deliveries were previously the responsibility of carriers, mobile depots would require end-receivers to collect own deliveries. Additionally, stakeholder perception of the roles of others could come into play. As an example, the focus group seminar revealed polarization and an inherent conflict between particular stakeholder groups. This suggests an underlying structural disagreement which might hamper future cooperation. As such, dissimilar areas of interest and priorities are expected to be a prominent challenge regarding the implementation of measures.

7.1. Reaching 'common ground'

The overall objective of collaborative processes as described above is to reach what we have labeled *common ground*. 'Common ground' refers to the abstract area where measures (or rather combinations of measures) that are most likely to be both effective and accepted by all stakeholder groups are found (see Fig. 2). That is, an area where each stakeholder perceives the advantages of measure implementation to be greater than the disadvantages. That is not to say that stakeholders see common advantages or disadvantages: what represents an advantage to one stakeholder might very well represent a disadvantage to another. This is illustrated by Fig. 2, which shows common ground components for a hypothetical measure.

Fig. 2 is a hypothetical representation of how a potential measure is expected to influence stakeholders. The stakeholder circles include nine examples of parameters which are affected by measure implementation in urban freight, such as EHS, operational costs, green profile and

Table 4
Evaluation summary of night and evening deliveries.

	Facilitators	Obstacles
Carriers	<ul style="list-style-type: none"> • Cost reductions exceeding increased costs • Key contracts/lock systems 	<ul style="list-style-type: none"> • EHS, working hours • Delivery predictability • Two consolidation and delivery regimes
End-receivers	<ul style="list-style-type: none"> • Work load distribution • Less noise and disturbance to customers • Technology and key contracts • Incentives on retailer chains 	<ul style="list-style-type: none"> • EHS, working hours • Unpredictable deliveries • Staff required in buildings not suited for technological solutions
Local authorities	<ul style="list-style-type: none"> • Lower emission concentrations • Improved land use • Encourages green transport • Noise reduction regulations • Increased safety 	<ul style="list-style-type: none"> • Conflicts with goals of living city • Land use, conflict with parking spaces • Around-the-clock maintenance • Legality

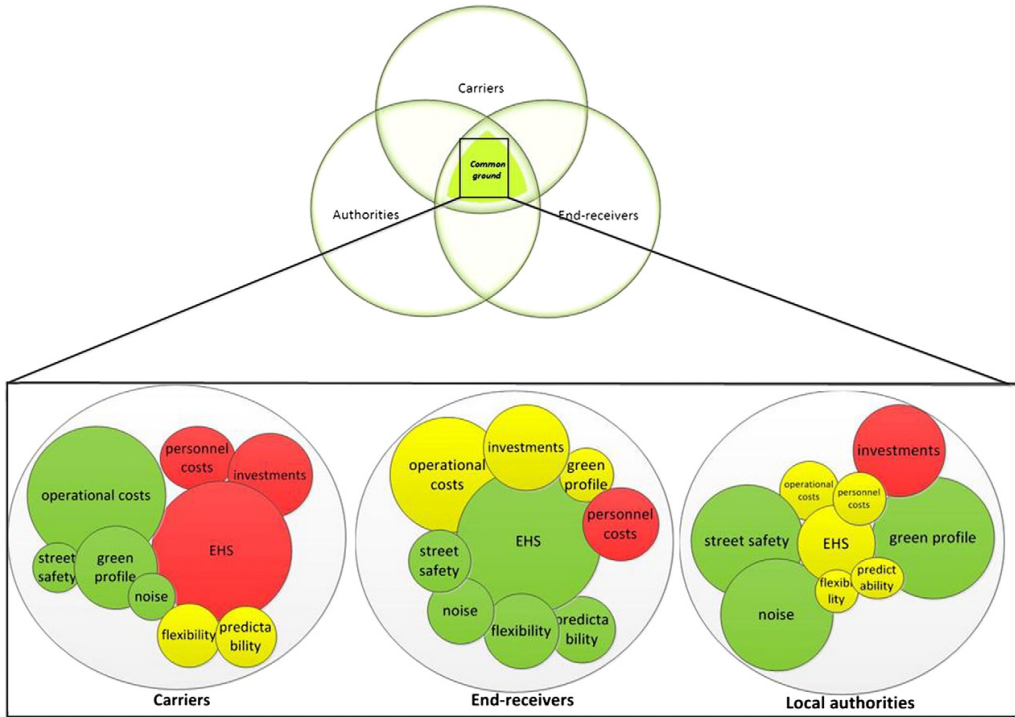


Fig. 2. Common ground components of a hypothetical measure: parameters and value expectations.

investments. Here, the parameters are not related to a particular measure, but simply included to exemplify the notion of ‘common ground’. The size of the parameters refers to their relative importance (weight) to the individual stakeholder, and their color indicate whether the potential measure is expected to bring negative value (red), positive value (green) or no value at all (yellow) to the stakeholders. These are termed *value expectations*. Both the weight of parameters and associated value expectations will depend on the measure in question. So will the inclusion of relevant parameters: parameters relevant for reaching common ground in implementing mobile depots will differ from relevant parameters in implementing night deliveries.

In a hypothetical case as represented in Fig. 2, measure implementation is expected to bring a negative value to carrier EHS, but a positive value to EHS in end-receivers. The EHS of local authorities is not expected to change. Conversely, the carriers expect the measure to bring positive value to their operational costs, while this is not the case with end-receivers and local authorities. Thus, stakeholders do not necessarily share value expectations related to each parameter, and common value expectations are not a prerequisite for reaching common ground. Rather, reaching common ground depends on an overall positive value expectation, namely that all stakeholders perceive the potential benefit to be greater than the potential loss. In Fig. 2, this is illustrated by the green and yellow parameters dominating red areas. The area outside common ground is dominated by red areas and suboptimal operation.

Reaching common ground is thus a matter of reflective collaboration between public and commercial stakeholders, in order to illustrate positive and negative values that a diversity of potential measures might bring to the individual stakeholders. Such processes typically involve modifying the measure and its supporting mechanisms to accommodate the most prominent obstacles. In accordance with common ground, these are typically the parameters with greatest weight in influencing the overall positive value expectation to the individual

stakeholder. The primary obstacle of implementation might very well lie with a single parameter related to one of the stakeholders, or it might result from conflicting value expectations between two or more stakeholders (such as EHS). Thus, in order to achieve a productive and positive collaboration with commercial stakeholders, public authorities must have knowledge of the obstacles and facilitators for implementation of relevant measures, and strive at adapting measures welcomed by carriers and end-receivers without compromising other important societal interests that are weighted as important.

Reaching common ground is thus a matter of adjusting measures to accommodate the value expectations associated with different parameters by stakeholders. For instance, carriers and end-receivers expect reduced operational costs and increased predictability from carriers gaining access to bus lanes. This would, however, jeopardize the green profile of local authorities by removing privileges for public transport. By modifying the measure to allow carriers access outside public transport peak hours (which do not necessarily coincide with peak hours for freight distribution), the measure no longer represents a threat to the authorities’ green profile, and common ground is within reach.

8. Research implications

The purpose of this study has been to chart stakeholder evaluations of potential measures for facilitating green and efficient urban distribution. It brings forward needs and prerequisites for three central stakeholders in city logistics, providing a basis for designing measures that are sustainable for all parts. This knowledge also helps decision-makers foreseeing the consequences of measure implementation and thus premises for achieving policy goals. Although included measures and stakeholders were selected within a specific local and national context, we have already seen findings to be transferrable to other urban transport.

In general, stakeholders display great commitment and positive attitudes towards solving problems in urban distribution. One purpose of this study has been to increase the stakeholders' awareness of each others' needs and premises in order to facilitate the evolution of policies which take into account the complex interaction of stakeholders. As such, this study might prove a cardinal step towards achieving viable and effective solutions for green and efficient urban distribution.

8.1. Implications for managerial practice

This study identifies potential facilitators and obstacles in achieving joint strategies in implementing measures in urban freight. Related to the particular measures included here, the results may influence anticipations when initiating and planning measures in urban transport, create awareness around typical pitfalls and facilitate smoother and more efficient decision processes. The primary value of this study to managerial practice lies in planning and designing measures in urban freight.

As described below, *common ground* could further be used as a framework for making both a priori and ex-ante assessments of measure feasibility. As such, common ground represents both a theoretical representation of particular collaborative processes in urban freight, as well as an aide in the practical organization and approach to measure implementation.

8.2. Contribution to scholarly knowledge

The main scholarly contribution of this study is its explicit documentation of stakeholder perceptions related to measures in urban freight transport. Only a handful studies have done so previously. Particularly, this study has succeeded in including local authorities in a collaborative process which is typically reserved for commercial stakeholders.

Interestingly, the findings of this study correspond with findings in similar studies. This implies conformity of stakeholder perceptions across borders, and suggests certain commonalities in urban distribution chains otherwise characterized by coincidental organization and ad-hoc management. This calls for greater scholarly attention to increased potential learning opportunities (such as the BESTFACT¹¹ initiative), but also questions why dissimilar implementation results occur despite of similar measure perceptions.

Finally, this study contributes to the theoretical understanding of stakeholder processes in urban freight by introducing *common ground*. The perception of common ground demonstrates the logic of collaborative processes in urban freight, and can represent a valuable tool in estimating a priori probabilities for measure implementation. Identifying relevant parameters, their weight and associated value expectations will visualize primary obstacles towards joint strategies and enables stakeholders to provide constructive, rational inputs to measure modification. Although the perception of common ground derived from the study presented above, the study itself does not include adequate data to assign the appropriate weight to relevant parameters. It will be the objective of future studies to apply and develop the common ground methodology as an indicator of measure feasibility and adaptation.

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PAPER III

E-groceries: Sustainable last mile distribution
in city planning.

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E-groceries: Sustainable last mile distribution in city planning

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ABSTRACT

E-grocery is developing into a frequent and prominent form of online shopping. While some empirical studies suggest that online shopping substitutes personal shopping travel, others indicate a limited or no impact on number of trips and travel distance. Mobility for passengers and freight is one of the key issues in integrated planning in urban areas, and the growth of e-commerce and home deliveries is likely to affect the structure and performance of the urban freight chain. This study explores the use of home delivery services through a survey among Norwegian users of services connected to food and groceries. The study draws on insight from the survey to discuss how city municipalities can integrate trends of urbanisation and digitalisation into planning for sustainable mobility and efficient urban freight transport. A prominent finding is that home delivery of food and groceries is associated with fewer trips to physical grocery stores and reduced car use on these trips. In considering implications for city planning, several strategies and potential instruments are presented and discussed.

1. Introduction

Continuous growth in e-commerce the past few years has triggered an increase in research on impacts e-commerce might have on mobility systems. E-commerce not only has potential to transform patterns of personal mobility, but also challenges operations and practices of freight transport and city planners, who must take continuously evolving mobility patterns into consideration when designing urban services and spaces. A holistic approach to sustainable mobility which includes goods movement and personal mobility requires sufficient knowledge about the transformative effects of e-commerce and other developments in mobility systems. Understanding e-commerce's impact on the quality of places and spaces in cities is necessary to uphold the values that cities represent to people and social interaction (Banister, 2008, 2011, 2019).

Online shopping is one of the most visible expressions of the digitalisation of society, and the share of European online shoppers has increased by 85% since 2007 (European Commission, 2017, p. 92). Home deliveries are an essential part of e-shopping (Visser, 2003) and responsible for the largest economic and environmental cost of transport associated with online shopping.

The sustainability of the last mile of e-groceries depends on two main factors; to what degree home delivery of e-groceries substitutes personal (car) travel to grocery stores, and to what degree the freight operations

of home deliveries are energy efficient (Henriksson, Berg, Karlsson, Rogerson, & Winslott Hiselius, 2018). Major changes in commercial and consumer behaviour, and the implications this have for urban logistics and freight transport, is a topic of major concern to planners responsible for urban design and urban transport systems (Dablanc, 2019). To motivate changes in urban logistics and the related freight transport systems increased engagement of city authorities, regional and national governments, and cooperation with private companies is essential (Browne, Behrends, Woxenius, Giuliano, & Holguin-Veras, 2019a). A priority for policy makers and city planners is also linked to innovative use of urban space and transformations resulting from planning for people at the expense of cars.

The purpose of this paper is to explore the sustainability of e-groceries and to suggest potential strategies for incorporating last mile distribution of e-groceries in city planning. The paper asks *how do services for home delivery of food and groceries influence travel and consumption habits?* This is investigated through a survey of Norwegian users of such services. The paper further draws on these insights to discuss *how city municipalities can integrate trends of urbanisation and digitalisation into planning for sustainable mobility and efficient urban freight distribution.*

When referring to e-groceries, this paper encompasses home delivery of food and groceries, including home delivery of meals from restaurants (take-out), meal subscription boxes, delivery from grocery stores and

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delivery of farm produce. Farm goods may differ from the others because the consumer does not necessarily decide herself what produce is delivered. Farm goods could therefore be more unpredictable as to what arrives whereas other deliveries provide you what you order.

This study contributes to the understanding of relationships between home delivery of e-groceries, travel behaviour, and the implications this might have for city planning. Providing empirical data on individual and household level is crucial to enable local authorities to plan and implement measures for urban freight. Freight and logistics planning must become an integral part of planning for cities (Dablan, Ogilvie, & Goodchild, 2014), and integrated with mobility planning and regulation in the context of the actual city (Ringholm, Nyseth, & Gro, 2018; Vedeld, Bergli, Millstein, & Andersen, 2015).

2. State-of-the-art

Online shopping and business to customer e-commerce has an impact on supply chains as well as the consumers' travel patterns (Comi & Nuzzolo, 2016). Although a growing body of research indicates that online shopping acts as a substitute for personal shopping travel, other empirical studies indicate a limited or no impact on number of trips and travel distance related to shopping. Further, the possibility for express delivery directly to the end consumer or delivery to pick up point changes consumer preferences regarding shopping accessibility and the demand for urban freight (Wang, Zhan, Ruan, & Zhang, 2014).

Online shopping has increased the demand for last mile delivery services (Henriksson et al., 2018). Increased online shopping deliveries are likely to affect the structure and performance of the urban freight chain (Goodchild & Ivanov, 2018) in producing additional and fragmented delivery systems (Henriksson et al., 2018), higher delivery frequencies of smaller orders and shipments (Visser, Nemoto, & Browne, 2014) and supply chains which include consumers (Goodchild et al., 2018; Hesse, 2016; Wygonik & Goodchild, 2018). As such, freight transport responses to online shopping, which often involve deliveries directly from terminal to the end consumer, are particularly evident on the last mile. Last mile is the final link in the supply chain between production, terminals and end consumers (Gevaers, Van De Voorde, & Vanelslander, 2011). Visser and Lanzendorf (2004) argue that home deliveries have the largest impact on freight transport, as they lead to a deeper penetration of freight activities into residential areas and because they produce large return flows, as a result of failed delivery attempts and returns from receiver. Missed and fragmented deliveries are particularly daunting challenges (Henriksson et al., 2018), and pick-up-points can contribute to consolidate last mile operations and reduce risks of failed deliveries (Morganti, Dablan, & Fortin, 2014; Taniguchi & Kakimoto, 2004). Time windows in attended home delivery (Allen et al., 2018; Lin, Zhou, & Du, 2018; Manerba, Mansini, & Zanotti, 2018) and the ability of the transport industry to cooperate (Taniguchi & Kakimoto, 2004; Zisis, Aktas, & Bourelakis, 2018) are other pressing issues.

There is little empirical knowledge about how online shopping affects freight transport, presumably because the data required to undertake such studies are proprietary. It is apparent, however, that trends in e-commerce change urban freight patterns (Cárdenas, Beckers, & Vanelslander, 2017) and vehicle movements in cities, which further complicates the challenges cities face (Bjørgen, Seter, Kristiansen, & Pitera, 2019). An increased number of last mile deliveries challenges traffic flows, environment, road safety, and the loading factor of operators (Cherrett et al., 2012; Hesse, 2016). They further place even greater pressure on urban land use in areas with growing populations (Cárdenas et al., 2017; Gatta, Marcucci, & Le Pira, 2017; Visser et al., 2014).

In contrast to research on e-commerce and freight, empirical research on impacts on personal mobility has grown rapidly. Existing research on e-commerce and personal transport is highly diverse and inconsistent, but there is a general recognition that e-commerce is a

growing characteristic of an increasingly digital era and that e-commerce will continue to increase and spread to new markets and industries (e.g. Allen et al., 2018). Still, existing research does not allow any definitive conclusion on the relation between e-commerce and transport.

The environmental impact of e-commerce depends on the travel mode choices and behaviour of the consumer (Hischier, 2018). Many studies indicate that e-commerce has a potential for increasing sustainability of personal travel through replacing trips to physical stores. Other studies show no impact or a complementary impact of e-commerce on personal travel behaviour (Rosqvist & Hiselius, 2016; Suel & Polak, 2017; Tonn & Hemrick, 2004; Weltevreten & Rietbergen, 2007), and most studies find a neutral or complementary effect (Ding & Lu, 2017). One reason is that the correlation between e-commerce and personal travel behaviour is influenced by intermediary factors, such as consumer and household characteristics, chained trips (Rotem-Mindali & Weltevreten, 2013) and location (Farag, Weltevreten, Van Rietbergen, Dijst, & Van Oort, 2006; Zhou & Wang, 2014). Several studies also accentuate the cardinal role of consumer willingness to reduce consumption (Rotem-Mindali, 2010), combining trip purposes and using less polluting travel modes (Edwards, Mckinnon, & Cullinane, 2010; Seebauer, Kulmer, Bruckner, & Winkler, 2016; Van Loon, Deketele, Dewaele, Mckinnon, & Rutherford, 2015). Impacts also relate to geographies, such as distances to physical stores (Cárdenas et al., 2017; Rosqvist & Hiselius, 2016). Impacts of e-commerce further vary between segments (Maat & Konings, 2018) and last mile practices (Bjerkkan, Bjørgen, & Hjelkrem, 2019); increased use of pick-up-points might for instance produce more trips with private car (Morganti et al., 2014).

The lack of empirical knowledge about the connection between urban logistics and consumer behaviour hampers public policy and planning (Cui, Dodson, & Hall, 2015; Hull, 2008; Pettersson, Winslott Hiselius, & Koglin, 2018; Rodrigue, 2006). Mobility for passengers and freight is a key issue in facilitating integrated planning in urban areas and in developing sustainable cities which attract people, activities and businesses (Banister, 2008; Marcucci et al., 2017; May, Kelly, & Shepherd, 2006). According to Ducret, Lemarié, and Roset (2016) urban freight and logistics is influenced by city characteristics, and they argue that pursuit of environmental efficiency in logistics should encompass both spatial, technical and economic approaches. A holistic approach which considers consumer's travel behaviour and urban freight (Pettersson et al., 2018; Visser et al., 2014) could enable local authorities to identify and evaluate potential impacts of home delivery practices on the sustainability of cities.

Hence, local authorities need knowledge about trends in freight and e-commerce to integrate changes in urban freight and logistics in city planning (Bjørgen, Fossheim, & Macharis, 2018; Lindholm, 2012, 2013; Sund, Seter, & Kristensen, 2016) and to facilitate personal mobility and goods movements (Kiba-Janiak, 2017; Marcucci et al., 2017). Local policies and planning contribute to shape and promote solutions for last mile delivery (Morfoulaki, Mikiki, Kotoula, & Myrovali, 2015). Based on existing research, this study therefore rests on the presumption of mutual influence between consumption, travel behaviour and the performance of urban logistics. In turn, these relations are expected to impact mobility in urban communities, city planning and the use of urban space (Fig. 1).

3. Methods and data

This paper explores the sustainability of home deliveries through data gathered in an online survey among Norwegian consumers. The survey was distributed in the period August 30th – September 30th, 2018 and generated 270 responses. The survey was primarily distributed through social media and a press release. Given that the survey was distributed as an open link, it is not possible to determine any response rate.

The survey was designed to explore the role of consumers' travel

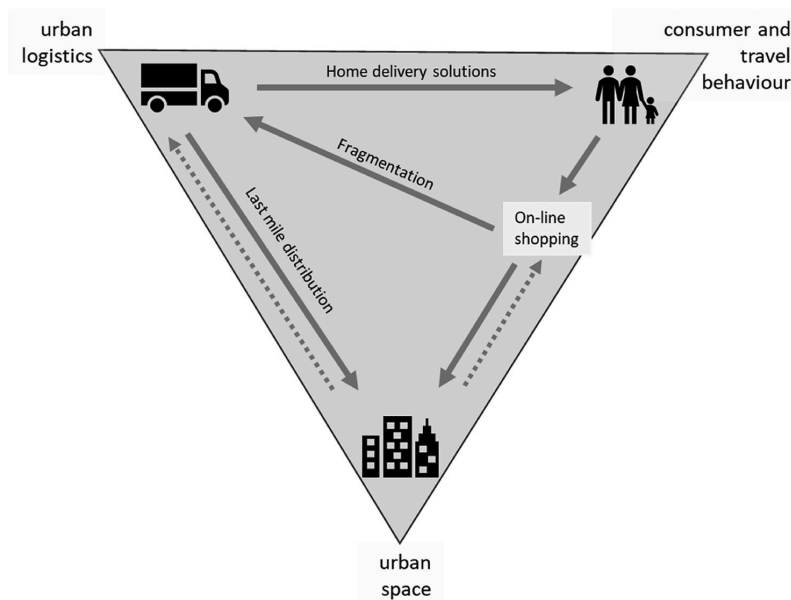


Fig. 1. A framework for understanding influences between urban logistics, consumer travel behaviour and urban space.

behaviour, which, as seen in Fig. 1, is essential to understand should city planning take e-groceries into account in promoting sustainable last mile distribution. The survey is largely based on established question batteries from national travel surveys and can be categorized into three sections: i) household characteristics, ii) familiarity with and use of home delivery services, and iii), travel behaviour.

3.1. Sample

Table 1 presents sample characteristics and comparable characteristics of the Norwegian population. It shows that the sample obtained through this survey is not a representative of the general population. The sample largely consists of women, employed respondents with a college or university degree, and a high household income. As such, respondents are resourceful in terms of social and economic capital, and one cannot assume that the results presented here are generalizable beyond the sample. There is no existing data on the prevalence of use of services for home delivery of food and groceries in Norway, making it difficult to assess whether the sample is also skewed compared to the population of users of such services. However, the sample is in line with earlier reports which show women to be in charge of household grocery shopping (Lavik & Jacobsen, 2015, pp. 2–2025), and the sample corresponds with national statistics that show e-shopping in general to be more prominent in people with higher education (Fjørtoft, 2017).

4. Results

The results from the survey are presented in two main sections. While the first section focuses on how the respondents use services for home delivery, the second section explores the relationship between home delivery on one hand and travel and consumer behaviour of the respondents on the other.

4.1. Use and non-use of services for home delivery of food and groceries

In total 70% of respondents have used a service for home delivery of food and groceries more than once, whereas 30% have never used or

only used once. Fig. 2 shows the sample's familiarity with and use of a selection of nine different services. The figure shows that most respondents are familiar with services for delivery of meal subscription boxes, which have been broadly advertised in Norwegian media. These are also the services most often used by the respondents, in addition to deliveries of local farm produce in central Norway.

Table 2 compares i) respondents who have never used any service or only tried such a service once, and ii) respondents who have used a home delivery service more than once. The table shows that the share of respondents who have used services for home delivery of food and groceries more than once are particularly high in women, the age group 40–49, households with children under 18 years, respondents with higher education of more than four years, households with access to car and households with a gross income of more than 1,5 MNOK.

Table 3 shows how important different aspects of home delivery of food and groceries are for respondent who have used such services more than once. 'Saving time' is the most important aspect, with an average score of 4.03, followed by not having to go to a physical store (3.98), less stress (3.86) and planning (3.71). Hence, cost reductions do not seem to be a prominent motivation for using home delivery services of food and groceries. This might, however, reflect the particularity of this sample, which largely consist of economically resourceful respondents.

As saving time is considered the most important aspect for use of these home delivery services, Table 4 shows the respondents' self-reported time use when purchasing food and groceries in a physical store. On average, respondents use approximately 35 min when shopping food and groceries in a physical store. Further, respondents who use home delivery services more frequently have a lower average time use in-store, which can indicate that their purchases in-store are in general smaller, perhaps because of using home delivery services as well.

Respondents who have not used services for home delivery of food and groceries, or have only used such a service once, were asked to reflect upon eight statements regarding such services. Their replies are presented in Fig. 3. The most prominent reason for non-use appears to be that such services are not available where respondents live (60% agree), followed by the perception that the delivery quality of such services is poor (41% agree). This coincides with national statistics that show long

Table 1
Sample characteristics.

	Sample n	Sample %	General population %
Gender ^a			
Male	80	30%	50%
Female	183	70%	50%
Age ^b			
20–29	32	12%	18%
30–39	99	37%	18%
40–49	72	27%	18%
50–59	46	17%	17%
60–69	18	7%	14%
70+	3	1%	15%
Region ^a			
Central Norway (Trøndelag)	199	74%	9%
Capital region (Oslo/Akershus)	48	18%	24%
Other	23	8%	67%
Education ^a			
No higher education	25	9%	61%
College/university, 4 years or less	54	21%	28%
College/university, more than 4 years	184	70%	11%
Main activity ^a			
Employment	242	90%	61%
Student	13	5%	10%
Other	15	5%	29%
Household gross income (1000 NOK) ^a			
1000k or less	120	47%	74%
More than 1000k	136	53%	26%

^a General population: From Statistics Norway Table 07459: Befolkning etter region, kjønn, statistikkvariabel og år. <https://www.ssb.no/statbank/table/07459/tableViewLayout1/>.

^b General population: Same source as above.

^a General population: Same source as above.

^a General population: From the Level of Living EU-SILC survey 2017 <http://nsddata.nsd.uib.no/webview/index.jsp?v=2&submode=abstract&study=http%3A%2F%2F129.177.90.161%3A80%2Fobj%2Fstudy%2FNSD2542&mode=documentation&top=yes&language=no>.

^a General population: Same source as above.

^a General population: From the National Media Survey of Norway (2016): <http://www.nsd.uib.no/nsddata/serier/medieundersokelsene.html>.

delivery times to be one of the most challenging features of home delivery (Fjørtoft, 2017). Having to order online or on your smart phone does not seem to be a barrier towards use, which is not surprising given the resourcefulness of the sample.

Table 2
Characteristics of respondents by use level (N = 270).

	Sample distribution (N = 270)	Used once or never (n = 80)	Used more than once (n = 190)
Gender			
Male	30%	41%	25%
Female	70%	59%	75%
Age			
20–29	12%	15%	11%
30–39	37%	38%	36%
40–49	27%	23%	28%
50–59	17%	18%	17%
60–69	7%	6%	7%
70+	1%	1%	1%
Children (under 18) in household			
Yes	59%	45%	65%
No	41%	55%	35%
Education			
No higher education	9%	11%	9%
College/university, 4 years or less	21%	22%	20%
College/university, more than 4 years	70%	67%	71%
Main activity			
Employment	90%	85%	92%
Student	5%	10%	3%
Other	5%	5%	6%
Household access to car			
Yes	83%	75%	86%
No	17%	25%	14%
Household gross income			
Less than 400k	7%	12%	5%
400-699k	15%	16%	15%
700-999k	25%	29%	23%
1mnok-1499 mnok	38%	33%	40%
More than 1,5 mnok	15%	9%	18%

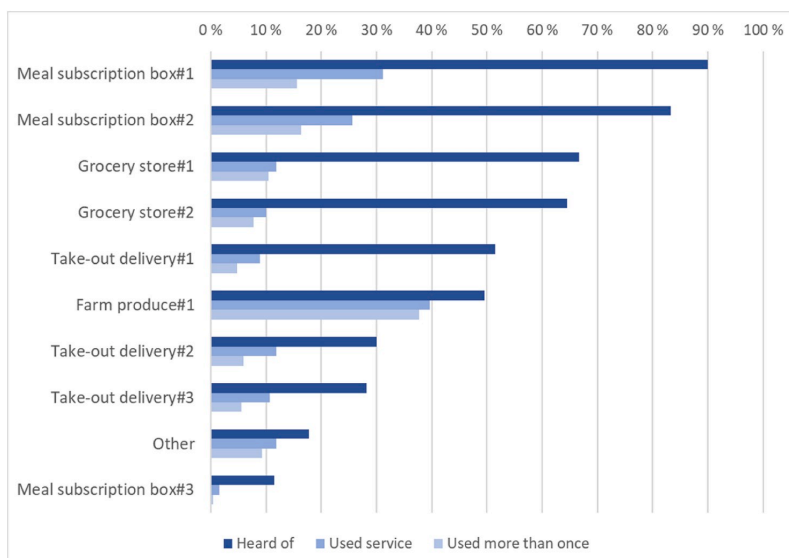


Fig. 2. Use of home delivery services for food and groceries (N = 270).

Table 3
How important are different aspects for use of home delivery of food and groceries. Not important = 1, very important = 5. Average values. (N = 214).

Saving time	Does not have to go to store	Less stress	Less planning	More to choose from	Higher product quality	Saving money	Other
4.03	3.98	3.86	3.71	3.05	3.02	2.69	2.46

Table 4
Time use for purchases in physical store, in minutes (N = 270).

	Average time use in grocery store (min)	Average time use to/ from grocery store (min)	Total
Used service once or never (n = 80)	29,36	9,9	39,26
Used service more than once (n = 190)	23,24	9,15	32,39
Total (N = 270)	25,05	9,37	34,42

4.2. Effects on consumer and travel behaviour

Respondents were asked to consider whether they visit physical food and grocery stores more often or more rarely since starting to use services for home delivery of food and groceries. As seen in Table 5, nearly two thirds visit physical stores less than before, whereas the rest does not experience any change (see Table 6).

Additionally, respondents reflected on whether their use of services for home delivery of food and groceries has changed their travel behaviour. Overall, use of such services mainly impacts the respondents' travels related to buying food and groceries. As reflected in Fig. 4, thirty-four percent believe these travels have changed with use of home delivery services.

Examining changes in travels related to buying food and groceries more thoroughly reveals that changes in travel mode are most often related to reduced use of car (fossil and electric) and increased walking, increased use of bicycle (electric and regular) and public transport. This finding suggests that, in this sample, use of services for home delivery of food and groceries is associated with more environmentally friendly

travel modes.

5. Discussion

5.1. Implications of survey results

This study explores the sustainability of e-groceries through the travel behaviour of e-grocery users. The results provide local authorities an idea of what to expect from increased online shopping and therefore allow them reflect on how trends of e-groceries and home deliveries could be incorporated into city planning.

As discussed earlier, the results show that the most commercially available services, such as the meal subscription boxes, are more familiar to the respondents and more widely used. Additionally, a significant number of respondents receive deliveries of local farm produce. This does not, however, reflect the usage of such services in the general

Table 5
Do you buy food or groceries more often or more rarely after starting to use home delivery services for food and groceries? (N = 190).

no longer visit physical store to buy food and groceries	0%
visit physical store significantly less frequent	18%
visit physical store more seldomly	46%
visit physical store as before	36%
visit physical store more often	0%
visit physical store significantly more often	0%

Table 6
What about your travel has changed when it comes to buying food and groceries? Respondents who have changed their travel behaviour on travels for buying good and groceries (N = 64).

	No change	More use	Less use	Net change
Car	21%	0%	79%	-79
Electric vehicle	80%	0%	20%	-20
Walking	63%	24%	13%	+11
Bicycle (electric)	71%	20%	10%	+10
Bicycle (regular)	68%	17%	15%	+2
Public transport	85%	5%	10%	+5
Taxi or transport service	92%	3%	5%	-2
Scooter or motorcycle	95%	0%	5%	-5
Other	95%	0%	5%	-5

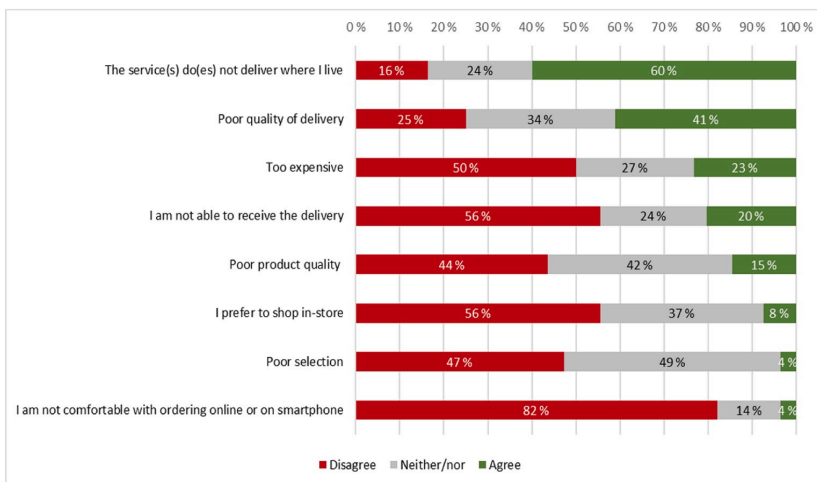


Fig. 3. To what degree do you agree with the following statements? Non-users of services for home delivery of food and groceries (N = 56).

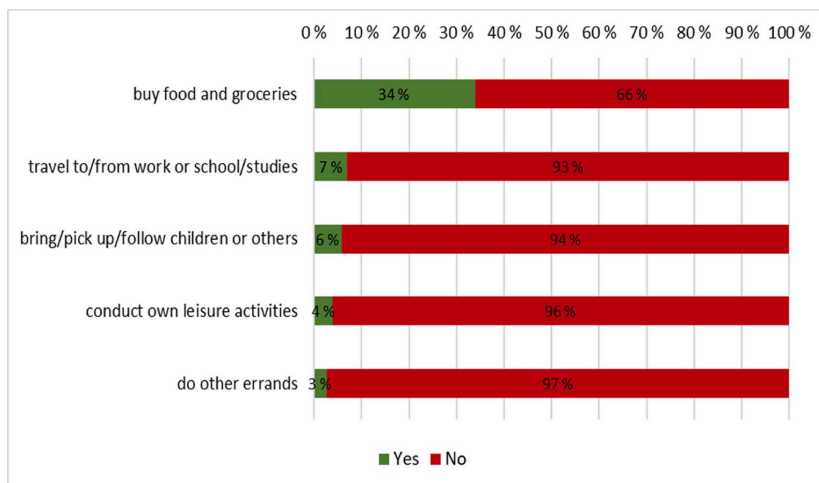


Fig. 4. After you started using services for home delivery of food and groceries, would you say the way you travel has changed (N = 190)?.

population, as this particular service is only available in central Norway and because the service provider has been active in distributing the survey to their customers. Consumers of farm goods account for about 20% in this sample and may particularly focus on the quality of food and supporting short travelled deliveries.

The results further show that the most important motivations for using services for home delivery of food and groceries are to save time and reduce stress and planning. It is particularly interesting that saving money seems to be a rather unimportant motivation. However, this result should be considered in relation to the skewness of the sample, as the sample holds significantly larger social and economic capital than the general population. Further, product quality seems to be of minor importance overall, although respondents having farm produce delivered consider product quality to be very important.

The perhaps most interesting results relate to changes in consumer and travel behaviour among respondents who use services for home delivery of food and groceries. Although 64% of users visit physical stores less than before, they still visit physical stores to supplement online purchases. The results therefore suggest that home delivery of e-groceries reduces personal travel but does not (yet) remove grocery travels altogether.

Unsurprisingly, use of services for home delivery of food and groceries impacts travels associated with purchasing food and groceries more than other travel. The results show that respondents whose grocery travels have changed because of home delivery services are more sustainable in their travel mode choices than before: respondents travel less with car (both regular and electric), and more as pedestrians or with public transport. This indicates that home delivery of food and groceries does have a potential for facilitating more sustainable personal transport.

The data upon which this study is based represent a particular sample of consumers. It is not representative for the general Norwegian population and is not necessarily representative for users of e-groceries in Norway. The last issue is difficult to assess, however, as there is no data available for making such a comparison. As such, this study provides a preliminary exploration of the relationships between e-groceries and personal travel, and prepares the ground for more comprehensive approaches with more sophisticated data analyses and greater sample representativity.

5.2. Implications for city planning and potential strategies

Because of the complexity in urban freight and city logistics, facilitating sustainability in last mile distribution is a challenging task. To devise potential strategies in city planning, local authorities need knowledge about urban logistics and freight transport, about the stakeholders in the supply chain and the connection between the local, regional and national dimension (Bjørgen et al., 2019; Browne et al., 2019a).

Fig. 5 illustrates the mutual influences between urban logistics, consumer behaviour and urban space, and suggests potential approaches to design the urban community which take into account the local context and the cities' mobility needs. The potential instruments range from strategical approaches to physical planning.

Given the complexity of city logistics, sustainable solutions require an integrated approach that involves stakeholders in all phases of planning; from the stages of problem identification, definition of alternative solutions, and effects assessment to implementation and evaluation (Bjørgen et al., 2018; Lindenau & Böhler-Baedeker, 2014). With increased knowledge about home deliveries and its impacts on travel behaviour it is easier for local authorities to include private companies in an early stage of the planning process. This requires, however, raising **city logistics and freight as a strategic issue** in city mobility planning and urban policies. To prepare for new mobility trends and define a holistic planning approach, facilitating soft travel modes and preventing unwanted effects, authorities need data, information and knowledge about both urban freight and logistics and individual travel and consumer behaviour. This is also discussed by Visser et al. (2014) and Petterson et al. (2018).

Knowledge about e-commerce and home delivery and their impacts is necessary to incorporate these trends in transportation and land use planning, in line with (Dablanc, 2019). This includes knowledge about the effects these trends have on consumer and travel behaviour, and the impact of home delivery on last mile delivery services in the urban logistics system (Petterson et al., 2018). Increased consideration of **integrated transportation and land use planning** is an essential strategy for local authorities (Banister, 2008; Lindenau & Böhler-Baedeker, 2014). It is important to be aware of the link between shopping areas, individual travel pattern and land use, e.g. consequences of facilitating shopping malls in rural areas which largely promote car-based shopping (Cui et al., 2015; Petterson et al., 2018). Planning for freight and logistics should be coordinated with infrastructure planning and land use

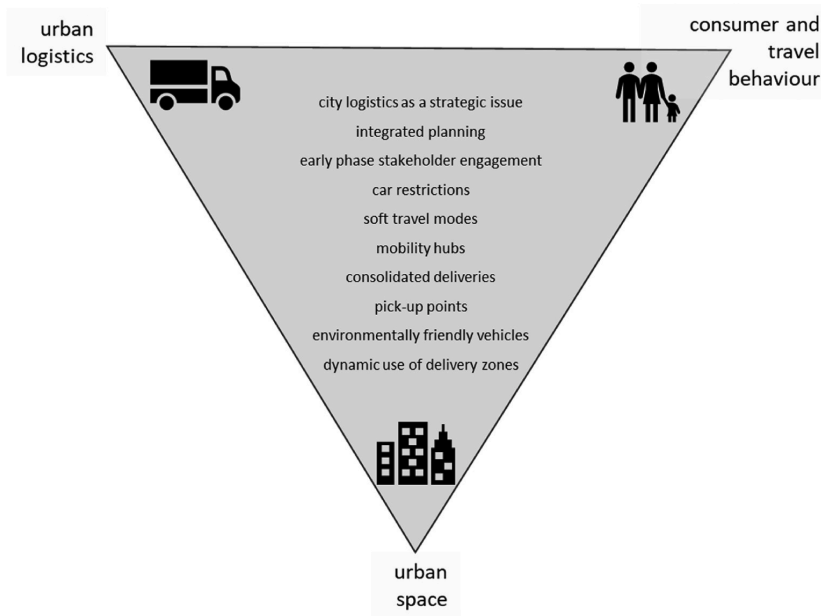


Fig. 5. Potential approaches to incorporate e-commerce in city planning.

decisions, due to globalisation and the increase of logistics activity at regional level (Behrends & Rogdrigue, 2019; Dablane et al., 2014). How to involve stakeholders in the planning process and what stakeholders to involve is the next step in facilitating early involvement in collaborative urban mobility planning, where dialogue, negotiation and trade-offs between stakeholders is essential (Bjørgen et al., 2018; Browne, Brettmo, & Lindholm, 2019b).

A key component in sustainable urban mobility is the introduction of private **car restriction** in planning principles, such as active parking restrictions, toll roads and facilitating car sharing. To achieve sustainable mobility (Banister, 2008) local authorities prioritise walking, biking and public transport, therein making it easier for inhabitants to conduct short journeys with **soft travel modes**. In line with Visser et al. (2014), this corresponds with reduced use of car (fossil and electric) and increased walking and use of bicycle (electric and regular) when using home delivery services.

Developing local centres and accommodating primary needs in **local mobility hubs** should be another strategy in city planning. Mobility hubs could for instance consist of services for personal travel, charging facilities, and depots for cargo distribution. Establishing neighbourhood pick-up-points such as post offices, stores and lockers, could also make it easier for logistics providers to coordinate and consolidate deliveries (Cherrett et al., 2012; Pettersson et al., 2018). To consumers, local mobility hubs, could provide flexibility in allowing them to collect their deliveries in combination with other trips and trip purposes.

The customer base is the most critical component in making home delivery more efficient. When more customers use home delivery services for groceries, the load factor and potential for optimising efficient routes for the logistic providers increases (Cherrett et al., 2012). Further, arranging **consolidated deliveries** to local hubs could make e-grocery more competitive and sustainable when allowing the end consumer to pick-up the grocery (Morganti, 2019; Visser et al., 2014). The local authorities may use public planning processes (i.e. spatial planning, building application processing) to instruct developers and property owners to include delivery facilities and solutions in constructing or renovating areas and buildings as stated in Vedeld et al. (2015) and

(Goodchild et al., 2018).

The local authorities may further seek to promote more **environmentally friendly vehicles** through regulatory incentives, such as toll roads and free charging stations. Given the rise of home deliveries, city logistics are likely to be at the forefront of the adoption of new vehicle technologies (Visser et al., 2014). The operation of home delivery services is very visible to consumers and take place in sensitive areas within cities. Promoting such vehicles both in city centres and residential areas would enable local authorities to support the European Union's aim of CO₂ free city logistics within 2030 (European Commission, 2011, p. 144). **Dynamic use of delivery zones and curb sides** in city centre may be another tool for facilitating efficient and sustainable urban freight and home deliveries as stated in Goodchild et al. (2018) and Goodchild and Ivanov (2018).

These potential instruments and strategies must be considered as part of policy mixes adapted to the context of the actual city to foster a fruitful mix of governance, planning and regulation for sustainable planning. Each city should create policy mixes which fits the city's needs and visions for urban mobility planning.

6. Concluding remarks and further research

This study has explored the use of services for home delivery of food and groceries and its implications for travel habits and city planning. As such, the study presents new knowledge on the relation between online shopping behaviour and personal travel behaviour. However, given the survey sample, the study provides little knowledge about the general prevalence of home delivery services for food and groceries in the population, nor who the users of such services are. Future research should therefore apply a broader scope for identifying and describing the population of users. Another relevant issue not explored in this study is time use. Although the study describes time savings to be a substantial motivation behind use of home delivery, it does not explore further how respondents make use of the time saved or if they shop less or more altogether.

This study has further raised several potential instruments for

facilitating sustainable last mile distribution through public planning, some of which directly relate to consumer behaviour and preferences. The potential for promoting sustainable last mile distribution through consumers should, however, be explored further. Interesting aspects that are not extensively addressed in the literature include influences from housing and household characteristics (density, dwelling type etc), use of new mobility solutions (i.e. car sharing) and demand for new delivery services in residential areas.

In turn, this relates to the interaction between urban space, consumption and managing freight flows for creating liveable cities. This should be further investigated and discussed with respect to how urban areas can be developed to accommodate growing city populations, considering new consumption and travel habits and pressures on land use and transport infrastructure. A comprehensive understanding of the complexity of city logistics makes it easier for local authorities to identify and apply instruments and create packages of policy tools which facilitate, limit or manage the distribution of e-groceries on different levels of regulation and for a stronger link between transport planning and land use.

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PAPER IV

How to build stakeholder participation in collaborative urban freight planning.

Cities



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How to build stakeholder participation in collaborative urban freight planning

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ABSTRACT

Although freight issues are often the subject of controversy within urban communities, urban freight stakeholders rarely participate in local planning processes. This paper studies how different criteria to ensure actor participation in collaborative processes are practised in urban freight planning in seven Norwegian cities. The authors link different criteria of actor participation to Arnstein's "ladder of citizen participation", and study if the collaborative urban freight arenas provide participants with enough power to affect the outcome of improved planning process for urban freight. Participatory observation of collaborative arenas in Norwegian cities, combined with interviews with participating actors, revealed that knowledge and consensus building allowed stakeholders to reach the fifth step on the ladder of participation. The findings suggest that city characteristics influenced what criteria were most important. One important finding was the need to introduce a tenth criterion 'political and planning anchorage', which seemed particularly important for private stakeholders' participation in collaborative processes. This finding may be of value to local authorities striving to enhance stakeholder participation and include both private and public stakeholder concerns in urban freight planning.

1. Introduction

To achieve sustainable and well-functioning cities the integration of infrastructure with aspects in land use, transport and mobility is crucial (Banister, 2008). However, planning for such well-integrated futures is often confronted with increasingly complex problems rooted in different societal domains, occurring at varying levels and involving a number of actors with dissimilar perspectives, norms and values (Loorbach, 2010). Therefore, legal requirements, community expectations and normative goals based on democracy and participation necessitate a collaborative approach to addressing urban problems (Raynor, Doyon, & Beer, 2018). Within this framework, urban planning struggle to integrate freight and logistics into city development (Cui, Dodson, & Hall, 2015). In Norway, urban transport planning focus on reducing private car travel and stimulate a mode shift to public transport, walking and cycling (Ministry of Transport and Communication, 2017). Planning principles such as integrated land use and transportation planning, compact cities, mixed land use, subsidised public transport, parking restrictions, and road tolls have been applied in order to reach such goals (Muller-Eie, 2018). While passenger transport has received considerable attention from the

scientific community and urban planners, less consideration has been given to urban freight (Browne, Allen, Nemoto, Patier, & Visser, 2012; Gatta, Marcucci, & Le Pira, 2017), which is the focus of this study.

Banister (2008, 2011) states that transport planning must involve all stakeholders potentially affected by or interested in a local environment in order to create an understanding of the rationale behind policy changes. The local authorities' capacity and knowledge regarding how to involve stakeholders in such planning is limited. However, studying the use of collaborative urban freight planning could change this (Bjerkkan, Bjørgen Sund, & Nordtømme, 2014; Bjørgen, Seter, Kristensen, & Pitera, 2019; Lindholm, 2013).

Two main approaches have been identified in planning for urban freight transport; (1) integrating urban freight into sustainable urban mobility plans (SUMPs) or other existing local plans (Fossheim, Andersen, Eidhammer, & Bjørgen, 2017) and (2) developing a separate sustainable urban logistics plan (SULP) (Ambrosino et al., 2015). With regard to urban freight this involves both private and public stakeholders from national, regional and local levels (Bjørgen et al., 2019; Cui et al., 2015). Private stakeholders include end consumers, and industry actors as logistic service providers (LSPs), retailers, private developers,

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entrepreneurs, property owners, unions, industry associations, and chambers of commerce. It is therefore important to understand public-private interactions and how to include industry actors in collaborative planning processes (Dablanc & Rodrigue, 2017). Building on Gunton and Day (2003), who identified key design and management criteria for citizen participation in collaborative planning, in this paper we study how these criteria may be practised in urban freight planning. To broaden the scope of collaborative planning, we apply the theory to a situation in which private stakeholders rather than citizens represent the main affected actors involved in the planning process. The relationships among highly diverse stakeholders add complexity to planning logistics activities since each group of stakeholders tend to act differently and seeks to have its own needs maximised (Cui et al., 2015; Macharis, Milan, & Verlinde, 2014). The benefit of understanding groups of stakeholders in urban freight planning is that solutions and policies to be implemented can be adjusted to the needs of those affected, thereby reducing the level of conflict, efficient land use, improved traffic flow etc. Thus, successful implementation of urban freight plans depends on the understanding and acceptance of the users involved in the implementation processes (Banister, 2011; Heitz & Dablanc, 2019).

Although integrated urban development requires planning methods that are adaptable, robust and responsive while also focusing on stakeholder participation (Lindenau & Böhler-Baedeker, 2014) to balance conflicting interests and ideas (Raynor et al., 2018), there has been little focus on whether the views of the private stakeholders are actually heard. To fill this knowledge gap, we therefore link the criteria for collaborative planning to Arnstein's ladder of participation (1969) to examine to what extent collaborative urban freight arenas in Norway provide participants with sufficient power to affect the outcome of improved planning process for urban freight. Increased knowledge about the relationship between those approaches may support innovative tools and methods to improve participation in the planning processes.

The article has the following structure; Norwegian planning system is described (Section 2), followed by a presentation of the theoretical framework of collaborative planning (Section 3), stakeholder participation and a literature review of the existing criteria for participation and the methods (Section 4). The criteria are analysed (Section 5) on the basis of empirical studies of seven Norwegian cities that have started a collaborative process in planning for urban freight before we discuss (Section 6) and conclude (Section 7) on our main findings. The focus of this paper is how to involve private stakeholders that represent the freight industry in urban planning.

2. The Norwegian planning system

In general, national planning systems are structures that support the modern state and its form of democracy (Pløger, 2001) with citizen participation as one of the core values. In Norway, participation in planning is enshrined in the Planning and Building Act (Ministry of Local Government and Modernisation, 2008). Local cities are responsible for municipal planning processes and ensuring their compliance with planning and building legislation with the purpose of creating attractive, liveable, and competitive communities where sustainable urban mobility is considered important.

Citizen participation in planning is given a high priority in the Norwegian Planning and Building Act in terms of general rules for consultations, publicity and information to ensure transparency, predictability and the participation of all affected parties (Ministry of Local Government and Modernisation, 2008; Ringholm, Nyseth, & Gro, 2018). As early as in the 1985 version of the Act, the Ministry of Environment emphasised that 'for the planning, it is an advantage that views can be identified as early as possible, avoiding the process coming to a standstill because vital points of view are presented too late in the process' (Ministry of Climate and Environment, 1985). Since the revision of the Act in 2008, the level of citizen participation has been with guidelines

for participation and tools for developing solutions adapted to local needs (Ministry of Local Government and Modernisation, 2014; Vedeld, Bergsli, Millstein, & Andersen, 2015).

Planning participation activities can be initiated by authorities or private actors. The role of market and industry actors has increased their influence in the planning system and in practical planning in the last years (Falleth, Hanssen, & Saglie, 2010). While local zoning plans in Norway were traditionally predominately devised by public authorities, currently approximately 90% of urban zoning plans are initiated by private developers (Falleth et al., 2010). In 2013, 67% of local politicians reported that they were always in contact with developers in early planning stages (Ringholm et al., 2018). Ringholm et al. (2018) state that detailed zoning plan processes tend to be non-transparent and inaccessible, even in cases where some level of participation is documented. The main contents of the plans are agreed upon by public planning officers and the market actors before the public hearing phase (Ringholm et al., 2018). Issues regarding urban freight and delivery solutions are not covered in the Norwegian Planning and Building Act, and guidelines on how to deal with related issues such as unloading/loading areas, street restrictions and parking access are not addressed. Furthermore, fragmented knowledge and responsibility on the local level, and little dedicated capacity to freight issues make it even more important that industry actors are included, know the steps in planning processes and participate in the early phases of current zoning plans (Bjørgen et al., 2019).

3. Participation in collaborative planning

3.1. Stakeholder involvement

From an overall mobility perspective, measures in freight transport are often subject to discussions, and included in the development and implementation of mobility plans (May, Kelly, & Shepherd, 2006) which combine high levels of cooperation, coordination, and consultation between different local, regional and national authorities. A transparent approach involving all of the relevant actors has to be followed in the development of the mobility plans to ensure user acceptance (Lindenau & Böhler-Baedeker, 2014; Morfoulaki, Mikiki, Kotoula, & Myrovali, 2015). Such stakeholder involvement in planning is often referred to as collaborative planning (Gunton & Day, 2003), an effective planning model that is more likely than other planning models to develop and implement a plan in the public interest. Collaborative planning is a communicative planning concept that emerged in the 1980s and 1990s and that is based on inclusive dialogues (Cullen, McGee, Gunton, & Day, 2010; Innes & Booher, 2015; Wondolleck & Yaffee, 2000). The approach consists on involving all those with a stake in the planning exercise (Innes & Booher, 2010) and to reach consensus agreements through negotiations (Bjørgen et al., 2019; Cullen et al., 2010).

Collaborative planning is increasingly used for dealing with social and political fragmentation, shared power and conflicting values (Innes & Booher, 1999). The goal is to create deliberative forums based on 'ideal speech situations' that aim to address uneven power relations (Habermas, 1987). Collaboration among competing stakeholders may expand possibilities without compromising their interests, so that the plans can move forward. The basic notion of collaborative planning is that the authority to develop plans is delegated to stakeholders who engage in face-to-face negotiations and long-term dialogue to reach a planning agreement and seek consensus solutions to common problems (Booher & Innes, 2002; Innes & Booher, 1999). Consequently, since levels of opposition and conflict can be reduced, collaborative planning can be more efficient than traditional planning processes that rely on expert decision-making with limited public consultation (Cullen et al., 2010). Designing and managing the collaborative process is important in order to achieve efficient planning and may be divided into three main phases. First, the pre-negotiation phase focuses on preparation, identifying potential stakeholders and making a framework according to time,

resources, principles, and leadership. Second, the negotiation phase may be, for instance, workshops to identify the stakeholders' roles and interests and map potential solutions. This is followed by discussions concerning options, moving towards consensus, and binding the parties to an agreement. Third, the post-negotiation phase achieves the approval of the agreement necessary for implementation and creating a monitoring process to evaluate the implemented solution. Collaborative processes and its phases need of course to be adjusted to local contexts with different challenges and opportunities, as well as with regard to city-specific implementation of solutions (Gunton & Day, 2003).

Advocates of collaborative planning argue that when stakeholders participate and are given responsibility to prepare and develop plans, the plans are more likely to be successful (Cullen et al., 2010; Innes & Booher, 1999). Stakeholder engagement and solving conflicting interests are the key to achieving robust solutions in planning. Stakeholder groups may seek the 'low-hanging fruit' first (i.e. the points on which everyone can agree) but they move on to more difficult issues that take months or years to work through (Innes & Booher, 2015). In addition, agreements reached through dialogue, experience and knowledge that multiple stakeholders bring to the table create greater support and successful implementation compared to plans developed without such collaboration. Stakeholder involvement is often time-consuming (Bjørgen et al., 2019), and furthermore, as pointed out by Ianniello, Iacuzzi, Fedele, and Brusati (2018) reaching agreement may be pointless if their results are ignored or even backfire, which can even create mistrust and hostility. Conflicts are seldom completely removed, although participants can agree on some ways to move forward together on the matters they care about without sharing the same values or interests (Innes & Booher, 2015).

3.2. Level of participation

To consider whether those who participate in collaborative urban freight planning are given power to affect the outcome of the planning process, the classic article on citizen participation by Arnstein (1969) provides a valuable framework. Participation is defined as the redistribution of power when decisions are being made, as indicated with reference to the ladder of citizen participation (Arnstein, 1969). The ladder starts with non-participation on the bottom level and develops until citizen control is reached at the top level, and consists of eight levels or steps named: manipulation, therapy, informing, consultation, placation, partnerships, delegated power, and citizen control. The ladder describes the transition from being informed to becoming involved in decision-making and acquiring real power to affect the outcome of the planning process (Arnstein, 1969; Ringholm et al., 2018). The ladder of participation has been critiqued for its focus on the power relations between authorities and citizens. Another critique is that Arnstein's (1969) notion of participation is devoid of context and, critically, has no means of making sense of the context in which the ladder is used (Collins & Ison, 2009). However, the idea of categorising the levels of participation may be useful as it allows employing a participatory approach regarding a city's ability to cope with involvement of different stakeholders or citizens. Arnstein (1969) argues that when analysing levels of participation, three questions need to be considered: (1) Who should be involved and given the possibility to participate? (2) How much influence and authority should stakeholders have? And (3) how will stakeholders' input form the decision-making process?

Several studies have focused on criteria for participation in collaborative planning (e.g. Gunton & Day, 2003; Innes & Booher, 1999). In this article, we emphasise the criteria that facilitate collaboration with private stakeholders. By combining criteria on user involvement from evaluations of collaborative planning with evaluations of public participation reported in the literature we identify nine criteria derived from theory that can be used to analyse collaborative planning processes.

The first criterion is that the collaboration ensures the *inclusion of all*

relevant participants (1) in the planning process. This means that all interests are represented and included, preferably early in the process. Hence, the selection and composition of stakeholders is important (Frame, Gunton, & Day, 2004; Gunton & Day, 2003; Innes & Booher, 1999; Laurian & Shaw, 2009; McCool & Guthrie, 2001). The second criterion and an important motivational factor for participation is that the collaboration *ensures commitment and keeps the participants interested* (2). The third criterion, which is an important determinant for participation in collaborative processes, is that local authorities need to *provide sufficient and well-organised management and leadership* (3). Clear ground rules, good leadership and effective process management can avoid or mitigate conflict and reduce political and organisational distinctiveness (Frame et al., 2004; Gunton & Day, 2003; McCool & Guthrie, 2001; Walter & Scholz, 2007). As a fourth criterion, for participatory purposes the collaboration needs to generate *well-defined and acceptable tasks* (4). The purpose of the collaboration and the tasks needs to be clearly defined, accepted socially and politically, and seen as real. Furthermore, the collaboration needs to remain flexible and adaptive to account for differing perceptions of problems and for building trust (Halvorsen, 2003).

The fifth criterion is *setting a time frame or restricting the time used* (5) for participation in the collaboration to ensure that more stakeholders are involved. It might also be important to provide realistic timelines because different stakeholder groups often have different perspectives in this respect. Sixth the *production and exchange of knowledge* (6), learning content and information is an attribute that can determine whether stakeholders find a collaboration important and decide to participate. Mutual learning and information can increase the overall knowledge, public awareness and agency awareness of public views (Faehnle & Tyrväinen, 2013; Frame et al., 2004; Innes & Booher, 1999; McCool & Guthrie, 2001; Walter & Scholz, 2007). As a seventh criterion, it is important to seek *consensus-oriented collaboration* (7) to ensure participation, especially after exhaustive discussions. Such consensus processes can result in structured decision-making and improved quality in such decision-making. For participation, and as the eighth criterion it is crucial to *reduce power imbalances* (8), inequities and asymmetries between stakeholders. Fairness and power sharing are important motivational determinants for participation. It is important to have equal opportunities in negotiation, shared respect and independence between participants (Laurian & Shaw, 2009; Margerum, 2002). In the collaboration, stakeholders must have similar levels of access to resources to generate a sense of ownership of the work (Gunton & Day, 2003; Halvorsen, 2003; Innes & Booher, 1999). The ninth criterion for participation is that ultimately the collaboration *aims to implement a particular plan, policy, or solution* (9). The collaborative process can commit to facilitating the implementation of a solution (Faehnle & Tyrväinen, 2013; Laurian & Shaw, 2009).

Participation refers to the integration of stakeholders, groups or citizens in planning processes and policy decision-making. The use of a collaborative approach is important in order to include all relevant stakeholders in the planning process and thereby insuring acceptance (Lindholm, 2010). Due to the complexities of urban freight transport (Bjørgen et al., 2019), involving multiple stakeholders with sometimes competing interests, the collaborative planning process acknowledges that stakeholders must engage in a negotiation process to seek mutually acceptable outcomes (Cui et al., 2015; Kin, Verlinde, Mommens, & Macharis, 2017; Lindenau & Böhler-Baedeker, 2014). To clarify whether the collaborative participatory planning actually provides the participants with sufficient power to affect the planning outcome, we have linked the ladder of participation to the criteria for collaborative planning. The connections between each of the nine criteria and their position on the ladder of participation are presented in Table 1.

Citizen control (step 8) is not achieved through collaborative planning; however, the willingness to implement joint solutions can be coupled with delegated power (step 7) on the ladder. The consensus-oriented criterion can be coupled with the level of placation (step 5),

Table 1

The connection between the criteria for collaborative planning and the level of citizen's participation.

No	Criteria for citizens participation	The ladder of participation (step level) Based on (Arnstein, 1969)
9	Aim to implement joint solutions	Delegated power (7)
8	Reduce power imbalances	Partnership (6)
7	Be consensus-oriented	Placation (5)
6	Produce knowledge, learning and information	Consultation (4)
5	Impose time restrictions	Informing (3)
4	Generate well-defined and acceptable tasks	Informing (3)
3	Establish leadership and well-organised management	Informing (3)
2	Ensure commitment and keep participants interested	Informing (3)
1	Ensure inclusion of all relevant participants	Informing (3)

whereas the reduction of power imbalances can be coupled with partnerships (step 6). The production of knowledge and information has some connection to consultation (step 4) on the ladder. The last five criteria relate to informing stakeholders or step 3 in the ladder. The first and second step, manipulation and therapy, are defined as non-participation and is therefore not relevant in this paper (Arnstein, 1969). The higher on the ladder, the deeper the level of the citizens participation, or in this case stakeholder participation.

Before we go on to analyse how these different criteria for collaborative planning are applicable in urban freight planning in Norway and whether the private stakeholders in this process are provided with sufficient power to influence planning outcomes, we will describe the data and methods used in this paper.

4. Methods

Urban freight is a crucial topic in the context of collaborative planning research because it affects private stakeholders in addition to citizens who all seek to use the same space and services which are of public interest. Hence, if the criteria for collaborative planning can be applied, the scope of this concept can be increased (Gerring, 2006).

Norway has a planning system that emphasises citizen participation and is thus a suitable context for investigating how the scope of participation in planning can be broadened to include private stakeholders in cases where they are the affected actors rather than citizens. Collaboration between authorities and private stakeholders has been emphasised by a number of other authors e.g. (Browne, Brettmo, & Lindholm, 2019; Lindholm, 2014). For the collaborative arenas studied in this paper, the national research project NORSULP (Sustainable Urban Logistics Plans in Norway),¹ which aims to facilitate local strategies for urban development through developing guidance for the establishment of urban logistics plans in Norway were used as a frame (Jensen, Fosshheim, & Eidhammer, 2020). The paper is mainly based on our participant observations in collaborative arenas in seven Norwegian cities in addition to meetings with the local authorities. These seven cities were chosen on the basis of being part of the NORSULP project, as this project seemed to be a particular useful frame for studying collaborative planning in urban freight. The seven cities were considered being a strategically sample by the researchers as key representatives of how urban mobility planning processes in the largest cities of Norway happen. Our observations of this work have provided us with information on how the theoretical criteria for collaborative planning are practised within the area of urban freight. The researchers were part of

the NORSULP project and participated in the local NORSULP workshops. The local authorities in respective cities, through the NORSULP project, invited private actors to hear their perspectives and to place urban freight and logistics on the agenda.

4.1. Data collection

The observations were made during one full-day collaborative workshop in each of the seven cities. It is relevant to reflect on our role in providing expertise in planning the workshops together with the local authorities as a part of the NORSULP project. Each local authority was responsible for deciding which stakeholders were invited, how the workshop was organised and whether to link the activity to other ongoing processes. The workshops were designed around two main sections. The first section focused on today's situations, barriers, and challenges. The second section was mainly a discussion among the participants about how to improve the situation and how to overcome the challenges. For the first section there was prepared presentations from different stakeholders.

We acknowledge that our role as researchers participating in the workshops, might have impacted the discussions. However, we participated as mainly as passive observers in order not to bias the results. To guide and supplement these observations, we used previously collected data from semi-structured interviews with twenty participating actors in three of these cities, as described in detail by Bjørgen et al. (2019). In the interviews, we identified what the industry stakeholders perceived as benefits from participating in urban mobility planning, how they would prefer to participate and how they experienced the current situation. Local authority representatives contributed similar reflections. To capture potential contextual differences, we selected stakeholder representatives from three of the seven NORSULP cities (Bodø, Trondheim, Drammen) that were geographically spread out across the country and varied in size. A summary of the data collection is presented in Table 2.

The analysis is based on seven Norwegian cities (Table 3); Bodø, Drammen, Kristiansand, Oslo, Stavanger, Tromsø, and Trondheim, all of which are typical cases of large to medium sized cities in Norwegian or small to medium sized European cities. All in all, we consider the seven cities to be representative for how urban mobility planning is conducted in cities in Norway.

The seven cities are quite similar in the sense that they have taken the same approach to collaborative urban freight planning, as a result of being a part of the NORSULP project, but somewhat different in other aspects such as geographical location and population size. By attending the NORSULP project the seven cities may represent the first stage of the process of integrating logistics and freight stakeholder's in urban planning. This made it possible for us to perform a comparison of the collaborative process, while keeping contextual differences in mind. However, given the explorative nature of this study we do not seek to generalise findings, but rather seek deeper understanding of how criteria for collaborative planning in urban freight can be seen as a valuable tool and means of understanding how to build stakeholder participation in collaborative urban freight planning.

In comparison to Europe the largest cities in Norway are small to medium-sized. The capital Oslo has almost 700,000 inhabitants whereas the other cities studied range from the city of Bodø with 50,000 inhabitants up to the city of Stavanger with 140,000 inhabitants (Statistics

Table 2
Data collection.

Year	Method	Cities	Stakeholders
2016	Semi-structured interview	3	20 (13 public and 7 private actors)
2017–2018	Participant observation	7	30–70 participants in each workshop

¹ www.norsulp.no.

Table 3
Characteristics of the case cities studied.

City	Bodø	Drammen	Kristiansand	Oslo	Stavanger	Tromsø	Trondheim
Population (2020) ^a	50.000	100.000	110.000	680.000	140.000	75.000	205.000
Geographical location	North	South	South	Capital	West	North	Mid
Estimated population growth 2040 (%) ^b	16,9	19,4	20,1	21,1	4	8,5	14
Relevant mobility/city program	Smart city Bodø	Living city Drammen	Mobility Kristiansand	Car free city life	Smart city Stavanger	Think Tromsø	Greener Trondheim

^a <https://www.ssb.no/en/befolkning/statistikker/folkemengde/aar-per-1-januar> (Statistics Norway, 2020).

^b <http://ssb1.maps.arcgis.com/apps/MapSeries/index.html?appid=59ccdd3707ef4a76bdab47e760e7674a>.

Norway, 2020). The estimated population growth towards 2040 varies among the participating cities and depends largely on the size of the region and the surrounding country. The urban density (population divided by urbanised land area) in Norwegian cities are in general low, around 1/3 of the typical European urban density. Urban density is critical in understanding the urban transport characteristics in any city. Low densities are associated with automobile dependence, and higher densities are associated with less automobile dependence and a greater role for public transport, walking, and cycling (Newman & Kenworthy, 2015). These cities being studied gives valuable input how to run collaborative planning processes involving private stakeholders and how to engage them. Thus, the findings presented are transferable to other European medium-sized cities as many urban freight issues seem to be quite similar across a majority of these cities (Browne, Behrends, & Woxenius, 2019).

5. The practice of collaborative urban freight planning

Using the identified criteria described in Section 3.2; Level of participation, we will in the following discuss how the criteria were practised in each of the ongoing collaborative planning processes on urban freight in the seven case cities.

Ensuring inclusion of all relevant participants (1) at an early stage in urban freight planning was widely discussed in the meetings with the cities' representatives, although none of the cities achieved this in terms of turnout in the collaborative arenas. Regardless of city context this criterion is challenging to achieve. Predefined groups of private and public stakeholders were invited; the workshops were overrepresented when it came to shop owners and city users, freight operators and authorities at different levels. The shop owner side was often represented through the local chamber of commerce or an interest organisation, which illustrates the challenge to achieving representation even when the issue is considered.

The collaborative urban freight arenas varied in how the criteria of ensuring commitment and keeping participants interested was practised (2). Overall, the invitation to participate in such a collaborative arena was in itself positively received among the private stakeholders. Each workshop was attended by 30–70 participants and they were open for further collaboration to achieve sustainable and efficient solutions for their city. It seemed that these actors' interest was sustained by both the information about ongoing plans and projects affecting them, and the prospects of creating a network of stakeholders. Some groups of actors, including citizens, receivers, and real estate developers, were less well represented, which might have introduced bias in the results. In the two cities, Drammen, and Oslo, where the local authorities had not decided on how to use the results, we observed that the commitment to urban freight planning was experienced as shallow by stakeholders.

Organised management and leadership (3) were practised by defining a suitable vision for the collaboration. The analysis revealed that an external facilitator was applied by a number of cities to contribute to the management. In Bodø, Drammen, Kristiansand, Stavanger, and Trondheim an external facilitator combined their competence as mediators with problem-solving methods, and integrated the knowledge held by public planners with the knowledge held by industry stakeholders.

However, having such expertise within the cities would probably have improved the collaborative process further, since this would have allowed authorities themselves to guide the discussions in preferred directions.

Explicitly defining the tasks (4) was practised among the seven cities with a structured invitation and clear agenda. Operating with well-known and clear targets in the collaborative arena influenced the private stakeholders to prioritise this workshop event. Achieving defined and acceptable tasks was done through prepared presentations and defined group discussions on issues to which the participants could relate. In addition, the planning agenda had time for open discussions that gave the stakeholders adequate opportunities for involvement.

The criterion of setting time restrictions (5) on collaborative urban freight planning was not practised in the seven cities. One reason for this may have been that the local authorities did not pay attention to time use as it was early on in the collaboration. Although it is well known that it is of great interest for the freight industry to have a predictable timeline with a defined date for ending the planning process. Another explanation may be that cities that plan for long time perspectives and private stakeholders that plan to achieve profit on a shorter time scale makes the time-restriction criterion difficult to accommodate.

The collaborative arenas, which were designed to facilitate deliberation among stakeholders, constituted a valuable opportunity for the production of knowledge, learning and information (6). Hence, the latter criterion was most often practised in all of the collaborative urban freight arenas. The participants in all the case cities expressed that the benefit was that the private stakeholders were given insights into public planning processes, while the public authorities gained insights into private stakeholders' needs, roles, and interests. Ultimately, this generated an increased willingness on both sides to continue the process.

Following from the above-mentioned criterion, deliberation among stakeholders can result in consensus building (7) between included stakeholders. However, the criterion of being consensus-oriented was less often practised in the seven cities than the production of knowledge, learning and information criterion. It was only two of the medium-sized cities, Kristiansand and Stavanger, which managed to ensure this criterion. In some of the collaborative arenas, particularly in the two largest cities, a divide between groups of private stakeholders and public stakeholders became visible. Hence, potential personal agendas and certain interests of the involved stakeholders existed rather than universal agreement.

As mentioned in Section 3.1; Stakeholder involvement, several interests are included and hopefully heard in collaborative planning. An important criterion is to reduce power imbalances (8) between participating stakeholders early in the planning process. Reducing the power of resourceful industry actors or interest organisations might provide opportunities for less resourceful stakeholders. Having all views represented is of major importance in collaborative planning processes, and with a few stakeholders dominating the collaboration, this perspective is reduced. Hence, it might also be a negative consequence as a result of the reduced inclusion of stakeholders or challenges in seeking consensus-oriented urban freight planning. The empirical findings suggest that this might be a bigger problem in larger cities, such as Oslo, as the interests represented there are potentially more diverse, and the

economic impact is often of greater importance compared with in smaller cities.

For private stakeholders to prioritise participation, it is important to aim to *implement joint solutions* (9). Their input in the collaborative arenas suggests that they tend to focus on specific solutions as for example mobility hubs, dynamic use of urban space or accessibility to curbs, rather than on overall planning. The observations indicated that planning for solutions rather than implementation was the focus among the authorities when initiating collaborative planning. Hence, the criterion of aiming to implement joint solutions as for example an urban consolidation centre was rarely practised in any of the seven cities. Specific solutions as evening and night deliveries are yet to reach local authority's attention, possibly due to limited knowledge and ownership of the freight and logistics situation locally and the topic of urban freight in general. The exception was Tromsø, Oslo and Stavanger, three cities with previous experiences in urban freight collaboration that shifted their attention from general planning to solutions. As in Oslo, these two city hubs^{2,3} are established lately in joint cooperation among the industry and the local authorities. It is worth noting that the studied collaborative arenas were in their start-up phase, which might explain why the focus has not been joint solutions.

Our observations led to the identification of an additional criterion: *the importance of political and planning anchorage* (10). This seemed to be an important criterion in collaborative planning when private stakeholders are the main affected actors. In six of the cities where this criterion was not practised, we observed that the stakeholders questioned the purpose of the workshop event. During the workshop we observed that participants expressed that political support and link to other ongoing processes, created an impression of political interest in their work. Thus, providing them with an incentive to increase their level of participation, due to that the effort and time use made a puzzle to the city planning. Politicians were only present among the stakeholders in Tromsø. Compared to the other case cities Tromsø is among the smaller cities and this workshop had a clear purpose of establishing a formal network compared to the other cities. The findings suggest that some criteria could be better accommodated at the collaborative arenas and that there were differences between the cities in how the criteria were used. These findings are summarised in Table 4.

In sum, our findings suggest that the criteria for collaborative planning were practised more often in the smaller cities, such as Kristiansand and Stavanger. In those cases, it may be easier to find common solutions through consensus building based on fewer conflicts. The complexity of the urban freight system is reduced in smaller cities because the numbers of interests represented, and competing activities are smaller. In larger cities, there is much at stake for the freight industry and larger economic consequences when reducing the opportunities for deliveries in a wider market, such as Oslo. The findings show that by facilitating interaction between private and public stakeholders, the collaborative planning process increased the acceptance of urban freight as an important part of local planning and that the context of the city influences which criteria are most important.

6. The participatory outcome of collaborative urban freight planning

Although the criteria for collaborative planning are more or less practised when the affected group consists of private stakeholders rather than citizens, they do not provide any information about whether this group of actors is provided with enough power to impact the outcome of the planning process for urban freight. The first five criteria for collaborative planning, together with political and planning anchorage, are

considered as information, whereby participants are given little power to affect the outcome and are therefore not discussed in this section. They are mainly important for organising the collaborative arenas and including affected stakeholders when planning for urban freight on a local level (Banister, 2011; Cui et al., 2015).

Our analysis revealed that through the *production of knowledge, learning and information* (6) participants in the Norwegian collaborative urban freight planning arenas achieved levels of participation characterised by information sharing and consultation through discussions and knowledge transfer. The broad involvement of stakeholders representing a wide spectrum of interests concerning the local city's development created an active arena for dialogue supporting positive relations and trust between actors that do not normally meet. We found that a more diverse group of actors was included in the consultations, which might have made the interests of marginalised or less resourceful actors heard, compared with consultations required by law in more traditional planning processes. The inclusion of a number of different urban freight stakeholders that are competitors was perceived as driver for participation among these stakeholders, as they saw the process as a means to acquire information about future plans. This is also an argument for targeting industry actors that might have limited resources to represent their case as new or for giving additional voices the opportunity to influence outcomes. Overall, the goal of mobility planning integrating personal mobility and freight is to ensure a good situation for society as a whole, which is better ensured when all of the above-mentioned actors participate in the planning process (Cui et al., 2015; Rodrigue, 2006; Visser, Nemoto, & Browne, 2014).

By aiming for *consensus-oriented* (7) planning through participation, private stakeholders with a stake in the planning exercise and an interest in negotiation are given the opportunity to advise and to be a part of the process. The power to decide on final outcomes is still kept within traditional arenas, but to a greater degree it relies on the participation of experts who represent the freight industry. Some of the Norwegian collaborative urban freight planning arrangements achieved placation, although in the majority of cases it was relatively less practised. Consensus-oriented collaborative planning in arenas was often practised by two of the seven studied cities, namely Kristiansand and Stavanger. The variety of stakeholder participation and the framing of the process towards consensus agreements resulted in an improved structure, better decision-making, and city-specific implementation of desired solutions (Bjørgen et al., 2019; Cullen et al., 2010).

At the level of partnership, participants are given some control and power over the outcome of the planning process for urban freight. They can negotiate, discuss and engage in trade-offs with traditional power holders on equal terms (Arnstein, 1969). However, we found there were obstacles to *reducing power imbalances* (8) between actors when industry was not fully involved in achieving this level of participation. None of the participants in the collaborative urban freight arenas often practised the criterion of reduction in power imbalances. There was a tendency for differences between industry actors to have an enhanced status in collaborative processes, since large and more traditional industrial actors sometimes presented their views as a united front to the other participants.

Of the seven cities the small to medium-sized cities seemed more open to innovation and, to a larger degree, more accepting of changes in urban planning. The industry actors in the small to medium sized cities had a more positive attitude towards the sharing of ideas and opportunities as example the establishing of a network arena in Tromsø. This situation can create obstacles to partnerships in that it can reduce the level of trust between participants. Hence, the selection and composition of stakeholders is important for reducing or even sometimes enhancing power imbalances between stakeholders in the urban freight and logistics field. Another reason for power imbalances might have been that local authorities had limited knowledge of urban freight, as found in previous studies (Bjerkkan et al., 2014; Bjørgen et al., 2019; Lindholm, 2013). This might mean that they were unable to distinguish lobbying

² <http://www.citylogistics.info/projects/evaluation-of-db-schenker-oslo-city-hub-lessons-learned/>.

³ <https://elskedeby.no/>.

Table 4
The use of criteria that determined stakeholder participation in the seven case cities.

No	Criteria	Bodø	Drammen	Kristiansand	Oslo	Stavanger	Tromsø	Trondheim
9	Aim to implement joint solutions	x	x	x	xx	xx	xxx	x
8	Reduce power imbalances	xx	xx	xx	x	x	xx	xx
7	Be consensus-oriented	xx	xx	xxx	x	xxx	xx	x
6	Produce knowledge, learning and information	xxx	xxx	xxx	xxx	xxx	xxx	xxx
5	Impose time restrictions	x	x	x	x	x	x	x
4	Generate well-defined and acceptable tasks	xxx	xx	xxx	xx	xx	xx	xxx
3	Provide sufficient and well-organised management and leadership	xxx	xxx	xxx	x	xxx	xx	xxx
2	Ensure commitment and keep participants interested	xx	x	xx	x	xxx	xxx	xx
1	Ensure inclusion of all relevant participants	xx	xx	xx	xx	x	xx	xx

Note: xxx – often practised, xx – less often practised, and x – rarely practised.

from expressions of common urban freight needs, thereby further increasing such imbalances. Since freight includes a diverse group of stakeholders, it is difficult to differentiate the various interests. Furthermore, some of the industry actors were insufficiently represented, which is worth questioning in future studies. The reason may be that the timing of the collaborative process was difficult or that they did not see the benefits of participation. Despite these challenges, and in line with (Ianniello et al., 2018), our findings suggests that participation itself is an important tool for balancing conflicting interests and goals between authorities and industry stakeholders.

In reaching the final two steps on the ladder of citizen participation, the local authorities in the studied seven Norwegian cities seemed unwilling to delegate power and provide citizens or, in this case, industry with control. The linked criterion, namely aim to *implement joint solutions* (9), was rarely practised in any of the cities, thus preventing that stakeholders would control some or all parts of the planning process. One reason not to delegate power may be that there is limited knowledge of the policy area within the city and that local authorities may be uncertain of the consequences of delegation and industry control, and another reason might be that private stakeholders have economic interests or self-interests in the outcome of local planning. This would require local authorities to consider carefully what is being expressed by whom and to keep control of the process to ensure that the majority of affected interests are heard. Although the highest level of participation has not yet been achieved in collaborative urban freight planning, participation still makes implementation easier and gives private stakeholders opportunities to influence outcomes rather than forcing them to accept an unforeseen development. Hence, as Innes and Booher (2010) put it, this is a way of coping with uncertainty.

7. Conclusions

In this paper, we have explored how nine key criteria for participation in collaborative urban freight planning are practised in an area in which the majority of actors are private stakeholders. Additionally, we have considered whether the collaborative arenas provide participants with sufficient power to influence planning outcomes. The findings presented here could be of value for European medium-sized cities as many urban freight issues, as for example the complexity and the challenges in last mile delivery, seem to be quite similar across a majority of these cities (Browne, Behrends, & Woxenius, 2019). The results demonstrate that involving stakeholders is one way in which one can improve the urban freight planning. For stakeholder engagement the results showed that collaboration, negotiation, and consensus building are potential viable strategies to overcome the complexity and often conflicting interests within urban freight.

The criteria that are most often practised and achieve participation in collaborative urban freight processes are the production of knowledge, learning and information, and sufficient and well organised management of the collaborative arena. Additionally, we found a tenth criterion, namely ‘political and planning anchorage’, which is rarely practised but through observations are considered important for the

participation of private stakeholders in collaborative planning. Comparatively, all cities seem to practise the production of knowledge and learning at the expense of time restrictions and implementing joint solutions in collaborative urban freight planning.

With regard to power given to stakeholders, they are mainly provided with informational power to influence planning outcomes. It appears that the Norwegian collaborative urban freight planning arenas have yet to provide stakeholders to participate. Overall, local authorities seem unwilling to delegate power to the industry in the implementation of joint solutions when including private actors. As they constitute a slightly different group of actors than citizens, such considerations might be necessary. Therefore, we suggest that, compared with citizen collaborations, there are other conditions for collaborative planning when including private stakeholders. When initiating such collaborative planning, both the reduction of power imbalances between the actors and the development of joint solutions seems important.

The findings from this study provide valuable insights into how the public sector can involve stakeholders and how to organise stakeholder participation when developing urban mobility plans that include both freight and personal mobility. The findings also enrich planning theory in terms of how to develop the collaborative planning approach in policy areas with a private emphasis but where the public sector is a key facilitator. Future research could investigate stakeholders’ perceptions of these collaborative processes or consider the different methodologies used by local authorities to initiate and organise collaborations with relevant stakeholders as early in the planning process as possible. This would help stakeholders to reach higher steps on the ladder of citizen participation.

The findings show that the local context and characteristics of each city influences which criteria are most important and on which step the stakeholder achieved on the ladder. However, the seven attended cities may represent the first stage of the process of integrating logistics and freight stakeholder’s in urban planning. Additionally, the study has contributed to compare planning processes between the cities and how it influences by the local context and other ongoing processes.

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Declaration of competing interest

There is no conflict of statement.

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